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DataCAD 24

DataCAD 24 focuses on faster high-volume drafting, more reliable drawing output, and easier access to the settings users need most. The release improves complex drawings with extensive XREFs, Symbols, GoTo Views, and Multi-Scale Plotting Sheets; expands graphic capabilities with gradient and tiled bitmap fills; and modernizes printing with an expanded Pen Table, redesigned printer settings, and integrated DataCAD PDF Direct output.

Together, the XREF Tree, All Program Settings, PolyCleanup macro, expanded masking options, repair enhancements, and new configuration settings make DataCAD 24 easier to customize, diagnose, and manage across day-to-day production work.

DataCAD 15 through 24 share the same drawing file format. However, you must use the **Save As** command in the **File** menu to save files backward to older version formats (11 through 14).

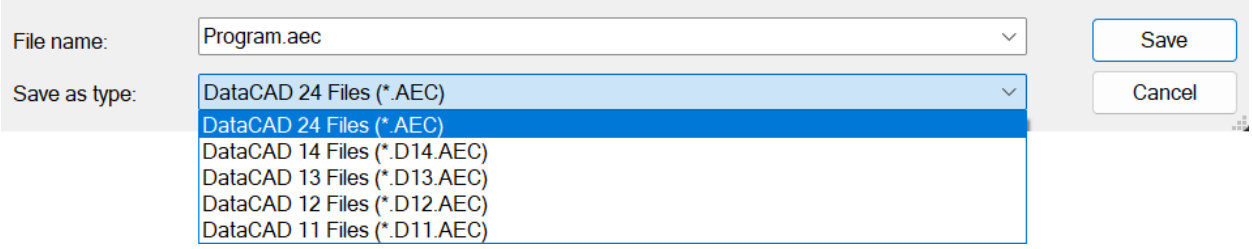


Figure 24.1: File, Save As Dialog

Large Drawing Performance

DataCAD 24 includes significant performance improvements for large and complex drawings that make extensive use of XREFs, Self-XREFs, clipped XREFs, clipped Symbols, Symbols with Layer Control, GoTo Views, and Multi-Scale Plotting Sheets.

In drawings that contain many repeated references, DataCAD now reduces redundant processing of clipping extents, layer visibility, reference calculations, and related drawing data. These optimizations are especially noticeable in drawings with hundreds of self-references that use clipping and GoTo View linking.

Operations that previously could take several minutes or more may now complete in seconds, depending on the drawing.

The performance of large drawings has been improved in the following areas:

- Opening files
- Closing and saving files
- Regenerating the display
- Displaying GoTo Views
- Opening the XREF Manager
- Entering and exiting the Print menu
- Displaying Multi-Scale Plotting Sheets
- Binding Multi-Scale Plotting Sheets
- Processing symbols with layer control enabled

For users managing large project files, these under-the-hood changes can significantly reduce wait time during common production tasks.

General Performance

Mouse Wheel Zoom has been updated to be smoother and more responsive to scrolling and direction changes.

The portion of the display pipeline that handles TrueType text has been optimized for faster redraw of font outlines.

Expanded Imaging Enhancements

In this major update, DataCAD's graphics pipeline has been further enhanced to support greater versatility in construction and presentation documents.

Gradient Fills

Gradient fills blend two colors and opacity levels across a boundary. Sixteen presets are available: Horizontal, Vertical, Diagonal 1, Diagonal 2, Horizontal Center, Vertical Center, Diagonal Center, Diagonal Center 2, Left, Right, Top, Bottom, Top Left, Top Right, Bottom Left, and Bottom Right.

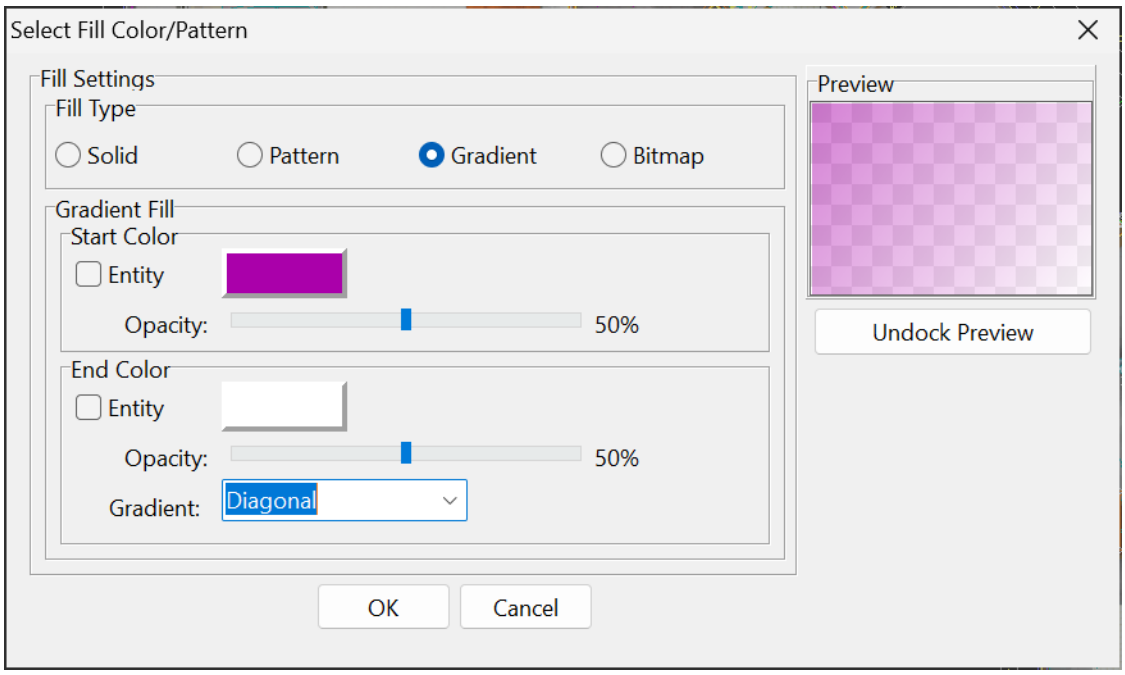


Figure 24.2: Solid, Pattern, Gradient, and Bitmap Fill Dialog

Note: Gradients applied to filled entities should round-trip between the current and older versions of DataCAD. In older versions, the gradient will appear as a solid fill. If the entity's fill properties are edited in an older version, the gradient will be reset to a solid fill.

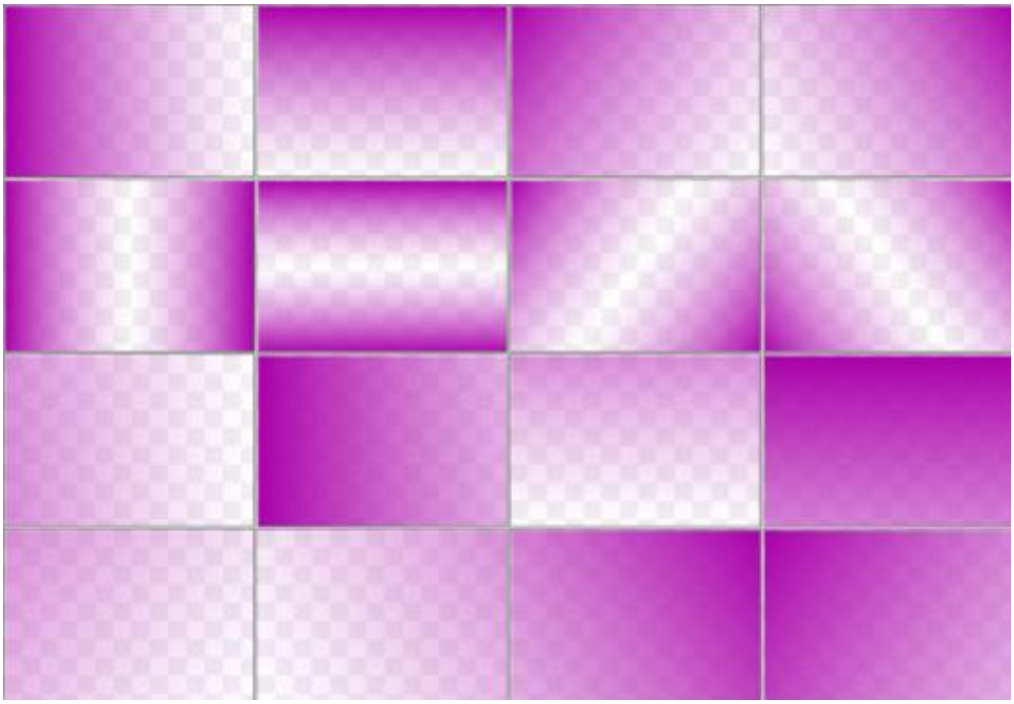


Figure 24.3: Gradient Fill Types

Tiled Bitmaps

Bitmap fills can now be tiled at a user-defined size, allowing an image to repeat across a boundary like wallpaper at the interval you specify.

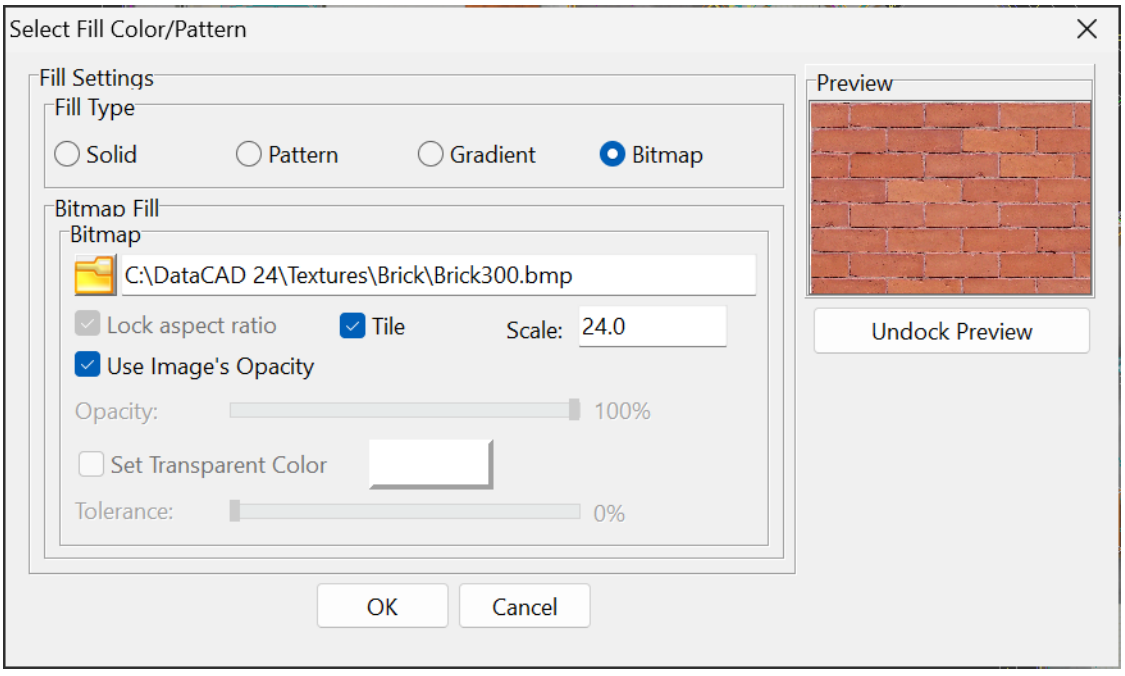


Figure 24.4: Enhanced Fill Settings Dialog

Note: Tiled bitmap fills should round-trip between the current and older versions of DataCAD. In older versions, the image will appear as a single bitmap rather than a tiled bitmap. If the entity's fill properties are edited in an older version, the fill will be reset to a single image.

As with hatch patterns, you can lock the origin, angle, and scale of a tiled bitmap fill. Origin makes the pattern move with the entity; Angle makes it rotate with the entity; and Scale makes the tile size change when the entity is scaled.

Enhanced Fills for TrueType Text and Smart Wall Cavities

Enhanced fill properties can now be applied to TrueType text and smart wall cavities.



Figure 24.5: Smart Wall Filled with Tiled Bitmaps



Figure 24.6: TrueType font filled with semi-transparent, gradient, and bitmap fills

Rotate Bitmaps Directly in the Drawing

When inserting a bitmap, toggle on Lock Angle so the image rotates with the entity when the entity is edited.

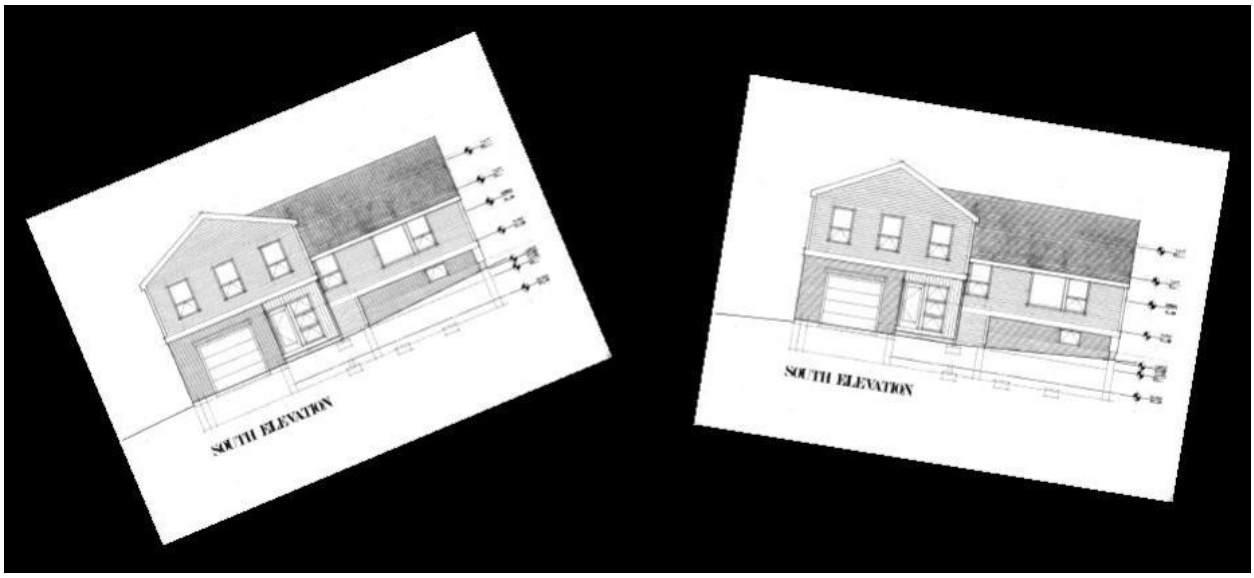


Figure 24.7: Bitmap Filled Entities Rotated in Drawing



Figure 24.8: SPB Fill Options Menu

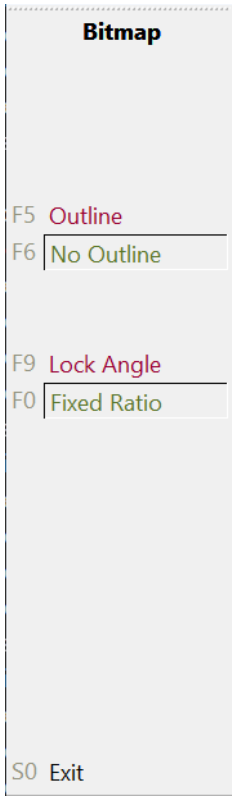


Figure 24.9: Insert Bitmap Menu

Printing Enhancements and Improved PDF Creation

These updates give users more control over printed and PDF output while reducing reliance on external drivers, hidden configuration files, and older batch-only workflows.

Pen Table Supports 255 Pens

The Pen Table can be configured for more than 15, and as many as 255 pens. From **All Program Settings**, set **Pen Table Dialog : Max Pens** to any value from 15 up to 255.

Note: The pen table file format has not changed. Pen 0 and Max Pens + 1 are non-print pens.

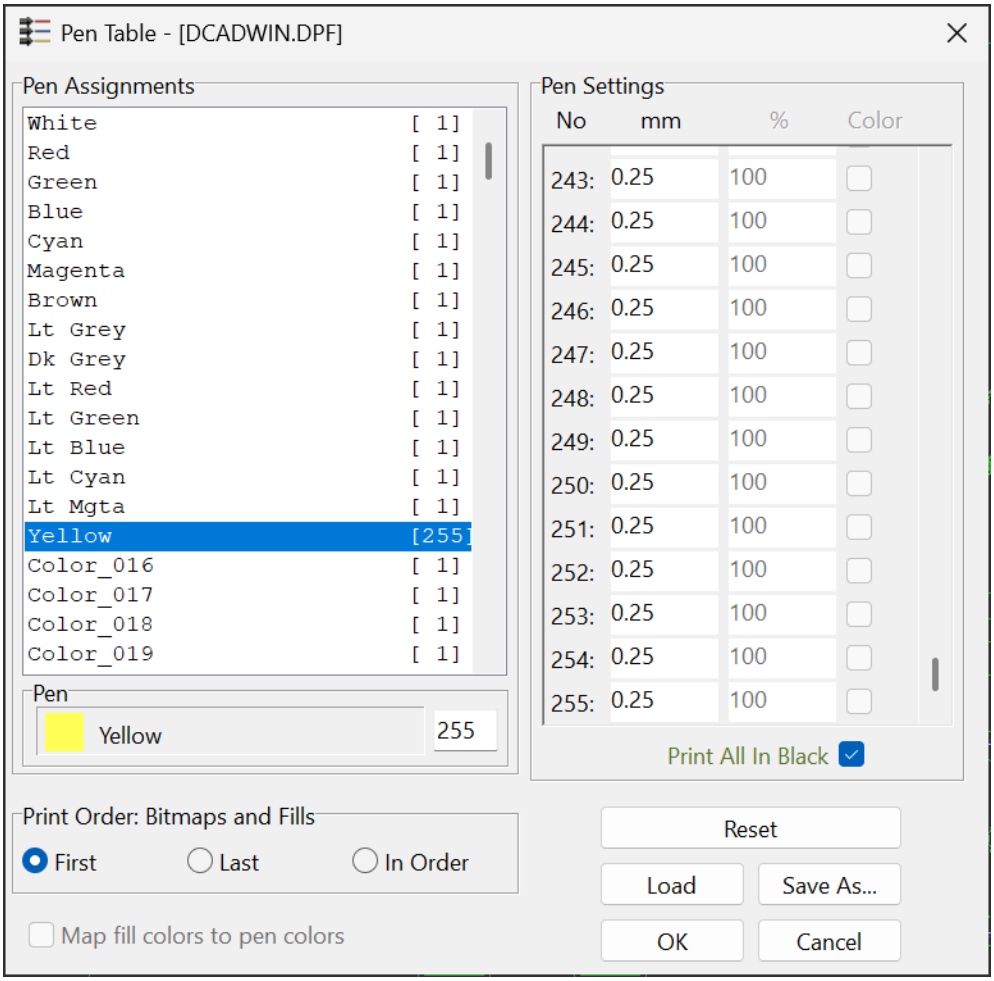


Figure 24.10: Enhanced Pen Table Dialog

Revamped Printer Interface

DataCAD's printing interface receives a major upgrade in this release. The Printer Settings dialog now provides direct access to the properties of the selected device driver and lets you set the output resolution in dots per inch (dpi).

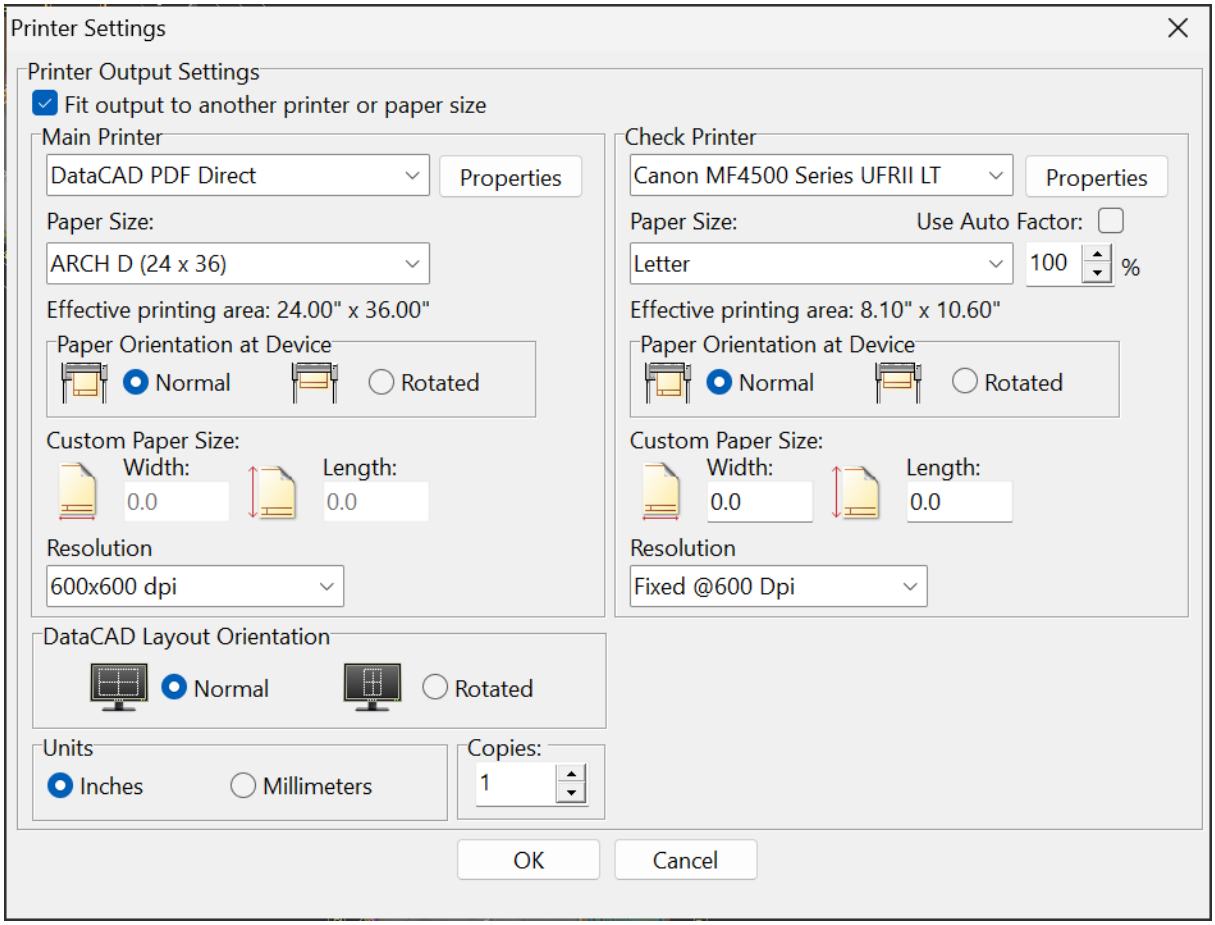


Figure 24.11: Redesigned Printer Settings Dialog

DataCAD PDF Direct

DataCAD 24 includes a built-in PDF creation interface called DataCAD PDF Direct. Select this printer to control PDF output directly in DataCAD without relying on a third-party PDF driver.

When you open a drawing created prior to DataCAD 24, DataCAD checks whether the printers saved with the drawing are still available. If a saved printer is unavailable, DataCAD automatically substitutes DataCAD PDF Direct. The first time you enter the Print menu, DataCAD displays a summary of the changes.

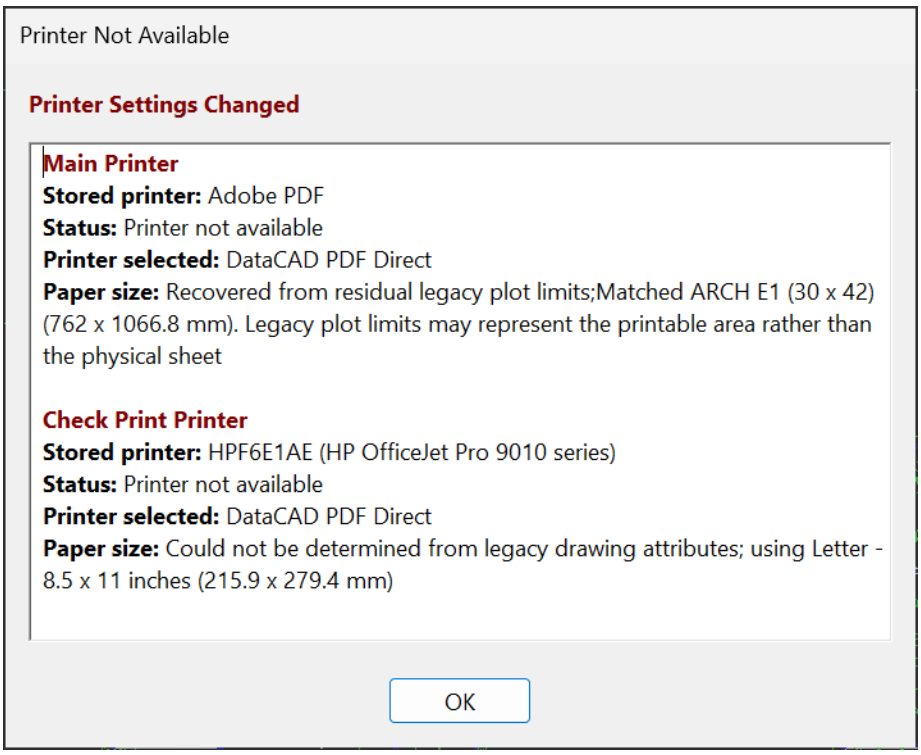


Figure 24.12: Printer Not Available Summary

DataCAD attempts to preserve the original paper size using the best information available in the drawing:

1. If complete paper information was saved, DataCAD matches the stored physical dimensions to a DataCAD PDF Direct paper size.
2. If an exact named size is unavailable, DataCAD creates a custom paper size using the recovered dimensions.
3. For older drawings, DataCAD examines legacy custom dimensions and saved plot limits.
4. If no reliable dimensions remain, DataCAD uses the default PDF Direct paper size, normally Letter.

Recovered paper dimensions are normalized so the short edge and long edge are stored consistently. The drawing's saved layout orientation then determines whether the Quick Layout preview is horizontal or vertical.

The notification identifies:

- The unavailable printer.
- The replacement printer.
- Whether the paper size was matched, recovered as a custom size, estimated, or could not be determined.

- Any limitations affecting the recovered printable area.

Because older drawing formats did not always store printer margins or Check Print paper dimensions, the recovered layout may not exactly match the original printer. DataCAD PDF Direct uses the full physical sheet as its printable area.

The following dialogs are used to customize PDF output and these settings are saved on a per-drawing basis.

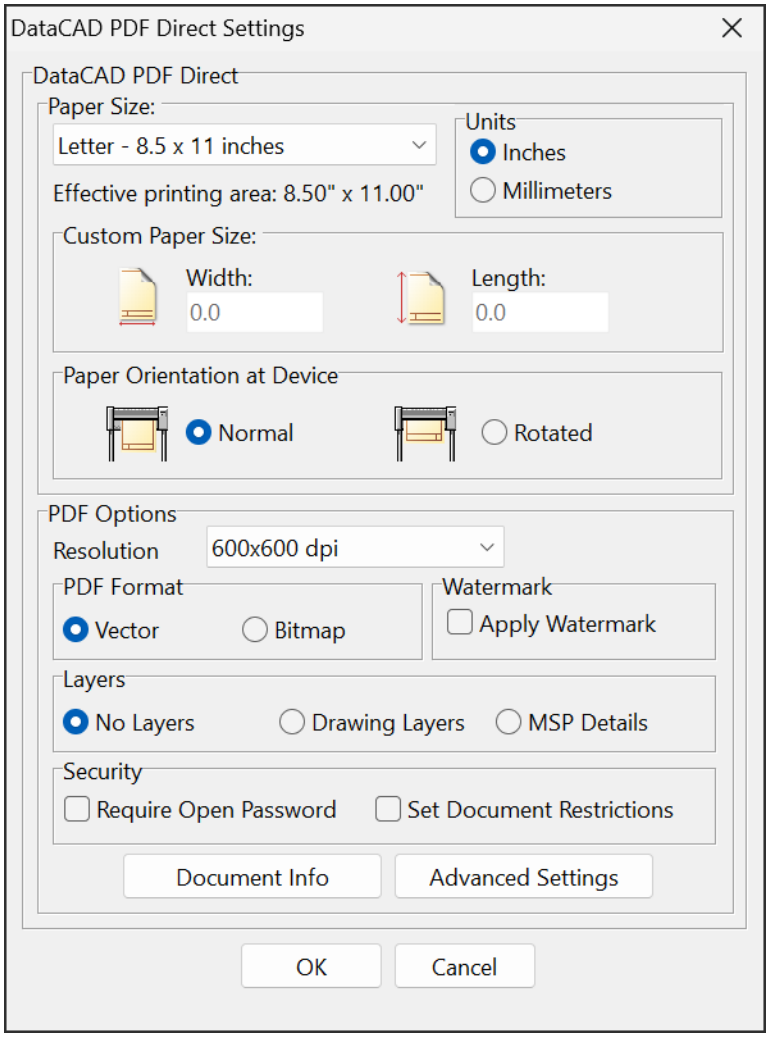


Figure 24.13: New DataCAD PDF Direct Settings Dialog

DataCAD PDF Direct provides a full complement of standard English and metric paper sizes. Output resolutions range from 72 to 4,800 dpi.

The main PDF Direct settings are grouped by output goal: choosing the file format, adding watermarks, preserving layers, applying security, setting document information, and using advanced troubleshooting controls.

PDF Format

Previously, the selected printer driver determined DataCAD's PDF output format. With DataCAD PDF Direct, you can choose Vector (line-based) or Bitmap (raster) output. Bitmap output can be useful when you want to limit the editability of preliminary or submitted drawings.

Watermark

Previously, the watermark feature was only available via Batch Plotting and File, PDF Watermark and the settings were only accessible by editing the DCADWIN.ini file. Now you can add a watermark from the Print menu directly and customize its properties from within your drawing. See the Watermark Settings dialog below.

Layers

Previously, you could create PDF layers from drawing layers or Multi-Scale Plotting details only through Batch Plotting or Print Preview. You can now set this option directly in the Print menu.

Security

Previously, you could only add passwords and document restrictions to PDFs via Batch Plotting or via the File, PDF Security menu. Now you can establish these options directly from the Print menu. See PDF Restrictions dialog below.

Document Info

Previously, document info was added automatically based on settings that were only accessible by editing keys in DCADWIN.ini. Now you can customize these fields on a per-drawing basis with DataCAD PDF Direct. See PDF Information Settings dialog below.

Advanced Settings

The Advanced Settings are intended primarily for support and troubleshooting. Most users should leave the defaults unchanged, with one practical exception: Write TrueType (not vectors) can preserve searchable text in PDFs, and Embed Fonts can help custom fonts display correctly for recipients who do not have them installed.

PDF Watermark Settings

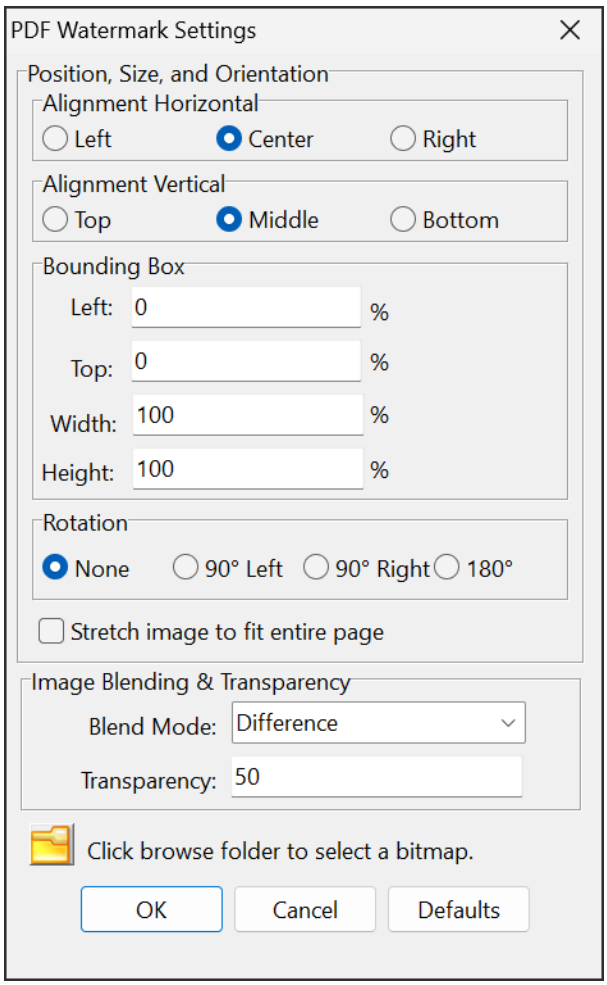


Figure 24.14: New PDF Watermark Settings Dialog

Image Align Horizontal
Sets the horizontal alignment of the image inside the bounding box. You can set the horizontal alignment to either Left, Center, or Right.

Image Align Vertical
Sets the vertical alignment of the image. You can set the vertical alignment to either Top, Middle, or Bottom.

Bounding Box
Left
Sets the left edge of the bounding box (in percent of the page) that contains the image. A value of 50 will put the left edge of the watermark at the middle of the page.

Top
Sets the top edge of the bounding box.

Width
Sets the width of the bounding box (in percent of the page) that contains the image. A value of 50 will set the width of the image box to half the width of the page.

Height
Sets the height of the bounding box.

Rotation
Set the orientation of the image as you would like it to appear on the page.

Stretch image to fit entire page
Use this option to automatically fit the image as large as possible within the page extents.

Blending & Transparency
Blend Mode
Can be set to one of the following values: Normal, Multiply, Screen, Overlay, Darken, Lighten, ColorDodge, ColorBurn, HardLight, SoftLight, Difference, Exclusion, Hue, Saturation, Color, or Luminosity.

Transparency
Sets transparency from 0 (completely opaque) to 100 (completely transparent).

Watermark Image
Click the folder icon to select a bitmap to use as the watermark.

PDF Information Settings
The PDF Information Settings dialog can be used to set the Title, Subject, Author, Keywords, and Creator of the document. The producer is DataCAD PDF Direct.

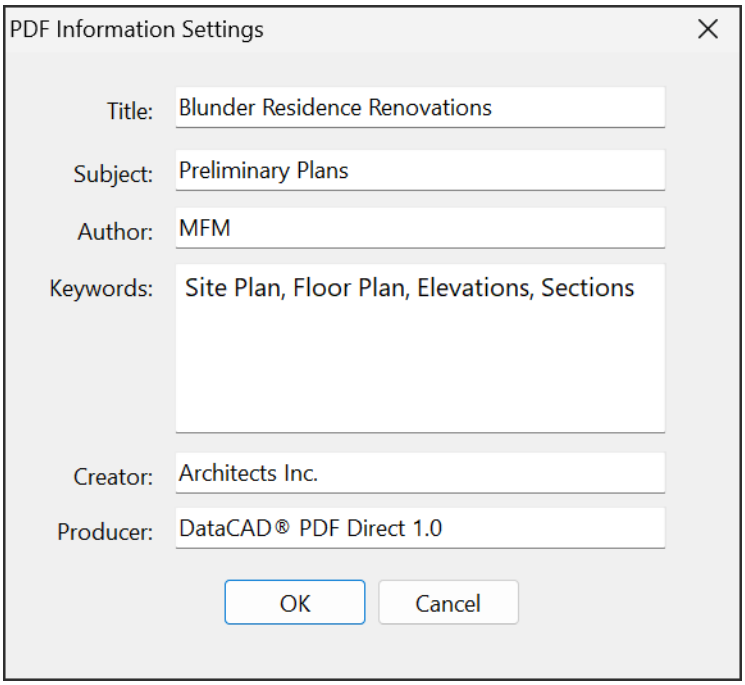


Figure 24.15: New PDF Information Settings Dialog

DataCAD PDF Direct Advanced Settings

Write TrueType (not vectors)
Check this option to add font names to the document instead of vectorized characters.

Embed Fonts
Check this option to embed font definitions in the document. This will increase the size of the document. Note: Not all fonts allow embedding. If you are using standard Windows fonts, embedding fonts is unnecessary.

Enable Compression
Compression is enabled by default to minimize file size; disable it only when troubleshooting.

Buffer Commands
For best performance, command buffering is enabled by default. Disable it only for troubleshooting.

Reload Properties On New Stream
This setting helps maintain reliable graphic stack structure and should remain enabled unless support recommends changing it.

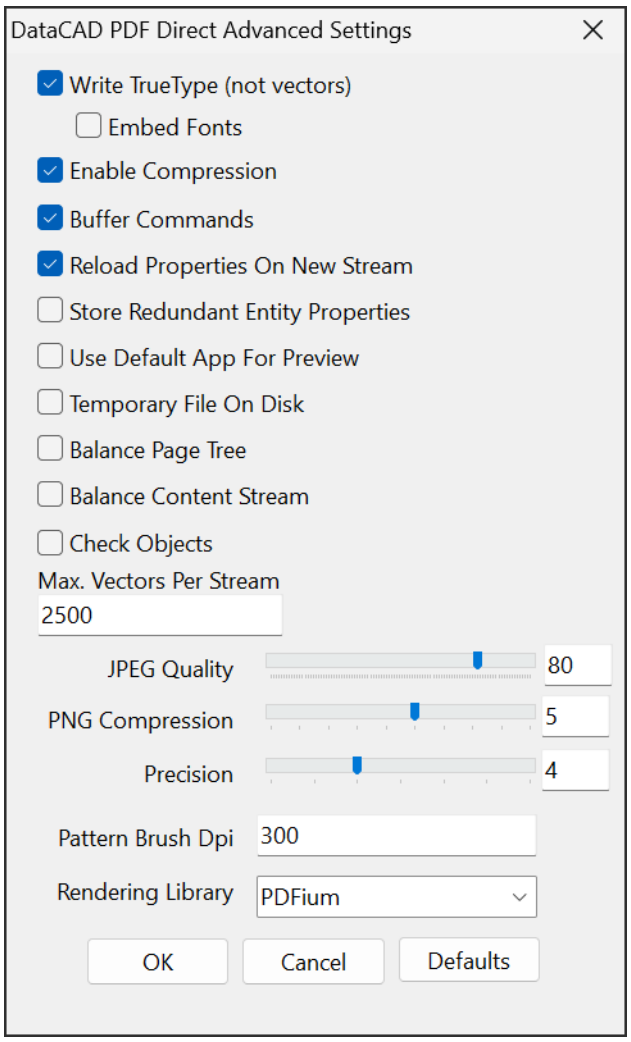


Figure 24.16: New DataCAD PDF Direct Advanced Settings Dialog

Store Redundant Entity Properties
Enabling this option increases the file size and the time required to generate the document. Enable it only for troubleshooting.

Use Default App For Preview
Check this option to preview the PDF in your default viewing application. Otherwise, DataCAD's built-in PDF Preview is used.

Temporary File On Disk
Temporary files are normally maintained in memory; enable disk storage only when troubleshooting.

Balance Page Tree
This option applies only to multi-page documents. Enable it only for troubleshooting.

Balance Content Stream
This option should only be used if the graphic stack is being improperly formatted.

Check Objects
For troubleshooting purposes. This process may take some time with large files and can consume large amounts of memory.

Max. Vectors Per Stream
The default value should be optimal. Only change this for troubleshooting purposes.

JPEG Quality
The default value of 80 is a good balance between size and quality. This applies to 24 bit images without transparency.

PNG Compression
The default value of 5 is a good balance between size and quality. This applies to 32 bit images that can have transparency.

Precision
The default value is a good balance between file size and accuracy. A higher number may cause objects and graphics to be more accurately positioned but will increase the file size.

Pattern Brush Dpi
Sets the resolution of pattern brushes.

Rendering Library
PDFium is the default rendering library and should be changed only when troubleshooting.

PDF Restrictions

Note: See PDF Restrictions in chapter 23 for more information.

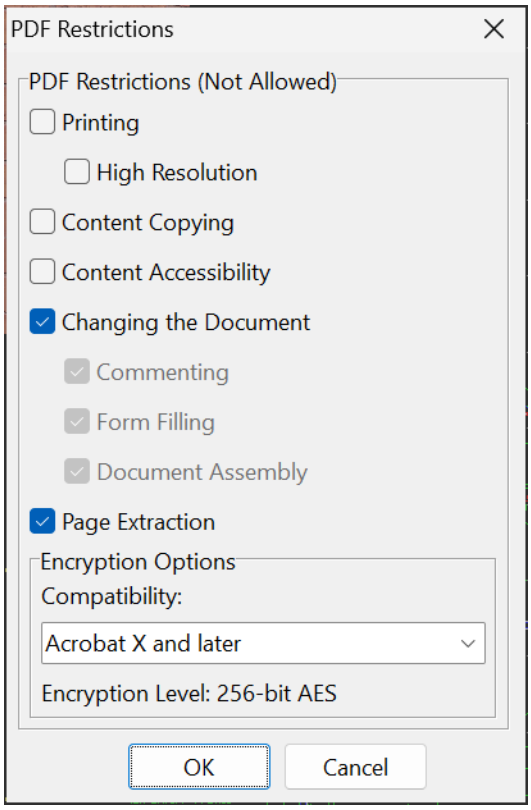


Figure 24.17: PDF Restrictions Dialog

Smart Wall Associations

When performing non-Copy or And Copy editing routines on smart walls (i.e., Move, Rotate, Mirror, and Stretch), associated doors, windows, and openings will automatically transform with the wall. New Associations are enabled by default. You can disable this behavior by setting the New Associations key in the [Smart Walls] section to False.

Note: Smart entities require additional overhead because they are dynamically generated. Changing them also adds records to the Undo / Redo system, so performance may be slower in larger models.

XREF Tree

A new XREF Tree tool displays the reference hierarchy of the current drawing, making nested XREF relationships easier to understand and troubleshoot.

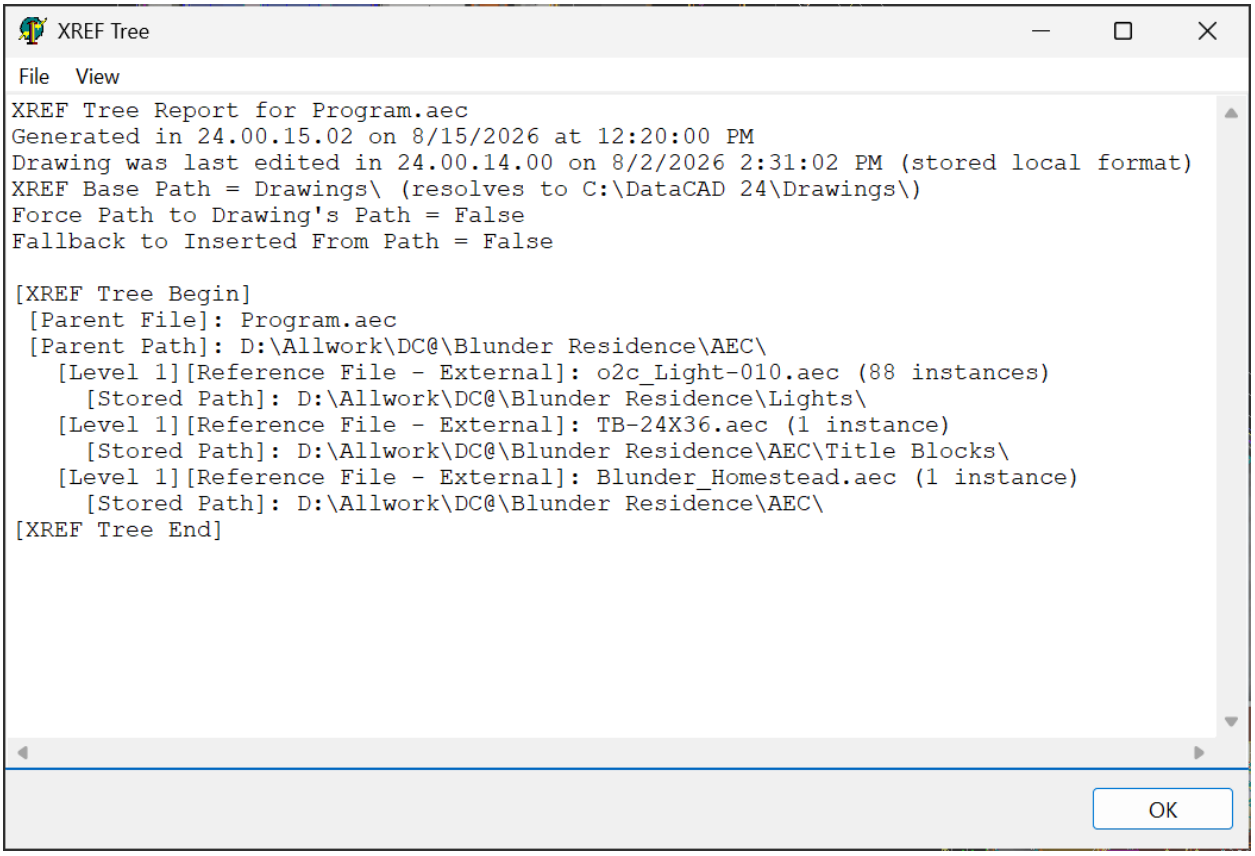


Figure 24.18: New XREF Tree Report Dialog

Automatic Screen Calibration

The scaling of the drawing form is now automatic. DataCAD queries the properties of your display and draws 1:1 at the current scale. You can customize the settings by unchecking Automatic in the Screen Calibration Dialog.

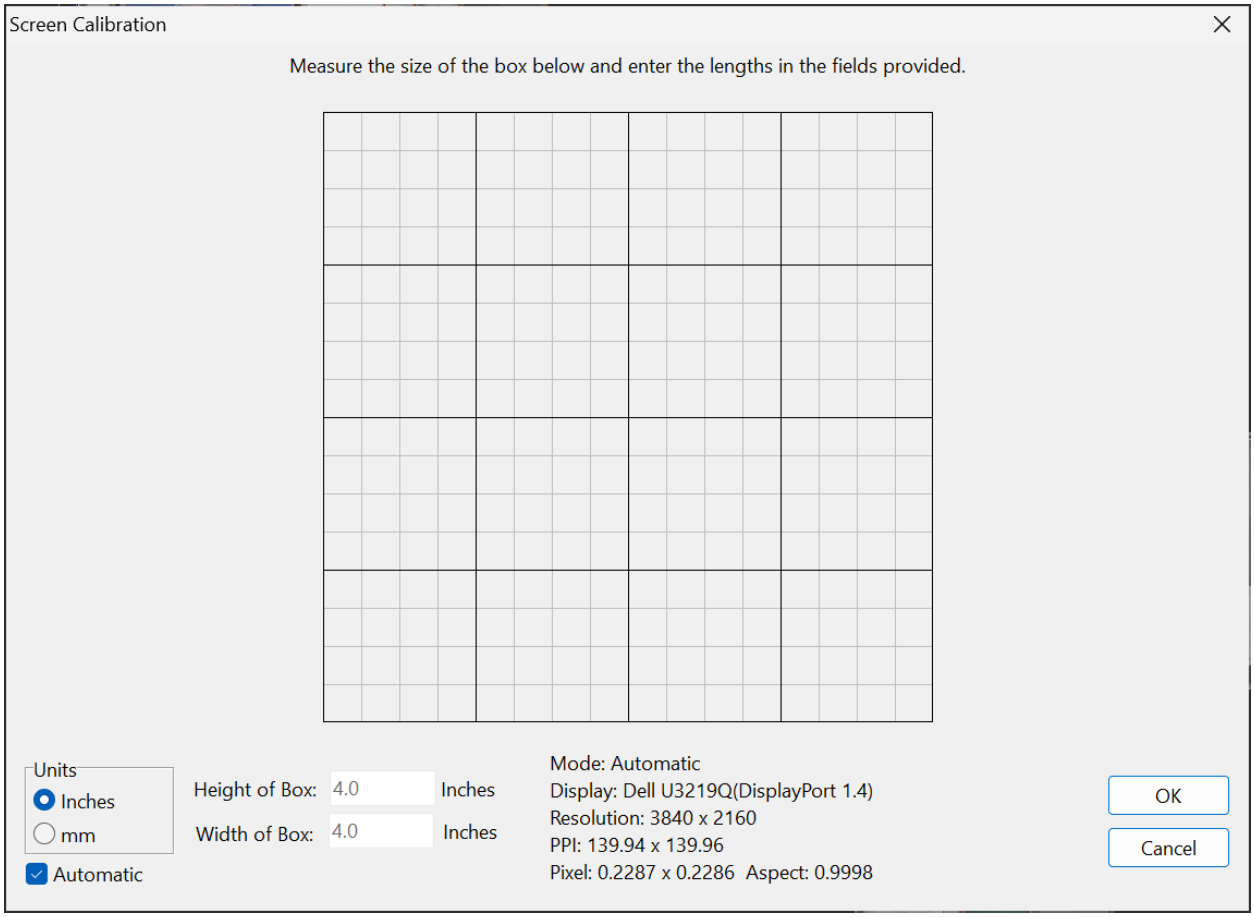


Figure 24.19: Updated Screen Calibration Dialog

Drawing Repair Enhancements

Repair Dialog Additions

The drawing repair logic has been updated to be more fault tolerant when evaluating corrupt data. Previously, invalid data identified as a deletable offense was added directly to the "do you wish to delete" list. The evaluation of invalid drawing data now includes a "can repair" pass first, so fields that can be repaired by resetting them to zero or a default value are updated before the entity is sent to the final validation pass.

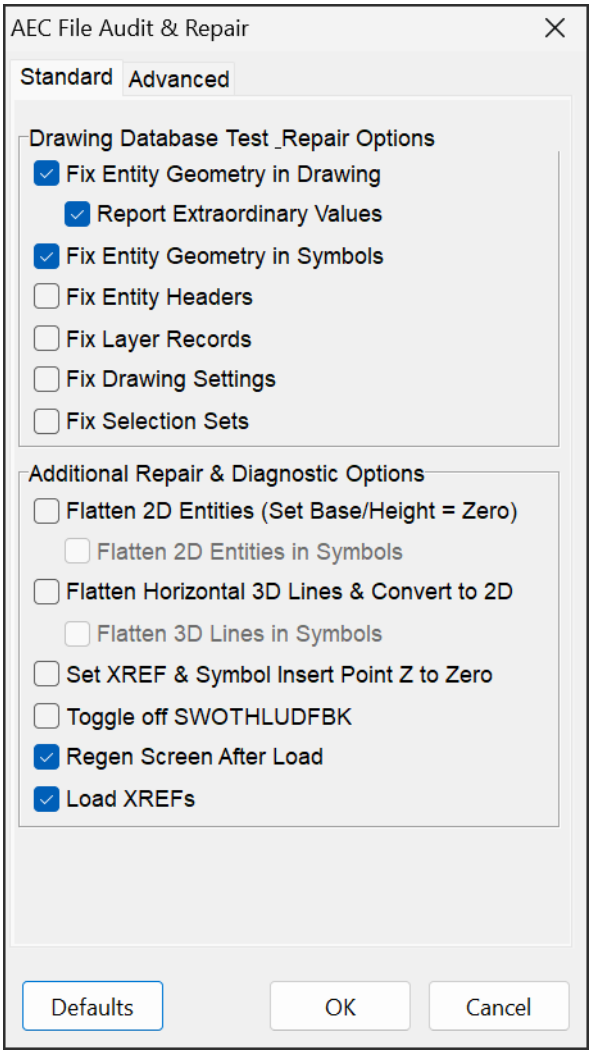


Figure 24.20: Expanded File Repair Options

Four new options have been added:

Fix Entity Headers

DataCAD entities have a header that includes fields for color, line type, width, selection set membership, and many others. When this option is enabled, the values in each entity's header are validated, repaired if necessary, or flagged as deletable.

Fix Layer Records
DataCAD layers have a header that includes fields for on/off state, entity count, grid origin, z-base, z-height, and many others. When this option is enabled, the values in each layer's header are validated and repaired if necessary. Layers with unrepairable data are not deleted.

Fix Drawing Settings
DataCAD drawings contain more than 700 settings which include items like current dimension and text settings, the state of SWOTHLUD, printer settings, and many others. When this option is enabled, the values for each setting are validated and reset to a default value if necessary.

Fix Selection Sets
The testing and repair of selection sets was originally implemented in DataCAD 10. It's rare for selection set data to become corrupt but this option allows you to validate them if necessary.

Flatten 3D entities has been updated to only affect 3D lines that are horizontal (same z values). Flatten 3D Lines in Symbols is now a separate option.

The Extraordinary Values dialog now exposes individual options for point (x, y, z) data, angles, text height, radius, and distance, in addition to z-base / z-height and reports the number of entities and corresponding extraordinary values found.

Three new sections allow you to skip the entity or all matching entities, replace the values in the entity or all matching entities, or delete the entity or all matching entities.

The audit report includes details about what invalid values were found and what the values were reset to.

All Program Settings

A new All Program Settings button has been added to the Program Preferences dialog. It opens a tree view of DataCAD's program settings, including options that are not available on the standard preference tabs.

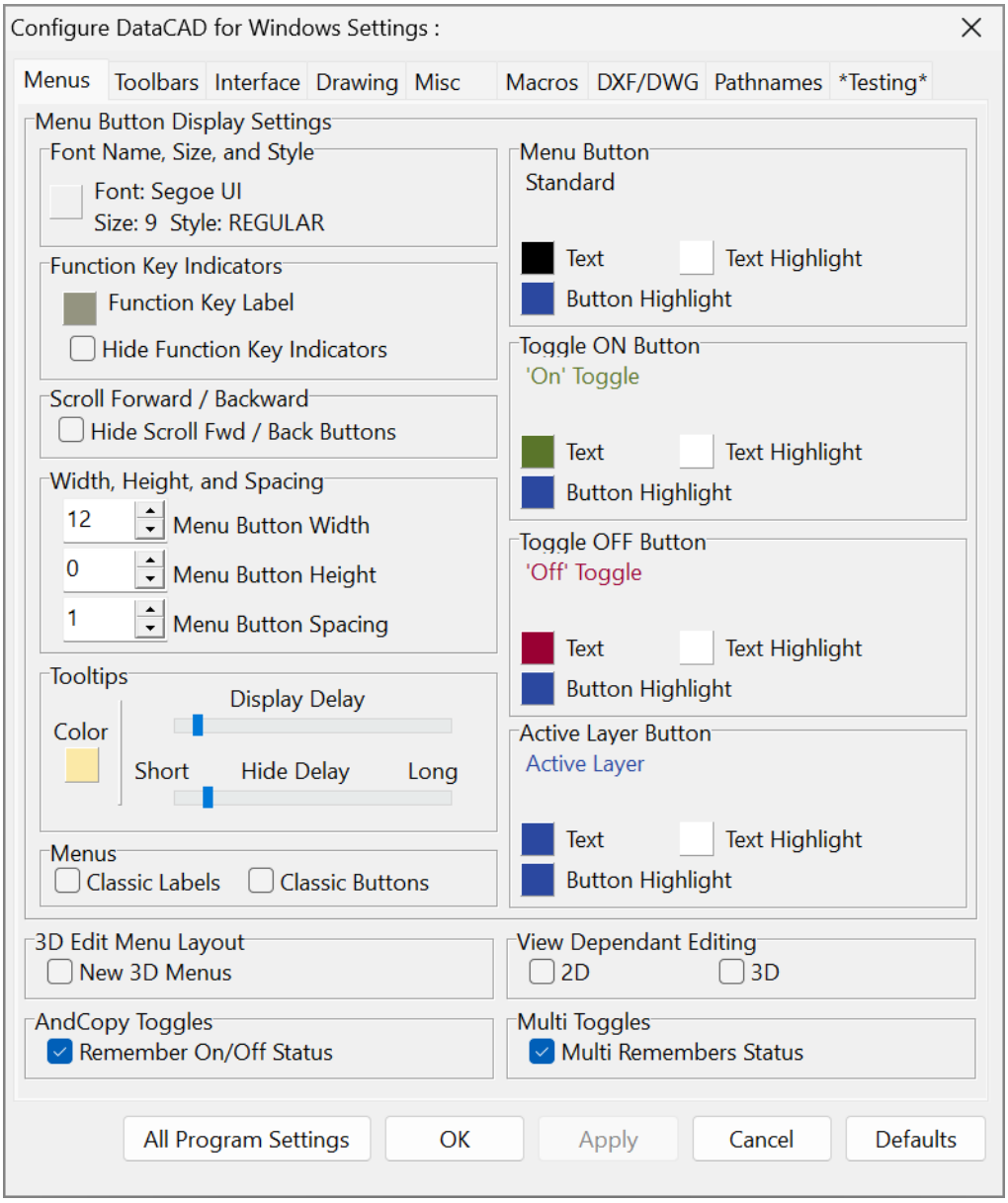


Figure 24.21: Program Preferences Dialog with new All Program Settings Button

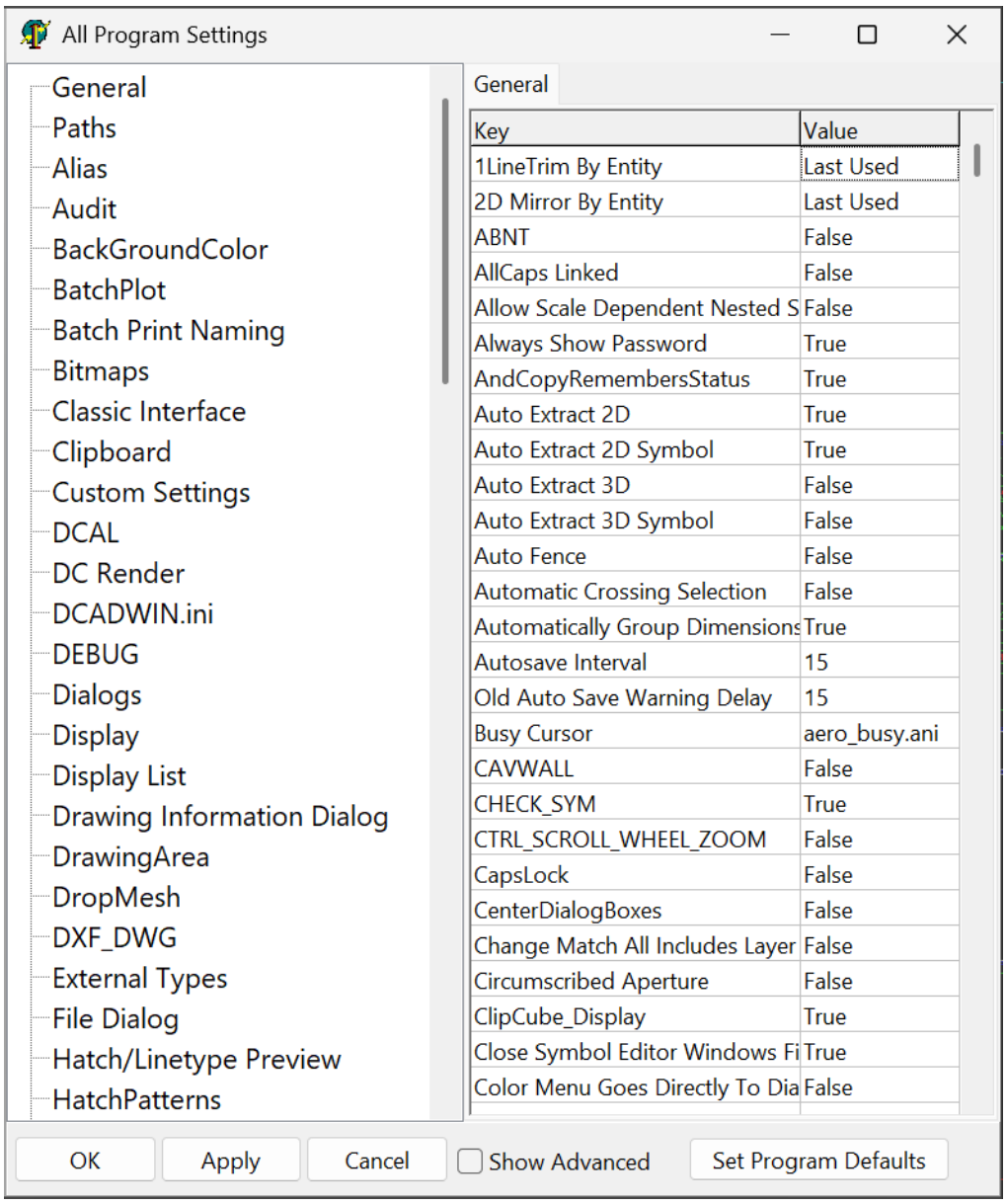


Figure 24.22: All Program Settings Dialog

Miscellaneous Enhancements

PolyCleanup Macro

The Polyline Cleanup macro automates the cleanup and simplification of complex polylines, particularly those found in topographic maps and manufacturer symbol libraries. It can remove redundant nodes, simplify geometry, flatten unnecessary bulges, and identify arc segments for conversion into bulges. The result is a more efficient and streamlined drawing.

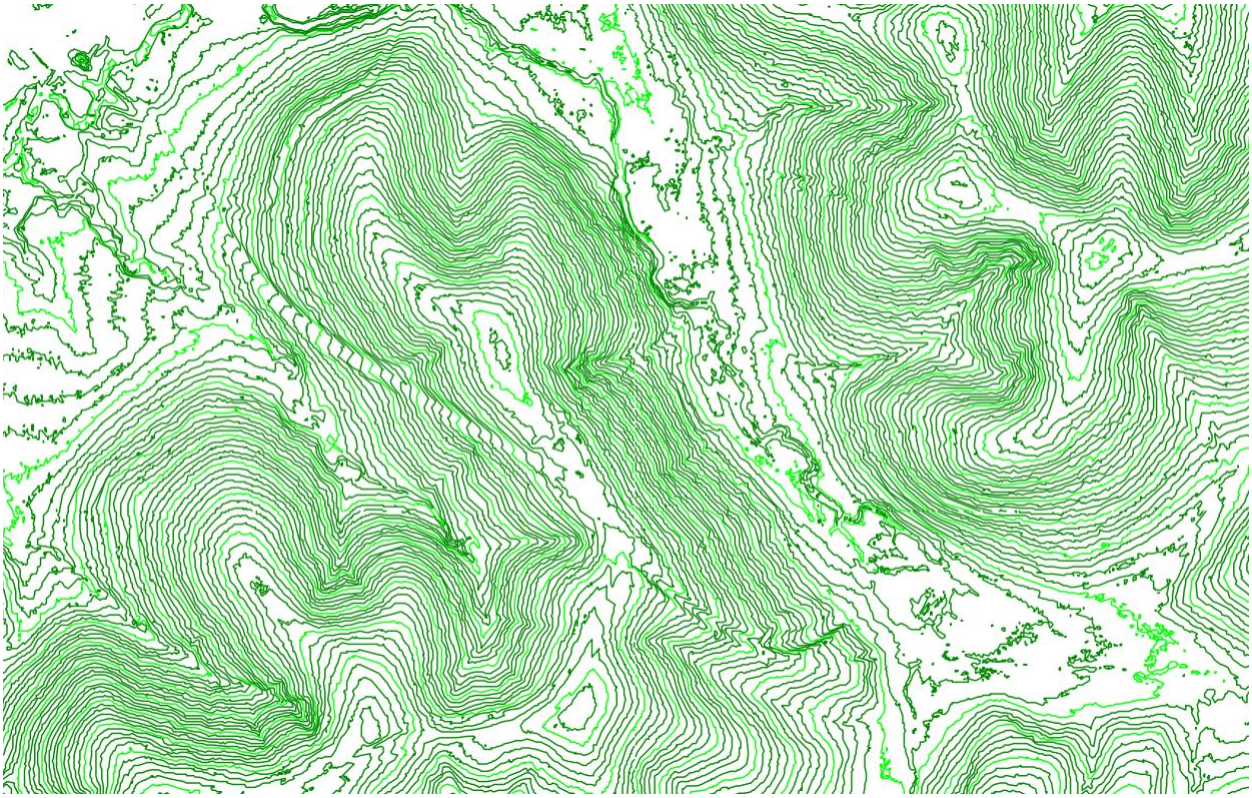


Figure 24.23: USGS Topo Map Imported As Polylines

Key Features

- **Cleanup Polylines**
  Operates at the drawing level and within symbols, including nested symbols.
- **Duplicate Node Removal**
  Identifies and removes duplicate (coincident) polyline nodes within a specified tolerance.
- **Collinear Node Removal**
  Detects and eliminates redundant nodes that are perfectly aligned (collinear) within a given distance, optimizing straight segments.
- **Polyline Simplification**
  Reduces node count using the Visvalingam-Whyatt algorithm, preserving overall shape while eliminating minor details.

- **Flatten Tiny Bulges**
  Converts small or imperceptible arc bulges to straight segments.
- **Arc Detection**
  Optionally detects nodes forming arcs and converts them into polyline bulges.
- **Symbol and Void Support**
  Processes polylines inside symbol definitions and recognizes voids (holes) within polylines.
- **Preview & Logging**
  Offers an optional preview of results before applying changes and logs detailed statistics about the cleanup process.
- **Flexible Destination**
  Updates original polylines or preserves the original entities by copying the modified entities to an existing/new layer or creating a new symbol.

Mask by Symbol and XREF Name

Symbol Name and XREF Name options have been added to the Mask by Entity menu.

When toggled On, a case-insensitive search string field appears. Any occurrence of the string in a Symbol or XREF name is considered a match. So, “flura” matches all of the following…

"C:\DataCAD 24\Symbols\Electrical\Lighting\FLURA1X2.dsf".
"C:\DataCAD 24\Symbols\Electrical\Lighting\FLURA1X4.dsf".
"C:\DataCAD 24\Symbols\Electrical\Lighting\FLURA1X8.dsf".
"C:\DataCAD 24\Symbols\Electrical\Lighting\FLURA2X2.dsf".

Contour Search

A Jump Gap option has been added to the Contour Search menu, allowing you to set the maximum search distance around line segment endpoints when creating a closed boundary.

Note: The default maximum gap distance is 1 1/2" (~38mm). The search starts near zero and increases incrementally up to eight times when a closed boundary is not found.

Drawing Information Dialog

The Drawing Information dialog can now display the current Windows file associations for DataCAD file types. For example, you can confirm which copy of DCADWIN.exe is associated with AEC drawing files.

Note: If DataCAD drawing files (such as .AEC) are not opening in DataCAD when double-clicked, you can restore the file association as follows:

1. Right-click any .AEC file in File Explorer and select Open with → Choose another app.
2. If one entry for DataCAD appears in the list, select it. Otherwise, click More apps, then scroll to the bottom of the list and click Look for another app on this PC.
3. Browse to the DataCAD installation folder (typically C:\Program Files\DataCAD <version>\) and select DCADWIN.EXE.

4. Enable the Always use this app to open .AEC files checkbox.
5. Click OK.

The .AEC extension should now be associated with DataCAD, and double-clicking an AEC drawing will open it in DataCAD.

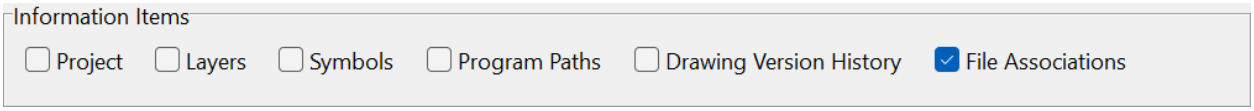


Figure 24.24: Drawing Info Information Items with new File Associations Option

New Configuration Settings

DataCAD 24 consolidates program settings in the All Program Settings tree in Program Preferences, so users can browse settings by section and adjust behavior without manually editing DCADWIN.ini.

Section : Setting : Default Value

General : Old Auto Save Warning Delay : 60

Old Auto Save Warning Delay is used by the File In Use dialog to indicate whether a file's auto-recovery save has occurred within the configured timeframe. Set this to a value greater than the Auto Save Interval.

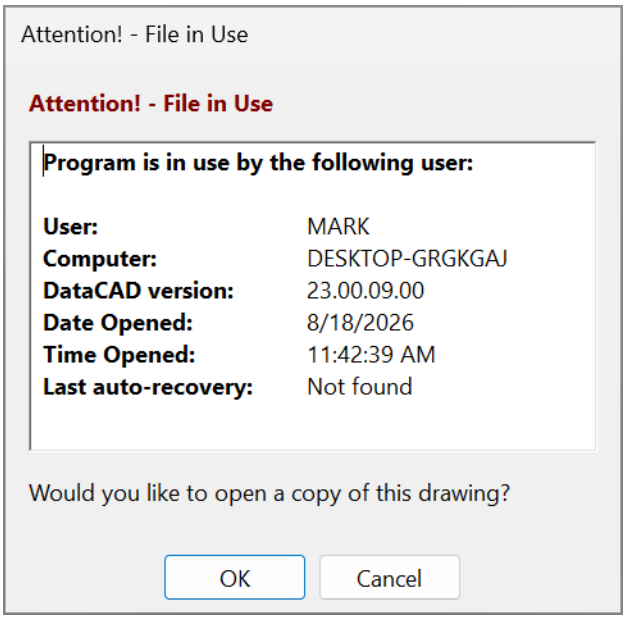


Figure 24.25: File In-Use Dialog

General : Scroll Wheel Zoom Factor : 1.25
You can reduce the distance the drawing zooms in and out by setting Scroll Wheel Zoom Factor to a value less than the default of 1.25. For example, a value of 1.10 will zoom the drawing by 10% with each mouse wheel movement. You can increase the distance by using a larger value.

Printer : Show Settings Before Printing : True
Set Show Settings Before Printing to False to disable the automatic display of the printer settings summary dialog each time you print.

Highlight : Allow Custom Highlight : False
Set Allow Custom Highlight to True if you would like to customize the properties of the selection highlight display.

Highlight : Color : 8
Set Color to any valid color palette index from 1 to 255.

Highlight : Pen Style : 4
Set Pen Style to any valid pen style index from 1 to 27 (Solid R through Water Line S).

Highlight : Spacing : 8.0
Set Spacing in 32nds of an inch. The default is 8/32nds; ¼" or 6.35 mm (multiply by 0.79375 to get mm or multiply mm by 1.2598425 to get 32nds).

Highlight : Width : 1
Set Width to set the line weight of the highlighted entity.

Menu 3D Edit : To 3D Lines : False
To display the To 3D Lines option in the 3D Explode menu, set To 3D Lines to True.

Pen Table Dialog : Max Pens : 15
Set Max Pens to any value from 15 up to 255.

Pen Table Dialog : Use Windows Color Dialog : True
To use DataCAD's Color Picker, set Use Windows Color Dialog to False.

Pen Table Dialog : Show Full Path In Titlebar : False
To display the fully-qualified name of the current Pen Table in the titlebar, set Show Full Path In Titlebar to True. Names that are too long to fit will be minimized to show the beginning and end of the filename.

Symbol Browser : Use Natural Sorting : False
To enable natural sorting similar to Windows Explorer where MySym_1 appears before MySym_10, set Use Natural Sorting to True.

Printer : Get Default From Windows : False
To get the Windows Default Printer automatically in new drawings, set Get Default From Windows to True.

Printer : Warn On Printer Unavailable : True
To skip the display of the information dialog when the currently configured printer cannot be found, set Warn On Printer Unavailable to False. DataCAD will automatically use DataCAD PDF Direct instead.

Recent File List : MaxMenuChars : 60
Set the max. number of characters to display in the Recent Files menu from 34 up to 255.

Recent Folder List : MaxMenuChars : 60
Set the max. number of characters to display in the Recent Folders menu from 34 up to 255.

Smart Walls : New Associations : True
When New Associations is True, doors, windows, and openings that are associated with a wall will automatically transform with the wall when it is edited with Move, Rotate, Mirror, or Stretch. Set New Associations to False to restore the previous behavior.

XREFs : Fallback to Inserted From Path : False
When an XREF is inserted, its fully-qualified path is compared to the currently configured base path. When there's a match, DataCAD stores the relative path with the XREF instance. Otherwise, the fully-qualified path is stored. When DataCAD cannot find the XREF in the stored path, it will look in the parent drawing's folder. If the file cannot be found in the relative path or the current drawing's folder path, the fully-qualified insertion path will be used if Fallback to Inserted From Path is True.

DCAL : Preferred Macro Extension : dmx
Set Preferred Macro Extension to dcx if you want the last macro used to favor DCAL for DOS macros over DCAL for Delphi macros with the same name.

Note: Because all program settings are accessible through Program Preferences, you no longer need to edit DCADWIN.ini manually.

New Extended Character Codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" in Chapter 30 of the DataCAD Reference Manual.

3057# Cut Wall On – Walls will be removed at door and window openings.

3058# Cut Wall Off – Walls will not be removed at door and window openings.

3059# In Wall On – Doors and windows will be centered between wall lines.

3060# In Wall Off – Doors and windows will not be centered between wall lines.

3061# One Layer On – One layer will be searched for walls to cut.

3062# One Layer Off – One layer will not be searched for walls to cut.

3063# Any Layer On – All "On" layers will be searched for walls to cut.

3064# Any Layer Off – Only the "Active" layer will be searched for walls to cut.

DataCAD 23

DataCAD 23 contains a collection of new features and enhancements designed to increase your productivity. DataCAD 15 through 23 share the same drawing file format. However, you must use the **Save As** command in the **File** menu to save files backward to older version formats (DataCAD 11 through 14).

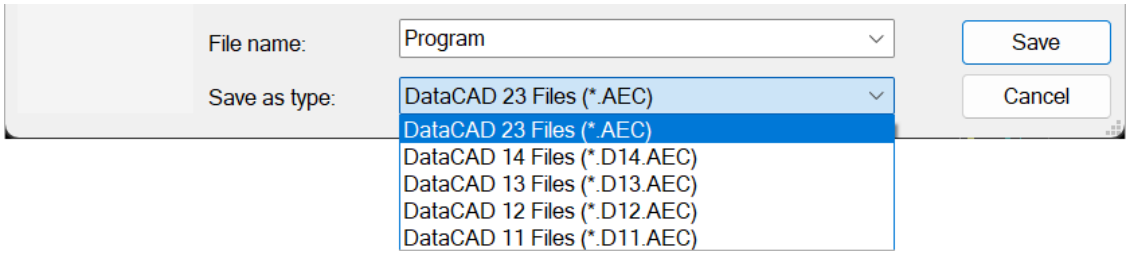


Figure 0.1: File, Save As Dialog

AutoCAD 2020 - 2023 Support

DataCAD 23 extends its compatibility with AutoCAD DXF and DWG files by adding support for R2020 - R2023 files; enabling you to collaborate and share files with associates who use the latest versions of AutoCAD.

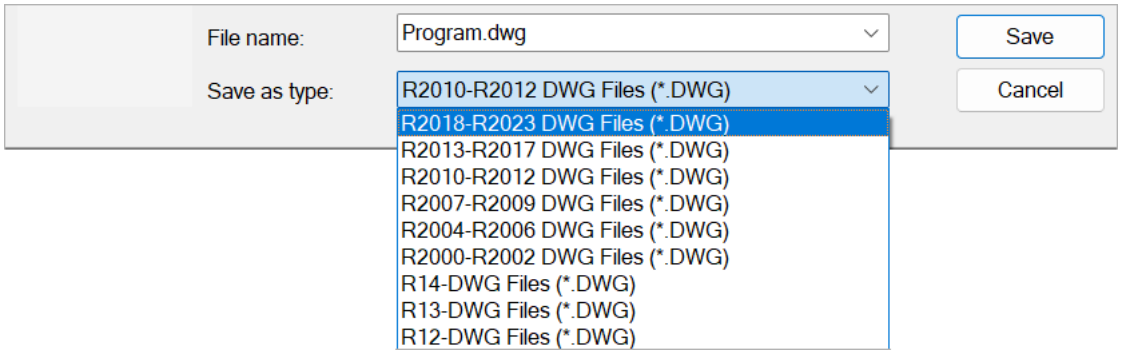


Figure 0.2: Export DWG Dialog

SketchUp 2020 - 2022 Support

DataCAD 23 extends its compatibility with SketchUp SKP files by adding support for version 2020 through 2022 files; enabling you to collaborate and share files with associates who use the latest version of SketchUp.

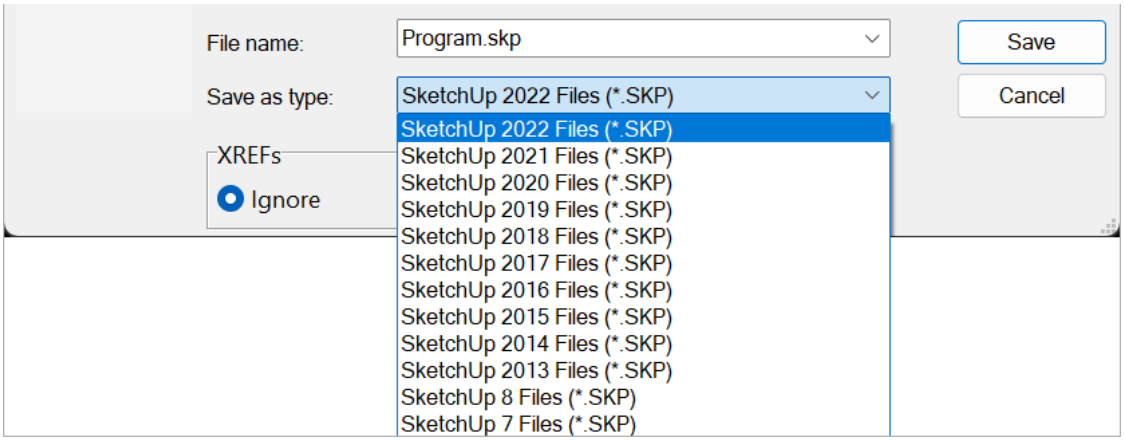


Figure 0.3: File, Export, SketchUp Dialog

Imaging Enhancements

In this major update, DataCAD's graphics pipeline has been enhanced to support greater versatility in construction and presentation documents. These improvements enable both the display and printing of fills and bitmaps with transparency, offering more control over the visual aspects of your designs. The new ability to incorporate 32-bit images into your drawings expands the range of your imaging options. Furthermore, we've introduced updated PDF Creation routines to support transparency and ensure smaller file sizes. With this progression in DataCAD's capabilities, we're confident you'll be able to refine the way you present and share your own designs.

Transparent Fills

There may have been times when you wanted to 'ghost' a portion of your drawing or merge the colors of two overlapping filled areas to better illustrate your design intent. Previously, you were limited to using a solid color or completely knocking out an entire area. With transparencies, you can achieve a more subtle delineation.

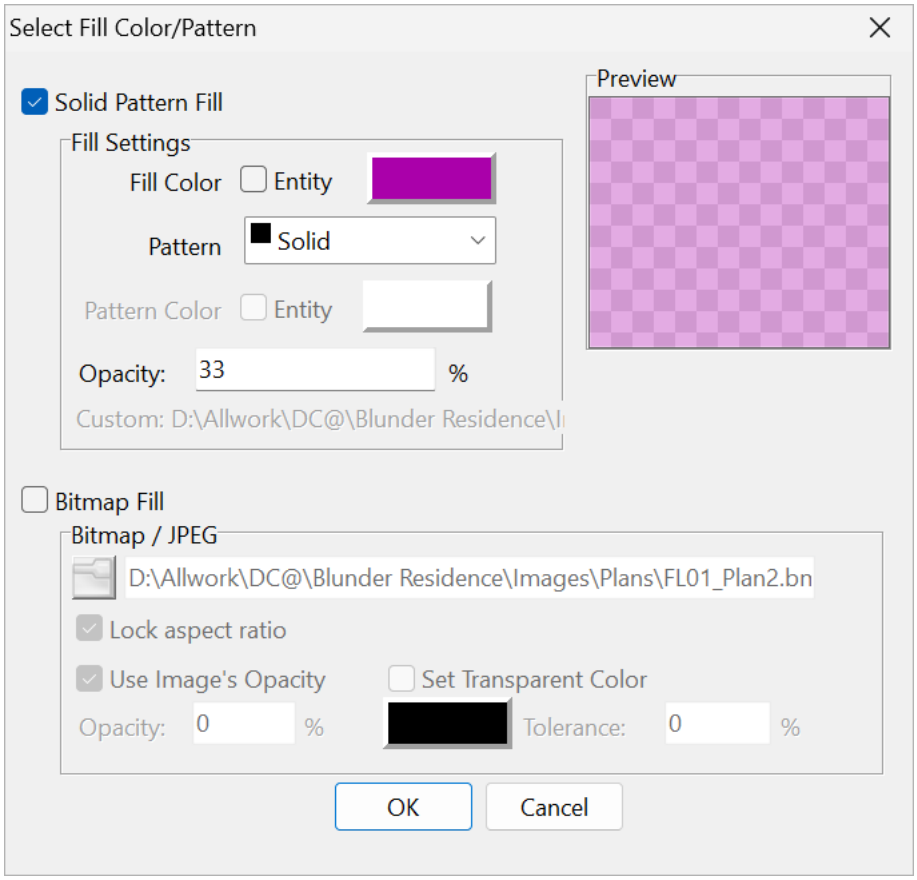


Figure 0.4: Solid, Pattern, and Bitmap Fill Dialog

In the Solid, Pattern, and Bitmap Fills (SPB-Fill) dialog, accessed via the Hatching menu, there's a new input field to set the opacity. The default value is 100%, or completely opaque. You can set this value below 100 to create transparent fills. A setting of 50 will allow graphics behind the fill to 'show through' and blend with the filled area.

Note: The opacity value applied to filled entities should round-trip between the current and older versions of DataCAD. In older versions, the color will appear solid. If the entity's fill properties are edited in an older version, the opacity value will be reset to the default of 100%.

32 Bit Bitmaps (Alpha Channel)

While there are several ways to use or apply transparency to Bitmap images you insert in your drawings, the most likely way is to take advantage of image libraries that already have the background removed from objects such as people, cars, and trees.

Some formats such as PNG (Portable Network Graphics) allow each pixel to range from fully transparent to fully opaque. In the SPB-Fill dialog, there is a new option in the Bitmap Fill section, Use Image's Opacity. This option is checked by default which means that DataCAD will display and print the image using its native transparent values if it contains any.

You can override the original image's values by unchecking this option. This enables the field where you can set the opacity below 100%. The value you enter here will apply to the entire image uniformly. Instead of this, you can check the Set Transparent Color option to assign a specific color such as white or black to be transparent. Furthermore, you can set the tolerance from 0 to 100 to expand the transparent areas to colors that are near the color you set.

Note: You can set the maximum size (i.e., width/height in pixels) for bitmaps by changing the key, **Max Bitmap Size**, in the [Display] section of DCADWIN.ini from its default value of 0. To limit the size of images in memory to a maximum width/height of 2048, set this value to 2048. Any image that is larger in width or height than 2048 pixels will be resampled for display. Smaller images will remain unchanged. Changing this value may be useful if you're experiencing performance issues when using a lot of large images in your drawings.

New Image Formats

The latest version of DataCAD greatly extends the kinds of images you can incorporate into your projects. This provides expanded compatibility with other software and gives you greater flexibility for where you can source your images. The following additional image types are now supported.

- **JPEG**
  `JPE, JIF, JFIF`
- **Windows Bitmap**
  `DIB, RLE`
- **TIFF**
  `FAX, G3N, G3F, XIF`
- **DICOM Medical Image**
  `DICOM, DCM, DIC, V2`
- **Photoshop**
  `PSD, PSB`
- **JPEG2000**
  `JP2`
- **JPEG2000 Code Stream**
  `J2K, JPC, J2C`
- **High Efficiency Image File**
  `HEIC, HIEF, HEICS, AVCS, HEIFS, AVIF, AVIFS`
- **WebP**
  `WEBP`
- **Microsoft HD Photo**
  `WDP, HDP, JXR`
- **Windows Icon**
  `ICO`
- **Windows Cursor**
  `CUR`

- **PaintBrush**
  PCX
- **Targa Image**
  TARGA, TGA, VDA, ICB, VST, PIX
- **Portable Pixmap**
  PXM, PPM, PGM, PBM
- **Wireless Bitmap**
  WBMP
- **Multipage PCX**
  DCX
- **DirectDraw Surface**
  DDS

This comprehensive range of supported formats ensures that you can work with varied image sources, regardless of their original format. So, whether you're using cell phone pictures, graphics you've downloaded from the Internet, or even medical images, DataCAD has you covered.

New and Improved PDF Creation

Now that PDFs have become nearly ubiquitous and more common than other native formats such as DOC or DWG, we want to make sure DataCAD's PDF tools are as comprehensive as possible.

Now when you print or batch print to PDF format, transparencies and 32-bit images are automatically handled, there's nothing further you need to do to include them in the documents you give to your clients. In addition, you don't have to worry about using high-quality, high-resolution images as they are also automatically compressed to keep file sizes to a minimum.

These advancements in PDF creation will not only increase the quality of your documents but also ensure your work is presented in the best way possible.

Note: The PDF Version set by the new and legacy PDF creators is now 1.5 instead of 1.2. Some customers have reported that certain agencies require version 1.5 at a minimum.

Batch Printing Enhancements

A major update to the batch printing interface provides features that automate the steps required to create PDF files from drawing layouts; Quick Layout, GoTo Views, and MSP Sheets. These include custom sorting, naming based on rules, and merging multiple documents into a single file.

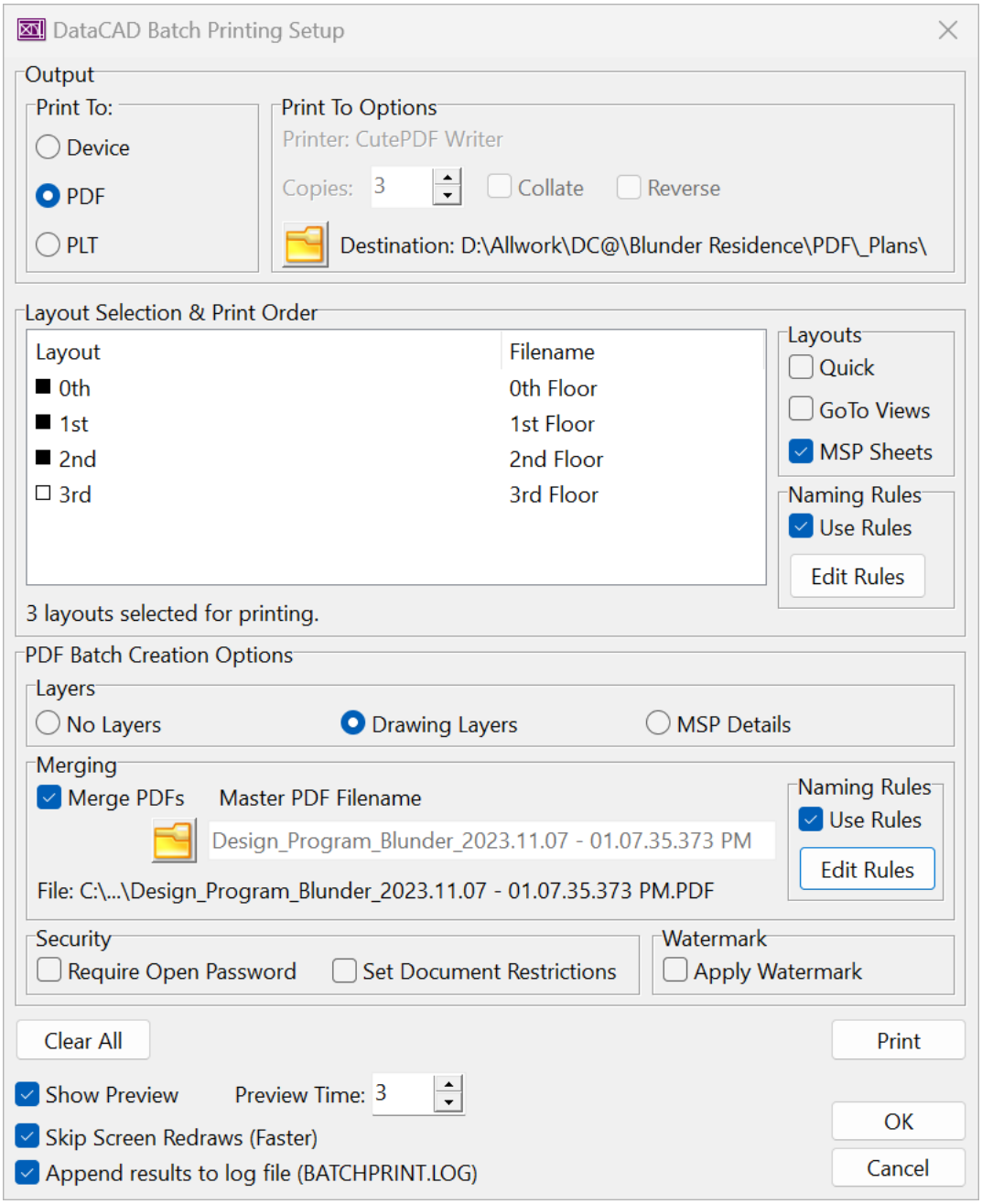


Figure 0.5: Enhanced Batch Printing Dialog

Note: Batch Printing can be performed 'internally' from an individual drawing or 'externally' when no drawings are open. Once a drawing has been set up for internal batch printing, it can then be selected, along with other drawings, from the external Batch Printing dialog.

Destination

The layouts you select can be output to a printer, a PDF document, or a plot file. When the output destination is set to a printer, two new options, **Collate** and **Reverse**, are available.

Collate

By default, DataCAD prints each layout times the number of copies you've set, and in the order, they appear in the list. So, if you print three copies of three layouts, you will have to manually collate them into sets. When printing multiple copies, check the **Collate** option to have DataCAD print each layout one at a time, and in order.

Reverse

If you need to print your layouts in the opposite order they appear in the list, check **Reverse**.

Layout Selection & Print Order

There are three types of drawing layouts, the Quick Layout, GoTo Views, and MSP Sheets. A new Layouts group box allows you to check the type to appear in the list. So, if you only need to print MSP Sheets, you can uncheck Quick and GoTo Views so only MSP Sheets are displayed.

By default, the order of layouts is the order they appear in the GoTo View or MSP Sheets menus. You can now sort the list alphabetically by clicking on the list column heading. An arrow indicating the sort direction (ascending or descending), appears at the top of the column you sorted. Click on the header more than once to reverse the current sort order. You can also set the order of the layouts by clicking and dragging them up or down in the list.

Note: You can use the keyboard shortcut **[Ctrl] + [A]** to check all the layouts to select them for printing. You can press **[F5]** to refresh the out filenames list. Press **[Ctrl] + [F5]** to reload the out filenames list from the drawing (prior to any changes you may have made since opening the dialog).

Out File Names

If you are printing to PDF or PLT files, you can now customize the default names that are generated by DataCAD. For example, an MSP Sheet named **1st Floor** will have an out filename of **Drawing Name-Sheet-1st Floor** where Drawing Name is the name of the current Drawing. To customize this name, click on the item to enable the edit field. Then modify the name as you wish.

Note: The following characters are not allowed in Windows' filenames and the edit field will prevent you from typing them. [\ ], [/], [:], [*], [?], ["], [<], [>], [|]

Out File Naming Rules

Instead of manually changing each out filename, you can enable and define naming rules, so they are customized automatically to suit your needs.

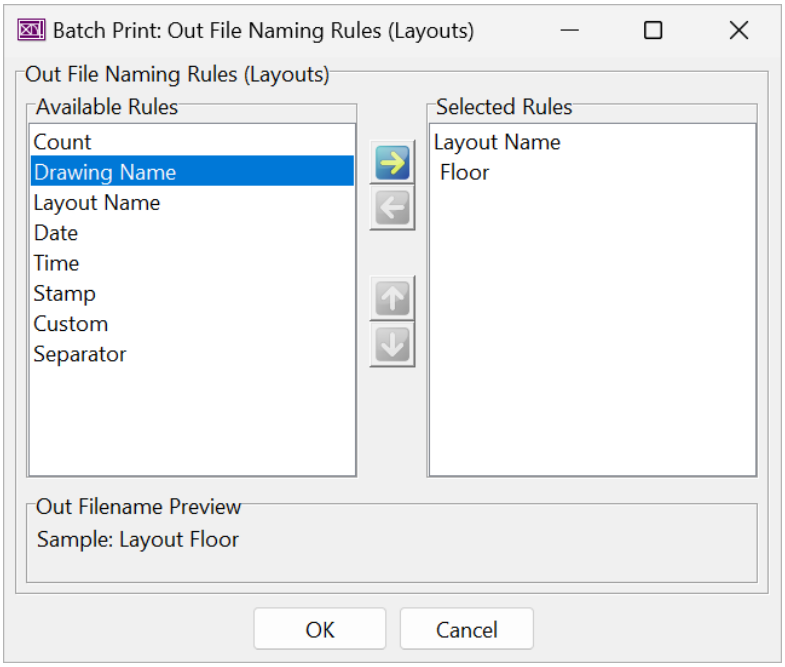


Figure 0.6: Out File Naming Rules Dialog (Layouts)

In the Naming Rules group box, check **Use Rules** to display the Naming Rules dialog. A list of available rules appears on the left, and rules you add appear on the right. The rules are applied in the order they appear in the list. Click on a rule to highlight it, then use the up/down arrow buttons to change the order. A sample of the name appears in the Out Filename Preview section of the dialog.

Count

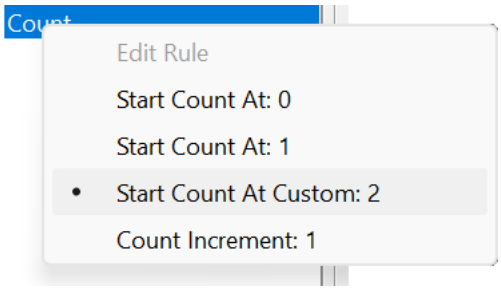


Figure 0.7: Count Rule Options

To include an automatically incrementing number in the name, add the **Count** rule. By default, the count starts at one, and is applied, in order, to the selected layouts. If more than 9 layouts are selected, single digit numbers will be padded with a zero (i.e., 01, 02, 03, …). For more than 99 layouts, two zeros will be added (i.e., 001, 002, 003, …).

You can customize the Count rule by right-clicking over the rule to display its options.

Start Count At 0
Select this option to start the count at zero instead of one.

Start Count At 1
This is the default setting.

Start Count At Custom
To start the count at a custom number, select **Start Count At Custom**. An input dialog appears. Enter the new value to start the count. For example, if the set printed from the current drawing will be output along with files from other drawings, you may want to start the count relative to those.

Count Increment
To increment the count by a custom value, select **Count Increment**. For example, you may want to count in increments of 100 (i.e., 100, 200, 300, …). In this case, you'll also want to change the **Start Count At Custom** value to 100.

Drawing Name & Layout Name

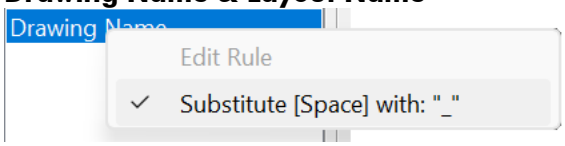


Figure 0.8: Space Character Substitution

To include the **Drawing Name** and/or **Layout Name** verbatim, add either or both rules. If you would like spaces in these names to be replaced with another character (i.e., [_] underscore by default), right-click on the **Drawing Name** or **Layout Name** item. In the popup menu that appears, select **Substitute [Space] with**. Then, enter the character you would like to replace spaces with.

Date

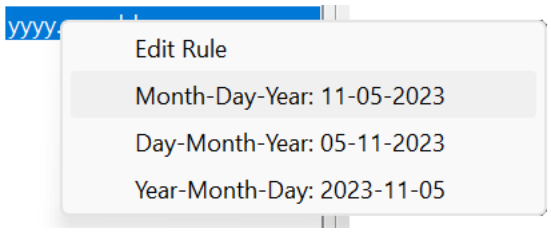


Figure 0.9: Date Format Options

By default, the date format for the **Date** rule is **Year-Month-Day**. If you would like to use a different format, right-click on the **Date** rule and select one of the other presets; **Month-Day-Year** or **Day-Month-Year**. Select Edit Rule if you'd like to use a custom format.

The formatting string can include a mix of ordinary characters that remain unchanged and formatting characters that are replaced with specific date strings. The following formatting character strings can be used.

Year:
yy = 21
yyyy = 2021

Month:
m = 1, 2, 3, ... 10, 11, 12
mm = 01, 02, 03, ... 10, 11, 12
mmm = Jan, Feb, Mar, ... Oct, Nov, Dec
mmmm = January, February, March, ... October, November, December

Day:
d = 1, 2, 3, ... 29, 30, 31
dd = 01, 02, 03, ... 29, 30, 31
ddd = Sun, Mon, Tue, ... Thu, Fri, Sat
dddd = Sunday, Monday, Tuesday, ... Thursday, Friday, Saturday
ddddd = Short Date: 21/08/2021
dddddd = Long Date: 21 August 2021

Time
Like the **Date** rule, the time can also be included in the name of file. The default time format is **hh.mm.ss** (**Hours.Minutes.Seconds**). The following formatting character strings can be used.

Hours
h = 1, 2, 3, … 22, 23, 24
hh = 01, 02, 03, … 22, 23, 24
ampm = AM … PM

Minutes
n = 1, 2, 3, … 57, 58, 59
nn = 01, 02, 03, … 57, 58, 59

Seconds
s = 1, 2, 3, … 57, 58, 59
ss = 01, 02, 03, … 57, 58, 59

Note: If you need to include formatting characters that should not be replaced, enclose them in ["] quotation marks so they will not be interpreted as date or time elements.

Stamp
The Stamp rule allows you to use DataCAD's existing stamps to populate the filename. The default stamp is **@USERNAME**. You can change this string to any of the Stamps defined in DCADWIN.ini.

Custom
If you would like to insert your own characters into the filename, add the **Custom** rule, then edit the string as needed.

Separator
Identical to **Custom** but included for convenience, add the **Separator** rule wherever you need to. You can edit the default string of "-" dash to a different string.

Notes About Naming Rules: The **Count**, **Drawing Name**, and **Layout Name** rules can only be added once. The other rules can be added multiple times.

PDF Options

When printing to PDFs, several new options can be enabled.

Merge PDFs

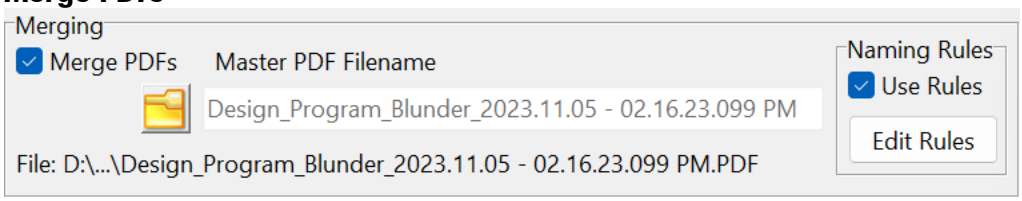


Figure 0.10: Merge PDFs Options

If you would like DataCAD to merge all the layouts you've selected into a single document, check Merge PDFs in the Merging section. Click on the file folder icon to select the destination for the merged document. The default name is the same as the drawing name.

Out File Naming Rules

To define naming rules for the merged document, check **Use Rules** in the **Naming Rules** section. The merge file naming rules are independent from the layout filename rules.

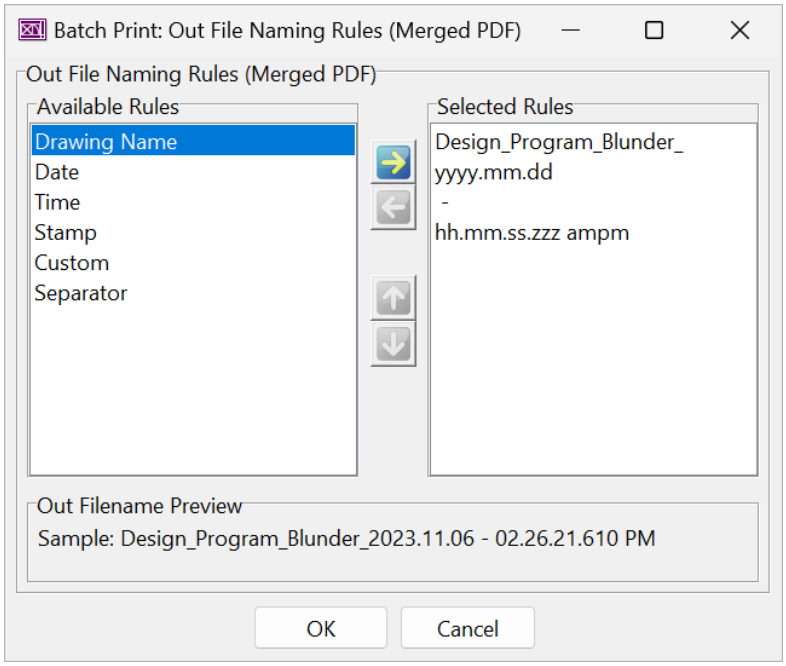


Figure 0.11: Out File Naming Rules Dialog (Merged PDF)

Note: The internal merge name rules do not include **Count** or **Layout**. The external merge name rules do not include **Count**, **Drawing**, or **Layout**.

Security

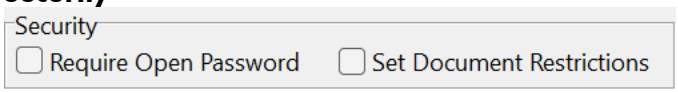


Figure 0.12: PDF Security Options

If you only want to require an Open Password (i.e., no other restrictions) to access your document, then check **Require Open Password** in the **Security** section. You will be prompted to provide the password that will be required to open the PDF files that are created during the batch session.

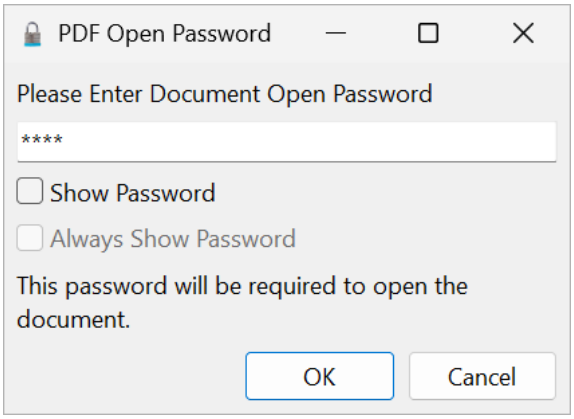


Figure 0.13: PDF Open Password Dialog

If you also want to restrict certain document-related functions such as high-resolution printing or content copying, then check **Set Document Restrictions**. The **PDF Restrictions** dialog will appear. Check the items you want to disallow.

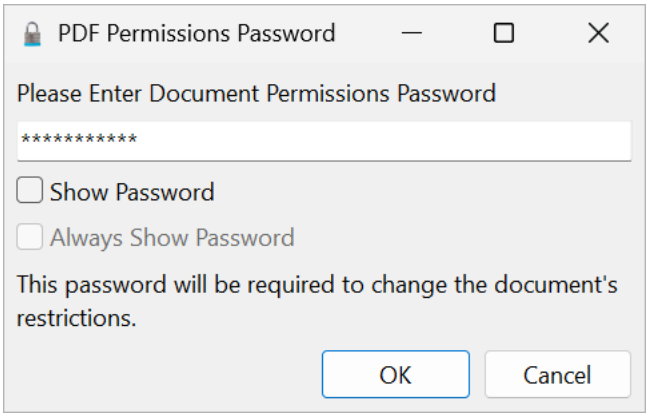


Figure 0.14: PDF Permissions Password Dialog

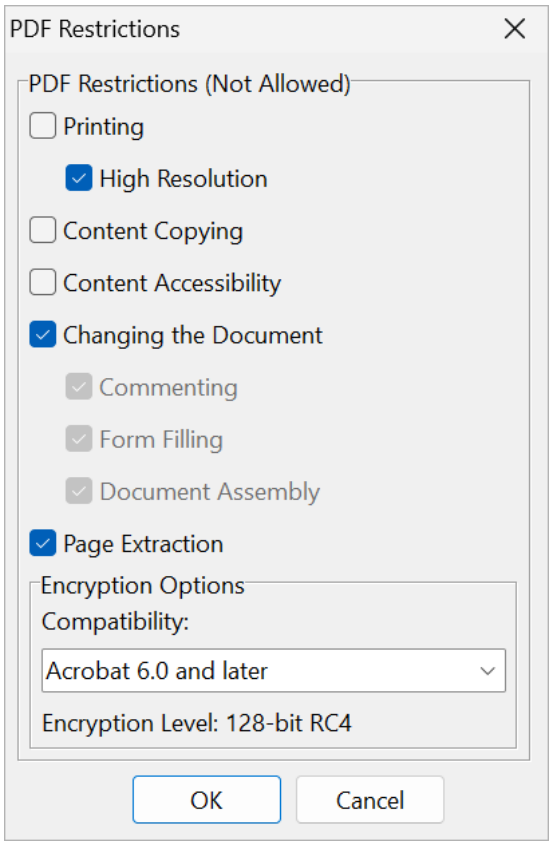


Figure 0.15: PDF Restrictions Options

Note: You can now set the Encryption Level. Previously, 256-bit AES (the highest available) was always used and requires Acrobat X or later.

Your previously set PDF Restrictions are saved to the PDF Security section of DCADWIN.ini. For internal batch printing, these settings are stored on a per-drawing basis. For external batch printing, these settings are saved to the SET file.

Watermark

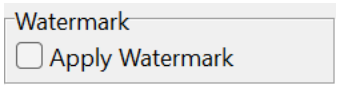


Figure 0.16: PDF Watermark Option

If you would like to apply a bitmap to the background of the pages in your PDF files, then check Apply Watermark. You will be prompted to select a bitmap. By default, the image you select will be placed behind the drawing, at 50% transparency, and will be centered to fit as large as possible on the page.

You can customize the settings DataCAD uses to create the watermark by changing the following keys in the **[PDF Watermark]** section of DCADWIN.ini.

Transparency
Sets the Transparency from 0 (completely opaque) to 100 (completely transparent)

Blend Mode
Can be set to one of the following values: Normal, Multiply, Screen, Overlay, Darken, Lighten, ColorDodge, ColorBurn, HardLight, SoftLight, Difference, Exclusion, Hue, Saturation, Color, or Luminosity.

Apply Watermark
True if Apply Watermark is checked or False otherwise.

Watermark Image
The path to the bitmap.

Watermark Text
(For future use, not currently used)

Image Left
Sets the left edge of the bounding box (in percent of the page) that contains the image. A value of 50 will put the left edge of the watermark at the middle of the page.

Image Top
Sets the top edge of the bounding box.

Image Width
Sets the width of the bounding box (in percent of the page) that contains the image. A value of 50 will set the width of the image box to half the width of the page.

Image Height
Sets the height of the bounding box.

Image Align Horizontal
Sets the horizontal alignment of the image inside the bounding box. You can set the horizontal alignment to either Left, Center, or Right.

Image Align Vertical
Sets the vertical alignment of the image. You can set the vertical alignment to either Top, Middle, or Bottom.

Image Rotate
(For future use, not currently used)

Show Preview / Preview Time
Previously, the **Skip Screen Redraws** option would suppress both the drawing window and the print preview. Now the print preview can be enabled separately by checking **Show Preview**. When **Show Preview** is enabled, you can also set the time (in seconds) the print preview will remain open before automatically closing, allowing the batch process to continue. You can also click the Close button at any time prior to the preview time elapsing.

Trim3D Macro

New 3D trimming routines, that will eventually be integrated directly into DataCAD, are now available in a new macro. These routines allow you to find the intersection between 2D lines, 3D lines, and 3D Polygons and modify them accordingly to create custom shapes for roofs and other purposes.

The macro provides specific trimming methods which can be used in any view projection including plan, elevation, isometric, and perspective. The behavior of these routines is like DataCAD's cleanup commands where the result of the trim occurs on the 'pick' side of the intersection point.

You can control whether to modify only the first, or both entities you select, or only display or add the intersection point(s) or line(s) to the drawing. This allows you to study a particular condition without making changes to the model.

Main Menu Options

Line to Line

Trim 2D/3D Lines to 2D/3D Lines

Toggle On Line to Line if you want to trim one 2D/3D Line to another. If they intersect, the lines will be trimmed or extended, as necessary.

Note: Lines will not be modified if they are parallel, skewed, or coincident.

Line to Poly

Trim 2D/3D Lines to 3D Polygons

Toggle On Line to Poly to trim a 2D/3D Line to a 3D Polygon.

Poly to Poly

Trim 3D Polygons to 3D Polygons

Toggle On Poly to Poly to trim one 3D Polygon to another. Select the edge of the first polygon to modify, then select the edge of the second polygon to modify.

Edge to Edge

Trim 3D Polygon Edges to 3D Polygon Edges

Toggle On Edge to Edge to trim one polygon edge to its intersection with another polygon edge.

Edge to Poly

Trim 3D Polygon Edges to 3D Polygon Faces

Toggle On Edge to Poly to trim one polygon edge to its intersection with another polygon face.

Show Node #s

Display Index of Polygon Vertices

Toggle On Show Node #s to display temporary index numbers at polygon vertices.

Trimming Sub-Menu Options

Trim Ents

Modify Selected Entities

Toggle On Trim Ents to modify the entities. Toggle Off Trim Ents to leave the original entities as-is.

Trim to …

Modify First Entity

Toggle On Trim to … to only modify the first entity you select.

Trim Both
Modify Both Entities
Toggle On Trim Both to modify both entities you select.

Split
Split Entity At Intersection
Toggle On Split to 'break' the line at the intersection point.

Split Both
Split Both Entities At Intersection
Toggled On Split Both to 'break' both lines at the intersection point.

Show Points
Display 3D Intersection Points
Toggle On Show Points to display temporary point(s) at the intersection(s).

Show Lines
Display 3D Intersection Lines
Toggle On Show Lines to display temporary 3D Line(s) extending to the intersection(s).

Add Points
Add 3D Intersection Points
Toggle On Add Points to add point(s) at the intersection(s).

Add Lines
Add 3D Intersection Lines
Toggle On Add Lines to add 3D Line(s) extending to the intersection(s).

Add Helpline
Add Helpline Along Intersection of 3D Polygons
Toggle On Add Helpline to add an infinite line (parallel to the ground plane) along the intersection of two polygons.

Note: While modifying 3D Polygons, the following validation tests and entity corrections are performed before the entities are saved to the drawing.

Coplanar Check
Any points in a polygon that do not lie in the plane of the polygon are corrected to preserve the polygon's structure.

Duplicate Points
Any pair of points that are considered to have the same coordinates into a single point.

Collinear Points
Any point found to be in-line with another is removed from the polygon.

---

o2c Quick Enhancements

- Form settings for individual o2c Quick windows are now saved to o2cQuick.gui
- The o2c setting **Remember Last View** is now supported by Quick o2c.

Note: Each new window is stored in a corresponding section **[Fo2cQuickForm]**, **[Fo2cQuickForm_1]**, **[Fo2cQuickForm_2]**, and so on. These are not currently associated with specific drawing files.

Hatch Pattern Manager Advanced Options

The options provided in the Hatch Pattern Manager can be expanded beyond loading and purging patterns to include editing of various properties. To enable these advanced options, set the key, **Advanced Options**, to **True** in the **HatchPatterns** section of DCADWIN.ini.

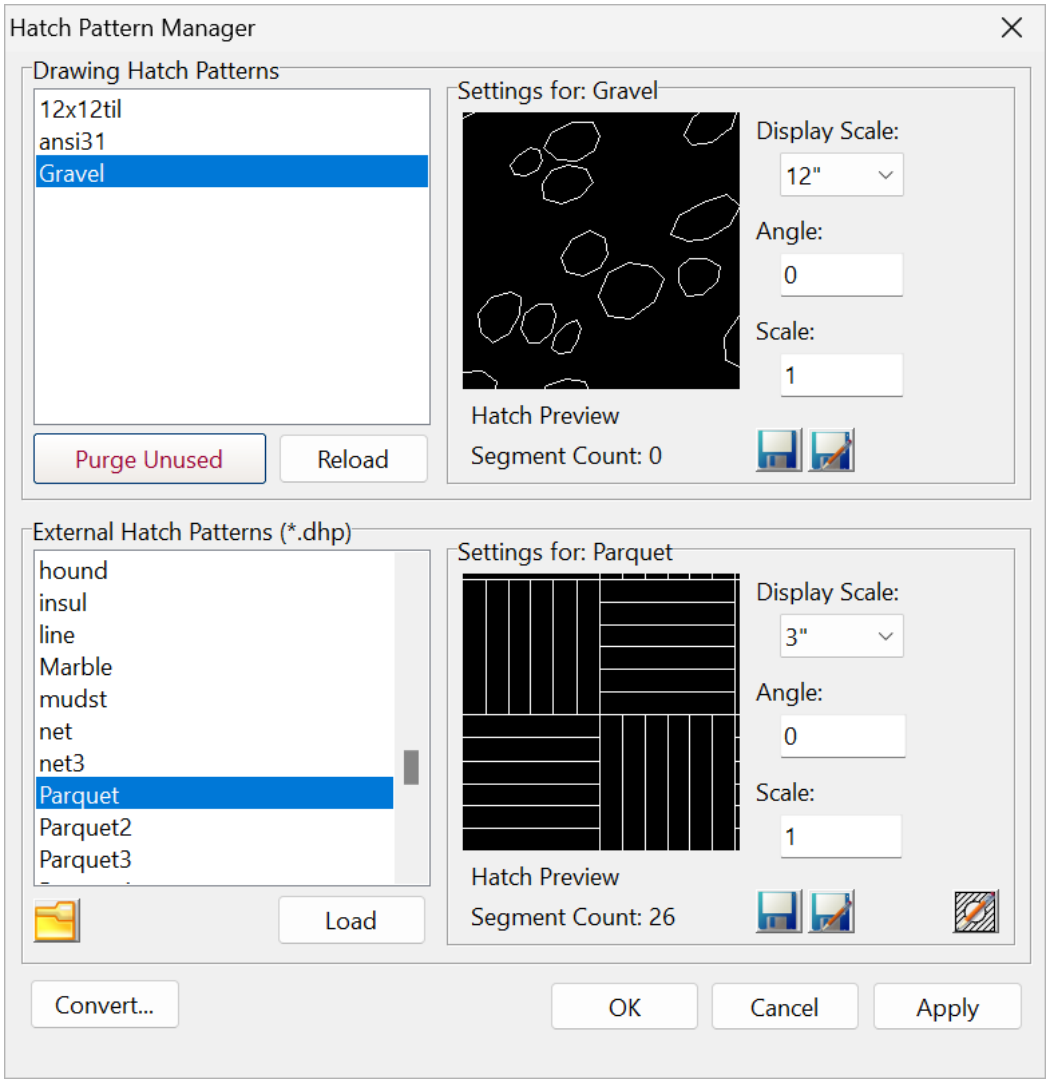


Figure 0.17: Advanced Hatch Pattern Manager Dialog

Note: The Convert option now allows you to convert both DataCAD and AutoCAD (*.PAT) hatch pattern files.

External Hatch Patterns Context Menu

Right-click on an item in the external hatch patterns list to reveal the options; **Rename**, **Change Scale**, and **Delete**.

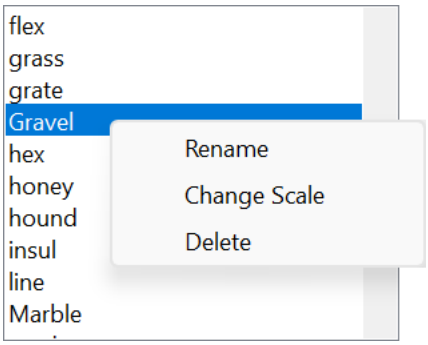


Figure 0.18: External Hatch Patterns Context Menu

- Select **Rename** to enable the edit field. The changes you make to the pattern name will be saved to disk when you exit the field.
- Select **Change Scale** to enter a new scaling factor for the pattern.
- Select **Delete** to remove the pattern from the hard drive.

Browse Folders

A Browse Folder icon allows you to change the path to look for hatch patterns from the default location of Support Files\Hatch Patterns\ to any location you require.

Save Changes Icon

The changes you make to the Display Scale drop-down, and Angle and Scale edit fields can be saved to disk by selecting the Save icon button.

Save As Icon

A Save As icon button allows you to save the currently selected pattern to a new name.

Hatch Pattern Edit Icon

A Hatch Pattern Edit icon button allows you to display the current hatch pattern definition in a string grid layout. This allows for direct editing of the Angle, X Offset, Y Offset, Delta X, Delta Y, and optional Pattern values.

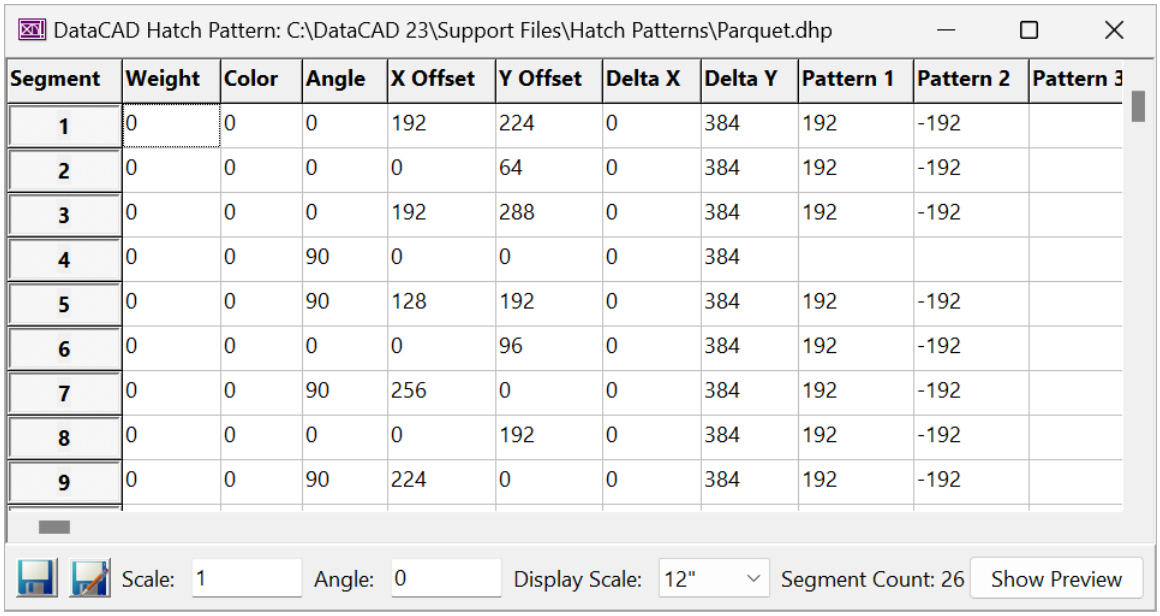


Figure 0.19: Hatch Pattern Definition Editor

- Click Show/Refresh Preview to see the pattern displayed in a non-modal window.
- You can toggle the buttons in the Segment column to selectively enable/disable scanline definitions. If displayed, the preview is updated automatically when a segment is toggled on or off.

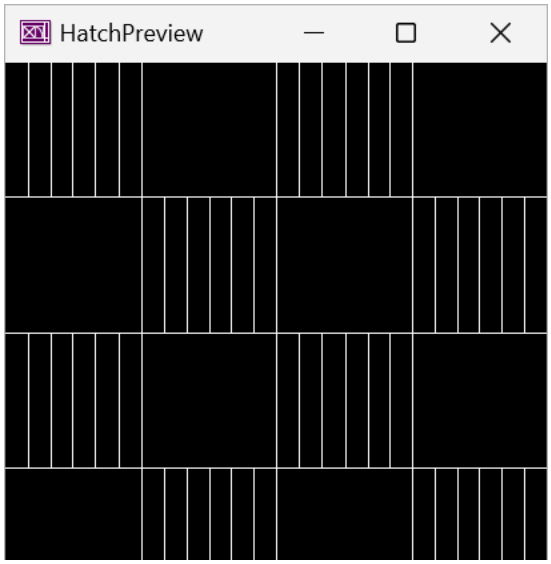


Figure 0.21: Hatch Pattern Editor Preview

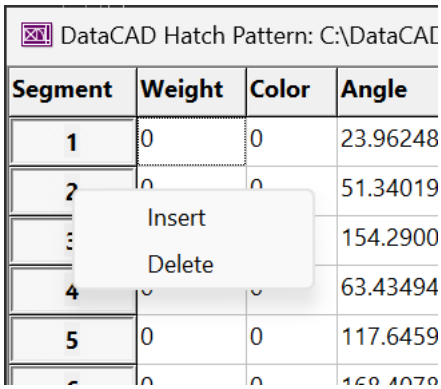


Figure 0.20: Hatch Pattern Editor Context Menu

A context menu provides options to **Insert** new or **Delete** existing segments.

Multi-View Window Enhancements

Magnetic Windows

It's now possible to 'magnetize' Multi-View Windows so they 'snap' to each other and the edges of your monitor(s). By default, Multi-View Windows are not magnetic. A **Snap Distance** key has been added to the **MultiView Windows** section of DCADWIN.ini. Set this key to a value greater than zero (i.e., 24) to enable magnetic windows. This value defines the proximity in pixels where tool windows will snap to each other or the edge of the screen.

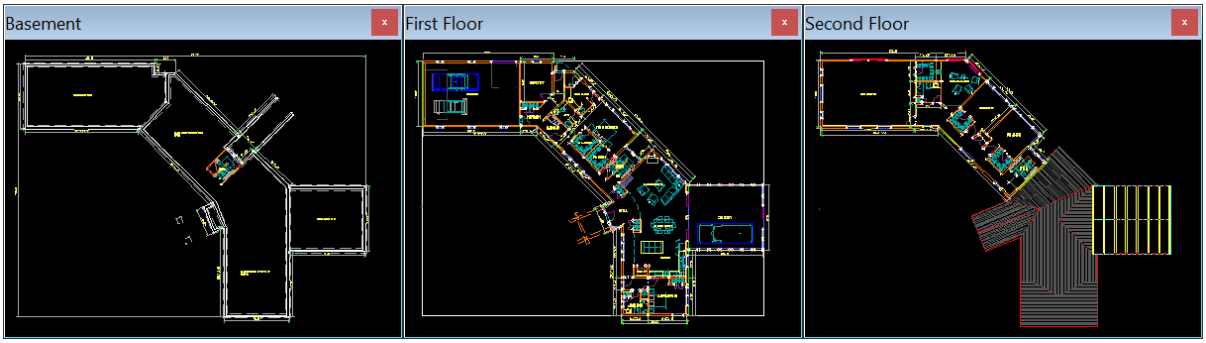
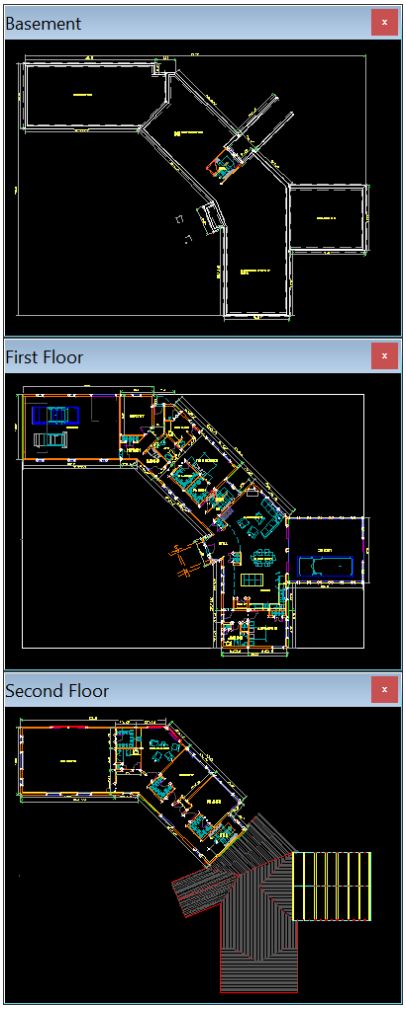


Figure 0.22: Magnetic Multi-View Windows



Customizable Dock Sites

You can now set which edge (Top, Bottom, Left, Right) of DataCAD's program window Multi-View Windows will dock to. The following keys have been added to the **MultiView Windows** section of DCADWIN.ini. By default, Multi-View Windows will dock to all four sides of DataCAD's program window. Set any key to FALSE to prevent the tool window from docking to the corresponding edge.

```
[MultiView Windows]
Dockable to Top=TRUE
Dockable to Bottom=TRUE
Dockable to Left=TRUE
Dockable to Right=TRUE
```

Docked Width & Height

You can now set the docked width and height of Multi-View Windows. Previously, the docked height and width were set to 9% of the monitor's resolution. The following keys have been added to the **MultiView Windows** section of DCADWIN.ini.

```
[MultiView Windows]
Docked Width=
Docked Height=
```

Figure 0.23: Magnetic Multi-View Windows

Minimum Width & Height

You can now set the minimum width and height of Multi-View Windows. The default is 32 pixels for both. The following keys have been added to the **MultiView Windows** section of DCADWIN.ini.

```
[MultiView Windows]
Min Width=
Min Height=
```

Miscellaneous Enhancements

Drawing Information Dialog

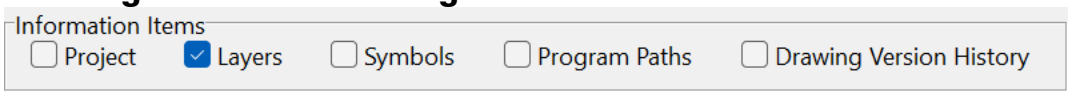


Figure 0.24: Drawing Information Items

A new option, Drawing Version History, has been added to the Information Items section of the Drawing Information dialog. Check this option to display a list of versions and dates the current drawing has previously been saved in.

Note: DataCAD 12 was the first release to store the last version and date the file was save in.

The state of the information item checkboxes in the Drawing Information Dialog is now remembered on a per-drawing basis. The default initial state of the checkboxes can be set in the **Drawing Information Dialog** section of DCADWIN.ini.

PDF Convert Multiple Pages Confirmation

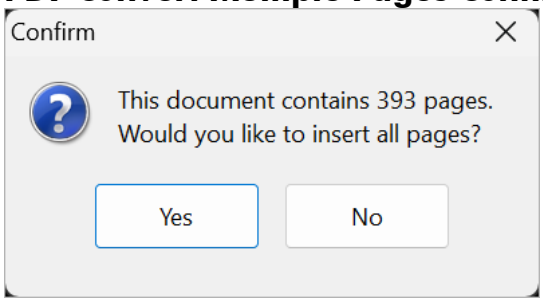


Figure 0.25: Multi-page Convert Confirmation

A confirmation dialog will now appear before you insert multi-page PDFs. Select Yes to convert all pages, or No to convert the first page only.

64 Bit PDF to Image Conversion

A 64 Bit conversion library is now used by default to convert PDFs to bitmaps. You can revert to the 32-bit library by setting the key, **Use 64 Bit PDF to Image Conversion**, to **False**.

Drawing Repair

For convenience, the Repair option is now available from the File pull-down menu when a drawing is open. Selecting this option when one or more files are open will require you to close all files before continuing with the repair.

3D Entity Testing

The included angle between the beginning and ending angles of 3D Arcs, Cylinders, Cones, Truncated Cones, Spheres, Tori, and Surfaces of Revolution is now tested.

Larger Default Near Zero Tolerance

The previous default tolerance for near zero tests has been changed from 1E-12 (One Trillionth) to 1E-6 (One Millionth). So, if the length between two points is less than one millionth of a 32nd of an inch, it will be considered zero length.

User-definable Epsilon Values

The epsilon (i.e., near zero) values are now user-definable via DCADWIN.ini. The default is 1E-6 (One Millionth). The tolerance can be set independently for Angles, Length, Radius, and Text Size (See DCADWIN.ini in *New Configurations Settings*).

Error Codes

The entity error reporting routines have been updated to return codes that correspond to the invalid property. The following table is now included at the end of the error report.

```
Entity Error Code Reference:
----------------------------
100: Invalid Entity Type
101: Zero Length Line
102: Invalid Floating Point Value
103: Zero Length Radius
104: Zero Degree Angle
105: Invalid Number of Control Points
106: Invalid Number of Leader Control Points
107: Color Index Out Of Range
108: Invalid Number of Vertices
109: Invalid Point Array
110: Invalid Smart Entity Control Point Count
111: Invalid Smart Text Font Height
```

Note: Entities are marked as invalid based on the first test to fail. Entities that contain multiple errors will only report the first error discovered during the audit.

Batch Printing Bookmarks

A new key, **Merged PDFs Add Bookmarks**, has been added to the **BatchPlot** section of DCADWIN.ini. The default value is False. If True, DataCAD will use the Layout Filename to create a corresponding bookmark in merged PDFs.

DWF Background Color

Drawing files exported to DWF format now have a white background by default.

Identify, Set All

Identify, SetAll will now set the state of the SPB-Fill Boundary On/Off toggle.

o2c Textures

Any of the newly supported image file types can now be used as o2c textures.

Internationalization

The hard-coded messages that are used during program startup when a necessary file is not found have been expanded to include French, Portuguese, and Spanish strings. The OK button in this dialog now uses the local language string for OK.

'Filename' ' does not exist.' (English)
'Filename' ' no existe.' (Spanish)
'Filename' ' n''existe pas.' (French)
'Filename' ' não existe.' (Portuguese)

The hard-coded messages that are used to indicate DataCAD is unable to read message from message file have been expanded to include the following locations.

[BR] Brazil, [CZ] Czechia, [DE] Germany, [ES] Spain, [FR] France, [HU] Hungary, [IT] Italy, [LV] Latvia, [MX] Mexico, [PL] Poland, [PT] Portugal, and [RO] Romania.

BR: 'Não é possível ler a mensagem do arquivo de mensagem.'
CZ: 'Nelze precíst zprávu ze souboru zpráv.'
DE: 'Nachricht kann nicht aus Nachrichtendatei gelesen werden.'
ES: 'No se puede leer el mensaje del archivo de mensajes.'
FR: 'Impossible de lire le message à partir du fichier de messages.'
HU: 'Az üzenet nem olvasható az üzenetfájlból.'
IT: 'Impossibile leggere il messaggio dal file del messaggio.'
LV: 'Nevar nolasit zinojumu no zinojuma faila.'
MX: 'No se puede leer el mensaje del archivo de mensajes.'
PL: 'Nie mozna odczytac wiadomosci z pliku wiadomosci.'
PT: 'Não é possível ler a mensagem do arquivo de mensagem.'
RO: 'Nu se poate citi mesajul din fisierul cu mesaje.'
US: 'Unable to read message from message file.'

In Program Preferences, the defaults option in the Paths tab will now set the default paths based on the installed language.

For example:
The default path for Materials in English speaking countries is Materials\.

For French it should be Matériaux\
For Portuguese it should be Materiais\
For Spanish it should be Materiales\

New Configuration Settings

DataCAD 23 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 23 installation folder (C:\DataCAD 23\DCADWIN.ini by default).

- For potential improvements in performance, and for consistency within DataCAD's source, DCADWIN.ini is now accessed exclusively from memory during program operation. The caveat to this change is that all manual edits to DCADWIN.ini must be made while DataCAD is not running. Otherwise, they will be overwritten when the program is closed.

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

[General]
Require DCADWIN.ini on Startup

If True, the default, DataCAD will halt during program startup if DCADWIN.ini is not present.
If False, DataCAD will run using default values and DCAWIN.ini will be recreated.

Save All On Forced Shutdown

DataCAD's forced shutdown logic has been updated to be compliant with Windows 11 guidelines.
If True, the default, all open drawings will be closed, then 'quick' saved (unused data such as deleted entities will not be purged). To cause all drawings to be closed but not saved during a forced shutdown, set this key to False.

Sort DCADWIN.ini On Exit

If True, the default, DCADWIN.ini will be sorted alpha numerically during program shutdown.
If False, sorting will not occur.

Sort GUI Files On Exit

If True, the default, DataCAD's GUI files will be sorted during program shutdown.
If False, sorting will not occur.

Use Internal Color Palette

If True, the default, DataCAD will read the embedded default color palette when the externally reference RGB file cannot be found.
If False, DataCAD will halt operation during startup when 'Default.rgb' cannot be found.

Use Internal Message Strings

If False, the default, DataCAD will halt during startup when any of the menu, message, and label files cannot be found. This includes DCADWIN.mnu, DCADWIN.lbl, DCADWIN3.lbl, DCADWIN.msg, and DCADWIN3.msg.
If True, DataCAD will only use the embedded files (the files on disk will be ignored).

Use Internal Support Files

If True, the default, DataCAD will read the embedded support files when the external files cannot be found. This includes DCADWIN.scl, DCADWIN.ang, DCADWIN.dis, and DCADWIN.dec.
If False, DataCAD will halt during startup when any of these are not found.

USER_LANG

Stores the language selected during installation (i.e., EN, FR, ES, PT).

Max Program Title Length

A hard-coded length of approx. 144 characters is applied by Windows to the application title when the Drawing Form is maximized, and its caption is concatenated onto DataCAD's title bar. This can cause the drawing's file name to get truncated or completely removed if it is in a deeply nested path. By default, if the fully qualified name is longer than 144 characters, the left-hand side of the string will be truncated and pre-pended with '...' to preserve the complete drawing file name.

Note: The MDI form caption supports 255 characters, so limiting the length to 144 characters will apply to both. To restore the previous behavior, set this value to 255.

[Audit]
Valid Angle Epsilon=1E-6

The user-definable tolerance for testing the beginning and ending angles of 3D Arcs, Cylinders, Cones, Truncated Cones, Spheres, Tori, and Surfaces of Revolution in Radians.

Valid Length Epsilon=1E-6

The user-definable tolerance for testing the length between two points. By default, if the distance is less than one millionth of a 32nd of an inch, it will be considered zero length.

Valid Radius Epsilon=1E-6

The user-definable tolerance for testing the radius value.

Valid Text Size Epsilon=1E-6

The user-definable tolerance for testing the height of text.

[BatchPlot]
Merged PDFs Add Bookmarks

The default value is False. If True, DataCAD will use the Layout Filename to create a corresponding bookmark in merged PDFs.

[DEBUG]
New SPB-Fill

If True, the default, the new transparent fill capabilities are enabled.

New PDF Printing

If True, the default, the new PDF Printing capabilities are enabled.

New/Old Print Dialog

The display of the New/Old Print Option Dialog is now determined by this key.

Warn On Force Directory

The default is False.

[Dialogs]

Dynamic Resizing

Some dialogs, such as the Smart Entity Managers, will no longer resize dynamically by default. If performance is not an issue, you can enable dynamic resizing of dialog layouts by setting the key, Dynamic Resizing, to True.

Gap Width

The gap width, exposed in some dialogs, can now be customized by setting the Gap Width key. The default value is 6 pixels at 100% scaling. A value of 0 would cause there to be no gap between components in some dialogs.

[Display]
Built-In Pattern Brush Size

The default value is 8 (meaning 8x8 pixels). Setting this key to a higher value such as 16 will double the scale of built-in pattern fills.

Max Bitmap Size

Note: You can set the maximum size (i.e., width/height in pixels) for bitmaps by changing the key, Max Bitmap Size, in the [Display] section of DCADWIN.ini from its default value of 0. To limit the size of images in memory to a maximum width/height of 2048, set this value to 2048. Any image that is larger in width or height than 2048 pixels will be resampled for display to this value. Smaller images will remain unchanged. Changing this value may be useful if you're experiencing performance issues when using a lot of large images in your drawings.

Use Global Bitmap Cache

[Drawing Information Dialog]

The state of the information item checkboxes in the Drawing Information Dialog is now remembered on a per-drawing basis. The default initial state of the checkboxes can be set in the 'Drawing Information Dialog' section of DCADWIN.ini.

Show Layers

The default is True.

Show Program Paths

The default is False.

Show Project

The default is False.

Show Symbols

The default is False.

Show Version History

The default is False.

[DXF_DWG]
DWF White Background

The default is True (White) for DataCAD 22.02 Subscription, otherwise it is False (Black).

Ignore XREFs During Import

The default is False. If True, DataCAD will not convert external DWG files that are XREF'ed into the file being converted.

[HatchPatterns]

Advanced Options

The default is False. If True, the Hatch Pattern Manager will display advanced options for editing external hatch pattern definitions.

Default Angle

The default is 0. The angle in decimal degrees for PAT to DHP conversion.

Default Display Scale

The default is 1. The Display Scale index for PAT to DHP conversion.

Default Scale

The default is 200. Scale factor, where 1 = 1/32", applied to the segment values for PAT to DHP conversion.

Fix Angles During Convert

The default is True. Negative angles that would otherwise cause the pattern to 'bleed' outside of the hatch boundary will be normalized during PAT to DHP conversion.

[Identify]
Symbol Show Item Name

The default is True. Identify will show the symbol's item name. If False, only the symbol's fully qualified name will be shown.

[MultiView Windows]

Dockable to Bottom

The default is True. Multi-View Windows can dock to bottom of application window.

Dockable to Left

The default is True. Multi-View Windows can dock to left side of application window.

Dockable to Right

The default is True. Multi-View Windows can dock to right side of application window.

Dockable to Top

The default is True. Multi-View Windows can dock to top of application window.

Docked Height

The default is 9% of the monitor’s height in pixels.

Docked Width

The default is 9% of the monitor's width in pixels.

Magnetize

The default is False. If True, and Snap Distance is greater than zero, Multi-View Windows will ‘snap’ to each other and the edges of your monitor(s) when they are within the specified Snap Distance.

Min Height

The default is 32 pixels. The minimum width a Multi-View Window can be resized to.

Min Width

The default is 32 pixels. The minimum height a Multi-View Window can be resized to.

Snap Distance

The default is 0 and must be greater than zero to have any affect. The proximity in pixels where Multi-View Windows will 'snap' to each other or the edges of the screen.

[o2cQuick]

LoadDataCADView

If True, and Remember Last View is False, Quick o2c will display the current drawing view if it is a perspective projection. Otherwise, the default o2c view will be shown.

Remember Last View

If True, Quick o2c will restore the last view for a given window.

[PDF]

Disable Layers In Preview

False by default. If True, the option to save a PDF file that includes layers directly from the preview will not be available. This setting does not affect Batch Printing.

Enable Compression

True by default. The contents of PDF files are compressed whenever possible.

JPEG Quality

The quality factor range for JPEG files is 1 to 100. The default is 80%.

Max Vectors Per Stream

The data in PDF files is made up of content steams that contain vectors and other data. The default value of 5000 should be sufficient in most cases. However, this value can be adjusted upward to 10000 if you experience out of memory errors when generating complex output.

Note: Setting this value below 5000 or above 10000 could result in slower PDF generation times.

PNG Compression

The range of compression values for PNG files are from 0 (no compression) to 9 (best compression). The default is 5.

Render Library

The default is PDFium. This sets the rendering library to use for displaying PDF files. Other options are Default, GDIPlus, Cairo (not used), and Debenu.

Store Redundant Entity Properties

The default is True.

Tile Pattern Dpi

The default is 300. Affects the tile size of pattern fills on the printed page.

Use 64 Bit PDF to Image Conversion

The default is True. A 64-Bit conversion library is used by default to convert PDFs to bitmaps. You can revert to the 32-bit library by setting this key to False.

Use Default App For Preview

The default is False. If True, DataCAD will use the default application associated with PDFs to display the output instead of the built-in viewer.

[PDF Information]

Author

The default is blank. Enter a string to use for the PDF Author field.

Creation Date

The default is the current date.

Creator

The default is 'DataCAD PDF Generator v2.0'.

Keywords

The default is blank. Enter a string to use for the PDF Keywords field.

Modified Date

The default is the current date.

PDF Version

The default is 1.5. Enter 1.6 for Acrobat 7.x, 1.7 for Acrobat 8.x, 1.8 for Acrobat 9.x, and 1.9 for Acrobat X.

Producer

The default is 'DataCAD Version: 23.00.00'.

Subject

The default is the current drawing name.

Title

The default is blank. Enter a string to use for the PDF Title.

[PDF Security]

Changing the Document

The default is True. Allow changes to the document's contents.

Commenting

The default is True. Allow adding annotation to the document.

Content Accessibility

The default is True. Allow text access for screen reader devices for the visually impaired.

Content Copying

The default is True. Allow the document's contents from being copied.

Document Assembly

The default is True. Allow combining or attachment with other documents.

Form Filling

The default is True. Allow form field fill-in or signing.

Page Extraction

The default is False. Prevent extraction of contents. This is the minimum restriction for password-protected documents.

PDF Encryption Level

The default is 0. Acrobat 6.0 and later.

Printing High Resolution

The default is True. Allow high-resolution printing.

Printing

The default is True. Allow printing.

[PDF Watermark]

Apply Watermark

The default is False. If True, a watermark will be added to each page in the PDF document.

Blend Mode=Difference

The default is Difference. This key can be set to one of the following values: Normal, Multiply, Screen, Overlay, Darken, Lighten, ColorDodge, ColorBurn, HardLight, SoftLight, Difference, Exclusion, Hue, Saturation, Color, or Luminosity.

Image Align Horizontal

The default is Center. Sets the horizontal alignment of the image inside the bounding box. You can set the horizontal alignment to either Left, Center, or Right.

Image Align Vertical

The default is Middle. Sets the vertical alignment of the image. You can set the vertical alignment to either Top, Middle, or Bottom.

Image Height

The default is 100. Sets the height in percentage of the page for the bounding box.

Image Left

The default is 0. Sets the left edge in percentage of the page for the bounding box.

Image Rotate

The default is None. (This key is for future use and is not currently used).

Image Top

The default is 0. Sets the top edge in percentage of the page for the bounding box.

Image Width

The default is 100. Sets the width in percentage of the page for the bounding box.

Transparency

The default is 50. Sets the transparency in percentage from 0 (completely opaque) to 100 (completely transparent).

Watermark Image

The default is blank. The path to a supported bitmap image.

Watermark Text

The default is blank. (This key is for future use and is not currently used).

[StatusArea]

New Drop Down Width Calculation

A new key, New Drop Down Width Calculation, has been added to the [StatusArea] section of DCADWIN.ini. The current default is False as this could cause the width of the Status Area and Types toolbar dropdowns to change unexpectedly. You can set this value to True (which will be the default in the next major release version), to get a tighter fit when these toolbars are docked vertically.

[SymbolBrowser]
Refresh On Zoom Window

The default value is False. If True, the Symbol Browser will be refreshed whenever a WindowIn is performed. This was the previous behavior.

[Toolbars On By Default]

The default visible state of toolbars can now be set from the View, Toolbars dialog. Once you've set the On/Off state of the toolbars listed in this dialog, you can click Set As Default. If DataCAD needs to reset the program interface due to a change in the desktop layout, your default toolbar states will be used.

TBContext

Context Toolbar (True by default)

TBCoordinate

Coordinates / Hints Toolbar (True by default)

TBIconA

Icon Toolbar I (True by default)

TBIconB

Icon Toolbar II (False by default)

TBIconC

Icon Toolbar III (False by default)

TBIconD

Icon Toolbar IV (False by default)

TBMView0

Multi-View Window 1 (False by default)

TBMView1

Multi-View Window 2 (False by default)

TBMView2

Multi-View Window 3 (False by default)

TBMView3

Multi-View Window 4 (False by default)

TBMView4

Multi-View Window 5 (False by default)

TBMView5

Multi-View Window 6 (False by default)

TBMView6

Multi-View Window 7 (False by default)

TBMView7

Multi-View Window 8 (False by default)

TBMView8

Multi-View Window 9 (False by default)

TBMView9

Multi-View Window 10 (False by default)

TBNavigation

Navigation Toolbar (True by default)

TBoSnap

Object Snap Toolbar (True by default)

TBProjection

View Projection Toolbar (True by default)

TBRendering

Rendering Toolbar (True by default)

TBStandard

Standard Toolbar (True by default)

TBStatus

Status Toolbar (True by default)

TBSwothlud

SWOTHLUDFB “Icons” Toolbar (False by default)

TBSwothludfb

SWOTHLUDFB “Text” Toolbar (True by default)

TBSymbolBrowser

Symbol Browser (True by default)

TBTypes

Smart Entity Types (True by default)

TBView

Viewing & Rendering Toolbar (True by default)

New Extended Character Codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" in Chapter 30 of the DataCAD Reference Manual.

3050# Polyline Cover Toggle On

3051# Polyline Cover Toggle Off

3052# Layer Set Toggle On

3053# Layer Set Toggle Off

3054# Sel. Set Append On

3055# Sel. Set Append Off

3056# Set Reference Point at Zero

Enhancements to DCAL

To support the new fill settings, and to maintain backward compatibility, DataCAD's fill attributes ('DC_IMG_1' (Fixed Aspect), 'DC_IMG_2' (Stretch to Fit), 'DC_IMG_3' (Pattern Brush (a.k.a. Bitmap Brush), and 'DC_FILL' (Color / Hatch)) now utilize the xData.Data byte array to store the new SPB fill settings.

```
xData.Data[0] = Version = 2
xData.Data[1] = Fill Color Red ( 0 - 255 )
xData.Data[2] = Fill Color Green ( 0 - 255 )
xData.Data[3] = Fill Color Blue ( 0 - 255 )
xData.Data[4] = Pattern Color Red ( 0 - 255 )
xData.Data[5] = Pattern Color Green ( 0 - 255 )
xData.Data[6] = Pattern Color Blue ( 0 - 255 )
xData.Data[7] = Fill Pattern ( 0 = Solid, 1-6 = Hatch Brush, 255 = Bitmap
Brush )
xData.Data[8] = Do Bitmap ( 0 = False, 1 = True )
xData.Data[9] = Do Fill Color by Entity ( 0 = False, 1 = True )
xData.Data[10] = Do Pattern Color by Entity ( 0 = False, 1 = True )
xData.Data[11] = Fixed Aspect ( 0 = False/Stretch, 1 = True/Fixed Aspect )
xData.Data[12] = Fill Opacity ( 0 = Completely Transparent, 255 =
Completely Opaque )
xData.Data[13] = Bmp Opacity ( 0 = Completely Transparent, 255 =
Completely Opaque )
xData.Data[14] = Bmp Opacity Method ( 0 = From Image, 1 = Custom, 2 =
Ignore (not implemented), 3 = By Color )
xData.Data[15] = Fill Color Index ( 0 = Custom, or Index, 1 - 255 )
xData.Data[16] = Pattern Color Index ( 0 = Custom, or Index, 1 - 255 )
xData.Data[17] = Transparent Color Index ( 0 = Custom, or Index, 1 - 255 )
xData.Data[18] = Transparent Color Red ( 0 - 255 )
xData.Data[19] = Transparent Color Green ( 0 - 255 )
xData.Data[20] = Transparent Color Blue ( 0 - 255 )
xData.Data[21] = Transparent Color Tolerance ( 0, Exact Match - 255, Match
All )
```

DCAL for Delphi

New Sample Projects

Polyhedron



Figure 0.26: Icosahedrons with various division settings.

TorusKnot



Figure 0.27: Torus Knot path mapped around a torus.

DCAL for C++

DCAL for DOS

DataCAD 22

DataCAD 22 contains a collection of new features and enhancements designed to increase your productivity. The DataCAD 22 drawing file format is currently compatible with DataCAD 15 through 21. However, you must use the **Save As** command in the **File** menu to save files backward to older version formats.

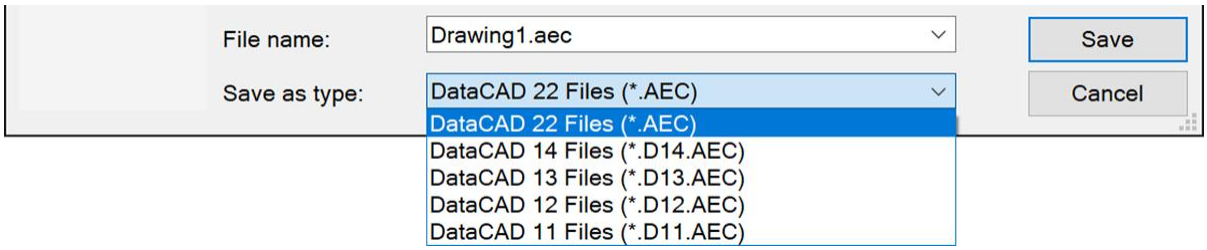


Figure 0.1: File, Save As Dialog

SketchUp 2019

In addition to the existing support for SketchUp 7, 8, and 2013 through 2015 files, DataCAD's translators have been updated to support reading and writing SketchUp 2016 through 2019 formats.

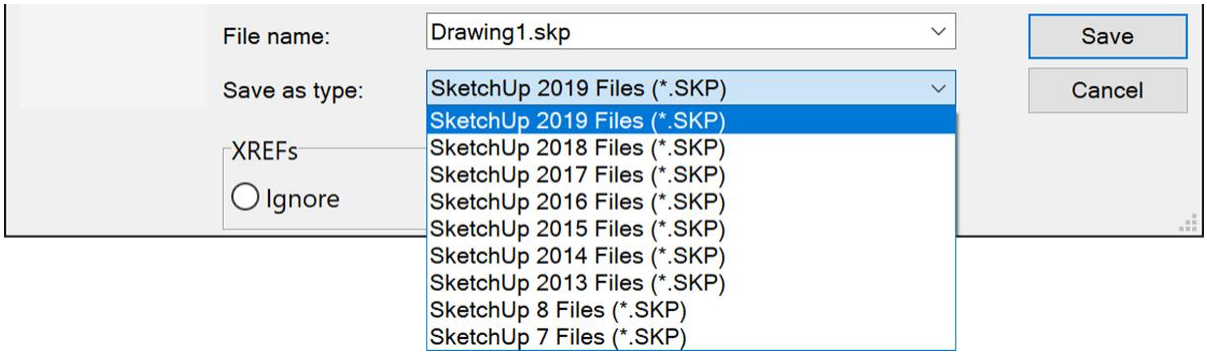


Figure 0.2: File, Export, SketchUp Dialog

Insert PDF as Image

A new option, **PDF**, has been added to the **Insert** pull-down menu. By default, the pages of the PDF file you select will automatically be converted to 300 dpi bitmaps in PNG format, and located in the same folder as the original(s). The converted file(s) will have the same name with a ' PDF_Pg-01 (300dpi)' suffix.

For example:
Source PDF File: MyDesign.pdf
Corresponding PDF Bitmap: MyDesign PDF_Pg-01 (300dpi).png

Note: If necessary, you will be prompted to provide a Document Open and Document Permissions password before inserting or reconverting password-protected PDF documents.

Dynamically or Fixed Size Placement

There are two methods you can use to place a PDF bitmap in your drawing: **Dynamically Sized** and **Fixed Size**. If you choose **Dynamically Sized**, you will be prompted to select the first point of the bitmap rectangle followed by the second point for each page in the PDF document. For multi-page documents, you can right-click after placing a page to skip inserting subsequent pages.

If you choose **Fixed Size**, you will be presented with a bounding rectangle that is scaled based on the PDF's paper size and the current plot scale. So, if the PDF's paper size is 24x36 and the current plot scale is 1/4" = 1'-0", DataCAD will enlarge the rectangle 48 times, to be 96' x 144'. You can use the menu option **Print Scale**, or the hotkey combination [Shift] + PgUp/PgDn to change the current plot scale before placing the bitmap.

As with Dynamically Sized, you will be prompted to pick the location for the center of each page in the PDF document. For multi-page documents, you can right-click after placing a page to skip inserting subsequent pages. If you would like the document to resize automatically when you change your plot scale, toggle on the **Lock Size** option before placing the image. For convenience, you can use the **Abs. Zero** option to place the center of the document at the origin of the drawing.

Note: All the pages in a multi-page PDF document will be converted to images prior to placing the first page. So, avoid inserting PDFs that contain more than a few pages.

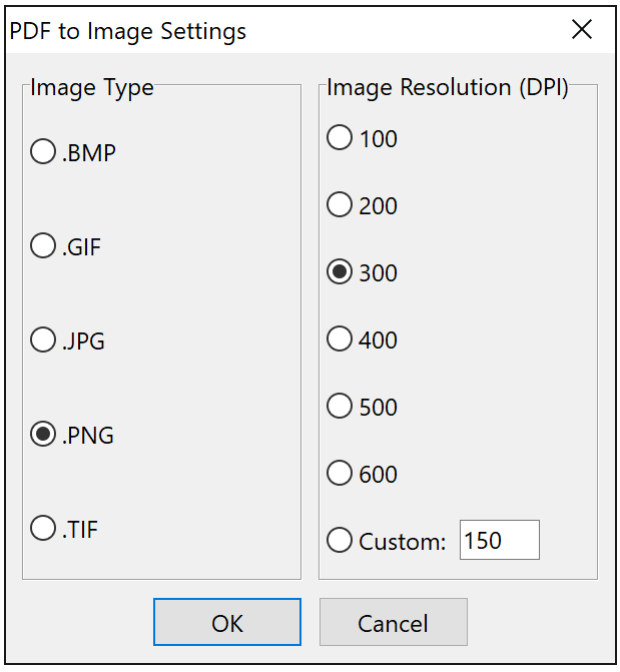


Figure 0.3: PDF to Image Settings Dialog

To control the image type and resolution of the converted PDF pages, use the **Insert** > **PDF to Image Management** > **Settings** menu. In the PDF to Image Settings dialog, select the image type (BMP, GIF, JPG, PNG, or TIF) and the image resolution in dots per inch (100, 200, 300, 400, 500, or 600). You can also enter a custom value from 72 to 1200.

These settings are stored on a per-drawing basis. PDF Images that you insert, retain the settings you used a the time they were converted.

Note: If the conversion process fails due to insufficient memory, try using a lower resolution.

If the source files have changed, and you need to update the PDF images in your drawing, use the **Insert** > **PDF to Image Management** > **Reconvert All** option to reconvert all the PDF pages in your drawing.

Note: Reconverting all the PDF document pages you have inserted in your drawing may take a long time depending on the number and resolution of the images.

To modify a single PDF image, [Ctrl] + Right-click on the image to access the context menu. Highlight **PDF to Image Tools** to either **Reconvert**, or if the boundary was dynamically sized, **Resize** the image. **Reconvert** allows you to change the resolution of the image. A checkmark is displayed next to the current resolution. **Resize** allows you to resize the bounding rectangle.

PDF Tools

Two PDF Tools have been added to the File pull-down menu: **PDF Merge** and **PDF Security**.

PDF Merge

Use **PDF Merge** to combine several PDF files into a single document. At first, you are prompted to enter the name of the master document that will contain the merged files. The second step is to select the PDF files to merge. In the file dialog, multi-select the files to merge then click **Open**.

Note: The merge function does not allow combining password-protected files. Prior to attempting the merge, the files you select are checked for passwords and the process will be cancelled if any of them require one.

PDF Security

Use the **PDF Security** options to set document restrictions or to password protect existing PDF files.

Restrictions

To set restrictions, select **File** > **PDF Security** > **Restrictions**. In the file dialog, select the PDF file(s) you would like to apply restrictions to then click **Open**. In the PDF Restrictions dialog, check the document restrictions to apply.

The PDF Restrictions dialog options conform with Adobe Acrobat's permission options. The items you check will be restricted (not allowed) by Acrobat, and third-party viewers that adhere to these standards.

Printing

Check Printing to prevent the document from being printed.

High Resolution
Check High Resolution to restrict printed output to 150 dots per inch.

Content Copying
Check Content Copying to prevent the document's contents from being copied.

Content Accessibility
Check Content Accessibility (not recommended) to prevent text access for screen reader devices for the visually impaired.

Changing the Document
Check Changing the Document to prevent changes to the document's contents.

Commenting
Check Commenting to prevent adding annotation to the document.

Form Filling
Check Form Filling to prevent form field fill-in or signing.

Document Assembly
Check Document Assembly to prevent combining or attachment with other documents.

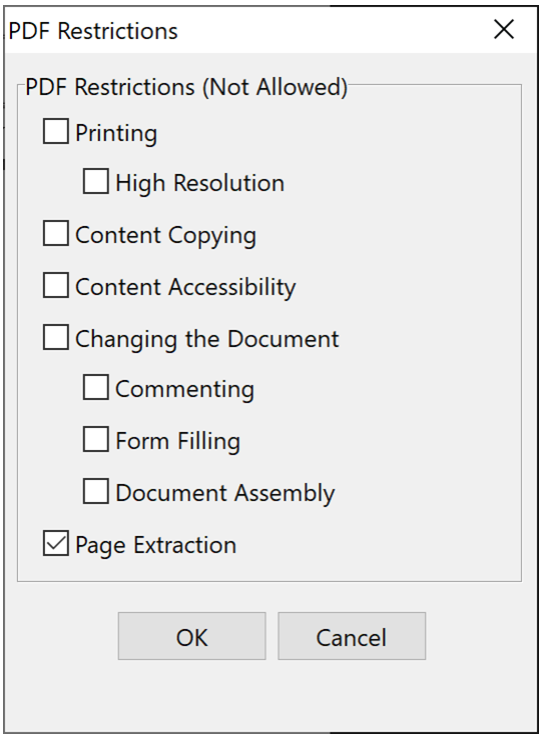


Figure 0.4: PDF Restrictions Dialog

Page Extraction

Note: Page Extraction is the minimum restriction for password-protected documents and cannot be unchecked.

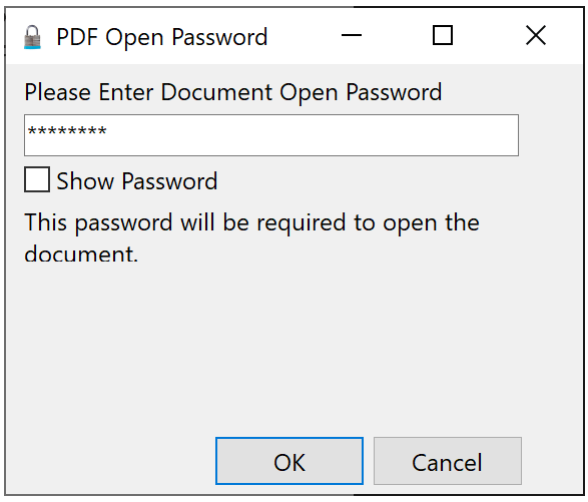


Figure 0.6: PDF Open Password Dialog

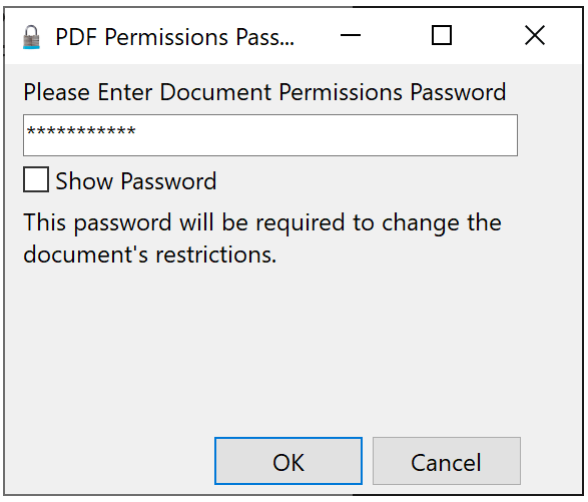


Figure 0.5: PDF Permissions Password Dialog

To set or change restrictions on the document(s) you select, you will be required to provide, if necessary, a Document Open and Permissions Password. Passwords cannot be blank, and the Open and Permissions Passwords must be unique.

Password Protect

To apply a password, select **File** > **PDF Security** > **Password Protect**. In the file dialog, select the PDF file(s) you would like to create a password for then click **Open**. In the Password dialog, enter the password to apply and click **OK**. Files that are already password-protected will be skipped.

PDF Watermark

Use **PDF Watermark** to overlay a custom bitmap on each page of PDF file(s) you select. The bitmap you select will be made 50% transparent and will fit into a square, expanded to the extents of the page width.

To add a watermark to each page of a PDF document, select **File** > **PDF Watermark**. In the File dialog, select the PDF file you would like to watermark then click **Open**. In the Select Image dialog, select a bitmap to use as a watermark then click **Open**.

Object Viewer Enhancements

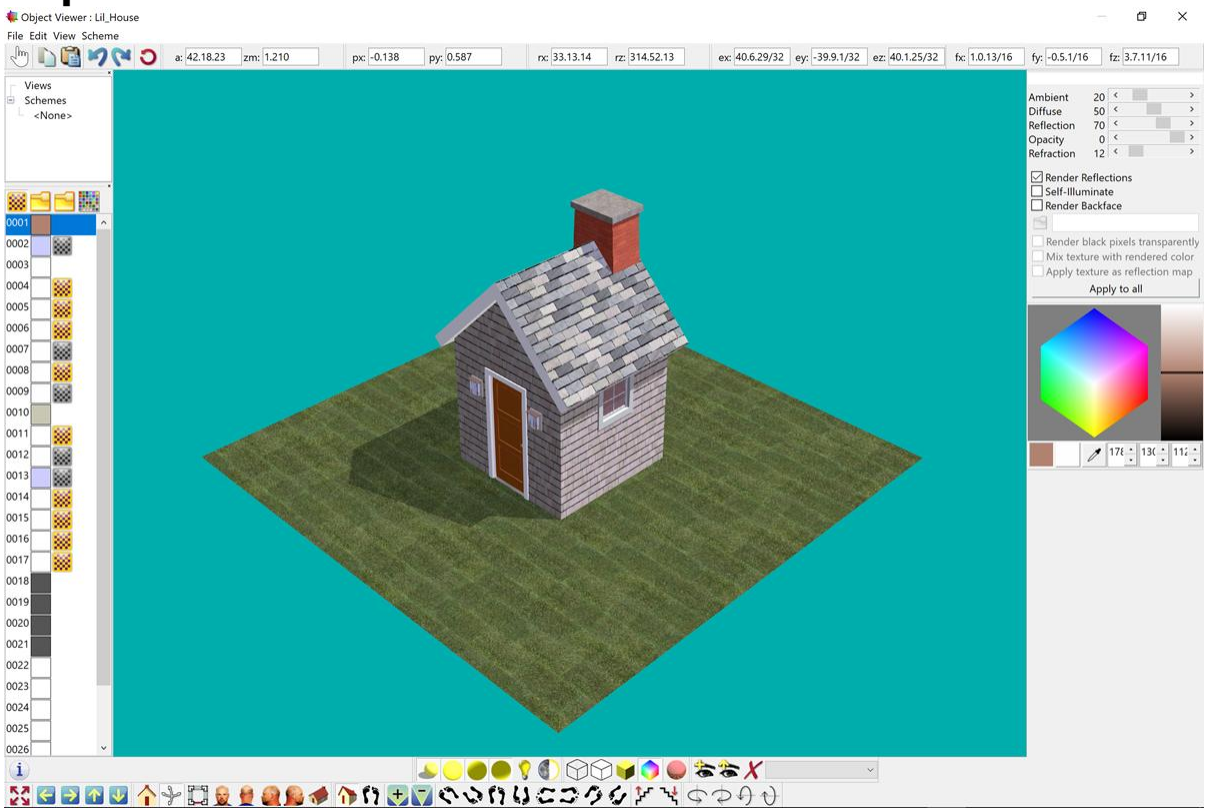


Figure 0.7: DataCAD's Object Viewer Application

Several features and components have been added to DataCAD's Object Viewer to make working with a rendered view of your model more interactive.

Standard Toolbar



Figure 0.8: Object Viewer's Standard Toolbar

The Standard Toolbar contains icons for material selection, copying, pasting, and undo, redo, and reset. When the selection icon is toggled on, navigation with the mouse is disabled. In selection mode, you can click on any surface of your model to make the corresponding material active for editing. You can then use the Material Properties and Material Color toolbars to customize the selected material.

Note: You can toggle selection mode on and off using the [S] hotkey.

You can copy the properties of one material and apply it to another by using the Copy Material and Paste Material icons. These functions are also available from the Edit pull-down menu, the Material Toolbar's context menu, or by using the standard [Ctrl] + [C] and [Ctrl] + [V] shortcuts.

After making changes to a single material, you can use the Undo, Redo, and Reset icons to move backward and forward through the changes or reset the material to its original properties.

Material Toolbar

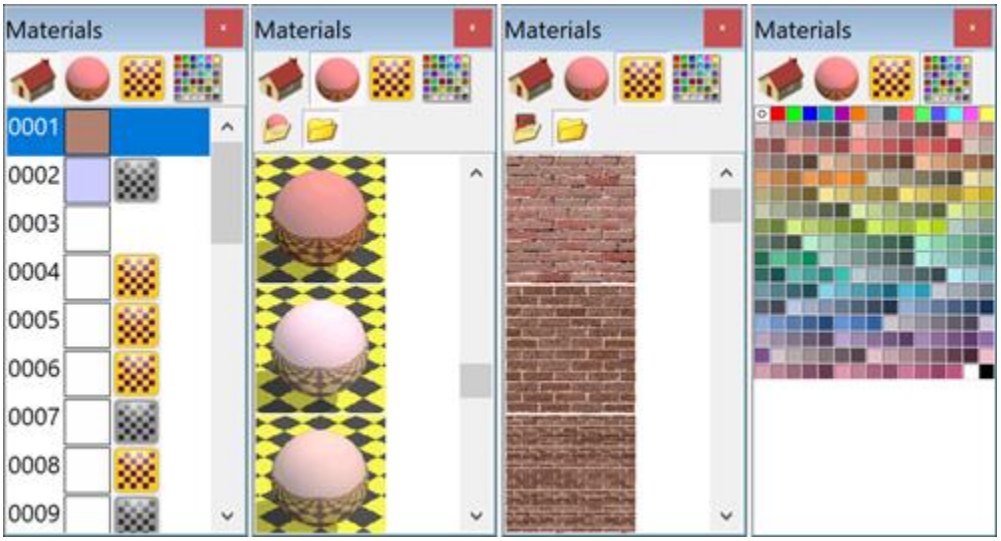


Figure 0.9: Object Viewer's Material Toolbar

In the Material Toolbar, you can browse the material properties associated with the various objects within your model. The four icons along the top of this toolbar toggle what appears in the list. From left to right, the icons correspond to: Current Model's Materials, Available Material Definitions, Available Bitmap Textures, and Color Palettes.

The list of your model's materials appears in the order they were generated when your DataCAD drawing was converted to o2c format. So, it is important for you to know this list will change when you add new entities and materials or change which layers in your drawing are on and off.

Current Model's Materials

Each material has a corresponding index number. However, you can also add a name to each material, so they are more-easily identified.

➔ To give a name to a material:

1. In the Material Toolbar, click on the first icon (checkerboard) to show the current model's list of materials.
2. Click on a material in the list to highlight it.

Note: If you are in Selection Mode, the entities that correspond to this material are highlighted in the Player Window.

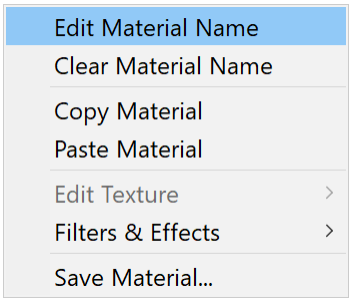
3. Right-click over the material you highlighted. A context menu appears beside the cursor.
4. 

Figure 0.10: Material Toolbar Context Menu

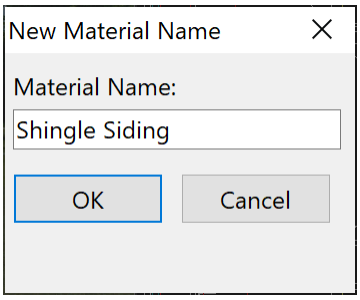
5. Click on Edit Material Name. The Material Name dialog box appears.
6. 

Figure 0.11: New Material Name Prompt

7. Type a name in the input box.
8. Click on OK or press [Enter]. The name appears in the Material Browser's list.
9. Continue giving other materials meaningful names.

➔ To change a material's name:

10. Right-click on the name you want to change in the Material Browser's list.
11. Select Edit Material Name from the context menu. The old name is highlighted in the Material Name dialog box.
12. Type a new name in the input box.
13. Click on OK or press [Enter]. The new name appears in the Material Browser's list.

➔ To clear a material's name and leave it blank:

14. Right-click on the name you want to eliminate.
15. Select Clear Material Name from the context menu. The name disappears from the Material Browser's list, but the index number remains.

Copying and Pasting Material Properties

You can take all the properties (except the source image name) from one material and apply it to another by using the copy and paste functions available in the Material Toolbar.

➔ To copy a material's properties:

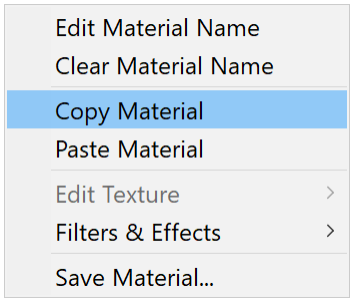
16. Click on a material in the list to highlight it.
17. Right-click to display the context menu.
18. 

Figure 0.12: Context menu for the list of project materials

19. Select Copy Material.
20. The material's definition is now ready to paste onto another material in the list.

➔ To paste a material definition, you previously copied:

21. Click on a material in the list to highlight it.
22. Right-click to display the context menu.
23. Select Paste Material.

Note: You can also use the keyboard shortcuts [Ctrl] + [C] for Copy and [Ctrl] + {V} for Paste to copy any paste material definitions.

Available Material Definitions

In the Material Browser, clicking on the first folder icon displays a list of pre-defined materials from DataCAD's material library. Notice that two new folder icons appear. The first icon allows you to set the path for browsing pre-defined materials. The second toggles the display of materials in sub-folders.

➔ To apply a pre-defined material to the currently selected material:

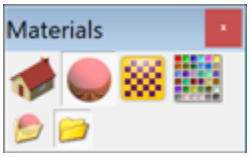
24. 

Figure 0.13: Material Browser Available Materials

25. Click on the first folder icon in the second row to display the Select Material Folder dialog. Scroll down through the Materials sub-folders and click on the Matte folder. Click OK or press [Enter] to set Matte as the parent folder to browse for materials. Make sure the second folder icon in the second row is toggled on so the materials in sub-folders are also displayed.

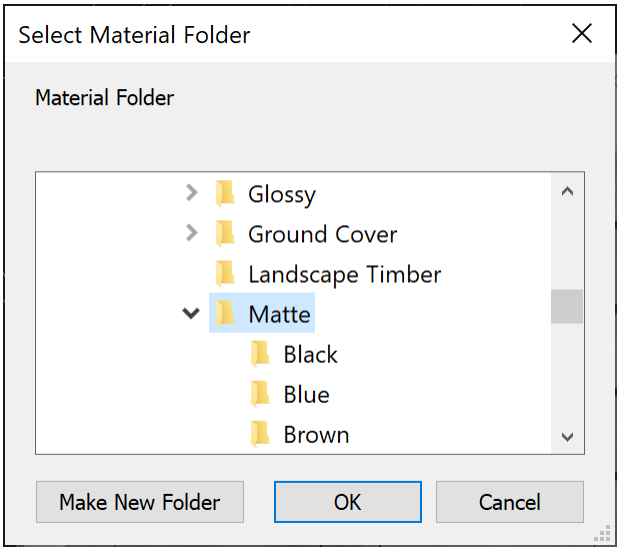
26. 

Figure 0.14: Select Material Folder dialog box

27. 

Figure 0.15: Material Browser displaying pre-defined matte materials

28. Click on a material's preview image to apply its properties to the currently selected material; the change takes effect immediately.

Note: You can display either small or large material preview images. Right-click over the preview images and select Small Icons or Large Icons from the context menu.

Available Bitmap Textures

In the Material Browser, clicking on the second folder icon displays a list of bitmaps from DataCAD's texture library. Just as with pre-defined materials, two new folder icons appear.

➔ To apply a texture to the currently selected material.

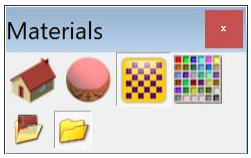
29. 

Figure 0.16: Material Browser Available Textures

30. Click on the first folder icon in the second row to display the Select Texture Folder dialog. Scroll down through the Textures sub-folders and click on the Brick folder. Click OK or press [Enter] to set Brick as the parent folder to browse for materials. The second folder icon in the second row does not need to be toggled on since the Brick folder has no sub-folders to display.

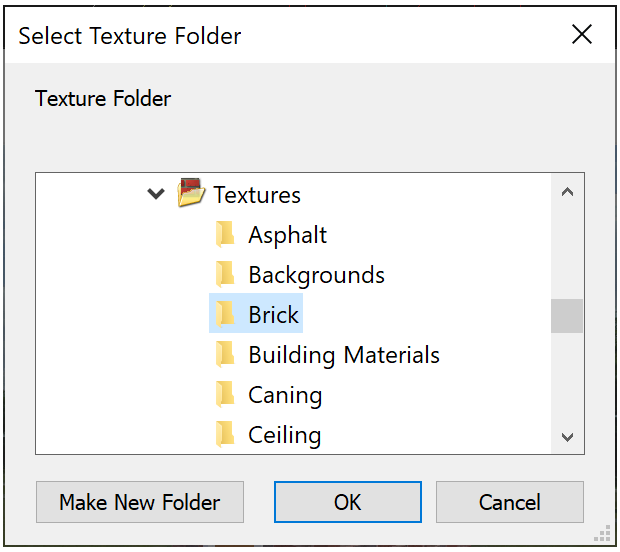
31. 

Figure 0.17: Select Texture Folder dialog box

32. 

Figure 0.18: Material Browser displaying brick textures

33. Click on a material's preview image to apply its properties to the currently selected material; the change takes effect immediately.

Note: You can display either small or large material preview images. Right-click over the preview images and select Small Icons or Large Icons from the context menu.

Color Palettes

You can use the Material Browser's color palette to change the diffuse or reflection color of the currently selected material.

➔ To change the diffuse color of the currently selected material:

34. Click on the color palette icon (the fourth icon from the left). The currently selected color palette appears.

35. Right-click within the palette to display a context menu that lists the available color palettes. Click the one you want to use.
36. To enlarge the color swatches, resize the Material Toolbar.
37. Click on the color swatch you want to apply to the currently selected material; the change takes effect immediately.
38. 

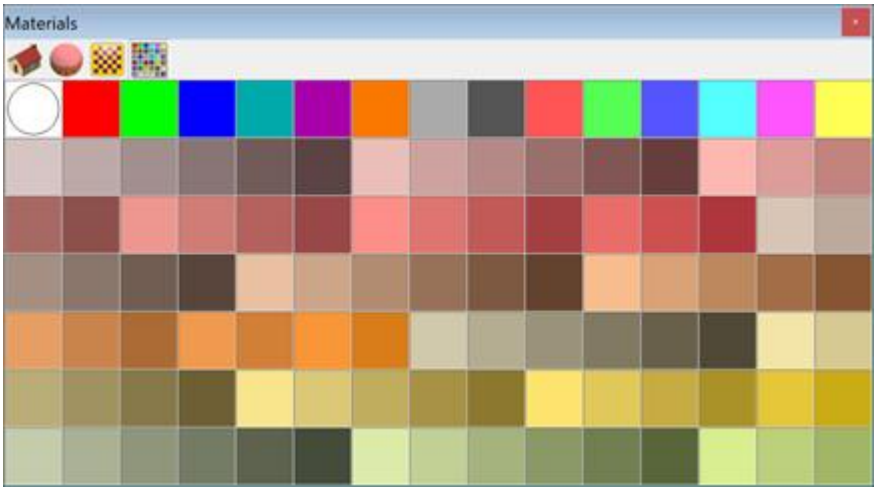
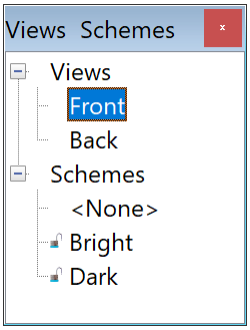


Figure 0.19: Material Browser resized to enlarge color swatches

Figure 0.20: Material Browser displaying current color palette



Views & Schemes Toolbar

Use the Views & Schemes Toolbar for quick access to the views and material schemes you have saved for the current model. Clicking on a view name will immediately change the viewing position in the Object Viewer. Clicking on a scheme name will immediately change the material scheme of the entire model. Select the '<None>' scheme to restore the original materials and textures.

Figure 0.21: Object Viewer's Views & Schemes Toolbar

➔ To save the view that is currently displayed in the Object Viewer's Window:

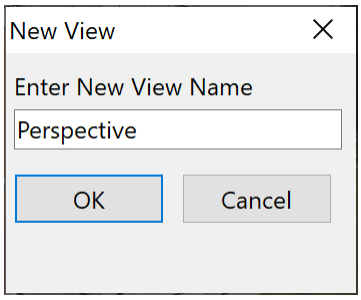
39. Select Add View from the View pull-down menu. The Add View dialog box appears.
40. 

Figure 0.22: The New View dialog

Note: You can also use the built-in keyboard shortcut [Ctrl] + [A] to add views to your project.

41. Type a meaningful name for the view in the input box.
42. Press [Enter] or click on OK.

➔ To save the changes you made to a view:

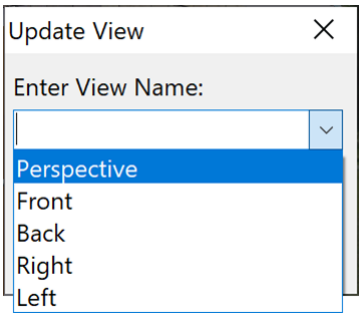
43. Select a view to restore it then make the changes you want.
44. Select Update View from the View pull-down menu. The Update View dialog box appears.
45. 

Figure 0.23: Select the name of the view you want to update

46. Click on the drop-down arrow to display the names of the views you created for this design project.
47. Select one of those views and press [Enter] or click on OK.

➔ To display the list of views you created and named, you can either:

- Click on the [+] button next to Views in the Views & Schemes Toolbar. The names of the views appear in the Views & Schemes Toolbar.

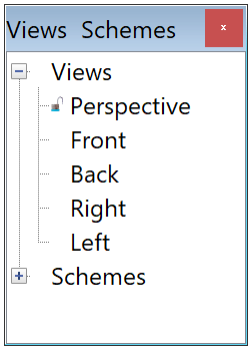


Figure 0.24: The views you create are displayed in the Views & Schemes Toolbar

Or

- Select Views from the View pull-down menu. The names of the views appear in an extended menu.

➔ To switch from the current view to a different one, you can either:

- Click on [+] beside Views to display saved views. Then, click on the name of the view you want in the Views portion of the Views & Schemes Toolbar.

  Or

- Select Views from the View pull-down menu. Then select the name of the view you want to display from those listed in the extended menu.

Working with Schemes

The changes you make to the materials and textures in your project can be saved and recalled by name using Schemes. This allows you to explore and present multiple scenarios for interior and exterior finishes in the same model.

When you first start the Object Viewer, the only thing that appears in the Schemes portion of the Views & Schemes Toolbar is <None>. You can click <None> anytime to restore your project to its original state. The schemes you add to your project appear in the Schemes section of the Views & Schemes Toolbar.

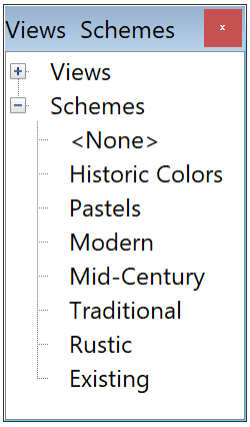


Figure 0.25: The original state of your design can be restored when you click <None> in the Views & Schemes Toolbar

➔ To create and name a new scheme based on the current state of your design:

48. Select Save As from the Scheme pull-down menu. The Save As Scheme dialog appears.

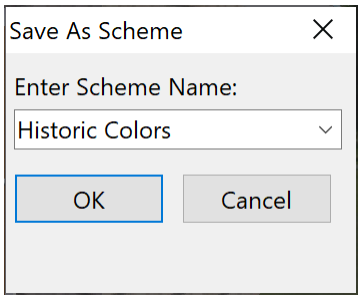
49. 

Figure 0.26: The Save As Scheme dialog

50. Type a meaningful name for your scheme.

51. Click OK or press [Enter]. Notice the scheme's name appears in the Schemes portion of the Views & Schemes Toolbar. Schemes are saved on your computer with the MSC extension.
52. If you would like to update the active scheme based on the latest changes you've made to your project's materials, you can use the Update option from the Scheme pull-down menu. For reference, the name of the active scheme appears next to the Update menu option.

Locking and Unlocking a Scheme

You can lock a scheme to prevent making alterations.

➔ To lock a scheme:

53. Click on the scheme you want to lock in the Schemes branch of the Views & Schemes Toolbar.
54. Right-click to display the context menu.
55. Select Lock Scheme. A padlock appears in front of the scheme you locked.

➔ To unlock a scheme:

56. Click on the locked scheme you want to unlock in the Schemes branch of the Views & Schemes Toolbar.
57. Right-click to display the context menu.
58. Select Unlock Scheme. The padlock disappears from in front of the scheme you unlocked.

Edit Material Toolbar

Use the Edit Material Toolbar to fine-tune the selected material's properties and its rendered display. There are five slider bars that let you control how the material's surface is affected by light.

For entities that had materials assigned to them with Apply Texture enabled, there will be additional options available.

Note: Certain material properties can only be set in DataCAD prior to launching the Object Viewer via the Edit Materials Dialog.

These are Smoothing, Apply Texture, and Texture Scale.

➔ To change how light affects a material by using the slider bars:

59. Click on the square for the material properties value you want to change.

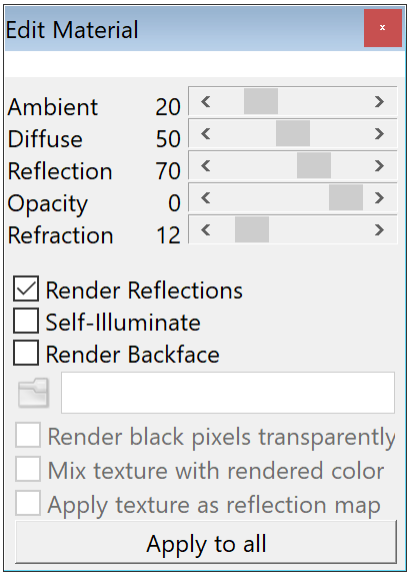


Figure 0.27: Object Viewer's Edit Material Toolbar

60. Drag the bar and watch the effect it has on the material. Alternatively, you can use the [Left Arrow] key or the button on the left of a slider bar to decrease the value; use the [Right Arrow] key or the button on the right of a slider bar to increase the value.

61. Adjust this combination of values to produce the effect you want.

- **Ambient** Increase this value to simulate plastic
- **Diffuse** Decrease this value to simulate velvet
- **Reflection** Increase this value to simulate glossy surfaces like chrome
- **Opacity** Increase this value to simulate transparent materials like glass
- **Refraction** Less than 10 simulates water; 10 equals air (no refraction); more than 10 simulates glass

Render Reflections

By default, all materials can reflect light from the surrounding environment. How much of that light is reflected is determined by the reflection value. A material's reflective property can be disabled entirely by unchecking Render Reflections. It's a good practice to only enable reflections on surfaces like a mirror, polished metal, or glass since additional calculations have to be made during raytracing for each 'reflective' polygon in your model.

Self-Illuminate

Use the Self-Illuminate option on surfaces that should always appear as bright as possible. When Self-Illuminate is checked, the corresponding material will not be affected by other lighting conditions in the scene.

Render Backface

If surfaces appear to be missing from your model, you can check Render Backface to force the Object Viewer to render both sides of the material's corresponding polygons. Only check this option when necessary since it will increase the time required to render your model.

Change Texture

➔ To change the texture properties of the currently selected material that has Apply Texture enabled:

62. Decide whether to change the image source for the texture. If you would like to use a different bitmap, click on the folder icon in the Edit Material toolbar. The Load Texture dialog box appears. Browse through supported image files on your computer. Click on a file to highlight it and display a preview. Click Open or press [Enter] to set this bitmap as the new source for the texture.

Note: The scale of a texture can only be set in DataCAD via the Edit Materials dialog and cannot be changed in the Object Viewer. The resolution of a texture's source image has no effect on its scale.

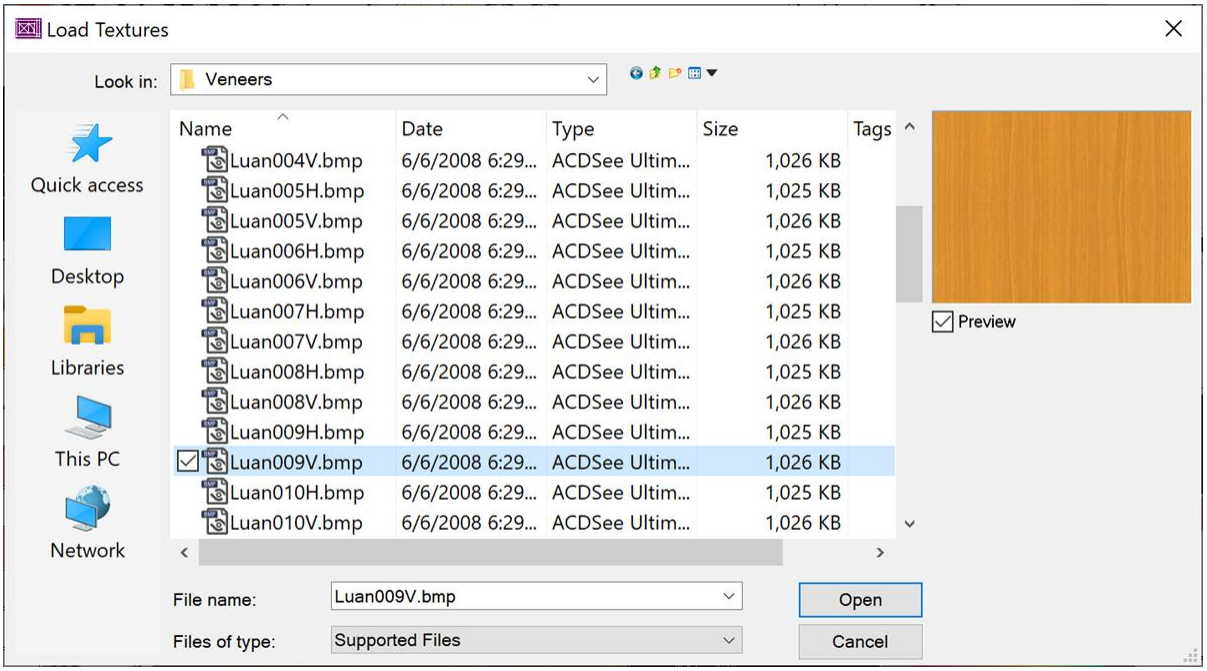
63. 

Figure 0.28: Load Textures Dialog

Render Black Pixels Transparently

64. Decide whether all the black (RGB 0, 0, 0) pixels in the texture's image should be rendered transparently. If, for example, you have an image of a person or tree on a black background, check Render black pixels transparently so only the figure is rendered in the scene.

65. 

Figure 0.29: Image of person on bicycle on black background

66. 

Figure 0.30: Image of person on bicycle with black pixels rendered transparently

Mix Texture with Rendered Color

67. Decide whether the texture should be mixed with the material's diffuse color. If so, check Mix texture with rendered color. This feature makes it easy to create 'tinted' variations of the same texture. For example, if you have an image of grey shingles, you could mix it with a shade of green like applying a semi-transparent stain.

68. 

Figure 0.31: Grey shingle texture tinted green by mixing with material's diffuse color

Apply Texture as Reflection Map

69. Decide whether the texture should be applied as a reflection on the material's surface. If so, check Apply texture as reflection map. In special cases where you need to simulate a metal surface like brushed nickel, you can apply the source image as a reflection.



70.

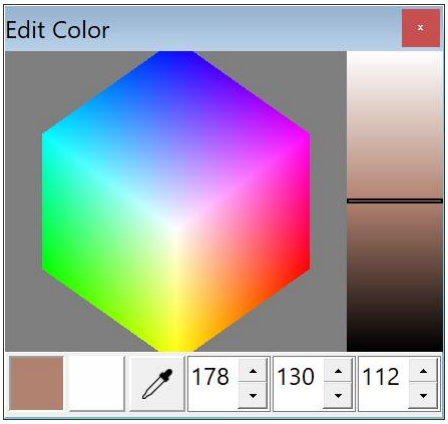
Figure 0.32: Brushed stainless faucet rendered with reflected stainless texture

Apply to All

The Apply to All toggle at the bottom of the Edit Material toolbar is a powerful option that should only be used in special cases when you want to make changes to all of the materials in your project at once. When Apply to All is toggled on, any change you make to an individual material setting will be applied to all materials. So, if you increase the ambient value of the currently selected material, all the other materials will inherit this value.

Note: Anytime you need to reset all the materials in your project to their original state, you can select the <None> scheme.

Edit Color Toolbar



You can control the diffuse and reflection colors of the selected material by clicking on the RGB Color Cube, using the Brightness slider, or entering new values in the Red, Green, and Blue value editors. A preview of the new color, surrounded by the old color, is shown to the left of the RGB value editors. One is for the diffuse color and the other is for the reflection color.

Note: You can Right-click and Drag over the Color Cube to spin its orientation to reveal all eight corners which correspond to Red, Green, Blue, Cyan, Magenta, Yellow, White, and Black.

Figure 0.33: Object Viewer's Edit Color Toolbar

➔ To change the currently selected material's color using the Edit Color toolbar:

71. Click on the location of the color cube that is near the hue you want. To access hues on the hidden sides of the cube, right-click and drag over the cube.

72. Once you have established the primary hue by clicking on the face of the color cube, you can use the slider on the right to adjust its brightness.

73. To make finer adjustments, you can adjust the red, green, and blue color components using the edit fields along the bottom of the toolbar.

Note: You can use the eyedropper icon to sample colors from anywhere on your desktop. Click on the eyedropper icon then hover over the image you would like to take a sample from. A preview of the color is shown at the tip of the eyedropper. Click to capture the color.

Speed Hotkeys for Navigation Toolbars

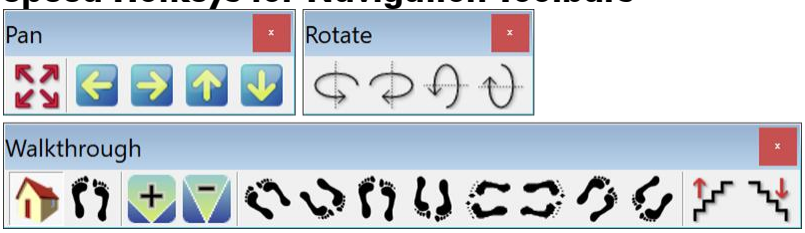


Figure 0.34: Object Viewer's Pan, Rotate, and Walkthrough Toolbars

Prior to Clicking and Holding on any of the navigation icons (Pan, Rotate, and Walkthrough) for continuous movement, you can press either or both of the [Ctrl] and [Shift] keys to adjust the speed.

- Click & Hold for Normal Speed
- [Ctrl] + Click & Hold for Half Speed
- [Shift] + Click & Hold for Double Speed
- [Ctrl] + [Shift] + Click & Hold for 5x Speed

View Stats Toolbars

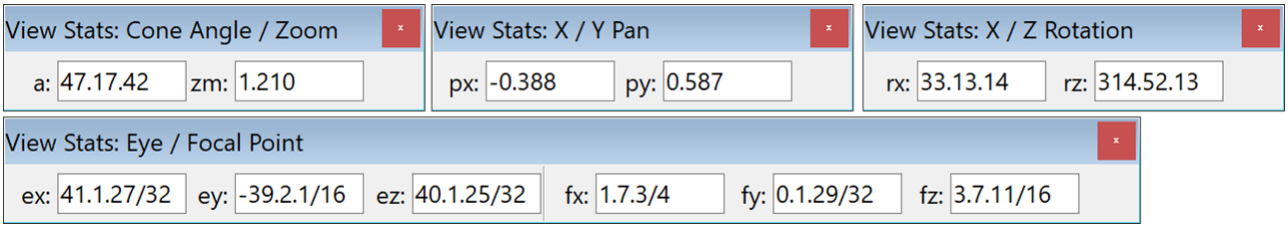


Figure 0.35: Object Viewer's View Stats Toolbars

The **View Stats** toolbars are now updated dynamically while you navigate using the mouse.

View Manager

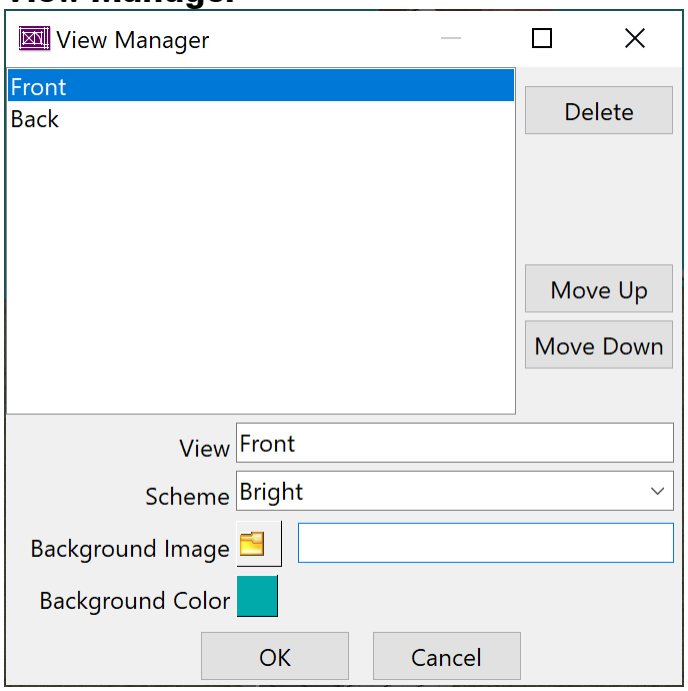


Figure 0.36: Object Viewer's View Manager Dialog

You can manage your saved views and associate them with specific schemes and backgrounds with the View Manager.

➔ To customize saved views:

74. Select View Manager from the View pull-down menu. The View Manager dialog box appears. Views that you created are listed in the box.
75. Highlight the view you want to customize.
76. Decide how you want to customize the view using these options:
    - *View* – You can rename the currently selected view. In the View input box, delete the old name and type the new. Press [Enter] to make this change appear in the View Manager's list box.
    - *Scheme* – Select the scheme you want to associate with the highlighted view from the options available in the drop-down box.
    - *Background Image or Background Color* – These two options are mutually exclusive. If no name appears in the background image input box, the color in the swatch will be used. To choose a different background color, click on the swatch and make your selection from the Color dialog box.

      If a name appears in the background image input box, it takes precedence. Click on the folder icon and use the Select Background Image for View dialog box to browse for an appropriate .BMP or .JPG file to use as a background image.

77. Repeat steps 2 and 3 for each view in the list that you want to customize.
78. Reposition a view in the list by highlighting it and clicking the Move Up or Move Down buttons until you are satisfied. Repeat this for other views you want to move up or down in the list.
79. Click on OK when you have finished making changes in the View Manager dialog box.

➔ To delete a view:

80. Select View Manager from the View pull-down menu. The View Manager dialog box appears. Views that you created are listed in the box.
81. Highlight the view you want to delete.
82. Click on the Delete View button in the View Manager dialog box. The view disappears from the View Manager's list immediately, but it is still visible in the Views & Schemes Toolbar.
83. Click on OK. Now, the view you deleted in step 3 disappears from the Views listing in the Views & Schemes Toolbar.

Slideshow

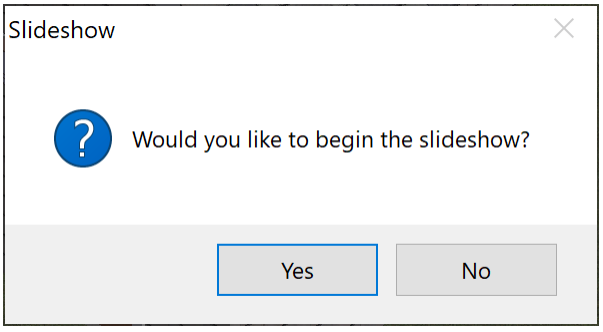


Figure 0.37: Object Viewer's Slideshow Confirmation

Displays each of your saved views in sequence, one second at a time.

Save Screen

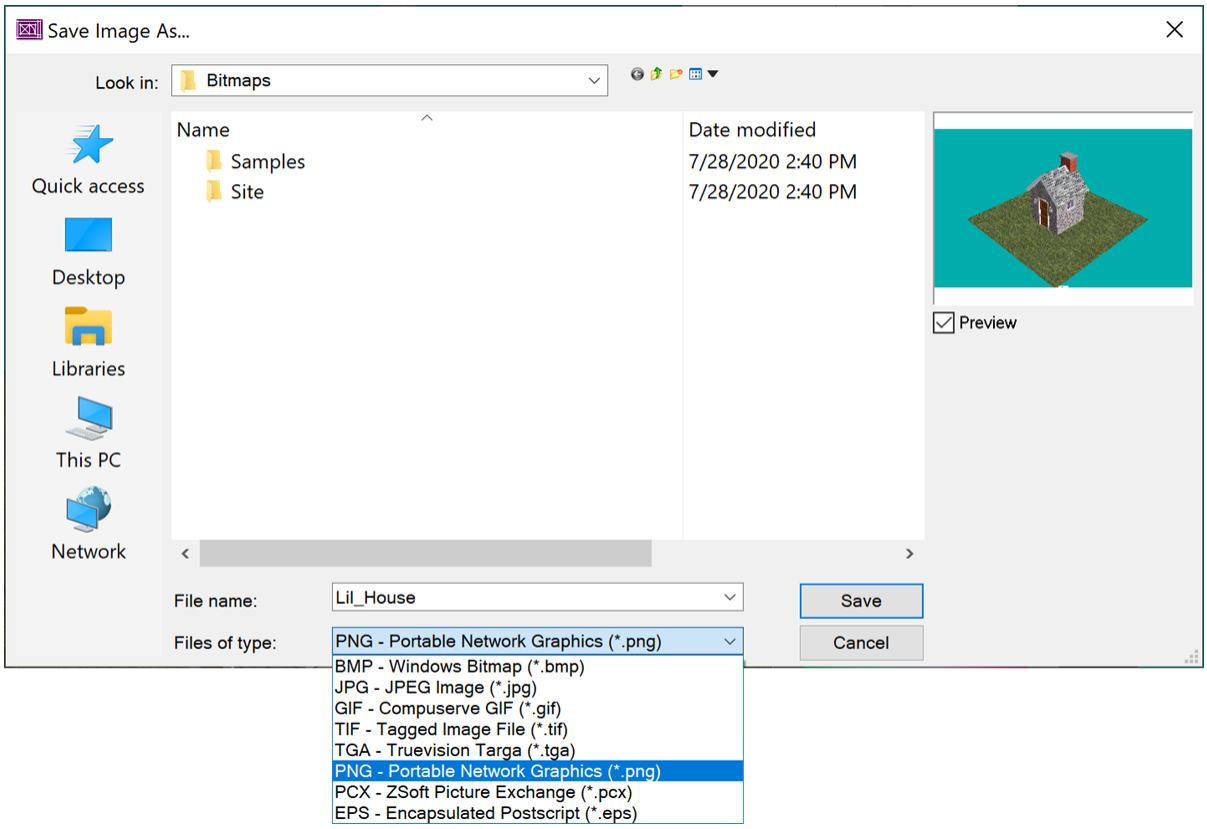


Figure 0.38: Object Viewer's Save Screen As Image Dialog

Use the Save Screen option to save the current view to a bitmap on your hard disk in either, BMP, EPS, GIF, JPG, PCX, PNG, TGA, or TIF formats. The output resolution of the image will match the current size of the Object Viewer window. Unlike Save Image, Save Screen is not limited to an output width of 2048 pixels.

Save Image

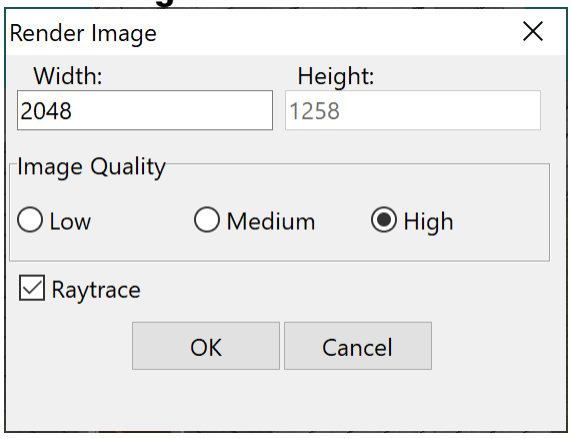


Figure 0.39: Object Viewer's Save Image Dialog

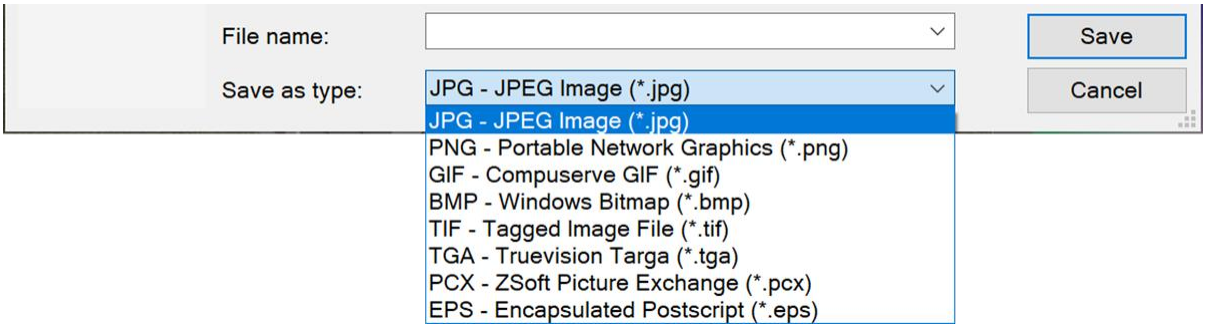


Figure 0.40: Object Viewer's Save Image As Dialog

Save Image has been enhanced so you can now render to EPS, GIF, JPG, PCX, PNG, TGA, and TIF formats. Previously, BMP was the only supported image format.

Full Screen Mode

Full Screen Mode displays the current view using the whole screen and hides the application title bar, menus, and all the toolbars that are currently displayed. Use the F11 hotkey to toggle Full Screen Mode on and off.

Batch Rendering

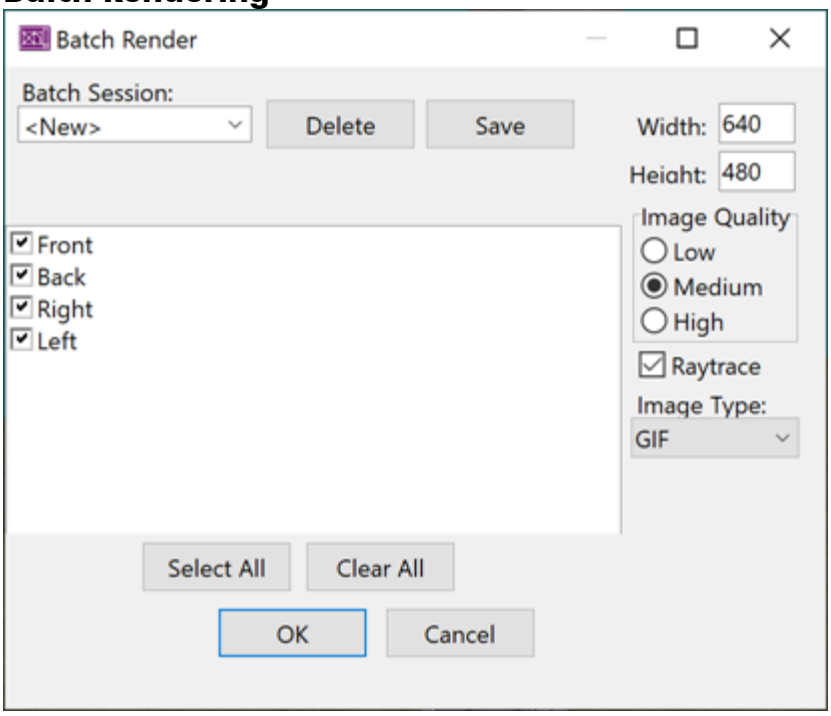


Figure 0.41: Object Viewer's Batch Rendering Dialog

You can render multiple views all-at-once. Since this may take a lot of time (depending on the number of views you select, their complexity, the output resolution, and your computer's processing speed), you can schedule this to occur during a break or after hours.

➔ To render a group of views all-at-once:

84. Select **Batch Render** from the **File** pull-down menu. The Batch Rendering dialog box appears.
85. Check the views that you want to render; remove the check from views you do not want to render. The Object Viewer assumes that you want to render everything, so it checks all the views by default. The Select all button checks all boxes; the Clear all button removes the checkmark from all boxes.
86. Set the width and height in pixels for the final images in the input boxes. The higher the value, the greater the resolution or detail and the longer it will take to render the views.

Note: The maximum width for rendered views is 2048-pixels. The maximum height has no practical limit.

87. Decide on the level of output quality you want: Low, Medium, or High. The Low, Medium, and High settings affect how much sampling will occur during rendering to smooth the edges of polygons. In most cases, a setting of Low or Medium is sufficient to produce a high-quality image. The High setting should be used rarely because it can greatly increase the time to render and achieves only a slightly better result than the Medium setting.
88. Check the Raytrace box if you want to render the views with shadows and reflections. Remember that raytracing requires more time.
89. Select the Output format you prefer from the drop-down options: BMP, JPG, PNG, TGA, TIF, PCX, GIF, or EPS files.
90. Click on <New> in the Batch Name drop-down box, choose the Save button to display the Batch Session Name dialog box, supply a name in the input box.
91. Click on OK or press [Enter].
92. Click on OK to start rendering all the views you checked in the batch.

Note: You can have several different batch session names that contain one or more views. For each batch name you want to add, click on <New>, choose the Save button, supply a name, and press [Enter]. If you want to change the options that apply to one of the batches, select the name from the pull-down list, and click on Save. If you want to delete one of the options from the Batch Session Name drop-down box, select the name and click on Delete.

Material / Texture Filters & Effects



Figure 0.42: Various Filters and Effects Applied to DataCAD Model

You can use Filters & Effects to alter or enhance material properties and bitmap textures. You can use filters and effects such as Sepia and Newsprint for abstract presentation or make lighting adjustments by applying Bright for better clarity.

In all, there are more than 35 filters and effects that can be applied to all materials at once, or one at a time.

None
Select the 'None' filter to restore the material and texture properties to their original values.

Artistic

Bump
Applies a waffle iron effect on textures. Set the Bump Factor to adjust the size.

Checkerboard
Replaces textures with a black and white checkerboard. Set the size of the squares in pixels.

Edges
Highlights edges in textures by intensifying outlines of high contrast areas and darkening areas of low contrast. You can set sensitivity of edge detection by value.

Engrave
Applies a woodcut effect to textures by removing the color and generalizing areas of the image into high and low tones. Set the factor from 1 (thin) to 10 (thick).

Grid
Applies a grid effect to textures by adding a white border around the image. Set the width of the gridlines in pixels.

Metal
Creates a metallic effect by applying all textures as reflection maps.

Newsprint
Applies a halftone pattern to textures to simulate a continuous tone with dots.

Spray Paint
Applies a spray paint effect to textures by randomly choosing colors from the image. You can adjust the spray from 1 (fine) to 100 (coarse).

Note: You can use the Seamless filter to remove the hard edges created by the Spray Paint filter.

Threshold
Transforms the RGB values of pixels in textures that fall above the threshold you set to 255 and values that fall below to 0.

Transparent
Sets the Opacity of all materials to 10% (90% transparent).

Color

Bleed
Intensifies the color of textures by expanding the image's color palette.

Fewer Colors
Reduces the color palette of textures down to 16 colors and dithers the resulting image.

Huey
Changes the hue, saturation, and brightness of textures to create an artistic effect.

Invert
Creates a negative image of material colors and textures by reversing the color values.

Mix
Changes the color of materials and textures by mixing the color you select with the diffuse, reflective, and image colors.

Detail

Blurry
Softens textures by smoothing transitions between hard edges and shaded areas.

Despeckle
Removes noise from textures by filling in pixels that would otherwise appear as dots. The fill color is determined by the color of the surrounding pixels.

Noisy
Adds noise to textures by modifying the intensity of RGB values in randomly selected pixels.

Sharp
Sharpens the detail of textures by increasing the contrast around edges in the image.

Distort

Mirror
Reverses the horizontal orientation of textures.

Motion
Blurs textures in a horizontal direction to simulate movement. This is analogous to taking a picture of a moving object with a slow shutter speed.

Wavy
Applies a radial ripple effect to textures.

Lighting

Auto-Contrast
Improves the image contrast of textures by making dark pixels blacker and light pixels whiter.

Bright
Brightens the entire model by pushing the material's Ambient and Diffuse properties to 80%.

Dark
Darkens the entire model by pushing the material's Ambient and Diffuse properties to 30%.

Enhance
Automatically adjusts the RGB values of pixels among areas of different colors and shades.

Gamma
Brightens the midtones of textures without dramatically altering the shadows and highlights.

Lit
Removes all shading from materials by enabling the Self-illuminate property.

Painting

Mosaic
Applies a stained-glass effect to textures.

Oil Paint
Applies an oil paint effect to textures. Use a lower value to preserve more detail and a higher value to exaggerate the effect.

Note: Using higher values will increase the time it takes to apply the effect.

Watercolor
Applies a watercolor effect to textures by 'smearing' the pixels of the image.

Retro

Greyscale
Converts the material and texture colors to monochrome shades of grey.
RGB: 29.9%, 58.7%, 11.4%

Sepia
Converts the material and texture colors to monochrome shades of sepia.
RGB: 112, 66, 20

Text

Text
Adds a text string you enter in the font you select to the center of the texture's image.

Special

Seamless
Removes the seam between tiles by quartering the image and duplicating the quadrants in opposite corners of the image.

Edit Texture

Highlight Edit Texture in the Material Toolbar's context menu to access options to change the orientation of a bitmap texture.

Rotate 90 (Clockwise)
Rotates the image 90 degrees clockwise.

Rotate 90 (Counterclockwise)
Rotates the image 90 degrees counterclockwise.

Rotate 180
Rotates the image 180 degrees.

Mirror
Reverses the horizontal orientation of the image.

Flip
Reverses the vertical orientation of the image.

Quick o2c

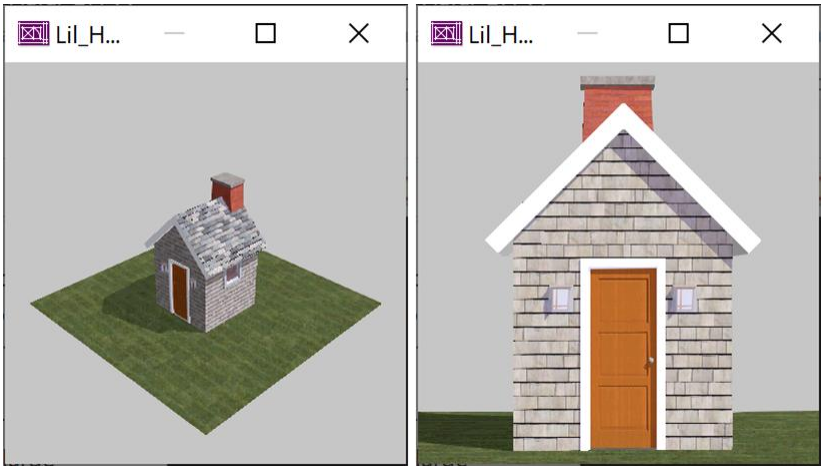


Figure 0.43: DataCAD's Quick o2c Player

With all of the features that have been added to the Object Viewer, some of you have requested an option to display a 'plain' o2c window when you want to just get a 'quick' view of your model, and don't require all of the other interactive features.

To display a 'Quick' o2c Player, hold down the [Ctrl] key while launching the Object Viewer from a toolbar icon or menu and DataCAD will show your model in a stripped-down o2c window. This window is modeless and will remain open while you continue to work in DataCAD. You can also launch multiple Quick o2c windows based on different views of your model. Quick o2c windows that are still open when you exit DataCAD will be closed automatically, and their size and position is not remembered.

Note: Extended character code #3049 has been added so you can launch Quick o2c from a custom toolbar icon.

Eye Dropper



Figure 0.44: DataCAD's Eye Dropper with magnified box enabled

An Eye Dropper icon has been added to DataCAD's Color Picker dialog and the Edit Color toolbar in the Object Viewer. Whenever you want to set the current color based on a pixel anywhere on your desktop, click the Eye Dropper icon, then move the cursor over the point on your desktop you'd like to match, then click to 'grab' the color. For reference, a preview box of the current eye dropper color is displayed while you move the eye dropper cursor.

Note: You can use the [Ctrl] key to toggle between the color preview and a magnified box surrounded by the current color.

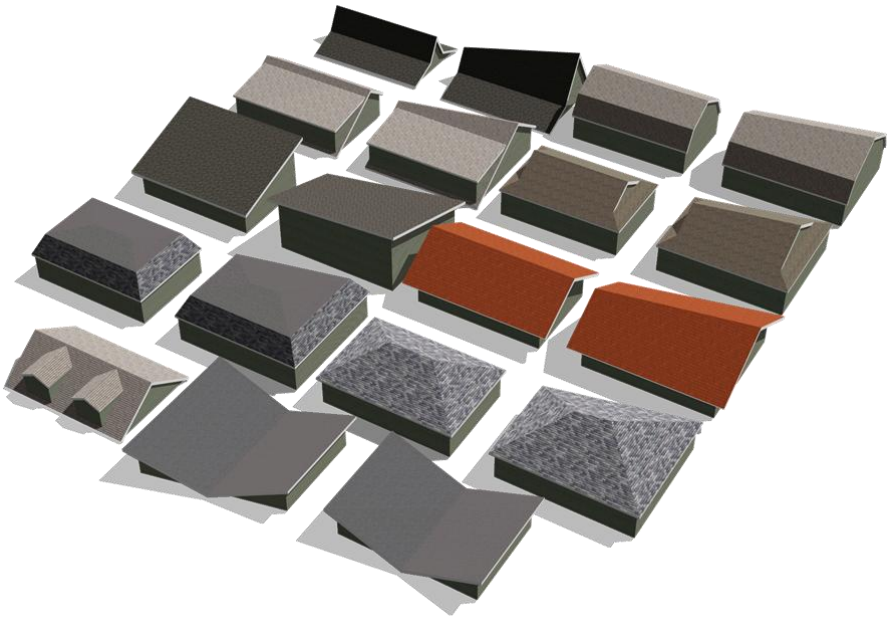


Figure 0.45: RoofIt Macro Roof Types

RoofIt Macro Enhancements

Two new options, **Set Colors** and **Set Layers** have been added to the RoofIt macro's **Settings** menu. This allows you to specify the colors and layers for the various roof components. Previously, everything was modeled in the current color and on the current layer.

Set Colors Menu

Roof Color (Red by default)
Attic Color (Yellow by default)
Rake Color (Cyan by default)
Fascia Color (Lt Grey by default)
Soffit Color (Brown by default)
Gable Color (Green by default)
Gable In Clr (Lt Magenta by default)

Note: Previously, the Gable Color was set by toggling On EndWall which has been renamed to Gable Walls.

Set Layers Menu

Roof Layer (RF Roof by default)
Attic Layer (RF Attic by default)
Rake Layer (RF Rake by default)
Fascia Layer (RF Fascia by default)
Soffit Layer (RF Soffit by default)
Gable Layer (RF Gable by default)
Gable In Lyr (RF Gable In by default)

Drawing Window Opacity

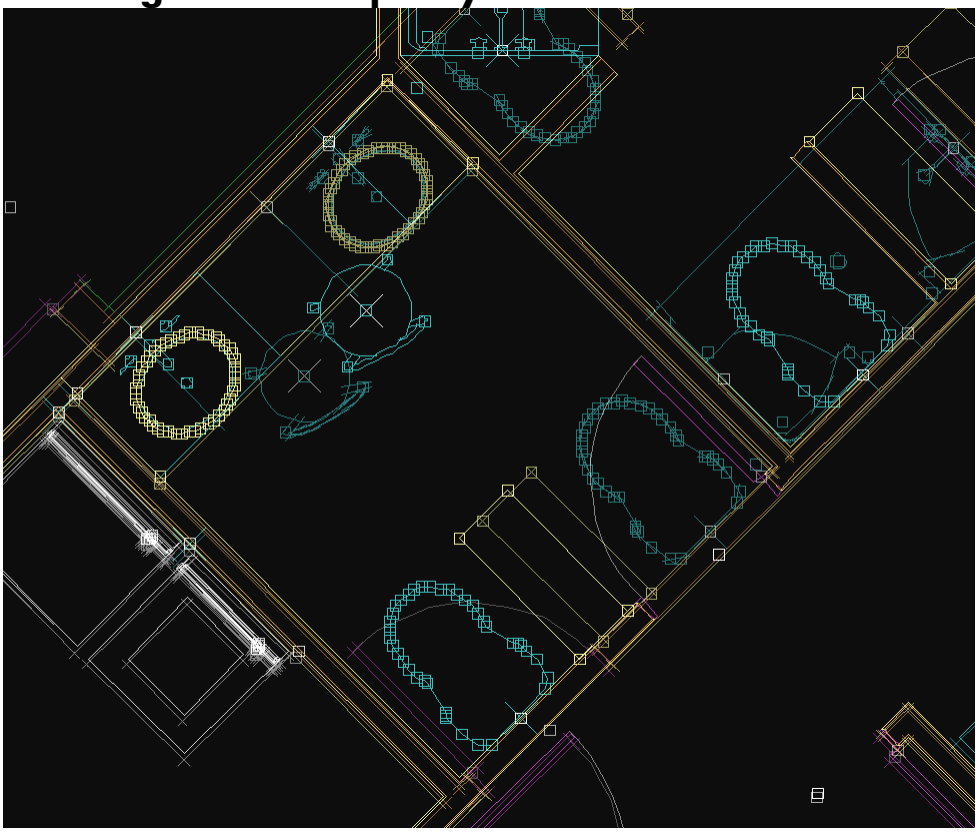


Figure 0.46: Transparent Drawing Window

A new option, **Drawing Window Opacity** has been added to the Drawing Context Menu. To access this feature, [Ctrl] + Right-click on a blank area of your drawing (i.e., not over an entity), and select **Drawing Window Opacity**. A dialog appears where you can enter a value from 10 to 100 to set the drawing window's opacity. Values less than 100 will cause other drawing windows to 'show through' when the transparent window is on top. This setting is remembered on a per-drawing basis and can be used to compare two drawings by placing one over the other.

In the example above, the 'newer' drawing is 'above' the 'older' drawing. The newer drawing's opacity is 66% and the older drawing's opacity is 100%. The newer drawing will appear 'brighter' than the older drawing when its opacity is greater than 50%.

Note: Windows' MDI (Multiple-document Interface) only allows one drawing window at a time to be maximized within DataCAD's program window. So, it is easier to compare two drawings when they are in their restored (non-maximized state).

Mixed-Mode DPI Awareness

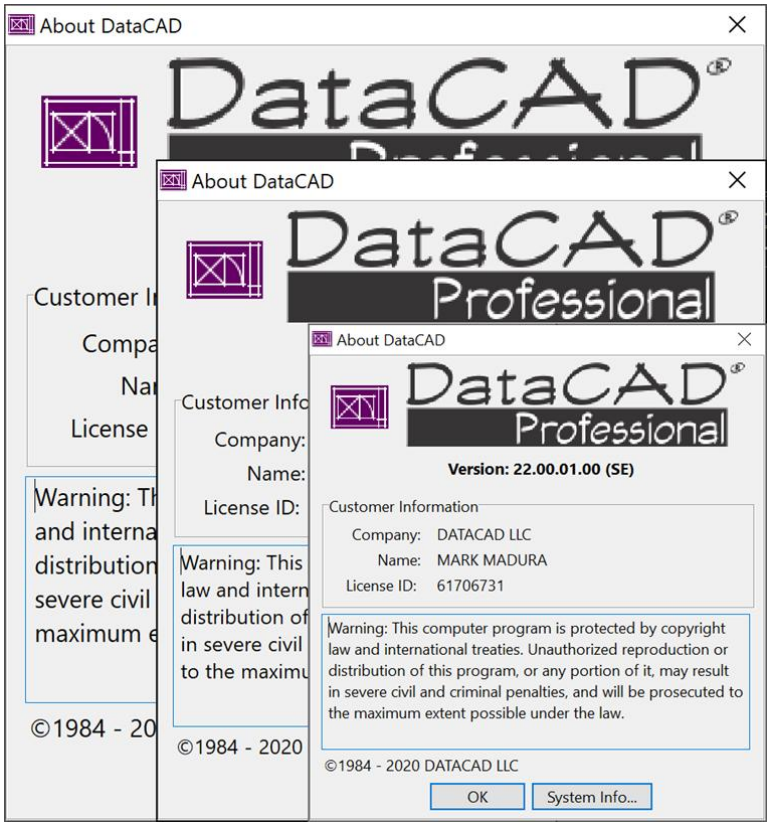


Figure 0.47: DataCAD's About Dialog shown at several scaling factors

DataCAD automatically sets the scaling factor and font height for dialogs and toolbars based on their corresponding monitor's display scaling percentage. Previously, DataCAD would only adapt the program interface for whichever display was designated by Windows as the Primary (a.k.a. Main). Now when you drag dialogs from one monitor to another, DataCAD will rescale them if necessary so they display consistently.

If, in addition, you would like dialogs and their interface text to appear even larger, you can apply an enlargement beyond the default size.



Figure 0.48: Dialog Box Enlargement Slider

In Program Preferences, on the Interface Tab, you can use the Dialog Box Size slider to make dialogs appear larger.

In addition, you can customize the font that is used in dialogs by modifying the [Dialogs] section of DCADWIN.ini.

See "New Configuration Settings" for more information.

Productivity Enhancements

Symbol Browser Show Nested

A new option, **Show Nested**, has been added to the Symbol Browser's **Options** menu. This is a per-folder setting. When enabled, only the top level of 'parent' symbols will be shown in the Symbol Browser. This option is especially useful when browsing Drawing symbols that contain many nested elements.

Mask Selection in Geometry Offset

The **Mask** selection option is now available in the **Geometry**, **Offset** menu. Use the **Mask** option to set which entity types and related properties should be included for the offset entity selection.

Fat Cursor



Figure 0.49: Fat Cursor shown over satellite image

A new option, **Fat Cursor**, has been added to the 2D Settings menu. Toggle this option On to set the weight of the drawing cursor larger than the default of 1; the maximum value is 9. Setting the weight of the cursor to a value of 3 can be helpful when drawing over bitmaps and fills that otherwise make the cursor hard to see.

Change Pitch, Angle, or Grade of Flat Polygons and Slabs

You can now change the pitch of 'flat' polygons and slabs (parallel to the ground plane) via 3D Edit, Polygons / Slabs and the Entity Properties Editor.

➔ To change the Pitch, Angle, or Grade of a horizontal Polygon or Slab via DataCAD's menus, you can now use the same steps outlined here.

➔ To change the Pitch, Angle, or Grade of a horizontal Polygon or Slab via DataCAD's Entity Properties Editor, you can now use the same method described here.

Note: The edge of the polygon or slab you select to invoke the Entity Properties Editor will be considered the bottom edge of the slope.

For more information about setting the slope of Polygons and Slabs…

Symbol Explode Include Off Layers

A new option, Include Off Layers, has been added to the Symbol Explode menu. This option is available when Symbol Layer Control is set to either Per Definition or Per Instance. When using Per Instance Layer Control and exploding symbol instances that include nested symbols, the on/off layer settings are transferred to the unexploded, nested symbols.

Sun Shader & Symbol Layer Control

The Sun Shader now recognizes on/off state of layers when Symbol Layer Control is set to either Per Definition or Per-Instance.

Custom Elevation: Bisect

A Bisect option has been added to the New/Custom Elevation menu to make it easier to define an Elevation View along the bisector of the angle between two lines or walls.

XREF: Show Hatch / Show Fill

Two new options, Show Hatch and Show Fill have been added to the XREF Entity, XREF Tools context menu. Uncheck either of these options to suppress the display of hatches and fills on a per-XREF basis. These settings do not apply to Smart Wall hatches and fills.

Multi-Scale Plotting Layout Divisions

The maximum number of multi-scale plotting layout divisions has been increased from 99 to 999.

Symbol Insertion Point by Center

A new option, By Center, has been added to the Save Symbol routine. This option appears when you are prompted to click an insertion point for the symbol. Picking this option will cause the symbol's insertion point to be located at the center of the selected entities' extents. This option is also available when you redefine a symbol.

Miscellaneous Enhancements

1. A new option, **Text Cursor**, has been added to the **Utility** --> **Settings** menu. If toggled on (the default), DataCAD will display a Carat (i.e. Text Cursor) when you are entering text. If toggled off, the standard drawing cursor will be displayed instead. When entering either PText or MText, this toggle is also displayed in the menu at S8. This setting is remembered on a per-drawing basis.
2. The Color Palette dialog is now resizable.
3. The DXF/DWG Color Mapping dialog is now resizable.
4. Setting the background color in the Object Viewer now displays the DataCAD Color Palette and Custom option for the Color Picker w/ Eye Dropper instead of the Windows standard Color Picker.
5. Added support for DMX macros when using 'M' action code in toolbars. The string for M= in the DTB file can be MyMacro, MyMacro.dcx, or MyMacro.dmx. A popup message will appear when the macro specified cannot be found.
6. Dialog-related hotkeys:

   [Shift] Restore dialog to default size and center position

   Pressing and holding the [Shift] key when invoking and displaying a form will reset the dialog to its default size and position.

   Pressing and holding the [Shift] key when launching DataCAD will reset the application window to its default size and position.

   [Ctrl] + [Shift] Restore dialog to center using previous size

   Pressing and holding the [Ctrl] & [Shift] keys when invoking and displaying a form will restore and center the dialog over DataCAD's application window, or the form that is currently open.

Note: Pressing and holding the [Ctrl] & [Shift] keys when launching any Windows program will cause the application to run as administrator.

New Configuration Settings

DataCAD 22 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 22 installation folder (C:\DataCAD 22\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

Dialog Font

To customize the font that is used in dialogs, modify the FontName key in the [Dialogs] section of DCADWIN.ini.

```
[Dialogs]
FontName=Segoe UI
Point_Size=9
Style=
```

The default dialog font is Segoe UI with a size of 9 points. If you would like text to appear larger, you could change Point_Size=9 to Point_Size=11.

Note: This setting is independent of the dialog enlargement setting, so if you increase the font size above the default value of 9, you'll need to set the dialog enlargement to at least 125% (approx. 11 / 9) to accommodate the larger text.

Hint Font Size

You can now set the Hint Font Size in the [Hints] section of DCADWIN.ini. Previously, the size was hard-coded to be 80% of the menu font size.

```
[Hints]
Point_Size=7
```

Delete to Recycle Bin

A new key, Delete to Recycle Bin, has been added to the [SymbolBrowser] section of DCADWIN.ini. Setting this key to TRUE will cause DataCAD to send files to the Recycle Bin rather that deleting them.

```
[SymbolBrowser]
Delete to Recycle Bin=FALSE
```

Disallow No On Layers in Symbols

A new key, Disallow No On Layers in Symbols, has been added to the [General] section of DCADWIN.ini. Setting this key to FALSE will allow symbols, with Per Instance Layer Control enabled, to have no On Layers.

```
[General]
Disallow No On Layers in Symbols=TRUE
```

PDF Image Type / Resolution

New keys, Default Image Type, and Default Image Resolution have been added to the [PDF] section of DCADWIN.ini.

```
[PDF]
Default Image Type=
Default Image Resolution=
```

The Default Image Type is PNG. Valid values are BMP, GIF, JPG, PNG, and TIF (not case-sensitive). The Default Image Resolution is 300. Valid values are 72 to 1200 (dots per inch).

Note: If the resolution used to convert the image is not one of the predefined values (100, 200, 300, 400, 500, or 600) then the menu item 'Custom: ' will appear followed by the user-defined resolution. Otherwise, only the predefined values will be shown.

MaxChunkSize

A new key, MaxChunkSize, has been added to the [Bitmaps] section of DCADWIN.ini.

```
[Bitmaps]
MaxChunkSize=
```

The default value is 52428800 kb (50 MB). This value determines the largest portion (a.k.a. 'Chunk') of a bitmap to convert into metafile data for printing (and saving to PDF, WMF, and EMF). 50MB should be large enough to process each bitmap in its entirety. The result should be one metafile element per image. Previously, this value was a very tiny at 16 kb. So, PDF files that contained bitmaps would end up with thousands of elements and the related 'bloat.' This change should fix that.

o2c Fixed Material Keys

The MatFixed Flags key has been removed from the [o2cViewer] section of DCADWIN.ini. To force material settings that were previously set with the MatFixed Flags key, the following keys should be used instead:

MatFixed Has Texture=

Set this key to TRUE so all material sub-objects can accept a texture in the Object Viewer.

Note: Except for bitmap textures that are applied as reflections, a material that has a texture cannot have smooth edges.

MatFixed Texture Mask=

Set this key to TRUE so the color black (RGB 0,0,0) will render transparently in all materials.

MatFixed Self-Illuminate=

Set this key to TRUE so all materials render without shading.

MatFixed Texture Colorize=

Set this key to TRUE so all textures are colorized with the corresponding material's rendered color.

MatFixed Render Backface=

Set this key to TRUE so all material sub-objects will be rendered on both sides.

MatFixed Texture Reflection=

Set this key to TRUE so all textures will render as reflections.

MatFixed Specular Reflection=

Set this key to TRUE so all materials can be rendered with reflections or FALSE, so no reflections are rendered.

MatFixed Smooth Edges=

Set this key to TRUE so all tangent polygons within the same sub-object will be rendered as a smooth surface (i.e. all the polygons that make up a sphere). By default, adjacent polygons with less than a 30-degree difference between their angles of orientation will be the same surface. This Edge Smoothing value can be set in the Rendering Settings dialog.

Note: Except for bitmap textures that are applied as reflections, a material that has a texture cannot have smooth edges.

MatFixed Texture Scale=

Set this key to a decimal value in meters so that all bitmap textures repeat with the same size tiles.

MatFixed Texture Name=

Set this key to a fully-qualified path to a bitmap texture so that all material sub-objects will have the same texture.

Object Viewer Min/Max Width/Height Keys

The following keys have been added to the [o2cViewer] section of DCADWIN.ini. Set these keys to restrict the minimum and maximum size/proportion of the Object Viewer client area.

```
[o2c Viewer]
o2c Max Width=
o2c Max Height=
o2c Min Width=
o2c Min Height=
```

Note: The 2048-pixel display width restriction has been removed from the o2c Client Area to accommodate 4K monitors.

Create Missing Folders

DataCAD will no longer create missing folders by default. To control this behavior, a new key, **Create Missing Folders**, has been added to the [General] of DCADWIN.ini.

```
[General]
Create Missing Folders=FALSE
```

If FALSE, the default, DataCAD will look in the corresponding default path, or if that fails, the DataCAD Program Folder, when the previous path cannot be found. If TRUE, DataCAD will try to recreate the previous path.

Import Non-associative Hatch Dots

DataCAD will now import zero-length lines (endpoints of lines with matching coordinates) as non-associative hatch dots. To control this behavior, a new key, **Treat Zero-Length Lines As Dots**, has been added to the **[DXF_DWG]** section of DCADWIN.ini.

```
[DXF_DWG]
Treat Zero-Length Lines As Dots=TRUE
```

The default is TRUE. If FALSE, DataCAD will ignore zero-length lines during import.

Print Overshoots

The key, Print Overshoots, has been added to the [Printer] section of DCADWIN.ini. Set this key to TRUE to always print overshoots, even if the attribute setting in the **Utility**, **Display** menu is toggled off. Set this key to FALSE to never print overshoots. Set this key to DEFAULT to use the current display setting.

```
[Printer]
Print Overshoots=DEFAULT
```

To Layer Color, Line Type, Line Spacing Toggles

The following keys have been added to the **[General]** section of DCADWIN.ini to control the Layer Color, Line Type, and Line Spacing toggles in the Move To Layer and Copy To Layer menus:

```
[General]
Remember ToLayer Color=TRUE
Remember ToLayer Linetype=TRUE
Remember ToLayer Line Spacing=TRUE
```

For each of the above, the following values are used:

If TRUE, the associated menu toggle will always be On
If FALSE, the associated menu toggle will always be Off
If blank (or missing), the associated menu toggle will be remembered

Scroll Zoom to Cursor

A new key, Scroll Zoom to Cursor Position, has been added to the [General] section of DCADWIN.ini. Setting this key to TRUE will cause DataCAD to zoom in and out toward the cursor's current position rather than the endpoint of the rubber-band line. The default value is FALSE.

```
[General]
Scroll Zoom to Cursor Position=FALSE
```

Sort Paths In Preferences

A new key, Sort Paths In Preferences, has been added to the [General] section of DCADWIN.ini. The default value is FALSE. Set this key to TRUE to have the list of program paths sorted alphabetically in the Paths tab of Program Preferences.

```
[General]
Sort Paths In Preferences=FALSE
```

New Extended Character Codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" in Chapter 30 of the DataCAD Reference Manual.

Material Files

3035 : Load a material file (INI)
3036 : Reload a material file (INI)
3037 : Assign a material to a color index (Load)
3038 : Assign a material to a color index (Reload)

Note: 3037 and 3038 apply to DataCAD's DMF (DataCAD Material File) when rendering by color.

Toolbar Examples:

```
[Load Brick100]
Hint=Load Brick100
Icon=
A=^3035#^C:\DataCAD 22\Materials\Brick\Brick100$^

[Load Brick Materials]
Hint=Load Brick Materials (reload)
Icon=A=^3036#^C:\DataCAD 22\Materials\Brick\Brick100$^C:\DataCAD
22\Materials\Brick\Brick101$^C:\DataCAD
22\Materials\Brick\Brick200$^C:\DataCAD
22\Materials\Brick\Brick300$^C:\DataCAD 22\Materials\Brick\Brick301$^

[Color 42 to Brick100 (load)]
Hint=Change Material for Color 42 to Brick100 (load)
Icon=
A=^3037#^C:\DataCAD 22\materials\brick\brick100$^45$^

[Color 42 to Brick100 (reload)]
Hint=Change Material for Color 42 to Brick100 (reload)
Icon=
A=^3038#^C:\DataCAD 22\materials\brick\brick100$^45$^
```

PDF

3039 : Insert a dynamically sized PDF Image
3041 : Insert a fixed size PDF Image
3043 : PDF Settings
3045 : PDF Merge
3047 : PDF Password
3048 : PDF Permissions

Quick o2c

3049 : Launch Quick o2c

Enhancements to DCAL

DCAL for Delphi

The following constants have been added:

```
maxpolyfence = 512; { Should not be less than maxpoly }
maxdiv = 128; { max Primary/Secondary divisions }
PathGUI = 73;
PathLayout = 74;
```

Note: Patho2cimporttexture = 48 has been removed.

The following functions have been added.

Attribute Functions:

```
Sys_Add_AtrStruct(aName : atrName; var struct; sz : byte) : attrib;
Hdr_AddPut_AtrStruct(aName : atrName; var struct; sz : byte) : attrib;
Get_AtrStruct(frstatr : lgl_addr; aName : atrName; var struct; sz : byte)
: Boolean;
```

Miscellaneous Functions:

```
list_get(var list: list_type; addr: lgl_addr): boolean;
```

This function is used to get a list of layers from a GoTo View or MSP Detail.

For Example:

```
vaddr := pgsv.strtview;
while view_get(view, vaddr) do begin
  vaddr := view.Next;

  if view.flag1 = 0 then f_wrstr(fl, 'GoTo View: ')
  else if view.flag1 = 1 then f_wrstr(fl, 'MSP Detail: ');

  f_wrstr(fl, view.name); { Long Name }

  addr := view.frstlyr;
  f_wrstr(fl, 'Layers: ');
  f_wrln(fl);
  try
    while list_get(list, addr) do begin
      addr := list.next;
      for i := low(list.Data) to high(list.Data) do begin
        if not isnil(list.Data[i]) then begin
          getLongLayerName(list.Data[i], lname);
          f_wrstr(fl, lname);
          f_wrln(fl);
        end;
      end;
    end;
  except
    on e: Exception do begin
```

```
      f_wrstr(fl, 'DataCAD 21.02.00 or later required to get layer
list.');
      f_wrln(fl);
    end;
  end;
end;
```

```
DCADPenToRGB(penNo: longint; var r: byte; var g: byte; var b: byte);
```

Use this function to convert a DataCAD pen number to an RGB triplet.

```
dwgpath(var str: str255);
```

Use this function to get the path of current drawing.

```
DataCAD_Version(): asInt;
```

This function returns the current DCADWIN.exe version as an integer.

Note: The drawing variable, PGSavevar.headerversion contains the version of DCADWIN.exe at the time the current drawing was last saved.

The following sample macros have been added.

Spiral
Converted from DCAL for DOS

TooSmall
Converted from DCAL for DOS

Write_AEC
Converted from DCAL for DOS

The following sample macro has been updated.

atrBrowserForm
Now uses a single f_wrAtrStr function to extract Drawing, Entity, Symbol, GoTo View, MSP Detail, and Symbol Text attribute strings.

```
undoStartTransaction();
undoEndTransaction();
```

These procedures mark the beginning and end of what the undo system sees as a "transaction".

DCAL for C++

The following constants have been added:

```
#define maxpolyfence 512 /* Should not be less than maxpoly */
#define maxdiv 128 /* max Primary/Secondary divisions */
#define PathGUI 73
#define PathLayout 74
```

Note: Patho2cimporttexture 48 has been removed.

The following functions have been added:

```
list_get(list_type &list, lgl_addr &addr);
```

This function is used to get a list of layers from a GoTo View or MSP Detail.

```
DCADPenToRGB(longint penNo, byte &r, byte &g, byte &b);
```

Use this function to convert a DataCAD pen number to an RGB triplet.

```
dwgpath(ShortString &str);
```

Use this function to get the path of current drawing.

```
undoStartTransaction();
undoEndTransaction();
```

These procedures mark the beginning and end of what the undo system sees as a "transaction".

DCAL for DOS

Note: The following functions were added to a previous version of DataCAD but were never documented.

```
PROCEDURE UndoStartTransaction; BUILTIN 634;
PROCEDURE UndoEndTransaction; BUILTIN 635;
```

These procedures mark the beginning and end of what the undo system sees as a "transaction".

For example, when creating a single line, the undo system sees the following:

- An entity was added
- It was drawn to the screen
- It was marked as the end of a "group"

These 3 steps are seen as a single "transaction" and will be "un-done" together.

```
PROCEDURE getLongLayerName(pLayer : lgl_addr; Name : IN OUT str80);
BUILTIN 636;
```

pLayer is the address of the layer being queried
Name is the long name of that layer

```
FUNCTION Lyr_Find_LongName(Name : str80; pLayer : lgl_addr); BUILTIN 637;
```

Name is the layer name to look for
pLayer is the address of the layer if found
The function returns True if it found a layer by that Name

```
FUNCTION Get_InpStyl : integer; BUILTIN 638;
```

This function returns the index of the current input style where:

0 = Relative Polar
1 = Absolute Polar
2 = Relative Cartesian
3 = Absolute Cartesian
4 = Direction/Distance

```
PROCEDURE Set_InpStyl(InputStyle : integer); BUILTIN 639;
```

This function sets the index of the current input style where:

0 = Relative Polar
1 = Absolute Polar
2 = Relative Cartesian
3 = Absolute Cartesian
4 = Direction/Distance

```
PROCEDURE Get_DimFont(Ent : Entity; FontName : IN OUT str80); BUILTIN 640;
```

This procedure retrieves the name of the font used in the associative dimension, Ent

```
FUNCTION setMSPSheetToPlotByName(Name : str80) : boolean; BUILTIN 641;
```

Name is the name of the MSP sheet to make current

This function returns True if it was able to find a sheet with the Name provided

```
FUNCTION setMSPSheetToPlotByNum(SheetNum : integer); BUILTIN 642;
```

Makes **SheetNum** the current MSP sheet (1-256)

This function returns True if a valid **SheetNum** was passed in

```
FUNCTION GetMSPSheetName(SheetNum : integer; SheetName : IN OUT str80) :
boolean; BUILTIN 643;
```

SheetName is the name of the MSP sheet specified by SheetNum

This function returns True if a valid SheetNum was passed in

```
PROCEDURE setToPlotQuickLayout(DoQuickLayout : boolean); BUILTIN 644;
```

DoQuickLayout tells DataCAD to default to plotting the Quick Layout rather than MSP

```
FUNCTION plotOpen10(PenWidth : integer; WinPaperSize : integer;
PaperSizeX, PaperSizeY : integer; NumCopies : integer; PlotToFileName :
str80; ErrorMessage : IN OUT str80) : boolean; BUILTIN 645;
```

PenWidth specifies the pen width in millimeters
WinPaperSize is the index into the available paper sizes
PaperSizeX / **PaperSizeY** specify the custom paper size in millimeters
NumCopies is the number of copies
PlotToFileName is the name of the plot file to create if plotting to file
ErrorMessage is a string to receive any error message (i.e. the printer doesn't support the paper size specified in **PaperSizeX** / **PaperSizeY**

```
FUNCTION plotMode10(Mode : IN OUT mode_type; paperMin, paperMax,
WindowMin, WindowMax, RotationCenter : point; RotationAngle : real;
MaintainAspect : boolean; ErrorMessage : IN OUT str80) : boolean; BUILTIN
646;
```

Mode is what will be plotted
PaperMin and **PaperMax** specifies the custom paper size in millimeters
WindowMin and **WindowMax** specify the real-world coordinates of the viewport to be plotted
RotationCenter is the real-world coordinate of the center of rotation if the printer is setup to rotate the print
MaintainAspect should be set to True if no distortion of the X or Y axis is desired
ErrorMessage is a string to receive any error message

This function returns True if no errors were encountered

```
PROCEDURE plotClose10; BUILTIN 647;
```

This procedure should be called after calling plotMode10

```
FUNCTION setPenTableNameToLoad(PenTableName : str80); BUILTIN 648;
```

PenTableName Name of Pen Table

This function returns True if successful

```
FUNCTION setPrinterByName(PrinterName : str80; ErrorMessage : IN OUT
str80); BUILTIN 649;
```

PrinterName Name of printer
ErrorMessage is a string to receive any error message

This function returns True if successful

```
PROCEDURE GetPrinterNames(PrinterNamesArrary : IN OUT; TPrinterNamesArr;
NumPrinters : IN OUT integer) BUILTIN 650;
```

PrinterNamesArrary will contain the names of the printers available to the system.
The type **TPrinterNamesArr** is declared as:

```
type
  TPrinterNamesArr = ARRAY[1..50] of string[80];
```

NumPrinters is the number of printers found

```
PROCEDURE SetMacroHints(DoHints : boolean); BUILTIN 651;
```

DoHints tells DataCAD whether to display tooltips for the function key labels

DataCAD 21

DataCAD 21 contains a collection of new features and enhancements designed to increase your productivity. The DataCAD 21 drawing file format is currently compatible with DataCAD 15 through 20. However, you must use the "Save As" command in the "File" menu to save files backward to older version formats.

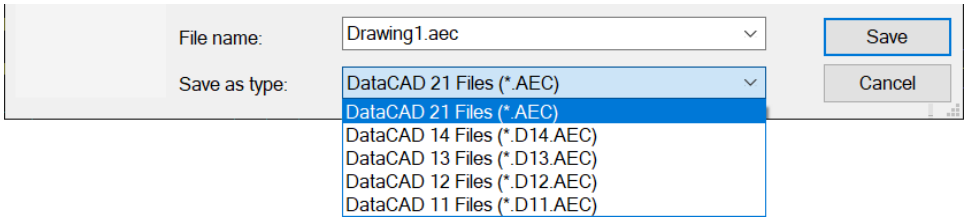


Figure 21.1: Save As Dialog

AutoCAD 2018/2019 support

DataCAD 21 supports the ability to import and export AutoCAD 2018/2019 files in DXF and DWG format. This enables you to collaborate and share files with associates who use the latest version of AutoCAD.

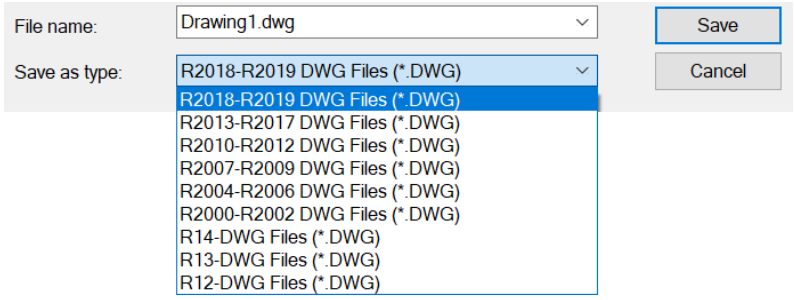
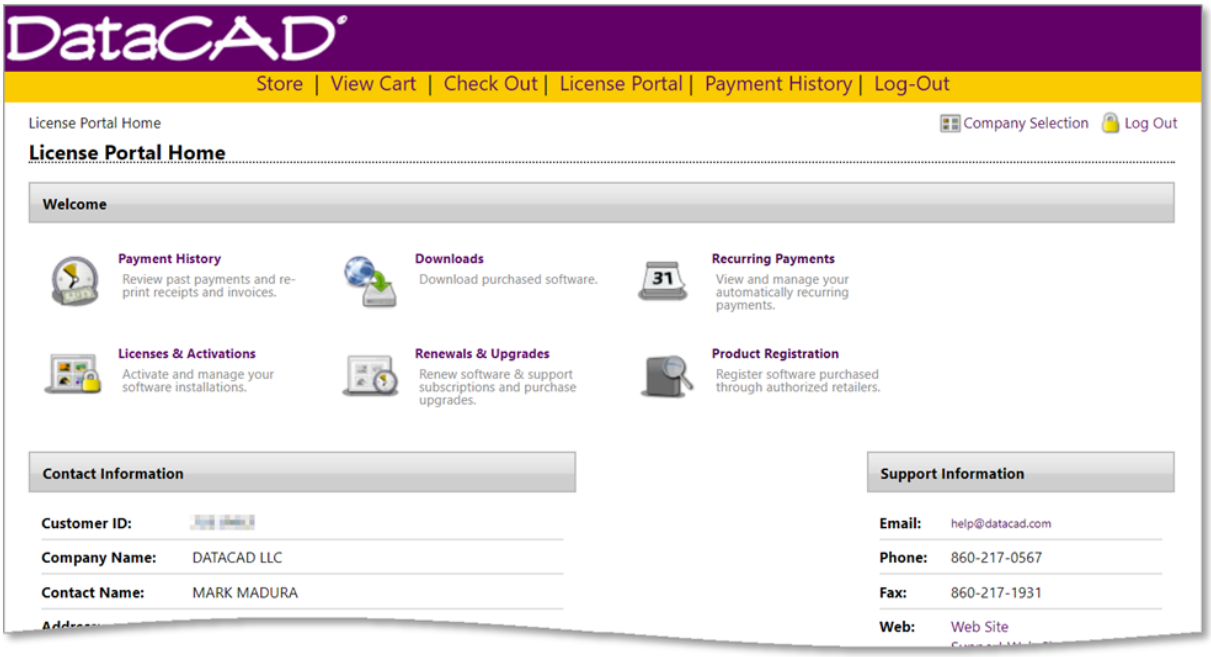


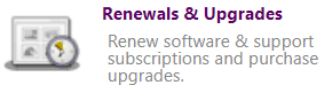
Figure 21.2: Export DWG Dialog

Enhanced Softlock Integration

DataCAD uses a software-based license management technology called a "Softlock." Each license you purchase can be activated on only one computer at a time. However, you can move your license from one computer to another by deactivating it at one location and reactivating it at another. You can perform the deactivation locally from within DataCAD, or remotely through the DataCAD License Portal.

Online Store Integrated with License Portal





DataCAD's Softlock has been integrated with our Online Store. So, in addition to managing your license activations remotely, you can now renew your subscription or upgrade a license directly from your customer license portal. Your new License IDs and activation passwords are automatically generated at the time you complete your order.

Saved License ID and Password



DataCAD 21's Activation Dialog remembers your License ID and Password after a successful activation. So, when you switch between your office and home computers, your license credentials will be readily available.

Installation Name

An Installation Name field has been added to the Activation Dialog that allows you to associate your license with the computer it is activated on. This will help you identify the activation in your License Portal as this name appears next to the Installation ID.

DPI Awareness

DataCAD's Program Interface and High-resolution Displays

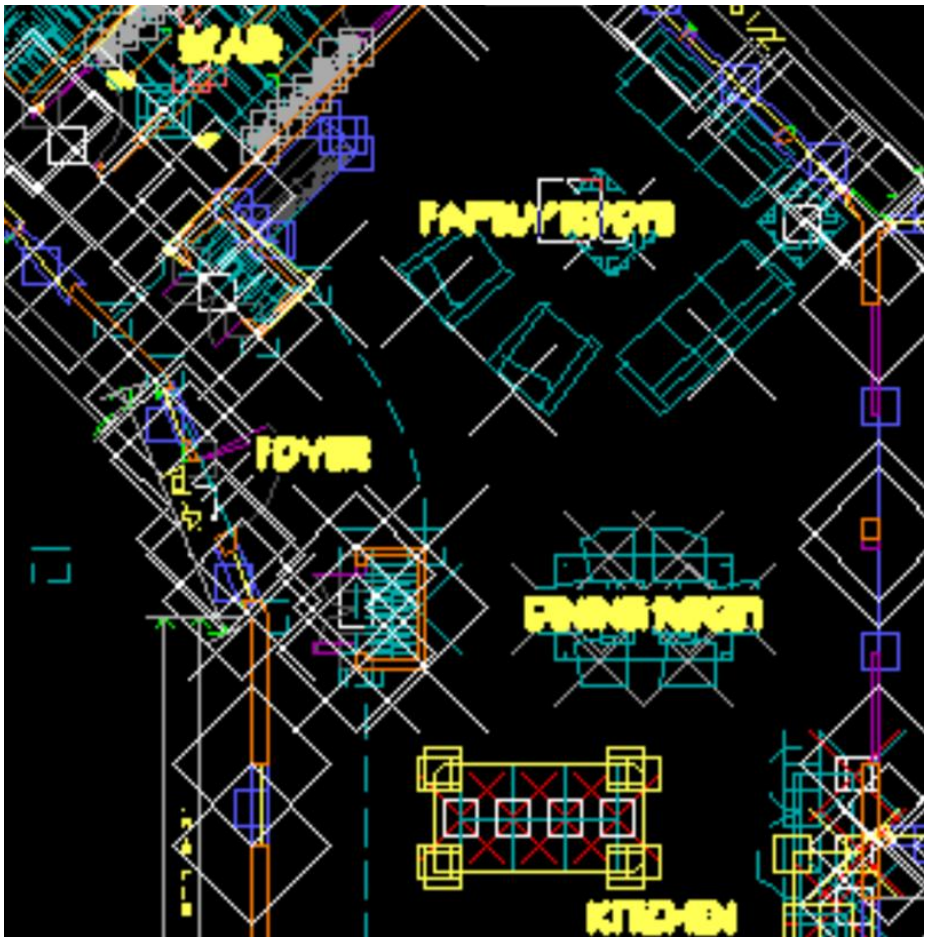


Figure 21.3: DataCAD's drawing window distorted by DPI Virtualization on a 4K display.

A multitude of issues related to the display of DataCAD's drawing and program interface on high-resolution devices, such as 4K monitors and tablets, have been addressed in this update. In all, more than 100 dialogs, including the Layer Manager and the XREF Manager, are affected by these changes.

Starting with Windows Vista, Microsoft introduced DPI Virtualization to automatically upscale (i.e., bitmap stretch) applications like DataCAD so that their interfaces would appear the same size on higher resolution displays. Until the recent introduction of hi-dpi displays like 4K monitors and tablets, stretching DataCAD's interface (dialogs and the drawing area) 125 - 150% was not detrimental. Even on a Surface Pro tablet running at 192 dpi, Windows did a fairly good job of upscaling DataCAD's menus and dialogs.

However, the quality of the drawing area could degrade beyond what was acceptable. A display scaling of 200% or more would cause lines to look 'fat,' text to look 'fuzzy,' arcs to look 'jagged,' and snapping points and markers to 'bloom.'

In Windows 8.1, Microsoft introduced a way to disable display scaling on a per application basis. You could right-click on DCADWIN.exe (or the program shortcut), select Properties, go to the Compatibility tab and check Disable Display Scaling On High DPI Settings. This would prevent DataCAD from being scaled, and the draw form would be rendered at 1:1.

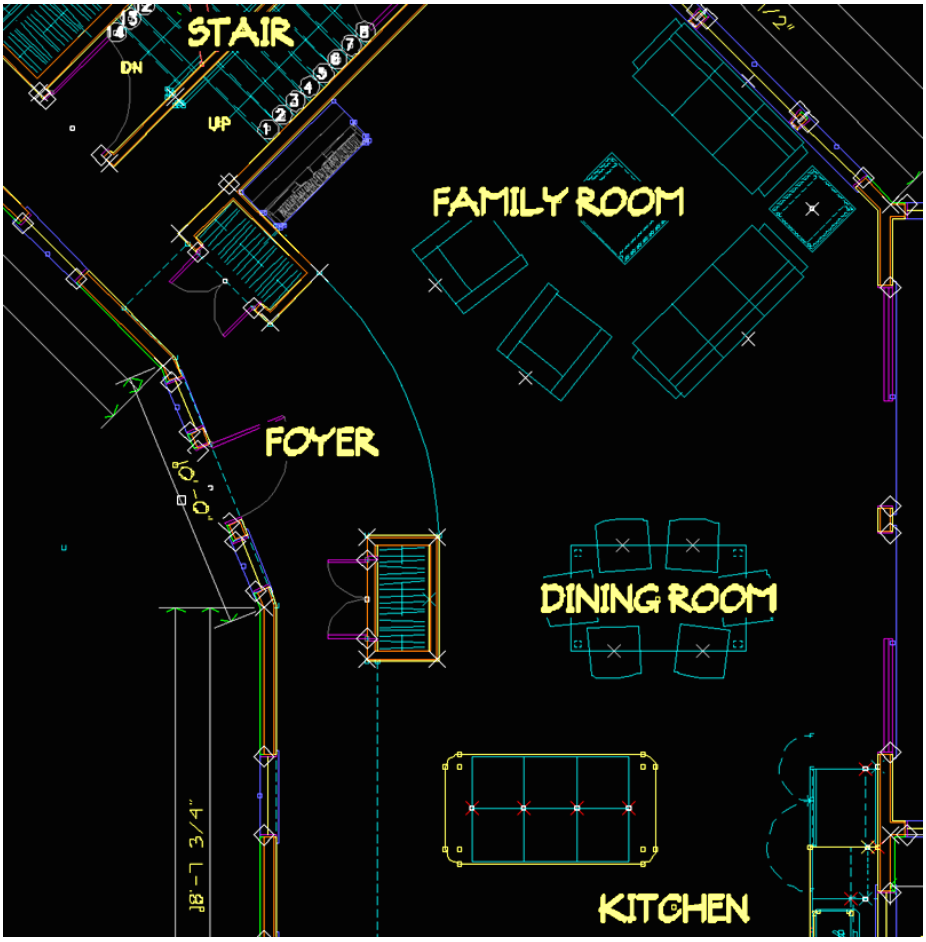


Figure 21.4: DataCAD's drawing window displayed 1:1 on a 4K display.

Disabling Display Scaling would restore the drawing area so that lines, text, and arcs were sharp. However, DataCAD's menus and dialogs would also be rendered at 1:1, so the interface would become too small to read. The size of toolbar icons and the menu font can be adjusted in Program Preferences, so the main interface could be corrected, but many other dialogs would appear too small.

The Windows 10 Creator's update introduced a major change to the way the operating system and applications implement DPI Scaling. In some cases, this would cause DataCAD to 'shrink' on high resolution displays. Even changing the display resolution would not correct this since the native resolution is always used.



Figure 21.5: Dialog Enlargement Slider

With this update to DataCAD, the drawing area will always be drawn at the highest resolution possible, or 1:1 with the display device. Toolbar icon sizes and menu font sizes can still be adjusted the same way in Program Preferences. For dialog boxes, a new Dialog Box Size slider bar has been added to the Interface tab. DataCAD will query the current display and automatically set a recommended enlargement. You can change this setting by adjusting the slider bar position.

Since most of DataCAD's interface is affected by these changes, we expect there to be anomalies we have overlooked. Please report any interface elements you find to be the wrong size to help@datacad.com.

Improved Symbol Layer Control

In the first implementation of Symbol Layer Control, whenever a Symbol was added to a drawing, its list of On/Off Layer Attributes were added to the symbol instance. This happened regardless of whether Symbol Layer Control was set to None, Per Definition, or Per Instance. In a drawing with hundreds of symbol instances, this created a lot of unnecessary overhead. Handling this data could significantly slow down File, Exit and Save, and saving a symbol from the Symbol Editor back to its parent drawing. Additionally, when Per Instance layer control was enabled, GoTo View Link Attributes were being added to symbol instances even when their GoTo View Link option was not enabled.

This is no longer the case. Layer On/Off Attributes are only added to a symbol instance when Symbol Layer Control is set to Per Instance. These attributes will also be added to existing symbol instances when you switch Symbol Layer Control from None or Per Definition to Per Instance. If you switch from Per Instance to either None or Per Definition, you will be asked "Would you like to retain Per Instance layer control attributes?" Answer Yes if you intend to return to Per Instance layer control at some point. Otherwise, answering No will delete the now unused Layer On/Off Attributes from each symbol instance in the drawing.

Also, when Per Instance Layer Control is enabled, GoTo View Link Attributes will only be added to those instances that have their GoTo View Link option enabled. This option is available in the Insert Symbol menu, Symbol Tools context menu, and the newly expanded Symbol Layer Manager.

Additionally, when a drawing is first loaded into this version and Symbol Layer Control is not set to Per Instance, DataCAD will delete the unused Layer On/Off attributes from each symbol instance in the drawing. This will slow down the loading of the drawing. However, it will only happen the first time the drawing is loaded and then saved.

3D Inclined Polygons & Slabs: Pitch / Angle / Grade

New options for Pitch, Angle, and Grade have been added to the 3D Inclined Polygons and Slabs Create and Edit menus.



Figure 21.6: 3D Inclined Polygons Menu

➔ To create an inclined polygon or slab using a pre-defined slope:

93. Go to 3D Entity, Polygons or Slabs, Inclines.
94. Select one of the inclined polygon or slab types to create:
    - **4 Edge Parallel** (i.e., gable roof plane or ramp)
    - **4 Edge Trapezoid** (i.e. hip roof plane or tapered ramp)
    - **4 Edge General** (i.e. gable to hip roof plane)
    - **3 Edge Bottom** (i.e. hip roof plane)
    - **3 Edge Top** (i.e. dormer roof plane)
95. Select one of the slope creation methods to use:
    - **Base/Pitch**
      (Create from z-base to a height, specified by Pitch: Rise / Run)
    - **Base/Angle**
      (Create from z-base to a height, specified by Angle)
    - **Base/Grade**
      (Create from z-base to a height, specified by Grade)

Note: For Pitch, any positive or negative Rise value is allowed. However, the Run value must be positive. For Angle and Grade, any positive or negative value is allowed.

The maximum values allowed are:

- Rise: +/- 685 units
- Run: + 1000 units
- Angle: +/- 89 degrees
- Grade: +/- 5700 percent

The minimum value must be non-zero.

---

96. Follow the prompts to enter the first edge of the polygon or slab.
97. Follow the prompts to enter the second edge or point of the polygon or slab.
98. Select New Pitch, Angle, or Grade to enter a new value for the slope of the polygon or slab.

➔ To change the slope an existing inclined polygon or slab:

99. Go to 3D Menus, 3D Entity, Polygons or Slabs, Edit.

100. Select Pitch/Angle.

101. Toggle one of the slope methods to use:

- Rise/Run
- Angle
- Grade

102. Select New Pitch, New Angle, or New Grade.

103. Enter a new value for the slope at the prompts.

104. Decide whether to move the Top (i.e. ridge) or the Bottom (i.e., eave) edge(s) of the polygon or slab.



Figure 21.7: Edit 3D Polygons Menu

105. Toggle on Move Top to update the z-coordinates of all but the lowest (i.e. Eave) vertices of the polygon or slab.

106. Toggle on Move Bottom to update the z-coordinates of all but the highest (i.e. Ridge) vertices of the polygon or slab.

107. The x and y coordinates of the polygon or slab vertices will not change.

108. Select inclined polygons or slabs by Entity, Group, Area, or Fence.

Note: If the polygon or slab you select is horizontal (i.e. does not already have a slope), you will be prompted to pick the bottom edge.

3D Inclined Polygons & Slabs: Properties Editor

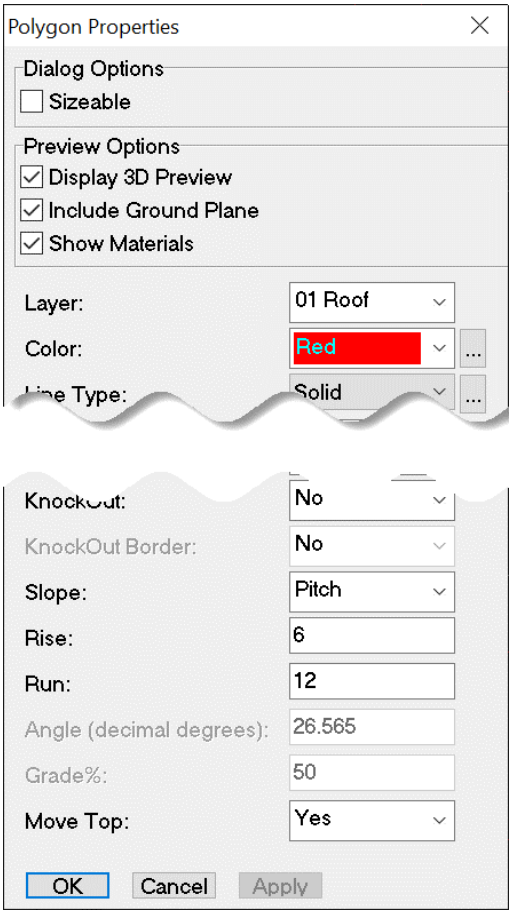


Figure 21.8: 3D Polygon Properties Editor

The Entity Properties Editor has been updated to include the Slope parameters of 3D Inclined Polygons and Slabs. When you display the properties of a 3D Polygon or Slab that is not horizontal or vertical and has at least one edge parallel to the ground plane, its slope properties are shown.

A drop-down list for the Slope Type can be set to one of the following:

Pitch
When set to Pitch, the Rise and Run parameters can be changed.

The maximum Rise value is +/- 685 units. The maximum Run value is 1000 units.

Angle
When set to Angle, the angle, in decimal degrees, can be changed.

The maximum angle is +/- 89 degrees.

Grade
When set to Grade, the grade, in percent, can be changed.

The maximum grade is +/- 5700%.

When you change the slope parameters, DataCAD will update the z-coordinates of all but the lowest (i.e. Eave) vertices of the polygon or slab. Set **Move Top** to No to update the z-coordinates of all but the highest (i.e. Ridge) vertices of the polygon or slab. The x and y coordinates of the polygon or slab are always maintained.

Symbol Layer Manager

When Symbol Layer Control is set to Per Instance, a new Symbol Layer Manager option is available in the Symbol Tools context menu. Select this option to display the Symbol Layer Manager for the currently selected symbol.

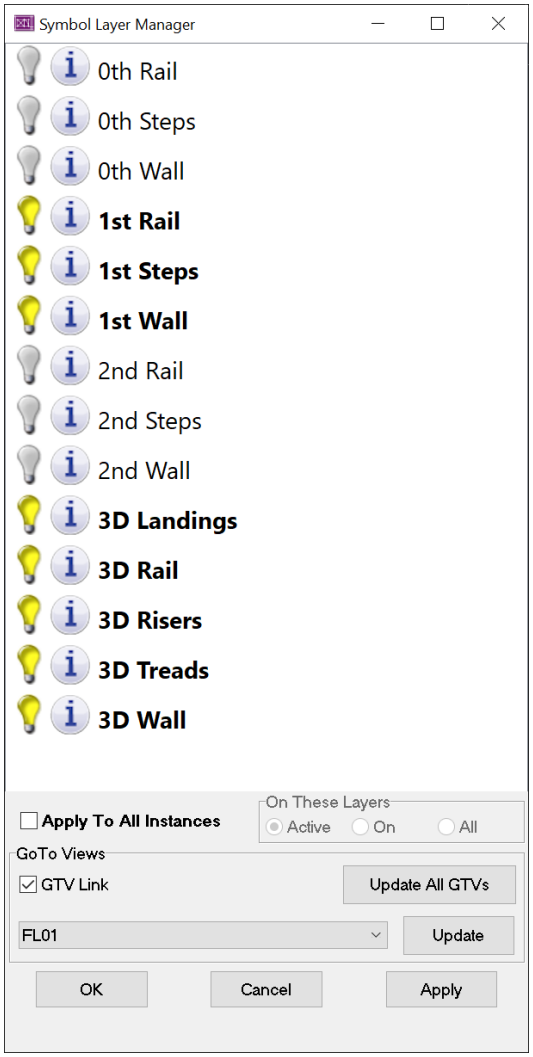


Figure 21.9: Symbol Layer Manger

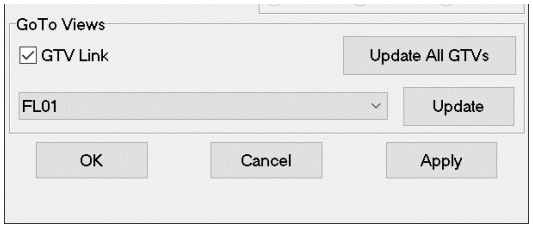


Figure 21.10: Symbol Layer Manager

Layers in the list can be toggled on/off by clicking on them.

An Info Tip is displayed next to layers that have View and/or Scale-independent attributes.

Note: The Symbol Layer Control 'Off' setting supersedes the View/Scale-dependent Symbol Layer 'On' setting. So, if a symbol's layer is set to 'Off' by Symbol Layer Control, the layer will not display, regardless of its view/scale-dependent setting.

The View/Scale-dependent Symbol Layer 'Off' setting supersedes the Symbol Layer Control 'On' setting. So, if a symbol's layer is set to 'Off' by View/Scale-dependent Control, the layer will not display, regardless if its layer control setting.

In other words, if a symbol's layer is turned off by either method, it will not display.

A new option, Open SLM (Symbol Layer Manager), has been added to the Insert Symbol menu when Symbol Layer Control is set to 'Per Instance.' When toggled on, the Symbol Layer Manager (SLM) will be opened when a symbol is inserted.

Symbol Layer Manager: GoTo View Link Options

Several options have been added to the **Symbol Layer Manager** to give you greater control of the way **On/Off Layers** and **GoTo View Links** apply to symbol instances.

Changing the **On/Off Layers** in the **Symbol Layer Manager** then selecting **Apply** or **OK** will set the **On/Off Layers** for the selected symbol instance.

Apply To All Instances, can be checked prior to clicking the **Apply** or **OK** buttons to apply the changes to all instances of the selected symbol definition on the **Active Layer**.

If **Apply To All Instances** is checked, the option, **On These Layers** becomes available so you can apply the changes to **All Instances** on the **Active**, **On**, or **All** layers.

A **GoTo Views** section provides options for managing the **GoTo View Links** in symbol instances.

When **GTV Link** is checked, DataCAD will associate the symbol's **On/Off Layers** and clipping boundary with a **GoTo View** whenever it is created or updated.

A drop-down list of the drawing's **GoTo Views** appears below the **GTV Link** checkbox. Selecting one of the **GoTo Views** from this list will set the **On/Off Layers** in the **Symbol Layer Manager**. Selecting **Update** will update the **On/Off Layers** that are associated with the selected **GoTo View**. Selecting **Update All GTVs** will cause the symbol to display the same **On/Off Layers** for every **GoTo View**.

For convenience, there is an option, **As Selected**, in the **GoTo Views** drop-down list. Selecting this option will set the **On/Off Layers** in the **Symbol Layer Manager** to the way they were when you first opened the **Symbol Layer Manager**.

Symbol Layer Control Notes:

Binding an XREF to a Symbol will copy the XREF's GoTo View links to the new Symbol Instance.

The following key has been added to the [Symbols] section of DCADWIN.ini:

GTV Link=TRUE

If that key is TRUE, the "GTV Link" toggle will always be ON when the Insert Symbol menu is shown. Conversely if the key is FALSE, the toggle will always be OFF. If the key is present but left blank, the state of the toggle will be remembered.

A GTV Link dropdown has been added to the Entity Properties Editor for symbols. This option is only shown if the current Symbol Layer Control is set to "Per Instance".

When Per Instance layer control is enabled, a new GTV Link toggle is shown at F8 in the Insert Symbol menu and the Symbol Tools context menu. The GTV Link toggle in the insert symbol menu controls the state of a drawing variable that is used to set that property as symbols are inserted. The GTV Link property is per-instance and can be enabled/disabled on a per symbol entity basis. GTV Linking for Symbols works essentially as it does for XREFs.

Changes have been made to allow you to add, delete, or rename layers in the Symbol Editor and have all its instances automatically update their local layer lists to reflect those changes. This, essentially, renders **Symbol Tools**, **Layer Control...**, **Rebuild Layer List** unnecessary when using Per Instance symbol layer control.

Changes have been made so that Symbols using layer on/off settings that have been assigned with Symbol Layer Control set to Per Instance will not lose those settings when switching between **None**, **Per Definition** and back to **Per Instance**.

When exporting to DWG and Symbol Layer Control is NOT set to "None", DataCAD will use the On/Off layer settings in the symbol definition. If you select "All Layers" for DWG export, all the layers in the symbol will be exported, but the On/Off status will reflect the current state of the symbol definition. If "On Layers" is selected, only those layers that are On will be exported.

Symbol Browser: Recent / Favorite Folder Manager:

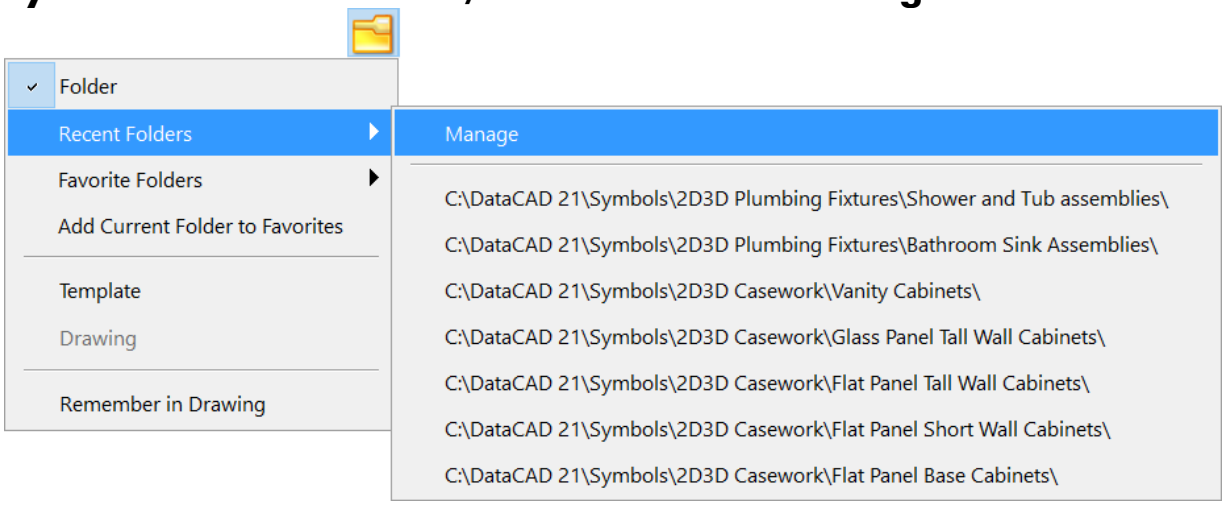


Figure 21.11: Symbol Brower Recent Folder Menu

A new option, **Manage**, has been added to the **Symbol Browser's Recent** and **Favorite Folders** menus. Select this option to display a dialog you can use to manage your list of **Recent** and **Favorite** symbol folders. Click on a single item to highlight it. Click and Drag an item to move its position in the list (only one item can be moved at a time). [Ctrl] + Click or [Shift] + Click to select multiple items. Press [Delete] to remove highlighted items from the list. Right-click to display a context menu with the following options.

- Sorted
- Delete Selected
- Set Max Folders

Select **Sorted** to alpha-numerically sort the list. When Sorted is enabled, the ability to move items in the list is disabled. Delete Selected is only available when items are selected. Select Set Max Folders to set the maximum number of saved folder locations (1 - 100).

SYMBOL BROWSER: RECENT / FAVORITE FOLDER MANAGER:

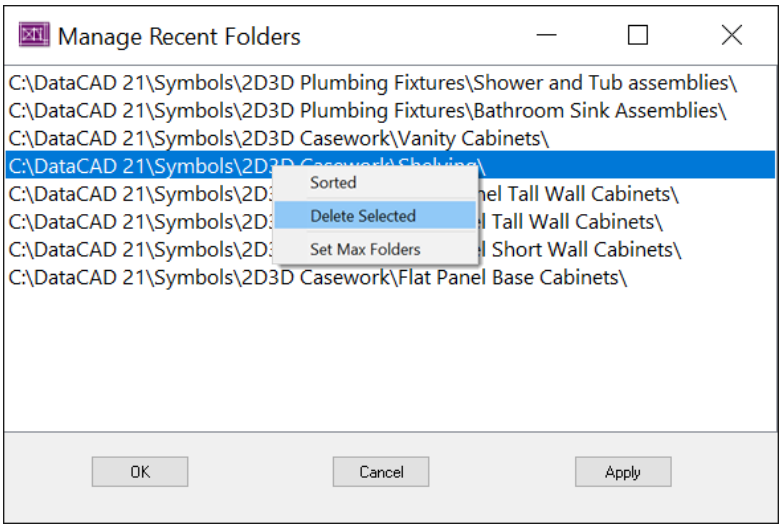


Figure 21.12: Symbol Browser Recent Folder Manager

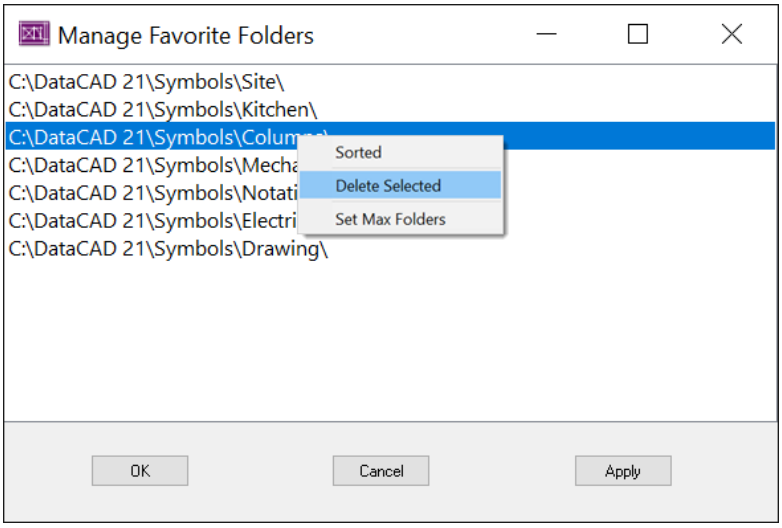


Figure 21.13: Symbol Browser Favorite Folders Manager

Exclude Selection from Editing Routines:

A new option, **Exclude**, has been added to the 2D and 3D Edit Menus; Move, Copy, Rotate, Mirror, Stretch, Enlarge, and Erase.

Note: Exclude is not available in Rotate, Quick, and Erase, Partial; or if Dynamic is toggled (On).

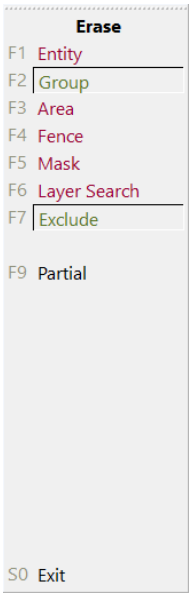


Figure 21.14: Exclude Toggle

The **Exclude** toggle appears at **F7** once you have begun the editing routine. For example, after you have defined the distance to stretch, toggle (On) **Exclude**, then click on entities you would like to exclude from Stretch. The entities you selected are highlighted. Click on a highlighted entity to remove it from the items to exclude. Right-click to return to the Stretch command. Perform the Stretch operation as many times as necessary. Toggle off **Exclude** to cancel and clear the **Exclude** selection. Exit Stretch; the **Exclude** Toggle and Selection will be reset.

Pak-N-Go Enhancements

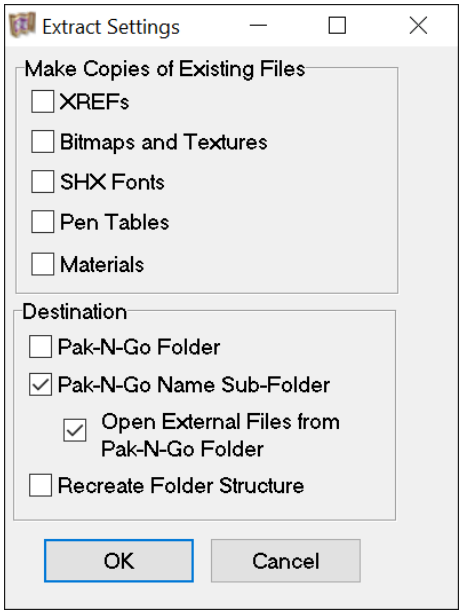


Figure 21.15: Pak-N-Go Settings Dialog

The following options have been added to the **Destination** section of the **Extract Settings** dialog for **Pak-N-Go**.

- **Pak-N-Go Folder**
- **Pak-N-Go Name Sub-Folder**
- **Recreate Folder Structure**

By default, the contents of a **Pak-N-Go** archive are extracted to the folder containing the **PAK** file. For convenience, the destination **Pak-N-Go Sub-Folder** has been added so the contents can be extracted to a sub-folder with the same name as the **PAK** file. **Recreate Folder Structure** extracts the contents of the archive to the original folders the individual files came from.

A new option, **Open External Files from Pak-N-Go Folder**, has been added to the **Pak-N-Go Settings** dialog. This option is only available when the extract to destination is set to either **Pak-N-Go Folder**, or **Pak-N-Go Name Sub-Folder**. Use this option to force DataCAD to use the contents of the archive as it was saved. Otherwise, DataCAD will try to read the external files from their original locations, which may be different from the archive.

Symbol and Smart Entity Counts:

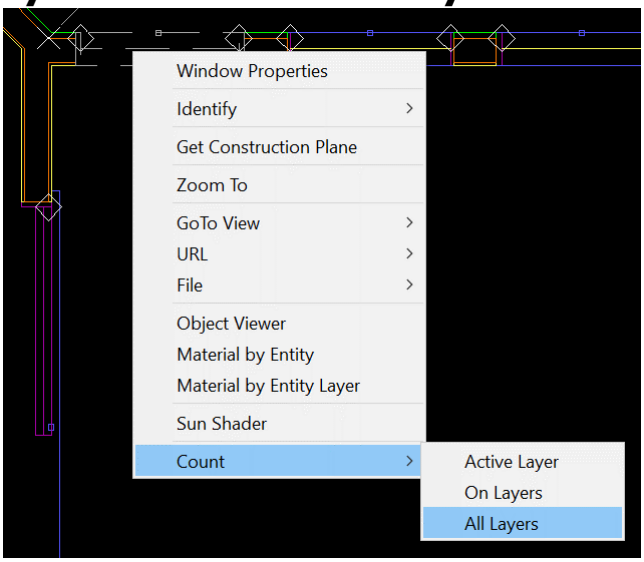


Figure 21.16: Symbol Count Context Menu

A new **Count** option is available for Symbols and Smart Doors and Windows. [Ctrl] + Right-click on any Symbol or Smart Door / Window instance and highlight **Count** in the Context Menu. Select **Active Layer**, **On Layer**, or **All Layers** to query the count for all instances of that item. The results are displayed on the **Attention Toolbar**.

For Symbols that have been loaded into the drawing, the **Count** option is also available in the **Symbol Browser's Context Menu** when browsing a folder or the current drawing.

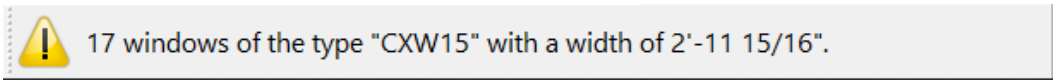


Figure 21.17: Attention Toolbar Symbol Count Results

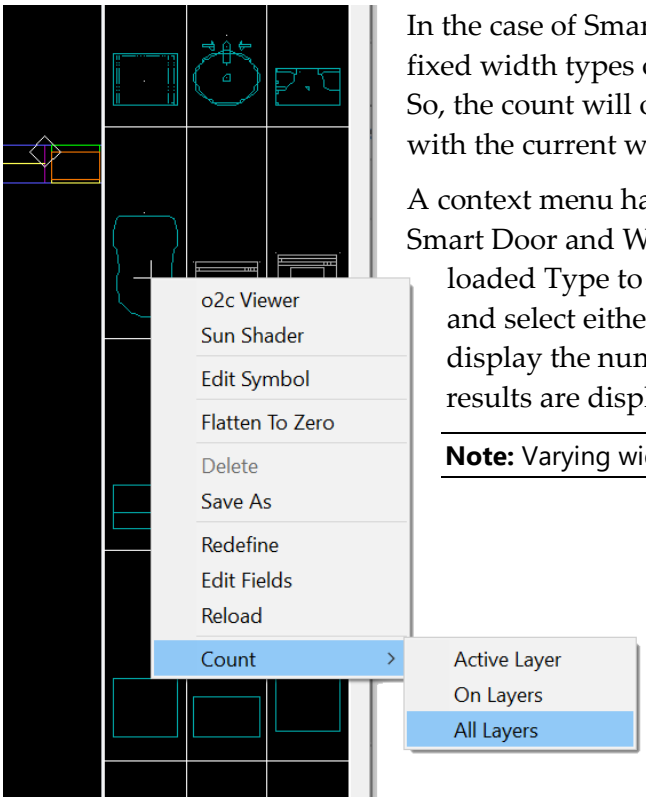


Figure 21.18: Symbol Browser Count Context Menu

In the case of Smart Doors and Windows, instances of non-fixed width types of varying widths are tallied separately. So, the count will only include instances of the current type with the current width.

A context menu has also been added to the item lists in the Smart Door and Window Managers. Right-click on any loaded Type to reveal the option, Count. Highlight Count and select either Active Layer, On Layer, or All Layers to display the number of occurrences of that Type. The results are displayed on the Attention Toolbar.

Note: Varying widths of the same Type are counted together.

Miscellaneous Enhancements

XREFs

- Changed what is shown when selecting a renamed **XREF** for renaming in the **Reference File Manager**.
- Added a new radio group, **Ignore CC**, to the **Reference File Manager**.
- For renamed **XREFs**, the original path to the **XREF** is now appended to the new name, separated by characters, defined by line **#6526** of **DCADWIN.msg**.
- Enhanced **XREF GTV Linking** to remember the state of the **Reference File Manager's Smart Wall Hatch/Fill** toggles **Show Hatch** and **Show Fill**. This can be turned off by modifying the following key in the **[XREFS]** section of **DCADWIN.ini**:

  GTV-Link Remembers Smart Wall Hatch/Fill=FALSE

Smart Entities

- Added a horizontal scrollbar (only when necessary) to the **Types** list of the **Types Managers** (Walls, Doors and Windows). Also, a hint is now displayed when the mouse is over a **Type** in the list.

Associative Dimensions

- Changed **Identify/Set All** on an **Associative Dimension** to set the **Show Dim Text** drawing variable.

Clip Cubes

- New options have been added to the **Clip Cube** menu for incrementally adjusting either the x, y, or z coordinates of the **Drawing Clip Cube**.

  Ortho or Parallel Clip Cube:

  Move X+
  Move X-
  Move Y+
  Move Y-
  Move Z+
  Move Z-
  Move Distance (X, Y, or Z Increment)

  Note: These options only appear when Clip Cube is enabled. Use these options while viewing a clipped view to move the clip box 'through' your model.

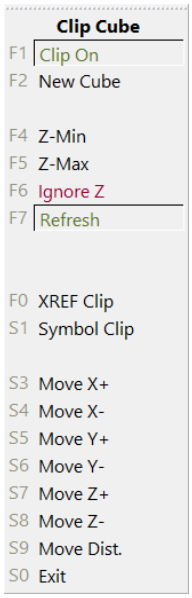


Figure 21.19: Clip Cube Menu

- **XREF Clips** and **Symbol Clips** will now be clipped by the **Drawing Clip Cube**. If an **X-Clip** or **S-Clip** overlaps a **Drawing Clip Cube**, it

will be merged with the **Drawing Clip Cube**. So, the portion of the **X-Clip** or **S-Clip** that lies within the **Drawing Clip Cube** will be displayed.

- **X-Clips** and **S-Clips** can be set to ignore **Clip Cubes** via a toggle in their context menu or within the **X-Clip** or **S-Clip** menus.

Note: Drawings saved in versions of DataCAD prior to 20.02.03 will automatically have their **X-Clips** and **S-Clips** set to **Ignore Clip Cubes** when opened in this version.

- The current **Base** and **Height** setting for **Clip Cubes** is now displayed on the **Error Line** while you are in the **Clip Cube** menu.

AEC File Repair

New options have been added to the **AEC File Repair** dialog.

- **Convert 3D Lines to 2D Lines and Flatten**
- **Flatten 2D Entities within Symbols** (now a sub-option of **Flatten 2D Entities**).
- **XREF and Symbol Insertion to Zero** is now a separate option. Previously, this would occur automatically if **Flatten 2D Entities** was checked.

Note: Covered Polylines are treated as **3D Entities** and are no longer flattened along with **2D** entities. **Uncovered Polylines** are treated as **2D** entities and will be flattened along with other **2D Entities**.

Symbols

- [Ctrl] + Clicking on a Symbol will now open the **Symbol Layer Manager** if **Symbol Layer Control** is set to **Per Instance**.
- The key, **Allow Trailing Spaces**, has been added to the **[Symbol Attributes]** section of **DCADWIN.ini**. Setting this key to **TRUE** will prevent DataCAD from removing trailing spaces in **Symbol Text Attribute** values.

Spell Checker

- Added **Check Spelling** to the context menu for **Text**, **PText**, **MText**, **Symbol Attribute Text**, and **Symbols**.

Enlarge Menu

- Added the options, **Half** and **Double** to the **Enlarge** menu.

Materials

- Added new **Board & Batten** and **Channel Lap** siding materials in 25 standard fiber cement colors.

Layer Manager

- A new option, Real-time Updating, has been added to the Persistent Layer Manager. If un-checked, the Layer Manager will only update its layer list when the dialog has the Focus.

Color Picker

- Added a new Color Picker/Mixer to replace the previous one.

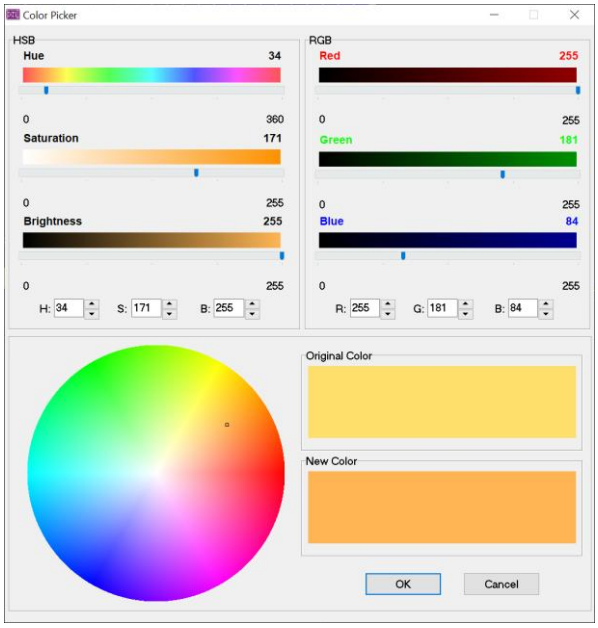


Figure 21.20: New Color Picker Dialog

- DataCAD's color drop-down combo-box will now give access to all 255 colors.

Geometry, Divide

- Associative Dimensions and Smart Walls can be selected using the Entity method of Geometry, Divide. For Dimensions, the divisions are added along the dimension line. For Smart Walls, they are added along the Control Line.

Entity Properties Editor

- The Entity Properties Editor has been updated to show all unavailable options in a disabled state. So, only available options, based on the current settings, are shown. For example, a Text entity has **KnockOut Border** and **X/Y Enlargement** options. However, they will only be enabled if **KnockOut** is set to **Yes**. This way, you do not need to select **Apply** after setting **KnockOut** to **Yes** to see those additional options. Setting **KnockOut** to **Yes** enables those options automatically.

Multi-View Windows

- As with GoTo Views, Multi-View Windows will now remember the current Tangents setting.

2D/3D Move, Copy, and Stretch

- A '**Distance X 2**' option has been added to the **2D** and **3D Move**, **Copy**, and **Stretch** menus.

Note: The appearance and position of this option is affected by the state of the **New 3D Menu** key in the **[General]** section of **DCADWIN.ini**.

Mask Menu

- Added new options, **Hatched**, and **Filled**, to the **Mask** menu. These options are mutually exclusive. When **Hatched** is toggled (On), entities that are hatched will be selected. If **Pattern** is also toggled (On), only entities hatched with the selected pattern will be selected. When **Filled** is toggled (On), entities that are filled will be selected.

Copy / Paste

- Changes have been made to the way the z-coordinate is handled when you select an Insertion Point during Copy/Paste. Previously, the z-coordinate of the insertion point you defined was set at the current Z-Base. Now, the z-coordinate will always be set at zero. This is the same behavior as defining an insertion point for a Symbol. When you Paste, the Z-Offset sub-menu is now available if an insertion point has been defined.

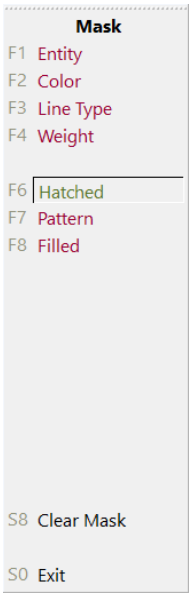


Figure 21.21: Mask Menu

Note: To Paste using the Insertion Point, By Center must be toggled (Off).

New Configuration Settings

DataCAD 21 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 21 installation folder (C:\DataCAD 21\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

XREFs: GTV-Link Remembers Smart Wall Hatch/Fill

[XREFs]
GTV-Link Remembers Smart Wall Hatch/Fill=TRUE

Symbols: New Scale/Rotation

[Symbols]
New Scale/Rotation=TRUE

Symbols: GTV Link

[Symbols]
GTV Link=TRUE

Symbol Attributes: Allow Trailing Spaces

[Symbol Attributes]
Allow Trailing Spaces=TRUE

Display: Auto Adjust Marker Size Percentage

[Display]
Auto Adjust Marker Size Percentage=100

New Extended Character Codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" in Chapter 30 of the DataCAD Reference Manual.

DMF (DataCAD Material File):

```
3033 : Load DMF File (Merge)
3034 : Load DMF File (Overwrite)
```

Toolbar Examples:

Display Load DMF dialog.

```
[Load Material File (DMF)]
Hint=Load Material File (DMF - merge)
Icon=
A=^3033#^
```

Load a material file (DMF Material by Color) by name.

```
[Load DCADWIN.dmf]
Hint=Load DCADWIN.dmf (merge)
Icon=
A=^3033#^DCADWIN$^

[Load DCADWIN.dmf]
Hint=Load DCADWIN.dmf (overwrite)
Icon=
A=^3034#^M:\MyMaterials\DCADWIN.dmf$^
```

Enhancements to DCAL (DataCAD Applications Language)

DCAL for Delphi Enhancements

- Header files for Delphi DX have been added. They are in the DCAL for Delphi\Header Files DX folder.
- A new sample macro, Edit_Group, has been added to demonstrate the use of the mode_group command.
- Sample macros are now included for Delphi DX in the DCAL for Delphi\Samples DX folder.
- All the sample macros have been compiled for DataCAD 21 and are available in the DCAL for Delphi\Compiled Macros folder.

Added the following functions:

Contour Search

```
boundary_search(pt1 : point; var frst, last : lgl_addr) : aSInt;
```

License-related Functions

```
is_trial() : boolean;
get_license_type() : integer;
get_license_id() : string;
get_customer_id() : string;
get_customer_company() : string;
get_customer_FirstName() : string;
get_customer_LastName() : string;
get_customer_name() : string;
get_customer_address1() : string;
get_customer_address2() : string;
get_customer_city() : string;
get_customer_state_province() : string;
get_customer_zip() : string;
get_customer_country() : string;
get_customer_email() : string;
get_customer_phone() : string;
get_customer_fax() : string;
get_latest_version_number() : string;
get_installation_name() : string;
trial_days_left_since_license_creation() : integer;
```

DCAL for C++ Enhancements

Added the following functions:

Contour Search

```
boundary_search(point pt1, lgl_addr &frst, lgl_addr &last) : aSInt;
```

License-related Functions:

```
is_trial() : bool;
get_license_type() : aSInt;
get_license_id() : ShortString;
get_customer_id() : ShortString;
get_customer_company() : ShortString;
get_customer_FirstName() : ShortString;
get_customer_LastName() : ShortString;
get_customer_name() : ShortString;
get_customer_address1() : ShortString;
get_customer_address2() : ShortString;
get_customer_city() : ShortString;
get_customer_state_province() : ShortString;
get_customer_zip() : ShortString;
get_customer_country() : ShortString;
get_customer_email() : ShortString;
get_customer_phone() : ShortString;
get_customer_fax() : ShortString;
```

DCAL for DOS Enhancements

Added the following BUILTIN procedures:

KnockOut

```
PROCEDURE SetKnockOut(Ent : In Out entity; TurnOn : boolean); BUILTIN 678;
```

License-related Functions

```
PROCEDURE IsTrial(Trial : IN OUT boolean); BUILTIN 679;
PROCEDURE GetLicenseType(LicenseType : IN OUT integer); BUILTIN 680;
```

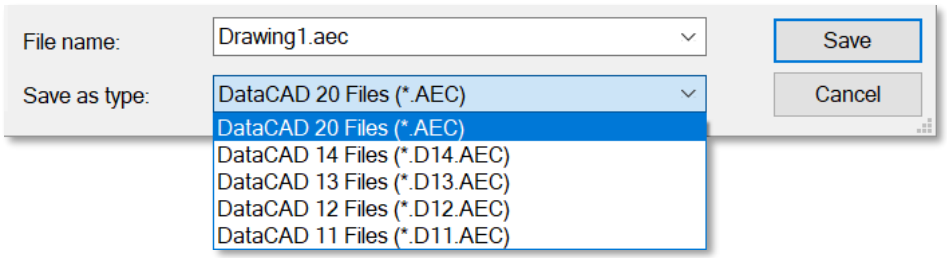
PROCEDURE GetLicenseID (LiceseID : IN OUT string); **BUILTIN 655**;

Note: This procedure was first added to DCAL for DOS in DataCAD 18.

```
PROCEDURE GetCustomerID(CustomerID : IN OUT string); BUILTIN 681;
PROCEDURE GetLatestVersionNumber(LatestVersionNumber : IN OUT string);
BUILTIN 682;
PROCEDURE GetInstallationName(InstallationName : IN OUT string); BUILTIN
683;
PROCEDURE TrialDaysLeft(DaysLeft : IN OUT integer); BUILTIN 684;
PROCEDURE GetCustomerCompany(CustomerCompany : IN OUT string); BUILTIN
685;
PROCEDURE GetCustomerFirstName(CustomerFirstName : IN OUT string); BUILTIN
686;
PROCEDURE GetCustomerLastName(CustomerLastName : IN OUT string); BUILTIN
687;
PROCEDURE GetCustomerName(CustomerName : IN OUT string); BUILTIN 688;
PROCEDURE GetCustomerAddress1(CustomerAddress1 : IN OUT string); BUILTIN
689;
PROCEDURE GetCustomerAddress2(CustomerAddress2 : IN OUT string); BUILTIN
670;
PROCEDURE GetCustomerCity(CustomerCity : IN OUT string); BUILTIN 671;
PROCEDURE GetCustomerStateProv(CustomerStateProv : IN OUT string); BUILTIN
672;
PROCEDURE GetCustomerZip(CustomerZip : IN OUT string); BUILTIN 673;
PROCEDURE GetCustomerCountry(CustomerCountry : IN OUT string); BUILTIN
674;
PROCEDURE GetCustomerEmail(CustomerEmail : IN OUT string); BUILTIN 675;
PROCEDURE GetCustomerPhone(CustomerPhone : IN OUT string); BUILTIN 676;
PROCEDURE GetCustomerFax(CustomerFax : IN OUT string); BUILTIN 677;
```

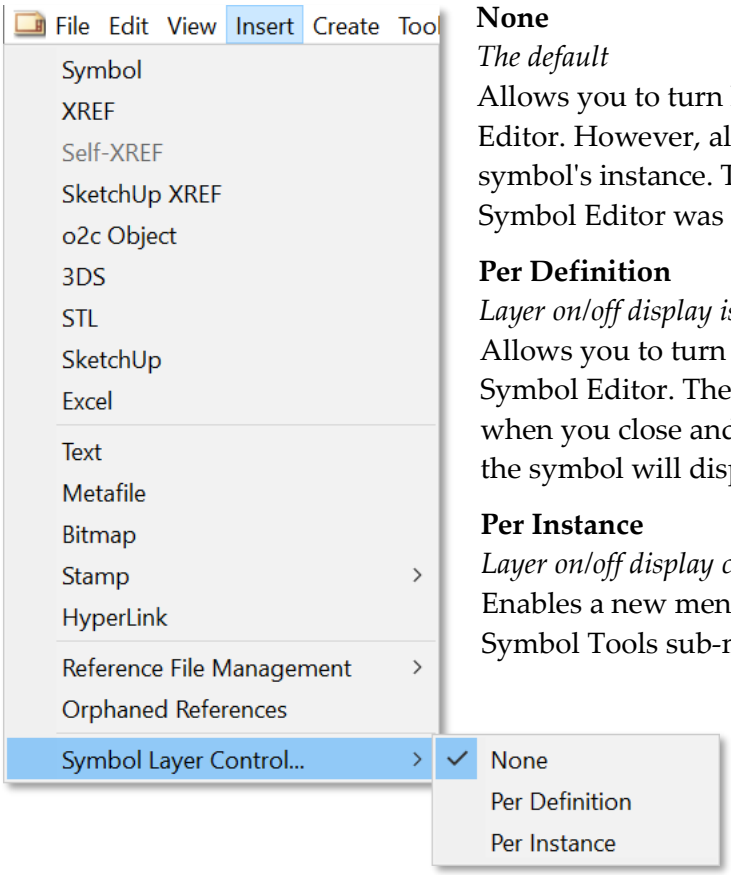
DataCAD 20

DataCAD 20 contains a collection of new features and enhancements designed to increase your productivity. The DataCAD 20 drawing file format is currently compatible with DataCAD 15 through 19. However, you must use the “Save As” command in the “File” menu to save files backward to older version formats.



Symbol Layer Control

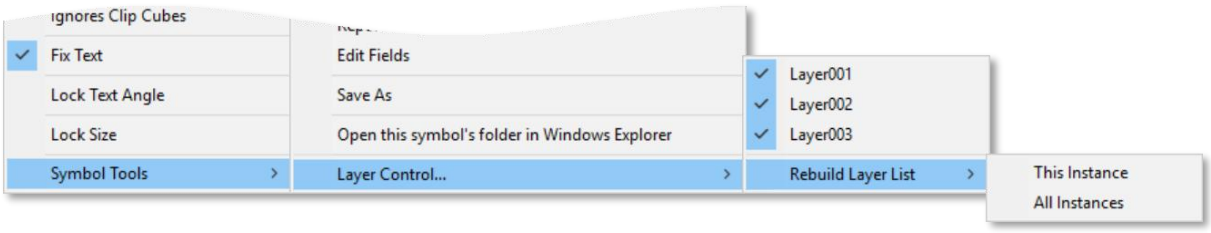
A new option, **Symbol Layer Control...** has been added to the Insert menu. There are three sub-options.



None
The default
Allows you to turn layers on and off within the Symbol Editor. However, all layers will be displayed in the symbol's instance. This has been the behavior since the Symbol Editor was added to DataCAD 12.

Per Definition
Layer on/off display is the same for all instances
Allows you to turn layers on and off within the Symbol Editor. The on/off state of the layers is retained when you close and save the symbol. All instances of the symbol will display the same 'on' layers.

Per Instance
Layer on/off display can be unique for each instance
Enables a new menu option, **Layer Control...**, in the Symbol Tools sub-menu of the Symbol Context Menu.



Layer Control…
Highlighting this option reveals two sub-options.

Layer List
A listing of all layers, top-level and nested, contained in the symbol. A checkmark next to the layer name indicates the layer should be displayed. Any layer that is unchecked, will not be displayed.

Rebuild Layer List
Selecting this option rebuilds the complete list of layers based on the current symbol definition and sets their displayed state to on. You should perform this operation after adding or deleting layers from a symbol definition. There are two sub-options.

This Instance
Rebuilds layer list for the selected symbol.

All Instances
Rebuilds the layer list for all instances of the selected symbol.

Helplines (a.k.a. Construction Lines)

A new option, [**S4**] **Helplines**, has been added to the Utility Menu. Helplines are infinite lines you can add to your drawing for reference only. You can offset them, snap to them, and trim to them, but they do not print.

➔ To add helplines to your drawing;

109. Select Helplines from the Utility menu.

110. Click the first point of the helpline.

111. Click the second point of the helpline.

DataCAD draws an infinite line between the two points.

The following options are available in the Helplines menu:

F1 Delete All
Select **Delete All** to remove all the helplines from your drawing.

F5 Color
Select **Color** to choose a color for helplines.

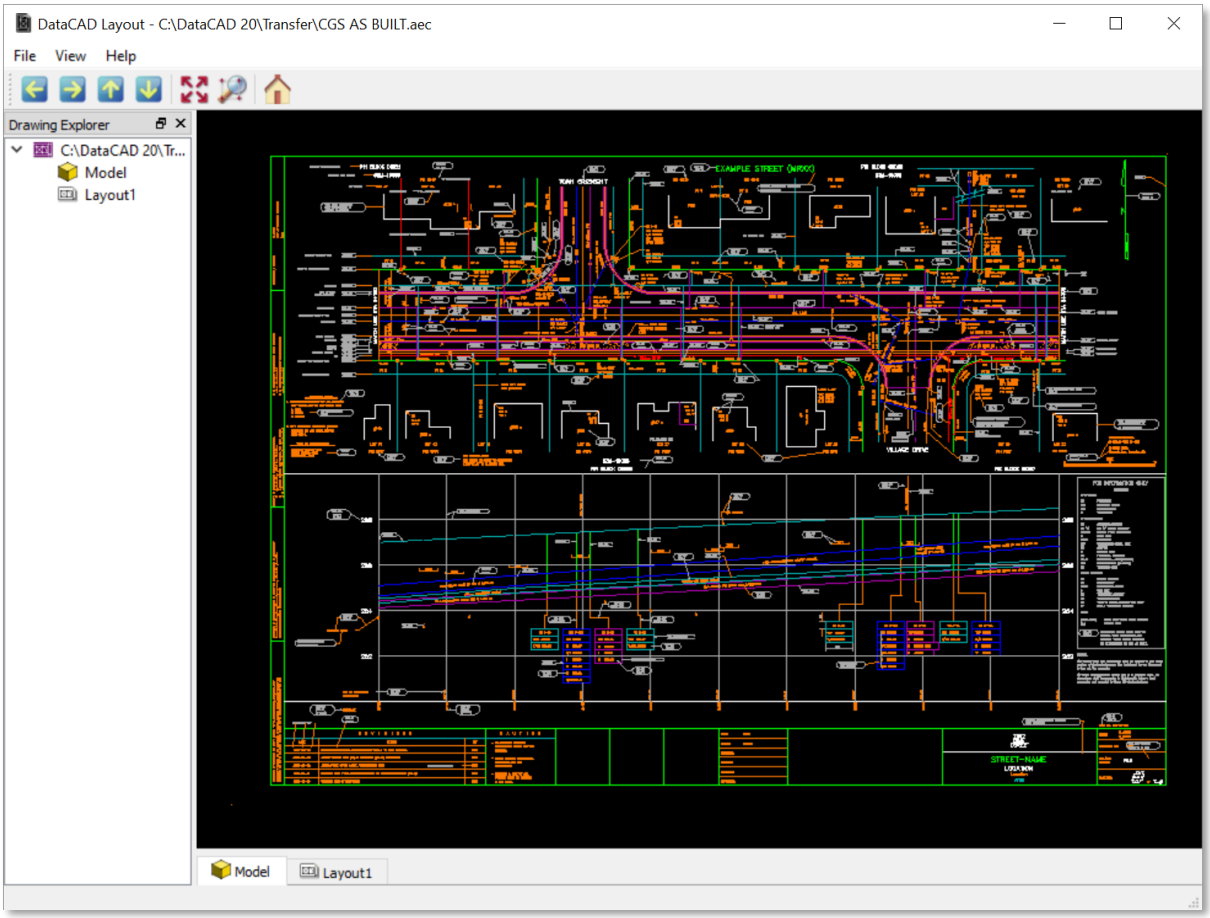
F6 Pen Style
Select **Pen Style** to choose a pen style for helplines.

F0 Show
Toggle **Show** off to disable the display of helplines.

S2 Draw First
Toggle **Draw First** on to have helplines draw before (i.e., underneath) other geometry.

S3 Draw Last
Toggle **Draw Last** on to have helplines draw after (i.e., on top of) other geometry.

Layout BETA (DWG Paper Space Layouts)



When you import a DWG file that includes Paper Space Layouts, DataCAD will display a new option, Include Paper Space, on the DWG Import Entity Assignments dialog. Check this option to include Paper Space Layouts and any Paper Space-specific entities from the DWG file during import. If the DWG file does not include any Paper Space Layouts, the Include Paper Space option will be greyed out.

Paper Space-specific entities belong to specific Paper Space Layouts and do not appear in the main DataCAD drawing.

A new option, **Paper Space**, has been added to the File drop-down menu. Selecting this option will launch Layout to display imported Paper Space sheets. This option is greyed out when no Paper Space Layouts have been imported.

A new option, **Paper Space** (**PaprSpac** for 8-character label), has been added to the Utility menu. Selecting this option will launch Layout to display imported Paper Space sheets. This option is only displayed when Paper Space Layouts have been imported.

Currently, Layout BETA does not provide any functionality other than displaying Paper Space Layouts that were imported from a DWG file. The primary utility of this feature is to reveal the Paper Space Layouts (like DataCAD's Multi-Scale Plotting Sheets) that were previously inaccessible. To help us improve Layout while it is still in BETA, we ask you to report any inaccuracies in conversions or other problems to help@datacad.com.

Z-Datum Reference

A new option, [**S5**] **Z-Datum**, has been added to the Utility, Settings menu. You can enable this feature to set a Z offset to a relative zero height (a.k.a. Z-Datum Reference). For example, if the first floor of your building is at a real-world height of 212', you would set the Z-Datum value to 212'.

Subsequently, when you add a wall at Z-Base zero and Z-Height 8', DataCAD will automatically calculate the offset to position the wall at a real-world Z-Base of 212' and a real-world Z-Height of 220'. This makes it easier to model your project relative to the first floor, rather than having to calculate the offset yourself.

Note: When this feature is enabled, the Coordinates/Hints Toolbar, Identify, and 3D Coordinate Identification indicate both the relative and world Z values.

Drag-n-drop Layer Files

In addition to the default action, replace current layer, you can now hold down the [Ctrl] key while dropping a layer to merge its contents with the current layer, or hold down the [Ctrl] + [Alt] keys while dropping a layer to create a new layer.

Productivity Enhancements

Polyline Length Readout

The length, or perimeter and area of polylines is now displayed during editing.

Identify, Set All, Create

A new option, **Create**, has been added to the Identify, Set All menu. After you identify an entity and select Set All, you can then select **Create** which will take you to the identified entity's creation menu.

Mirror, Bisect

A new option, **Bisect**, has been added to the Mirror menu.

Change, Match, Layer

A new toggle option, **Layer**, has been added to the More... sub-menu of Change, Match. After you select Change, Match, toggle on **Layer** to apply the layer property of one entity to another.

The state of the Layer toggle when Change, Match, All is selected can be set by the key, **Change Match All Includes Layer**, in the **[General]** section of DCADWIN.INI. Set this key to TRUE if you want the entity's layer property to be included during Change, Match, All. The default value is FALSE.

GetSnap Enhancements

Two new options have been added to the **GetSnap** popup menu.

Angle + Distance

Gets the angle between two points, then adds (or subtracts with negative value) the distance you specify.

➔ To get the angle between two points and specify a distance along that angle;

112. Click or snap to the first point.
113. **GetSnap** to the relative point.
114. Select Angle + Distance.
115. Enter the distance beyond (or short of with negative value) the relative point.

Midpoint

Gets the midpoint between two points.

➔ To get the midpoint between two points;

116. Click or snap to the first point.
117. **GetSnap** to the relative point.
118. Select **Midpoint**.

Miscellaneous Enhancements

1. The maximum number of Fence points has been increased (from 36) to 256 in Stretch (2D and 3D).

2. In addition to MCR, DMX (DCAL for Delphi and C++) macros are now remembered when they are the last macro used.
3. Modified 2 Line Trim to allow the selection of coincident lines for the selection of the first line. That is, you select the 1st line and if it is the wrong one, right-click once and select again and it will pick the next line. This may be repeated until the correct line is selected.
4. Modified Explode in the Symbol Tools context menu to obey the Keep Groups toggle in the Symbol Insert (Explode) menu.
5. Mirror by Entity has been enhanced to allow the selection of Helplines.
6. A new option, **Separator**, has been added to Scale Type, AS 1100 menu toggle. This option allows you to choose either a space character, or a comma to delineate meters.
7. DataCAD will now save the Active layer upon a Symbol's creation.
8. Pak-N-Go now includes symbols marked for 'Auto Reload.'
9. It is now possible to Object Snap to the Absolute Zero indicator.
10. The display grids can now be set to a custom color.
11. A new toggle, **Ignore CC** (Clip Cubes), has been added to the symbol insert menu.
12. A new option, **By Center**, has been added to the Move, Drag menu.
13. For convenience, an '**Abs. Zero**' option has been added to the Multi-scale Plotting, Layout menu.
14. A **New Layer** option has been added to the Layer, Import menu.
15. Associative Dimension lines now support No. Divisions object snapping.
16. [Ctrl] + [Enter] may now be used with DataCAD's input line.
17. The Reload option is now available in the Symbol Browser's context menu, for loaded symbols, when browsing by folder.
18. Pressing and holding [Ctrl] + [Shift] and selecting the New Layer option in the Layer Manager will force the New Layer dialog to display at the center of the main display.
19. MText can now be selected in Tangents.

New Configuration Settings

DataCAD 20 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 20 installation folder (C:\DataCAD 20\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

Default Layer Control

The following key is automatically added to the [Symbols] section of DCADWIN.ini to set the default state of Layer Control in Symbols.

[Symbols]
Default Layer Control=0

0, the default ('**None**' in the menu option), allows you to turn layers on and off within the Symbol Editor. However, all layers will be displayed in the symbol's instance. This has been the behavior since the Symbol Editor was added to DataCAD 12.

1, ('**Per Definition**' in the menu option), allows you to turn layers on and off within the Symbol Editor.

The on/off state of the layers is retained when you close and save the symbol. All instances of the symbol will display the same layers.

2, ('**Per Instance**' in the menu option), enables a new menu option, 'Layers...', in the Symbol Tools sub-menu of the Symbol Context menu. Highlighting this option reveals the list of all layers, top-level and nested, contained in the symbol. A checkmark next to the layer name indicates the layer should be displayed. Any layer that is unchecked, will not be displayed.

Smart Text Margin Obeys TextScale

The following key has been added to the [Smart Text] section of DCADWIN.ini to set the behavior of Smart Text Margins.

[Smart Text]
Smart Text Margin Obeys TextScale=TRUE

Setting this key to FALSE will cause PText/MText margins to always act as though TextScale is Off. The default value is TRUE.

AS 1100 Exports As mm

The following key has been added to the [DXF_DWG] section of DCADWIN.ini to set the default scale type for export when AS 1100 is toggled on.

[DXF_DWG]
AS 1100 Exports As mm=TRUE

Setting this key to TRUE, will cause DataCAD to export the AS 1100 Scale Type as millimeters.

Nesting In XREFs

Three new keys have been added to the [XREFs] section of DCADWIN.ini to control the display of nested XREFs, and whether nesting is enabled for newly inserted XREFs and Self-XREFs.

```
[XREFs]
Display Nesting=TRUE
```

The key, Allow Nesting has been deprecated. A new key, **Display Nesting**, has been added to store the Program Preference, Display Nested XREFs.

The following keys control the default state of the Nesting toggle in the Insert XREF menu.

```
[XREFs]
Nesting In XREFs=FALSE
Nesting In Self-XREFs=FALSE
```

Auto Adjust Marker Size Percentage

The display size of DataCAD's markers used for the object snap indicator, insertion points, and 3D markers can now be customized by changing the value of the following key in in the [Display] section of DCADWIN.ini.

```
[Display]
Auto Adjust Marker Size Percentage=100
```

The initial value, in percent, is set automatically based on your display resolution.

Change Match All Includes Layer

The state of the Layer toggle when Change, Match, All is selected can be set by the following key in the [General] section of DCADWIN.INI.

```
[General]
Change Match All Includes Layer=FALSE
```

Set this key to TRUE if you want the entity's layer property to be included during Change, Match, All. The default value is FALSE.

Entity Context Menu Obeys Layer Search

The following key has been added to the [General] section of DCADWIN.ini to control whether Layer Search applies to the Entity Context Menu.

```
[General]
Entity Context Menu Obeys Layer Search=FALSE
```

If FALSE, the default, [Ctrl] + Right-clicking on an entity ignores the Layer Search toggle. If TRUE, the Layer Search toggle will apply to the Entity Context Menu.

New Clipped Area Selection

Corrections have been made to Area/Fence selection of clipped XREFs and Symbols. This new methodology can be turned off with the following hey in the [XREFs] section of DCADWIN.ini:

```
[XREFs]
New Clipped Area Selection=TRUE
```

Miscellaneous

```
 [General]
New Dimension Visible Attribute Positioning=FALSE
```

```
[General]
Show Visible Attributes When Dragging=FALSE
```

New Extended Character Codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" in Chapter 30 of the DataCAD Reference Manual.

A new toolbar code, 145, has been added for XClips. It is equivalent to the menu selection sequence, Insert, Reference File Management, Clip Cubes.

Helpline-related codes:

```
1111 : Helplines Show On
1112 : Helplines Show Off
1113 : Helplines Draw First
1114 : Helplines Draw Last
```

Dimension Rounding-related codes:

```
1115 : Dimension Rounding On
1116 : Dimension Rounding Off
```

Z-Datum-related codes:

```
1117 : Z-Datum Reference On
1118 : Z-Datum Reference Off
1119 : Enter Z-Datum Reference point
```

Enhancements to DCAL (DataCAD Applications Language)

DCAL for C++

A 'Hello World' example has been added to illustrate DataCAD's re-entrant state machine logic.

The 'Arrow' example has been updated for Visual Studio 2013.

DCAL for DOS

```
PROCEDURE Get_Active_SSet : Integer; BUILTIN 672;
PROCEDURE PlinVoidAdd(Parent, Void : In Out entity; DoDraw : boolean);
BUILTIN 673;
PROCEDURE PlinCovered(Plin : In Out entity; covered : boolean); BUILTIN
674;
PROCEDURE Ent_Mirr(ent : In Out entity; pt1, pt2 : point; FixText :
boolean); BUILTIN 675;
PROCEDURE Ent_Explode_With_Matrix(ent : In Out entity; mat : modmat);
BUILTIN 676;
PROCEDURE Explode_Symbol_Entity(Syment : In Out entity; Where : integer);
BUILTIN 677;
```

DataCAD 19

DataCAD 19 contains a collection of new features and enhancements designed to increase your productivity. The DataCAD 19 drawing file format is currently compatible with DataCAD 18, 17, 16, and 15. However, you must use the "Save As" command in the "File" menu to save files backward to older version formats.

AEC File Repair

A new 'Repair' option has been added to the 'idle' (no drawings open) File menu. When you open a file using this option, you will be presented with a dialog that includes options for testing the drawing database.

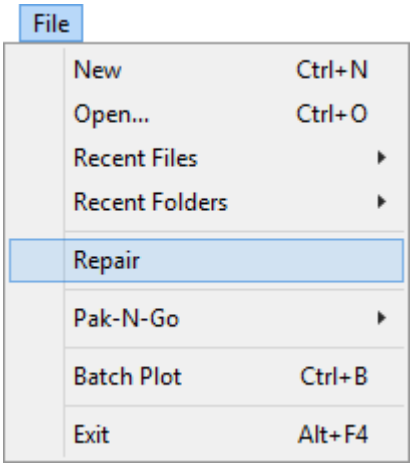


Figure 19.2: File, Repair Menu

Drawing Database Tests

- Invalid Entities in Drawing
- Invalid Entities in Symbols
- Duplicate Polyline Vertices
- Extraordinary Values

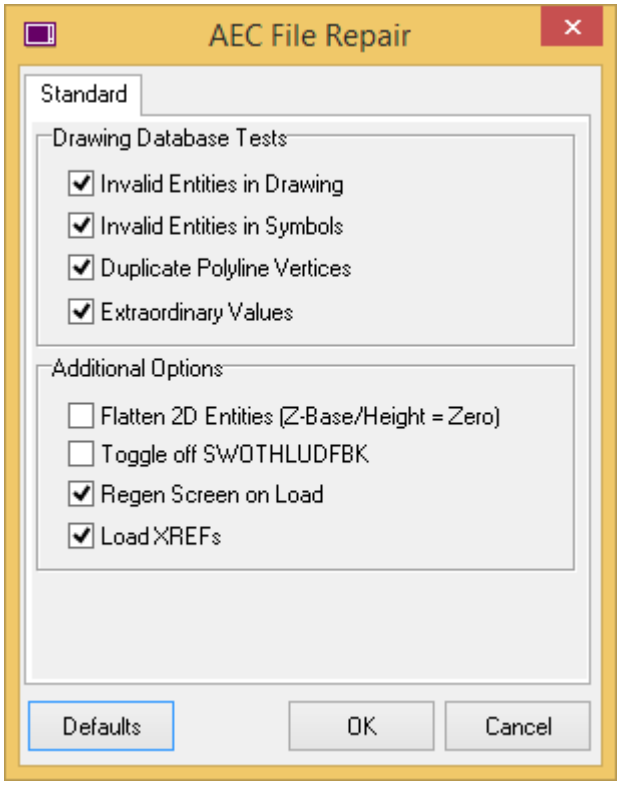


Figure 19.1: File Repair Dialog

Invalid Entities in Drawing / Symbols

Invalid Entities in Drawing, and Invalid Entities in Symbols, compares specific entity variables to 'absolute zero' (defined as 1.0E-12). When these variables, such as the radius of a circle, are so tiny (between 0 and 0.000000000001 32nds of an inch), they can prevent you from editing them, or cause DataCAD to crash. These 'garbage' entities are identified and can be deleted from the drawing database.



Figure 19.4: Delete Invalid Drawing Entities Confirmation

Enhanced entity validation is applied to drawing data imported into DataCAD. A new key, Validate

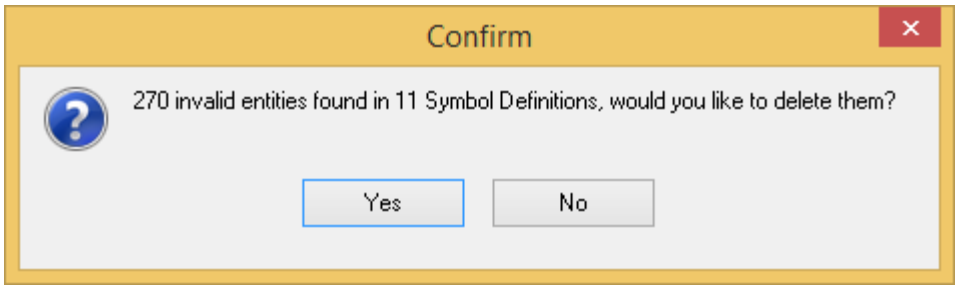


Figure 19.3: Delete Invalid Entities in Symbols Confirmation

Entities On Import, has been added to the [DXF_DWG] section of DCADWIN.INI to enable or disable validation during import. The default is TRUE.

Duplicate Polyline Vertices

Duplicate Polyline Vertices looks for duplicate polyline nodes and automatically deletes them.

Extraordinary Values

Extraordinary Values will display a 'Z-Min/Max' dialog that will reveal Z values that are larger than 10,000,000 32nds of an inch (by default). So, if any of your entities contain Z values less than -26,041.67 feet or greater than 26,041.67 feet, they will be shown. You can edit the variables for each entity manually, or you can 'flatten' them one by one, or all at once. You can change the minimum and maximum values then 'Rescan' to see if any Z values fall outside of the range you specify.

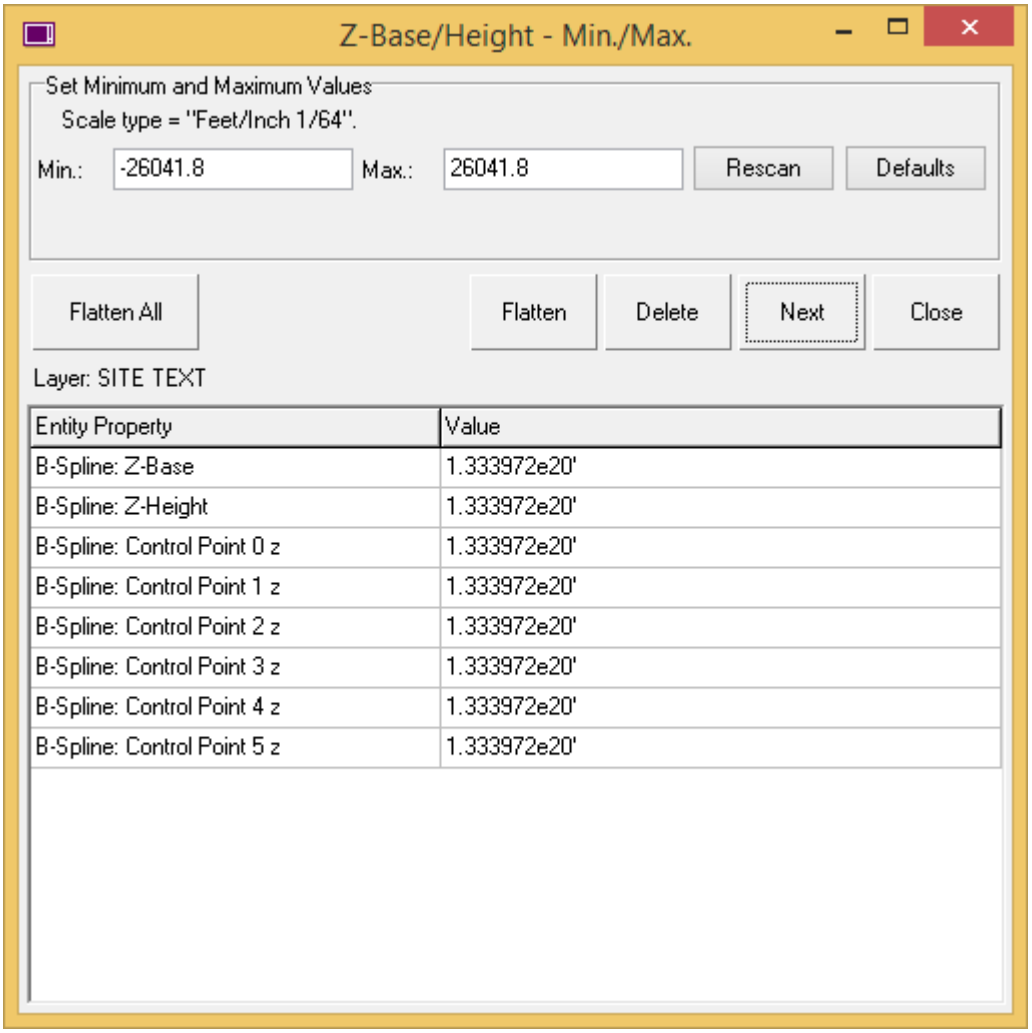


Figure 19.5: Extraordinary Z-Base/Height Values Dialog

Additional File Repair Options

- Flatten 2D Entities
- Toggle off SWOTHLUDFBK
- Regen Screen on Load
- Load XREFs

Flatten 2D Entities

Flatten 2D Entities allows you to set all 2D entities' z-base and height values to zero; including 2D entities found in symbols.

Toggle off SWOTHLUDFBK

Toggle off SWOTHLUDFBK is useful when a corrupt line type or hatch pattern is preventing you from opening your drawing. Disabling the display of hatch patterns and line types may allow you to open the drawing so you can reload the offending definition.

Regen Screen on Load
Regen Screen on Load can be toggled off if regenerating the display of your drawing is causing DataCAD to crash after it is loaded.

Load XREFs
Load XREFs can be toggled off so that external file references will be ignored when you open the file.

You can also suppress the loading of XREFs by pressing the [Ctrl] key at the same time you select Open from the File Open dialog.

File Repair Summary
During the File Repair process, a '.Audit' text file with the same name as your drawing is automatically created and contains a report of your drawing's history and what type of entities were deleted.

```
                Version History for:

        "Stonehenge Manors.aec"

Version                 Save Date and Time
=======                 ==================

12.08.04.03             11/11/2010 12:00:53 PM
17.00.00.03             6/9/2015 11:49:57 AM
17.02.00.09             6/9/2015 12:04:04 PM


        Scan For Invalid Geometry Results

Entity Type             Layer Name
===========             ==========

LINE                            Front-A
LINE                            CRAWL
LINE                            Flr-1
LINE                            Roof A
LINE                            Struc-Crawl


Scan For Invalid Geometry Within Symbol Definitions Results

Entity Type             Symbol Name
===========             ============

LINE                            C:\DATACAD\SYMBOLS\FIXTURES\DE101
LINE                            C:\DATACAD\SYMBOLS\FIXTURES\DE107
LINE                            C:\DATACAD\SYMBOLS\FIXTURES\DE114
LINE                            C:\DATACAD\SYMBOLS\FIXTURES\4040
```

Figure 19.6: File Repair Log

Program Preferences

The Program Preferences dialog has been expanded and reorganized to provide easier access to DataCAD's menu, interface, drawing, and program settings.

The Interface tab has been renamed to Menus. The options provided on this tab affect the display and behavior of DataCAD's menu buttons. A new Interface tab includes options for customizing toolbars and dialog boxes. A new Drawing tab includes options for customizing the drawing area and the behavior of the drawing cursor. Many of the options that were previously on the Miscellaneous tab have been moved to the Menus, Interface, or Drawing tab and several new options have been added.

An Apply button has also been added to the Program Preferences Dialog.

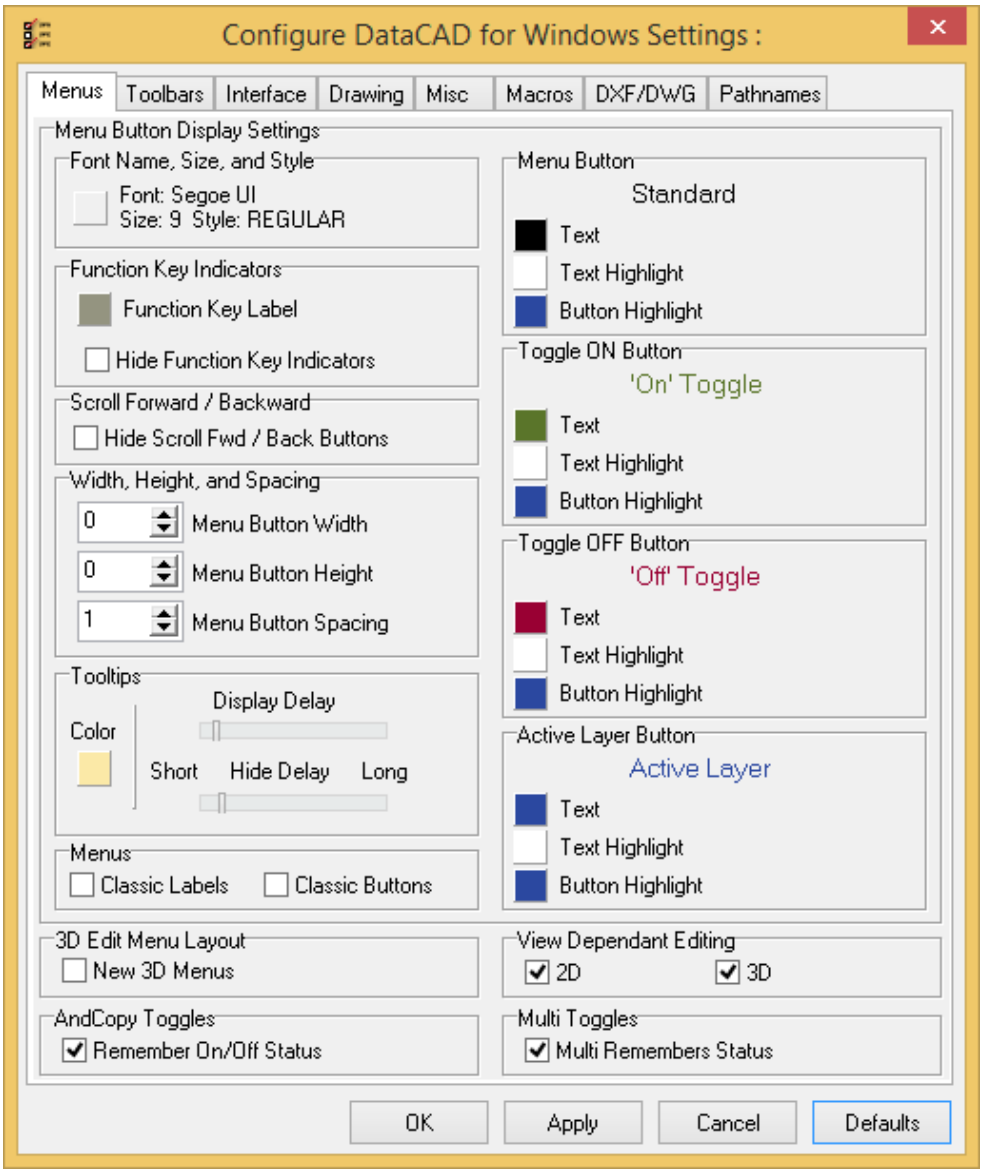


Figure 19.7: Program Preferences Menus Tab (formerly Interface)

Menus Tab

Scroll Forward / Backward

Check Hide Scroll Fwd / Back Buttons to remove the Scroll Back and Scroll Fwrd buttons from menus where they would otherwise appear. For example, in a drawing where there are more than 15 layers, a Scroll Fwrd button appears at [S7], while [S6] is reserved for Scroll Back. Hiding the Scroll Fwd / Back buttons frees up two positions in the menu list, as the scroll wheel and [PgUp]/[PgDn] keys can be used instead.

Width, Height, and Spacing

A new option, Menu Button Height, has been added to the Width, Height, and Spacing section. You can use this option to increase the height of the menu buttons in pixels.

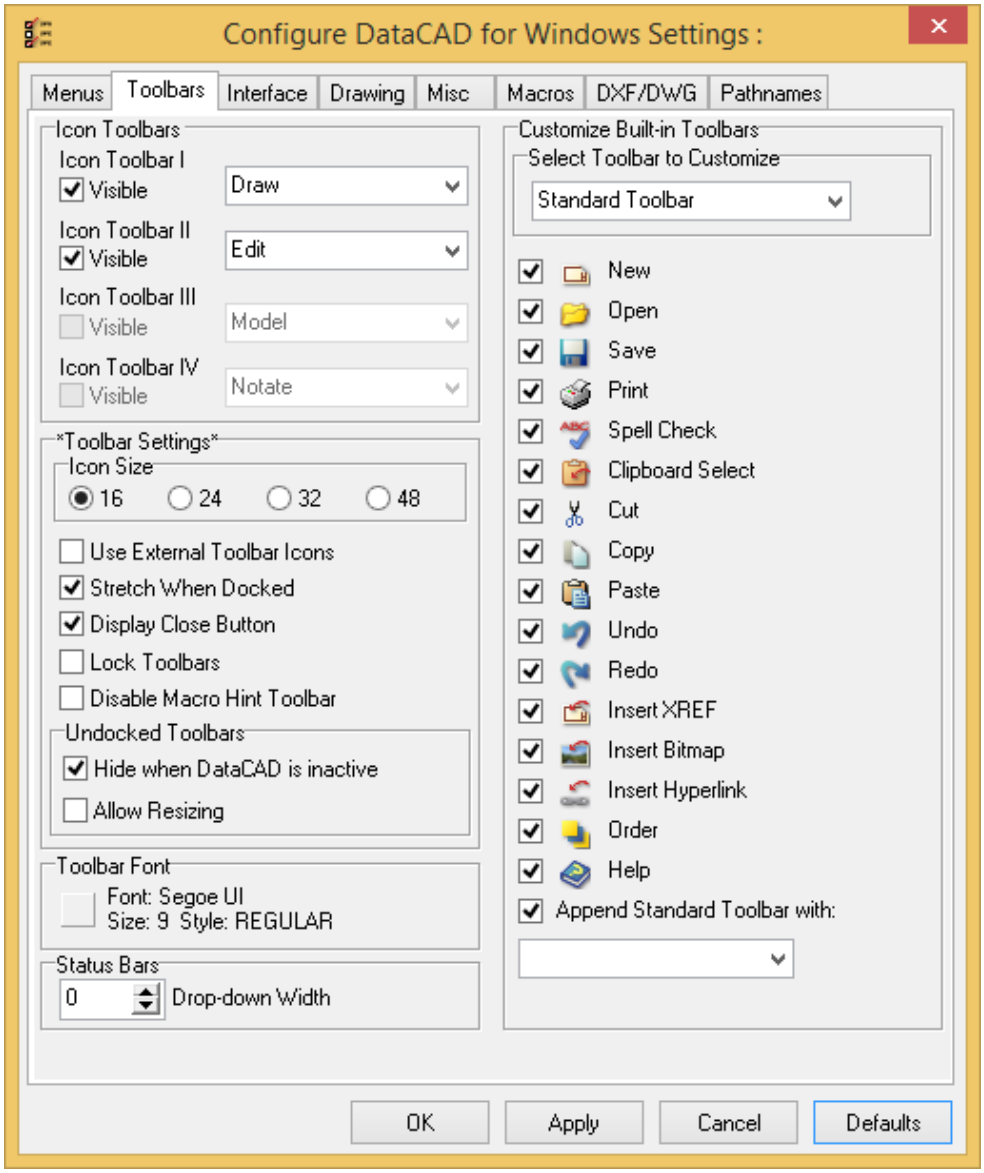


Figure 19.8: Program Preferences Toolbars Tab

Toolbars Tab

A new Toolbars tab has been added to Program Preferences. Toolbar-related items which were previously on the Interface tab have been moved to the Toolbars tab.

Customize Built-in Toolbars

A new section, Customize Built-in Toolbars has been added. You can use the 'Select Toolbar to Customize' drop-down to choose the DataCAD toolbar you would like to modify. This applies to the Standard, Status, Types, Object Snap, Rendering, and Viewer toolbars.

Icon Toolbars

The Icon Toolbars section has been expanded to accommodate two additional user-definable toolbars. So, you can now have up to four user-definable toolbars displayed at once.

Toolbar Settings

A new Toolbar Settings section exposes the following options.

Stretch When Docked

Enabled by default, this option determines whether a docked toolbar will 'stretch' to fill the empty space that would otherwise occur between adjacent toolbars.

Display Close Button

Enabled by default, you can uncheck this option to hide the close button from docked toolbars.

Lock Toolbars

You can enable this option to lock the current arrangement of your docked toolbars.

Disable Macro Hint Toolbar

If you only want pause hints to appear at the message line, then you can check this option to prevent the hint toolbar from displaying.

There is a related enhancement to the behavior of the Macro Hint toolbar. The toolbar will no longer appear if the hint text is either, [''] (empty), or if it matches line 6288 of DCADWIN.MSG (NO COMMENT).

Undocked Toolbars: Allow Resizing

Check this option if you would like to resize undocked toolbars.

Toolbar font

The Toolbar Font section has been updated so you can now define the Font name, size, and style for text that appears on toolbars. This includes status bar drop-down lists, the SWOTHLUDFBK (Text), Coordinates / Hints, Message, and Attention toolbars. Formerly, the menu button font was applied to these toolbars.

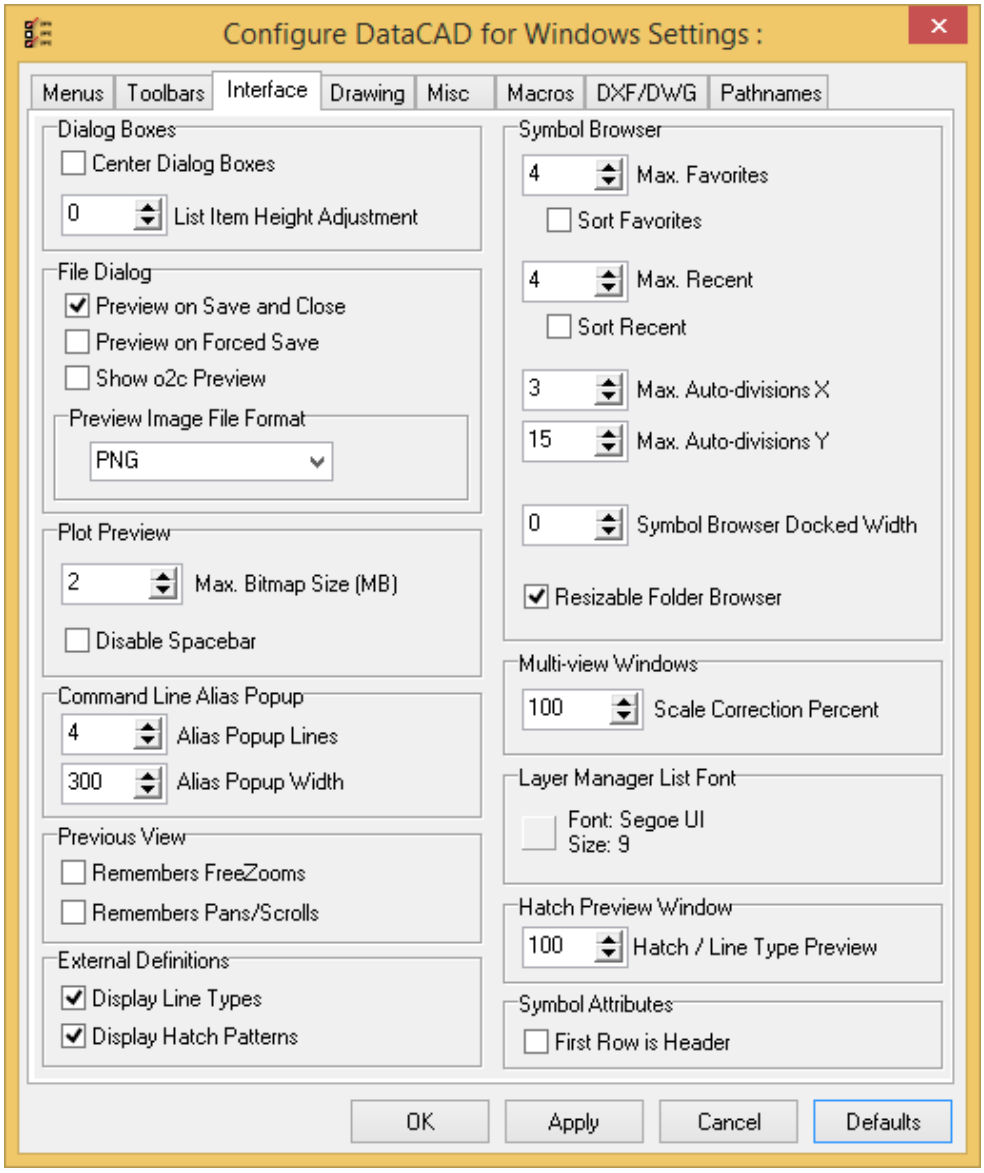


Figure 19.9: Program Preferences Interface Tab

Interface Tab

The following items have been added to Interface Tab

File Dialog

You can use the options in this section to customize DataCAD's File Dialog preview settings.

Preview on Save and Close

Enable Preview on Save and Close to have DataCAD automatically create a bitmap preview of your drawing in its current state when you close and save the file.

Preview on Forced Save

Enable Preview on Forced Save if you want DataCAD to update the bitmap preview of your drawing in its current state each time you save your file.

The time to create the drawing preview will increase as the drawing becomes more complex.

Show o2c Preview
Enable Show o2c Preview to see a 3D preview of files you select to open.

This option is available directly in the file dialog. However, if the 3D preview is problematic because of the complexity of the file(s), you can disable the option here instead.

Preview Image File Format
Use this option to select the file format for the bitmap preview image which can be either BMP, JPG, TIF, TGA, PNG, or PCX.

Plot Preview
Max. Bitmap Size (MB)
This value sets the largest individual metafile size when generating the plot preview.

Disable Spacebar
You can check Disable Spacebar to prevent this key from registering while the Plot Preview is being displayed.

Symbol Browser
Max. Favorites
Max. Favorites sets the maximum number of favorites to display at once.

Sort Favorites
Check Sort Favorites to sort the list of favorites alpha-numerically.

Max. Recent
Max. Recent sets the maximum number of recent folders to display at once.

Sort Recent
Check Sort Recent to sort the list of recent folders alpha-numerically.

Max. Auto-divisions X
Max. Auto-divisions X sets the maximum number of horizontal divisions that are automatically created to display all the symbols in each folder.

Max. Auto-divisions Y
Max. Auto-divisions Y sets the maximum number of vertical divisions that are automatically created to display all the symbols in each folder.

Resizable Folder Browser
Check Resizable Folder Browser to allow resizing the Folder Browser dialog.

Multi-view Windows
Increase or decrease the Scale Correction Percent value so Multi-View Window previews more accurately reflect the saved view.

Layer Manager List Font
You can use this option to customize the font name and size used to display the list of layers.

Note: Font style options such as bold and italic are not accessible since they are used by the Layer Manager to denote specific layer states.

Symbol Attributes
Check First Row is Header if the first row in your CSV files that are linked to a symbol attribute database lookup contains headings, not data.

Drawing Tab

Display Options

Check Extents Box During Pan/Zoom to display an extents box while you are panning or zooming instead of the line segments that make up the entities that are currently on screen.

Hot Keys

The 'Disable Hot Keys' section has been reworked for clarity. Disable Hot Keys has been renamed to Hot Keys since only the [Insert] and [w] keys can be completely disabled. By default, the Spacebar and numeric keys can be used to invoke distance input. Since the Spacebar cannot be disabled, this option has been renamed to '[0...9] Number Keys for Input'. When this option is unchecked, the number keys will not invoke distance input.

The [-], [,], or [.] keys for input options can be checked so that these keys will invoke distance input instead of their default behaviors.

XREFs

Check Dynamic Snapping to search for object snapping points within XREFs.

Check Refresh on Regen to automatically refresh displayed XREFs when the display is regenerated (i.e., when you press the [U] key).

When Update GoTo View Links is checked, XREFs that reside on locked layers may have their GTV Link updated.

Check Automatically Convert to automatically convert DC5 files to AEC files when they are referenced in the drawing being opened.

Mouse Panning and Zooming

Check Left & Right Mouse Buttons for Panning to enable panning while holding down the left and right mouse buttons.

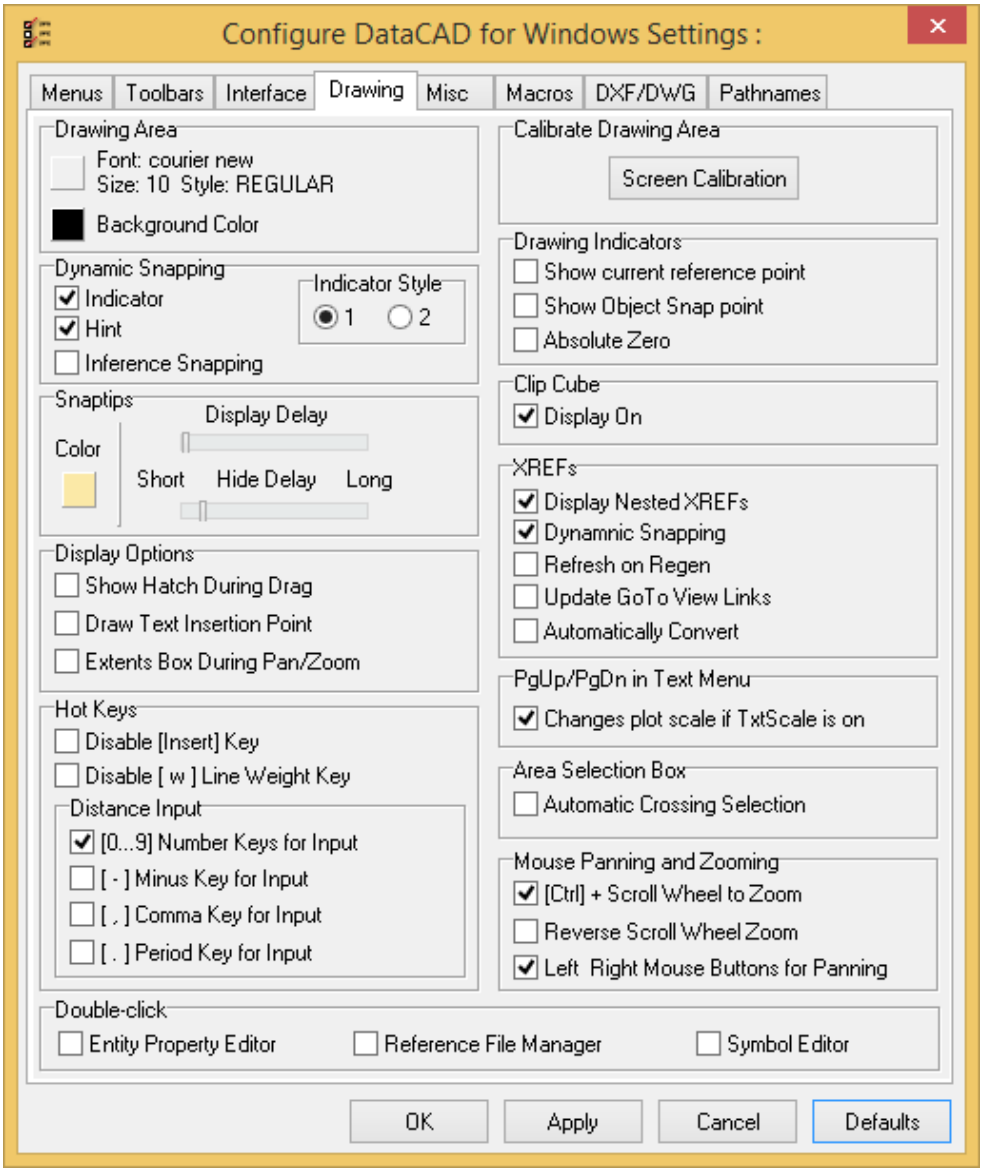


Figure 19.10: Program Preferences Drawing Tab

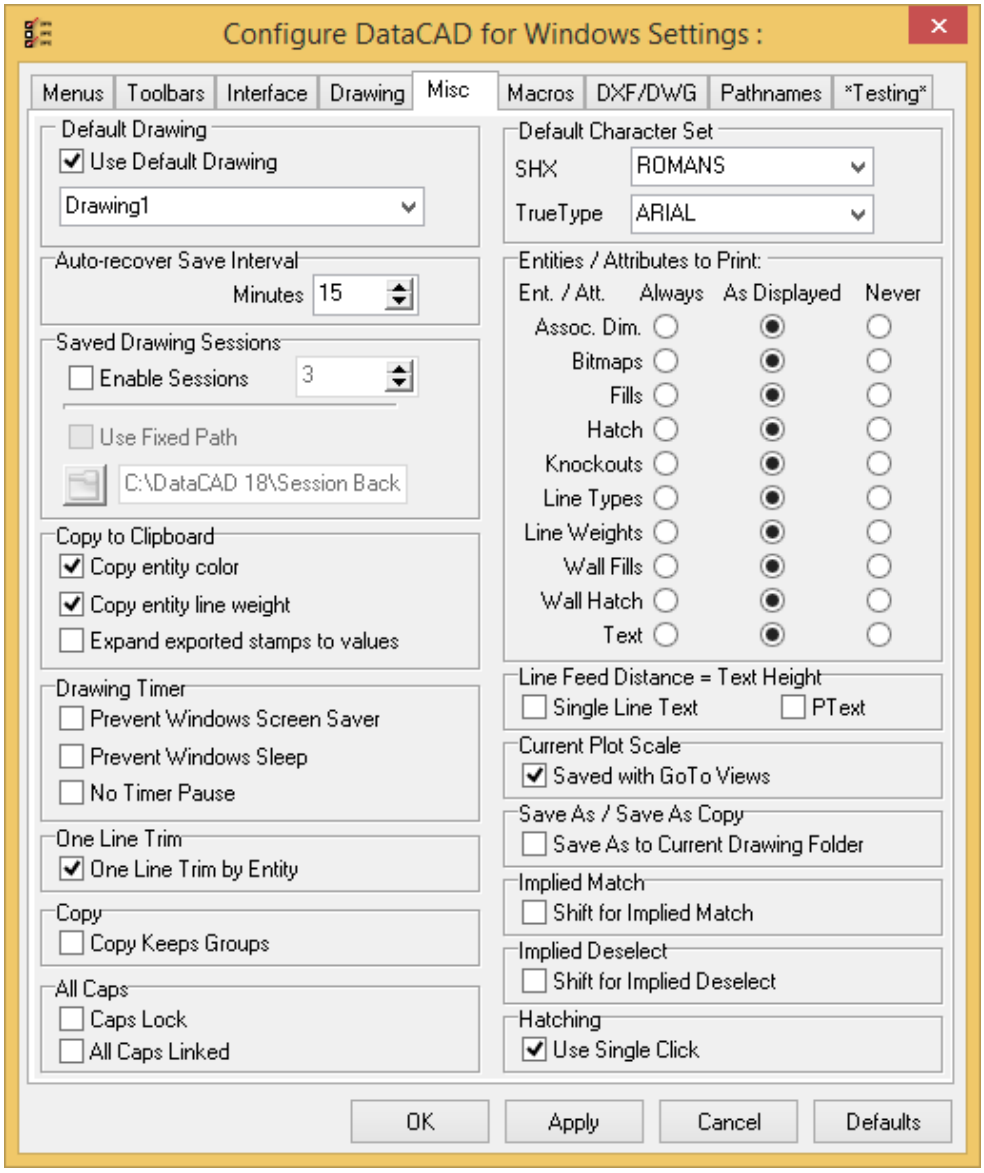


Figure 19.11: Program Preferences Miscellaneous Tab

Miscellaneous Tab

Entities / Attributes to Print

The checkboxes in the Print / Plot Options section have been replaced with groups of three radio buttons each. There are three possible states:

- Always, where all entities / attributes print, regardless of what is being displayed.
- Never, where none of the entities / attributes print, regardless of what is being displayed.
- As Displayed, where what is printed corresponds to what is being displayed (i.e., THLUDFBK).

Line Feed Distance = Text Height

The line feed distance for single line text and PText can now be based on the current text height rather than the current font definition. This applies to single line text entered through the Text menu, pasted from the clipboard, or inserted from a text file.

When Single Line Text or PText are checked, a line spacing factor of 1.5 applied to a text height of 4 inches will always result in a line feed of 6 inches, regardless of the current font selected.

Line Feed = Text Height can be applied on a per PText entity basis. This setting is exposed in the PText Properties dialog and [Ctrl] + Right-click context menu for PText.

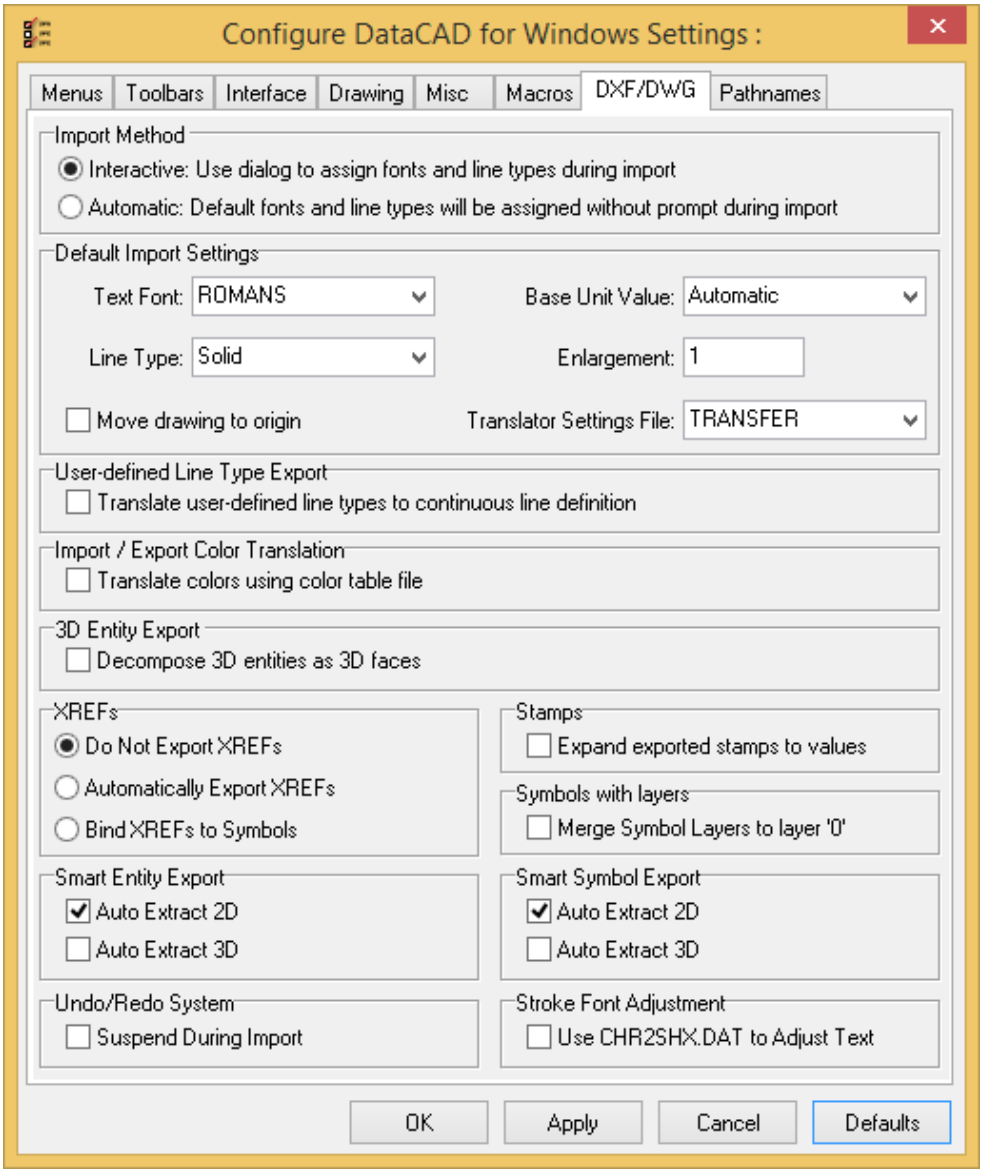


Figure 19.12: Program Preferences DXF/DWG Tab

Hatching

Check Use Single Click to remove the Begin option and hatch entities as soon as you click on them.

DXF/DWG Tab

Undo/Redo System: Suspend During Import

Suspending the undo/redo system during import can greatly reduce the time required to convert DXF/DWG files. The default value is checked.

Stroke Font Adjustment: Use CHR2SHX.DAT to Adjust Text

The CHR2SHX.DAT file is now included with DataCAD 19. Previously, if this file were present in the Fonts folder, it would automatically be used to adjust the size settings of stroke fonts (i.e. SHX) during DXF/DWG import and export. Starting with DataCAD 19, this file will only be used when Use CHR2SHX.DAT to Adjust Text is checked.

New Toolbars

Object Snap Toolbar

A new Object Snap toolbar has been added to DataCAD to provide persistent access to the current object snap settings. This toolbar may be turned on or off via the View, Toolbars pull-down menu.

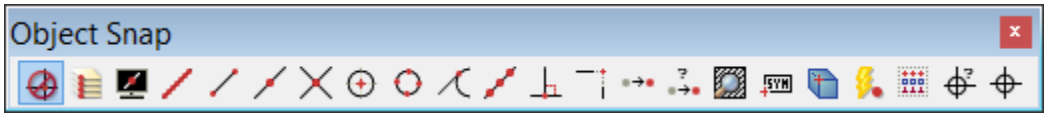


Figure 19.13: Object Snap Toolbar

Icon-based SWOTHLUDFBK Toolbar

A new Icon-based SWOTHLUDFBK toolbar has been added to DataCAD. The size of the letter icons is determined by the Icon Size setting located in the Icon Toolbars section of the Interface tab in Program Preferences.



Figure 19.14: Icon-based SWOTHLUD Toolbar

You can customize the icons displayed on this toolbar by changing the corresponding bitmaps in the Toolbars folder.

Letter_S.png, Letter_W.png, Letter_O.png, Letter_T.png, Letter_H.png, Letter_L.png, Letter_U.png, Letter_D.png, Letter_F.png, Letter_B.png, and Letter_K.png.

Use External Toolbar Icons must be enabled if you want DataCAD to give preference to bitmaps located in the Toolbars folder.

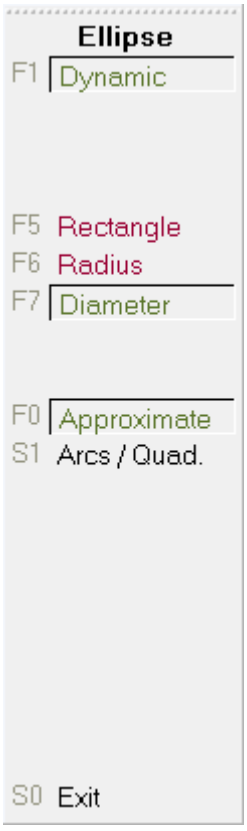


Figure 19.15: Ellipse

Productivity Enhancements

New Ellipse Creation Methods

Two creation methods, Radius and Diameter, have been added to the Curves, Ellipse menu.

Radius

Radius allows you to define an ellipse by entering its center, and one endpoint for the first, then second axis. The first two points entered determine the angle of the ellipse.

Diameter

Diameter allow you to define an ellipse by entering both endpoints of the first axis, and one endpoint of the second axis. The first two points entered determine the angle of the ellipse.

Approximate

A new option, Approximate, has been added to the Ellipse menu. When toggled on, DataCAD allows you to specify how many arcs per quadrant will be used to approximate the edge of the ellipse. This can be useful for specifying two or three radii for the construction of an elliptical arch.

Plot Scale Dropdown / Print Icon

A new Plot Scale dropdown and Print menu icon can be displayed on the Status Panel. These elements are off by default. To display them, use the Customize Built-in Toolbars section on The Toolbars tab of Program Preferences.

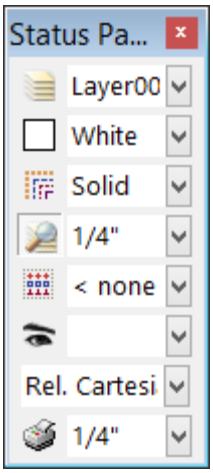


Figure 19.16: Status Panel

Symbol Browser: Flatten to Zero

A new 'Flatten to Zero' option has been added to the Symbol Browser's context menu. You can use this option to set the z-base/height of 2D entities in a symbol to zero.

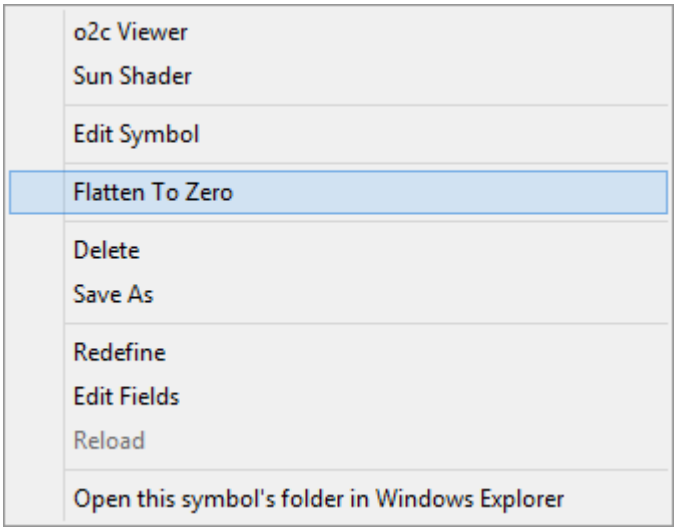


Figure 19.17: Symbol Browser Context Menu

Miscellaneous Enhancements

ClipCube Base/Height Display

The current ClipCube Base/Height is now displayed when the drawing's ClipCube is enabled.

Measures: To Clipboard

A 'To Clipboard' option has been added to the Measures menu with the following options:

- Drawing Text: Copies the 'To Drawing' text to the clipboard.
- Value: Copies the measured value to the clipboard for use in the keyboard input field.

Offset: Coincident Entities

The selection routine in the Offset command has been enhanced to cycle through coincident entities. If you select the wrong entity, you can now right-click, then click the same spot to choose the next available coincident entity.

Update Installer Changes

Custom Support Path

The DataCAD updater will now determine if you have defined a custom path for your Message and Label files. After the custom path has been verified, the updater will make the necessary changes to the files in this location. If the custom path cannot be verified, the default path 'DataCAD 19\Support Files\Messages and Labels\' will be used instead.

Wide Menu Labels

The DataCAD updater will now determine if you have customized the width of DataCAD's 'wide' menu button labels. If your existing DCADWIN.lbl and DCADWIN3.lbl files are configured with 'wide' labels that are greater than the default 12 characters, new and changed lines will be formatted accordingly.

New Configuration Settings

DataCAD 19 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 19 installation folder (C:\DataCAD 19\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

Symbol Browser: Audit Symbol Files

External symbol files can now be audited by enabling the following key in the [DEBUG] section of DCADWIN.ini.

```
[DEBUG]
Audit Symbol Files=TRUE
```

The default value is FALSE. This key should only be set to TRUE temporarily when you audit your symbol libraries, then set back to FALSE when you are finished. Leaving this key set to TRUE will increase the time it takes to display symbols in the Symbol Browser.

Setting this key to TRUE will cause DataCAD to scan Symbols for invalid geometry while browsing folders in the Symbol Browser. If an invalid entity is encountered, the entity is deleted from the symbol definition, the .DSF file is updated, and a '.Audit' file is created with the symbol's name in the same folder. The number of updated .DSF files is reported on DataCAD's error line.

Symbol Editor: Inherit Parent Input Mode

A new key, Inherit Parent Input Mode, has been added to the [SymbolBrowser] section of DCADWIN.ini. If set to TRUE, the default, the Symbol Editor will inherit the input mode from the current drawing.

No Macros From Locked Layer

A new key, No Macros From Locked Layer, has been added to the [General] section of DCADWIN.ini. The default is FALSE. If set to TRUE, keyboard macros and aliases will not run when the active layer is locked.

Independent from this setting, DCAL macros cannot be run when the active layer is locked.

XREFs: New Check For Nested

A new key, New Check For Nested, has been added to the [XREFs] section of DCADWIN.ini. If set to TRUE, the default, new trivial rejection logic is enabled to ignore nested XREFs if nesting is turned off, either for the parent XREF or globally. This will reduce the amount of time required to process XREFs for display, plotting, and object snapping.

New Regen

A new key, New Regen, has been added to the [General] section of DCADWIN.ini. If set to TRUE, the default, DataCAD's Regen command will not include layers that are Off in its extents recalculation.

Undo: Disable During Import

An option to disable the undo system during DXF/DWG file import has been added to the DXF/DWG tab of Program Preferences. Disabling the undo system during import can greatly reduce the time required to convert the file. The default value is TRUE.

```
[Undo]
Disable During Import=TRUE
```

This applies to the importation of DXF/DWG, SKP and STL files.

Symbol Browser: Windows Cursor

A new key, Windows Cursor, has been added to the [SymbolBrowser] section of DCADWIN.ini. The default is FALSE. If set to TRUE, DataCAD will display the Windows arrow cursor over the Symbol Browser instead of the crosshair cursor.

New Extended Character Codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" in Chapter 30 of the DataCAD Reference Manual.

```
1105: Dimension Auto Style "No Points" On
1106: Dimension Auto Style "No Points" Off
1107: Dimension Auto Style "Points Only" On
1108: Dimension Auto Style "Points Only" Off
3022: Save File
3023: Save As
3024: File Purge
3025: Refresh Drawing
3026: Regen Display List
3027: Insert Symbol
3028: Save Symbol
3029: Pak-N-Go Create
3030: Pak-N-Go Extract
3031: Pak-N-Go Open
3032: Pak-N-Go Settings
```

Enhancements to DCAL (DataCAD Applications Language)

The following routines have been added to DCAL.

```
PROCEDURE GetSetLayerFilter(Filter : IN OUT str8; ReadOnly : boolean);
BUILTIN 671;
PROCEDURE PrintStr255(str : str255; Column, Row, Color, Curs : integer;
Invert : boolean); BUILTIN 670;
FUNCTION DataCAD_Version : real; BUILTIN 669;
Added long layer name support to setlyrname() and lyr_find() functions.
```

DataCAD 18

DataCAD 18 contains a collection of new features and enhancements designed to increase your productivity. The DataCAD 18 drawing file format is currently compatible with DataCAD 17, 16, and 15. However, you must use the "Save As" command in the "File" menu to save files backward to older version formats.

SketchUp 2015

DataCAD 18 supports the ability to insert, export, and externally reference models from SketchUp 2015. This enables you to collaborate and share files with associates who use the latest version of SketchUp.

Symbol Attribute Enhancements

Resolving Broken Links to Databases

Starting with this version of DataCAD, a prompt will appear when the database associated with a symbol text attribute cannot be found. Previously, DataCAD would always ignore the error and allow you to enter the value manually, rather than select it from the database. You can still choose to ignore the error, but now you have the option to search for the file yourself to repair the link.

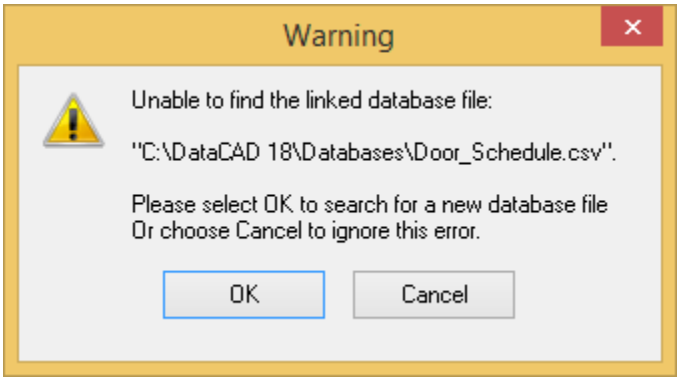


Figure 18.1: Unable to Find Linked Database Warning

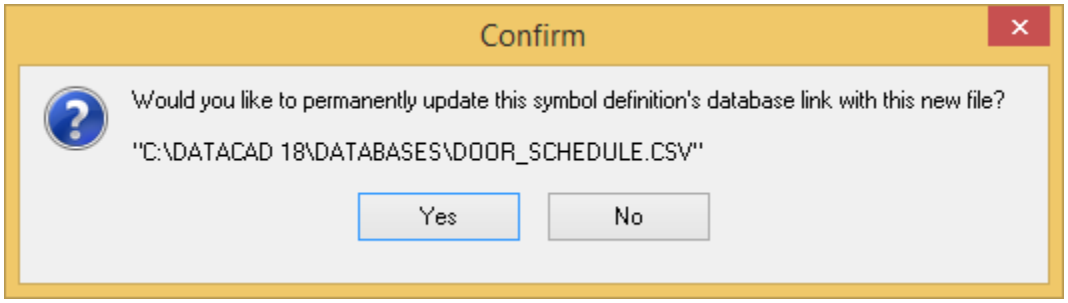


Figure 18.2: Update Database Link Confirmation Dialog

If you can redefine the path to the file, you will then have the option to make the change permanent. Otherwise, DataCAD will again look to the original path for the database the next time you open the drawing.

DataCAD will automatically search the following locations to find the database link before prompting you to locate the file yourself.

- The original path.
- The currently configured Databases path.
- The current drawing file path.

The "Pak-N-Go" command will now include any symbol attribute database linked files. After un-packing the file, if the database file is not in the original path, DataCAD will automatically look in the current drawing folder, like the way XREFs are resolved if not found.

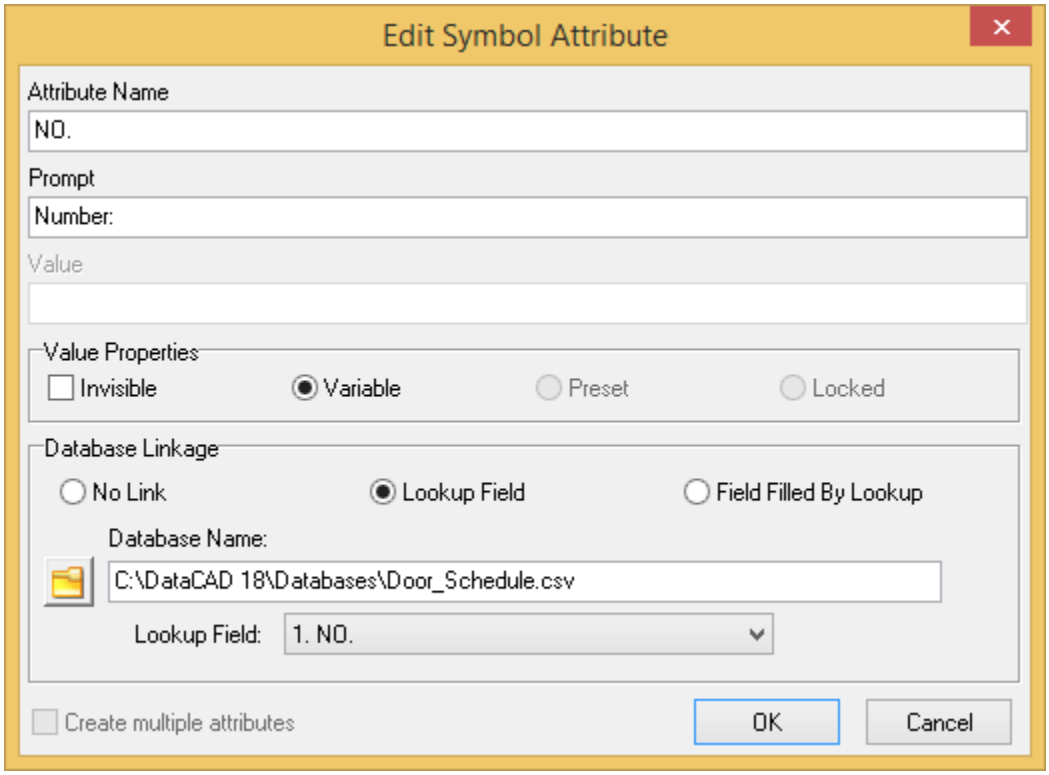


Figure 18.3: Edit Attribute Dialog

Edit Attribute Menu

A new menu item, Edit Attribute, has been added to the context menu for Symbol Attribute Text within the Symbol Editor. When you [Ctrl] + Right-click on an attribute text entity, you can select this menu item to display the Edit Symbol Attribute dialog.

You can use the fields and options in this dialog to redefine the properties of text attributes contained within a symbol's definition.

Note: While you can define many text attributes within a given symbol, DataCAD will only recognize one database per symbol. So, all the text attributes within the same symbol must be linked to fields in the same database.

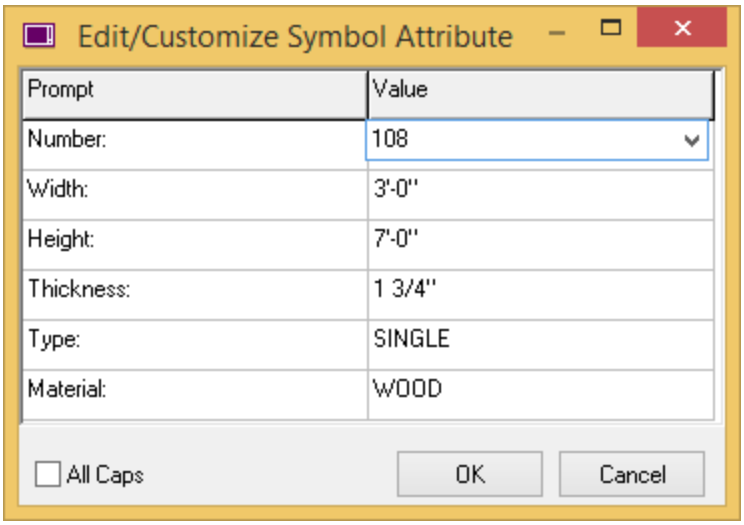


Figure 18.4: Edit Attributes Dialog

Edit Attributes Menu

A new menu item, Edit Attributes, has been added to the context menu for symbols. When you [Ctrl] + Right-click on a symbol that contains attribute text entities, you can select this menu item to display the Edit/Customize Symbol Attribute dialog.

Note: *For more information about using attributes, see "Using Text Attributes for Symbols" in Chapter 13 of the DataCAD Reference Manual.*

Hyperlink to File and GoTo View

It is now possible to hyperlink an entity in your current drawing to a specific GoTo View in a different drawing. Once you have defined the drawing and corresponding GoTo View for the entity's hyperlink, selecting the hyperlink will open the drawing then automatically recall the GoTo View. This is useful for linking a wall type tag in a plan drawing to its corresponding detail in the details file.

To create a hyperlink to a drawing and a specific GoTo View:

119. Open the drawing which contains the entity, such as a wall type symbol, that will have the hyperlink assignment.

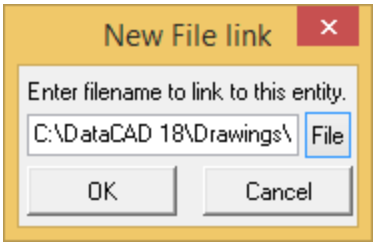


Figure 18.5: File Hyperlink Dialog

120. [Ctrl] + Right-click the entity, select "File" from the context menu, and then choose "Add."

121. In the "New File link" box, click the "File" button to browse to and select the drawing file to link to. Click "OK" when finished.

122. In the "New View" box, click the drop-down menu and then choose from the list of available GoTo Views in the linked file.

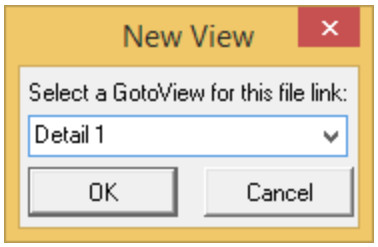


Figure 18.6: New File / GoTo View Hyperlink Dialog

123. Click "OK" on the "New View" box to accept the GoTo View assignment or click "Cancel" to assign just the file, but no specific GoTo View.

Now, whenever you access the hyperlink, DataCAD will open the drawing then automatically recall the GoTo View. If you chose "Cancel" on the "New View" box, DataCAD will open the file to the last saved view in that file.

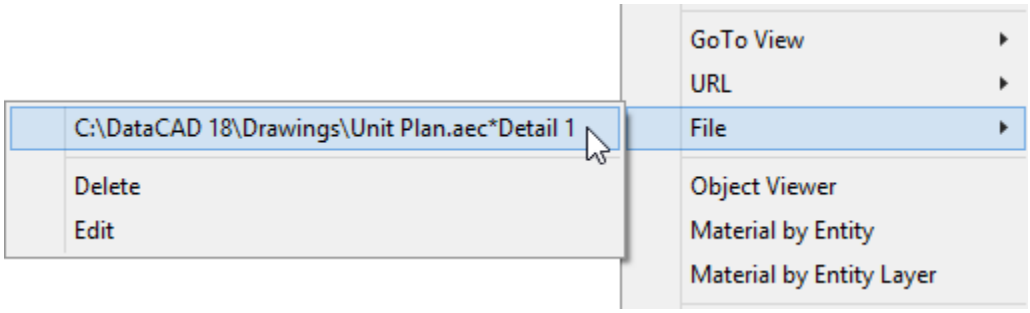


Figure 18.7: File Hyperlink Showing Linked Drawing and GoTo View

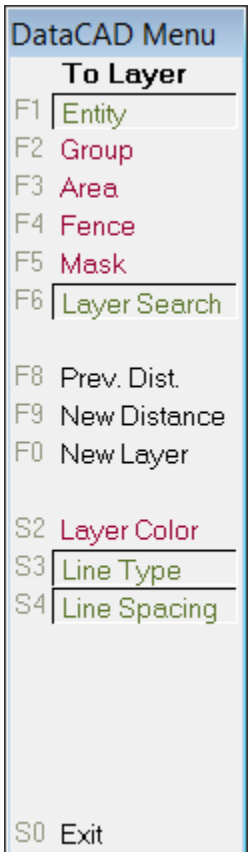


Figure 18.8: To Layer Menu

Line Type and/or Spacing by Layer

New options, Line Type by Layer and Line Spacing by Layer have been added to the Layer Manager dialog. When enabled, DataCAD will set the current line type and/or spacing on a per layer basis. You can specify the line type and/or spacing for a given layer within the Layer Manager, however, DataCAD will always remember the last active line type and spacing you used for a given layer.

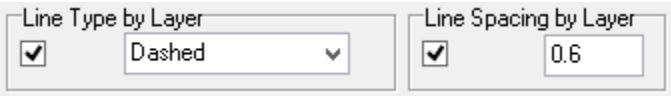


Figure 18.9: New Line Type and Spacing Options in Layer Manger

New options, Line Type and Line Spacing have been added to the Move, and Copy, To Layer menus. You can toggle these options on to set the line type and/or spacing of the entities you are moving or copying to a given layer.

When Line Type and/or Spacing by Layer are off, the default setting, enabling these options will cause DataCAD to prompt you to select the line type and/or spacing you wish to use.

When Line Type and/or Spacing by Layer are on, enabling these options will cause DataCAD to automatically use the line type and/or spacing currently associated with the layer.

Get Snap Enhancements

The Get Snap popup menu includes new items that will appear when the nearest entity includes the corresponding snapping points. This makes it easier to snap to explicit points along an entity, even when they are not visible within the current view (i.e. off screen).

New Get Snap Options

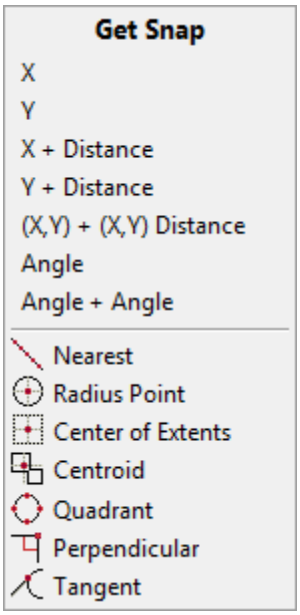


Figure 18.10: Enhanced Get Snap Menu

Get: (X,Y) + (X,Y) Distance

Gets a point that is offset in the x and/or y direction from the point you snapped to.

Get: Nearest

Gets the nearest point along entity that is closest to the point you snapped to.

Get: Radius Point

Gets the radius point of Arcs, Circles, and Ellipses that you snap to.

Get: Center of Extents

Gets the center of extents of the entity you snapped to.

Get: Centroid

Gets the centroid of polylines and polygons you snap to.

Get: Quadrant

Gets the nearest quadrant of Arcs, Circles, and Ellipses that you snap to.

Get: Perpendicular

Gets the point along the entity you snapped to that is perpendicular to the point you are drawing from.

Get: Tangent

Gets the point along Arcs and Circles that is tangent to the point you are drawing from.

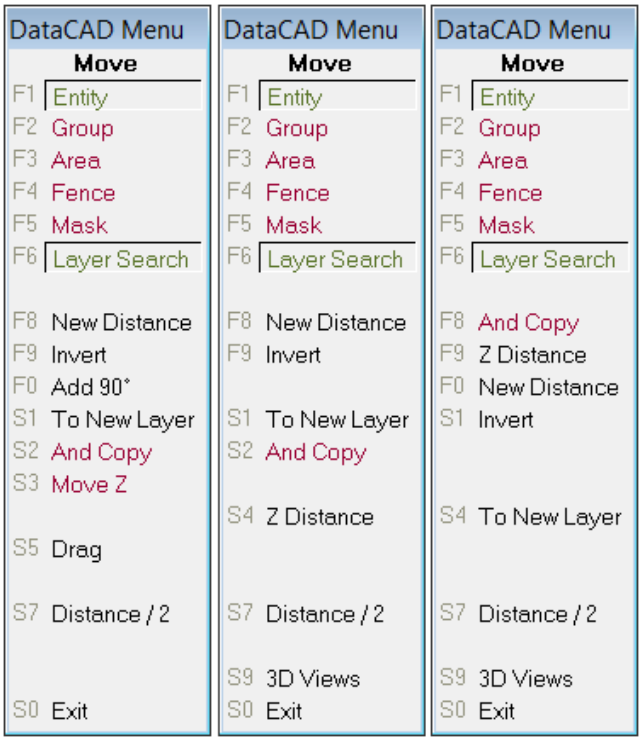


Figure 18.11: 2D Move, New 3D Move, and 'old' 3D Move Menus

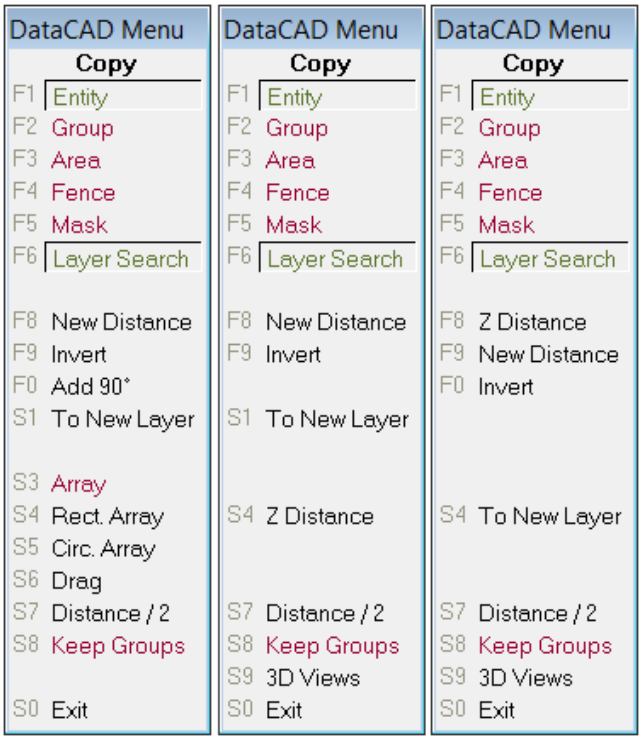


Figure 18.12: 2D Copy, New 3D Copy, and 'old' 3D Copy Menus

New 3D Edit Menus

A new set of 3D Edit Menus are available so you can have the position of the menu buttons in the 3D Move, 3D Copy, 3D Mirror, and 3D Stretch menus match (as closely as possible) to the positions of the menu buttons in the 2D Move, 2D Copy, 2D Mirror, and 2D Stretch menus.

To enable the new button arrangement in the 3D Edit Menus, set the 'New 3D Menus' key in the [General] section of DCADWIN.ini to TRUE. The default is FALSE, so you will not see these changes without changing the value of this key.



Figure 18.13: 2D Mirror, New 3D Mirror, and 'old' 3D Mirror Menus

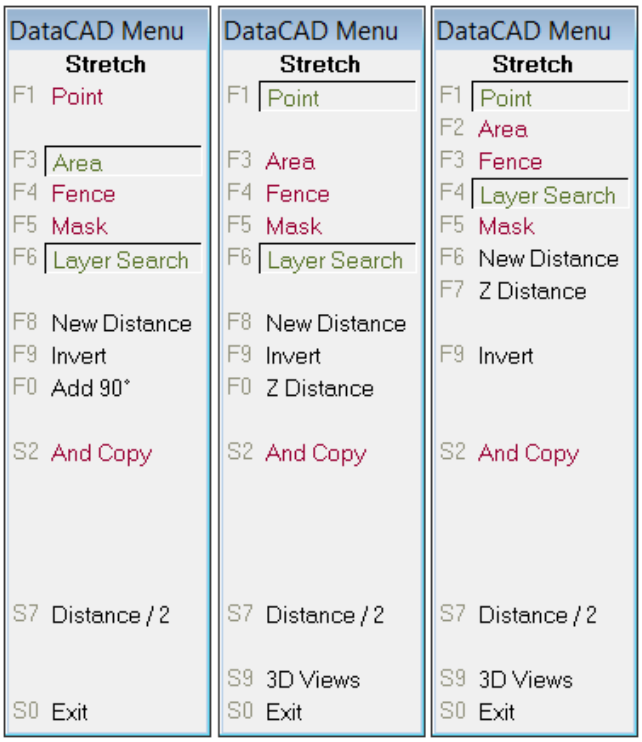


Figure 18.14: 2D Stretch, New 3D Stretch, and 'old' 3D Stretch Menus

Productivity Enhancements

Save As Copy

"Save As Copy" to the "File" pull-down menu. This command will save the changes of the current drawing session to a new file with a new name. It differs from the "Save As" command in that it will then return to working in the current drawing, as opposed to then opening the new version of the file.

For example, you are working in Drawing1.aec. You choose File, Save As Copy, and then save out Drawing1_OptionA.aec. When the process is complete, DataCAD returns you to editing Drawing1.aec. If you had selected File, Save As to save out Drawing1_OptionA.aec, DataCAD would have returned to editing Drawing1_OptionA.aec after completing the command.

Coincident Entity Selection

The ability to select coincident entities when executing the Erase, Partial command has been improved. In cases where there are two entities that occupy the same coordinates, choose Erase, Partial and then left-click to select the entity. If it is the wrong entity, right-click once, and then left-click again in the same place to select the other entity. You may now proceed with defining the segment to remove.

New & Only On

Added a new button to the 3D Hide menu labeled "New+Only On." This button appears after the command is complete. Clicking this button results in DataCAD setting the new layer which contains the hidden line removal result as "Active Only," and switches to the Plan view, enabling you to quickly access the hidden line removal result.

Prevent Windows Screen Saver

This key has been added to the [General] section of DCADWIN.ini so you can prevent the Windows Screen Saver from running while DataCAD is running. The default value is FALSE. Setting this key to TRUE will disable the Windows Screen Saver when DataCAD is running.

Prevent Windows Sleep

This key has been added to the [General] section of DCADWIN.ini so you can prevent Windows from going to sleep or hibernating while DataCAD is running. The default value is FALSE. Setting this key to TRUE will disable Windows sleep and hibernate modes while DataCAD is running.

Enable XClips and/or SClips

"Enable XClips" and "Enable SClips" toggles have been added to their respective entity context menus for convenience.

Orphaned Nested XREF Warning

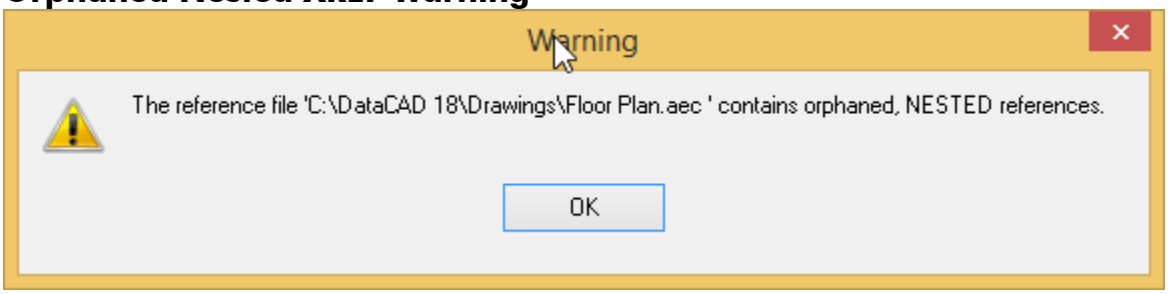


Figure 18.15: Orphaned Nested XREF Warning

DataCAD will now issue an explicit warning to indicate the occurrence of orphaned, nested XREFs upon opening your drawing. Previously, the same warning applied to both orphaned XREFs and orphaned nested XREFs.

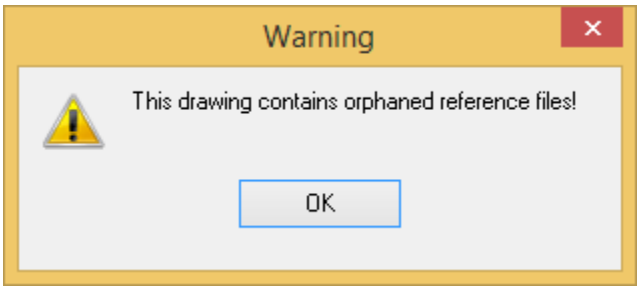


Figure 18.16: Orphaned XREF Warning

Identify, Set All: Smart Arrows

Selecting a Smart Arrow using Identify, Set All now toggles Smart Arrow on in Text, Arrows.

XClip, New Cube Cursor

The XClip, New Cube cursor now disables the crosshairs while you are creating the bounding area box.

Process XREFs

This key has been added to the [DXF_DWG] section of DCADWIN.ini to enable (the default) or disable the conversion of XREFs during DWG export. When the value is FALSE, DataCAD will include XREF instances in the drawing being exported but will not convert externally referenced files.

This option may be useful when only the parent file has changed, and externally referenced files do not need to be re-converted.

Identify: Associative Dimension

Selecting an Associative Dimension using Identify now displays its length on the Coordinates/Hints toolbar.

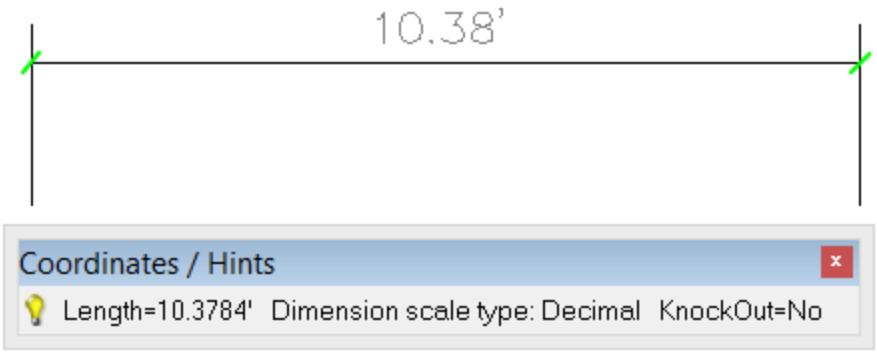


Figure 18.17: Associative Dimension Length Display

Note: This only applies to Associative Dimensions that have Lock Scale enabled.

Print Alias List

A new option, Print Alias List, has been added to the Select Alias dialog box. Selecting this option will print the Alias List immediately.

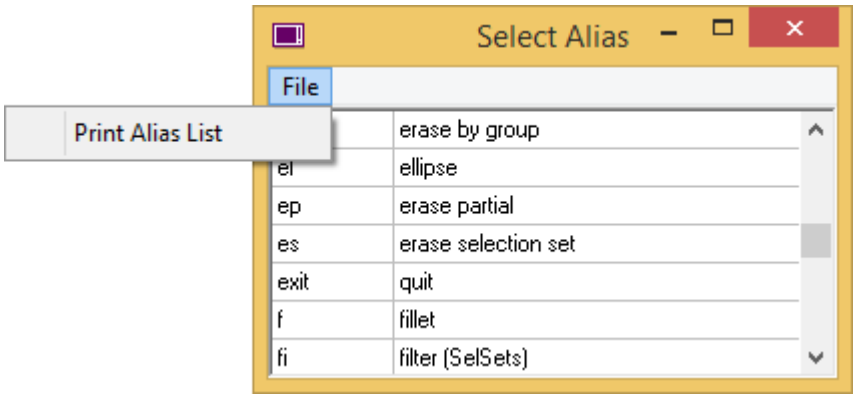


Figure 18.18: New Print Alias List Menu

Allow Scale Dependent Nested Symbols

This key has been added to the [General] section of DCADWIN.ini to determine whether the Lock Size setting of nested symbols should be recognized or ignored. The default value is FALSE. If set to TRUE, DataCAD will recognize the Lock Size setting of nested symbols.

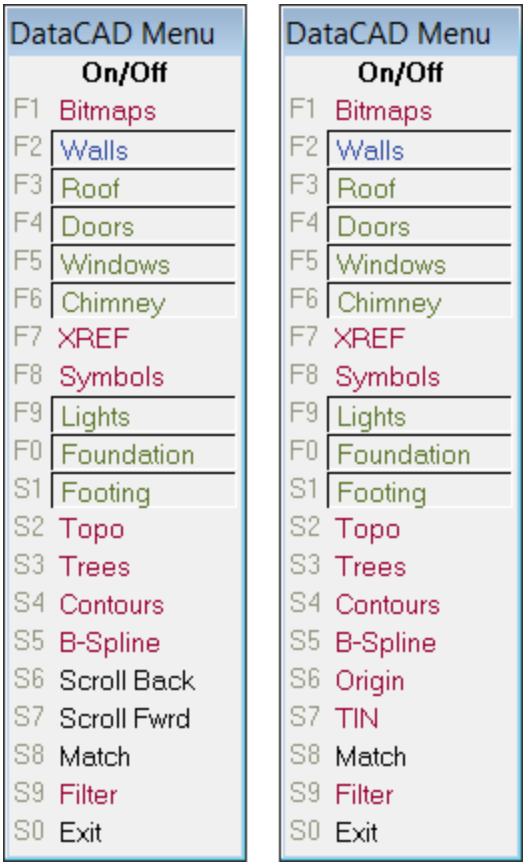


Figure 18.19: DataCAD's Layer On/Off Menu Shown With, and Without Scroll Fwrd/Back Buttons

No Scroll Forward / Backward Keys

A new key, "No Scroll Keys", has been added to the [General] section of DCADWIN.ini. Setting this key to TRUE, removes the Scroll Back and Scroll Fwrd buttons from menus where they would otherwise appear. For example, in a drawing where there are more than 15 layers, a Scroll Fwrd button appears at [S7], while [S6] is reserved for Scroll Back. Setting No Scroll Keys=TRUE frees up two positions in the menu list, as the scroll wheel and [PgUp]/[PgDn] keys can be used instead.

View Layer File

The View Layer File function has been enhanced to allow 255 (increased from 80) character file / path names.

Fix Text Toggle

The 'Fix Text' toggle has been added to the Clipboard Paste menu when you are pasting text.

Use Significant Digits In Dialogs

This key has been added to the [General] section of DCADWIN.ini so you can enable significant digits in DataCAD's distance edit fields shown in dialogs. The default value is FALSE. Setting this key to TRUE will cause the Distance edit fields in dialogs to adhere to the SigDigit setting in the ScaleType menu.

Persistent Layer Manager Hotkey

[Ctrl] + [L] is the default key combination for opening and closing the Layer Manager (customizable in dcadwin.mnu). This only applies to the persistent Layer Manager.

GUI File Path

A unique path has been added to the "Pathnames" tab of Program Preferences to define the location for "User Interface Files (.GUI)." This enables you to store the user interface files "dcadwindialogs.gui," "dcadwintoolbars.gui," and "objectviewer.gui" in a path that is different from other support files.

Color Menu Goes Directly To Dialog

This key has been added to the [General] section of DCADWIN.ini so you can now display the Color Palette dialog in commands that would normally display the "Color" menu.

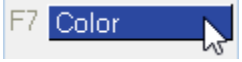


Figure 18.20: Color Menu Button

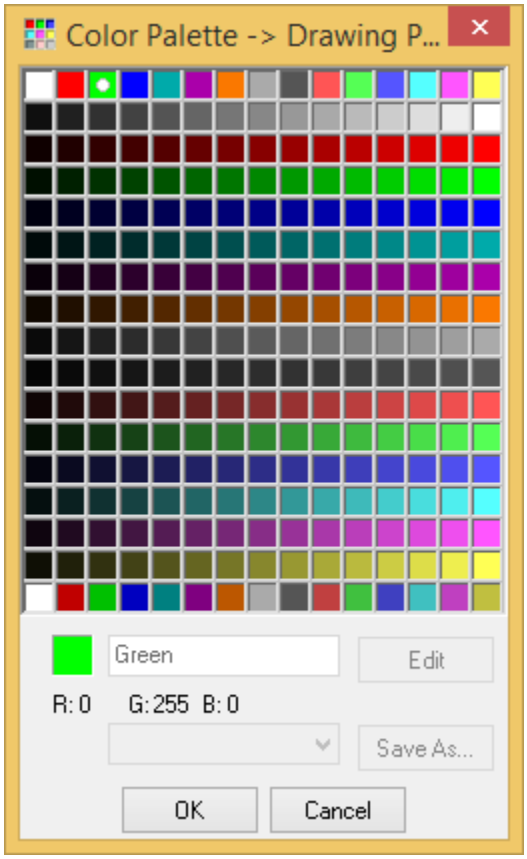


Figure 18.21: DataCAD's Color Palette Dialog

Note: While this feature is enabled, you can temporarily suppress the Color Palette dialog by pressing the [Ctrl] key while clicking the "Color" menu button. This causes DataCAD to display the "Color" menu, instead of the Color Palette dialog, for this one operation.

Note: To set a specific color in a keyboard macro, specify the color index number followed by the "$" character.

Edit Symbol Fields Dialog

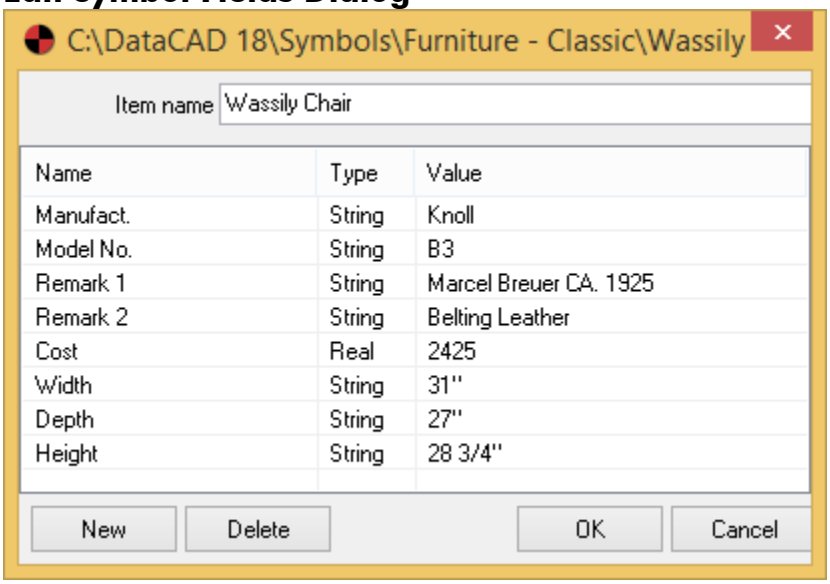


Figure 18.22: Edit Symbol Fields Dialog

The "Edit Fields" dialog is now displayed after choosing "Save As" from the right-click menu of a symbol displayed in the Symbol Browser, or from the [Ctrl] + Right-click, Symbol Tools context menu of a symbol in the drawing area.

o2c None Materials

A set of keys have been added to the [o2cViewer] section of DCADWIN.ini so you can customize the default "None" material settings. These settings determine the rendered appearance of entities that do not already have a material assigned to them.

See “New Configuration Settings” for the list of keys.

o2c Fixed Materials

A set of keys have been added to the [o2cViewer] section of DCADWIN.ini so you can 'force' certain material settings to apply to all entities, regardless of their currently defined material definition. For example, if you want all surfaces in your model to appear glossy, you might set MatFixed Specular to 70 instead of the default value of 10. Or, if you want everything in your model to appear transparent, you might set MatFixed Opacity to 30 instead of the default value of 100.

See “New Configuration Settings” for the list of keys.

Note: These settings only apply at the time you launch your model in the Object Viewer and have no effect upon the material definitions that are stored in the drawing.

Material XOR Background

This key has been added to the [o2cViewer] section of DCADWIN.ini to prevent DataCAD from 'flipping' an entity's default rendered color when it is the same as the background color. Typically, this would apply to a white background. In this case, DataCAD will XOR the white lines in your drawing to black so they will not 'disappear.' This causes white entities to render black in the Object Viewer. Setting Material XOR Background to FALSE, will cause white entities to render white, instead of black, when you have a white background.

See "New Configuration Settings."

Sun Shader Enhancements

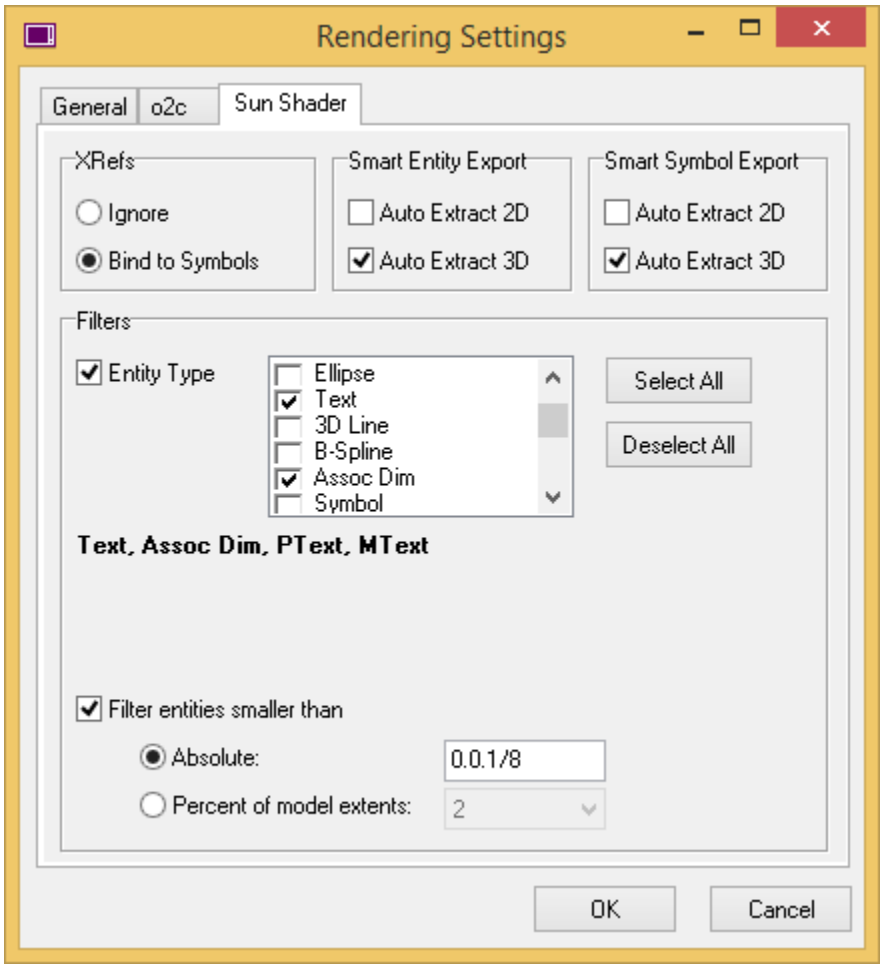


Figure 18.23: Rendering Settings Sun Shader Tab

Entity Filter

The Sun Shader entity filter now applies to entities contained within Symbols, Smart Entities, and XREFs. The key, 'Apply Filters To Embedded Entities' has been added to the [Sun Shader] section of DCADWIN.ini to control this behavior. The default value is TRUE.

Smart Symbol Export

Added a new option to the Sun Shader tab of the View/Rendering/Settings dialog, labeled "Smart Symbol Export." When "Auto Extract 2D" is checked, layers inside of symbols that are assigned to display in 2D view projections (i.e. plan) are included in the Sun Shader. When un-checked, the 2D layers are not included. When "Auto Extract 3D" is checked, layers inside of symbols that are assigned to display in 3D view projections (i.e. isometric or elevation) are included in the Sun Shader. When un-checked, the 3D layers are not included.

Miscellaneous Enhancements

- The width of the Saved Views drop-down is now defined by the length of the longest name.
- When using File/Save Image, the path, image resolution, and image type are now stored with the application, and remembered across sessions.
- Added the ability to reload the Sun Shader interface text without having to restart DataCAD. This option is helpful when translating the program interface into other languages.

  Modify the following key in SunShaderNX.ini, located in the C:\DataCAD 18\Sun Shader\NX\Support Files\ folder:

  ```
  [TRANSLATION]
  EXPOSE INTERNATIONALIZATION TOOLS=FALSE
  ```

  If TRUE, a new "[Debug] - Internationalization Tools" pull-down menu is shown at the top of the Sun Shader interface. Click it and then choose "Reload messages" to reload the interface text.

New Configuration Settings

DataCAD 18 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 18 installation folder (C:\DataCAD 18\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

[General]

`New 3D Menus=FALSE`

If TRUE, the position of the menu buttons in the 3D Move, 3D Copy, 3D Mirror, and 3D Stretch menus match as closely as possible to the positions of the menu buttons in the 2D Move, 2D Copy, 2D Mirror, and 2D Stretch menus.

`Color Menu Goes Directly To Dialog=FALSE`

If TRUE, clicking "Color" (for example in the Change menu) will automatically display the Color Palette dialog. Previously, it would display the "Color" menu.

`Prevent Windows Sleep=FALSE`

If TRUE, Windows sleep and hibernate modes will be disabled while DataCAD is running.

`Prevent Windows Screen Saver=FALSE`

If TRUE, the Windows Screen Saver will be disabled when DataCAD is running.

`Use Significant Digits In Dialogs=FALSE`

If TRUE, the Distance edit fields in dialogs will adhere to the SigDigit setting in the ScaleType menu.

`Allow Scale Dependent Nested Symbols=FALSE`

If TRUE, DataCAD will recognize the Lock Size setting of nested symbols.

`SaveAs Uses Current Drawing Folder=FALSE`

If TRUE, DataCAD will set the path to the current drawing folder, instead of the previous File, Open path, when you use the Save As... or Save As Copy... commands.

`No Scroll Keys=FALSE`

If TRUE, the Scroll Forward and Scroll Backward buttons will not appear in list menus with more than 15 items. Instead, up to 17 items will be shown.

[Paths]

`PATH_GUI_FILES=Support Files\`

Path to store GUI (User-interface) files.

[DXF_DWG]

`Process XREFs=TRUE`

If FALSE, DataCAD will include XREF instances in the drawing being exported but will not convert externally referenced files.

[o2cViewer]

`Material XOR Background=TRUE`

If FALSE, white entities will render white, instead of black, when you have a white background.

`MatFixed ClrDiff_Red=`

Fixed Diffuse Color for Red Component (0-255).

`MatFixed ClrDiff_Green=`

Fixed Diffuse Color for Green Component (0-255).

`MatFixed ClrDiff_Blue=`

Fixed Diffuse Color for Blue Component (0-255).

`MatFixed ClrRefl_Red=`

Fixed Reflection Color for Red Component (0-255).

`MatFixed ClrRefl_Green=`

Fixed Reflection Color for Green Component (0-255).

`MatFixed ClrRefl_Blue=`

Fixed Reflection Color for Blue Component (0-255).

`MatFixed Reflection Ambient=`

Fixed Ambient Reflection Percent (0-100).

`MatFixed Reflection Diffuse=`

Fixed Diffuse Reflection Percent (0-100).

`MatFixed Reflection Specular=`

Fixed Specular Reflection Percent (0-100).

`MatFixed Highlight Size=`

Fixed Highlight Size (1-200).

`MatFixed Opacity=`

Fixed Opacity Percent (0-100).

`MatFixed Refraction=`

Fixed Refraction Index (1-64 where 10 equals no refraction).

`MatFixed Flags=`

Fixed Material Flags

`MatNone Color Diffuse=`

'None' Material Diffuse Color (DataCAD Color Palette 1-255).

`MatNone Color Reflect=`

'None' Material Reflection Color (DataCAD Color Palette 1-255).

```
MatNone Reflection Ambient=50
```

'None' Material Ambient Reflection Percent (0-100).

```
MatNone Reflection Diffuse=40
```

'None' Material Diffuse Reflection Percent (0-100).

```
MatNone Reflection Specular=10
```

'None' Material Specular Reflection Percent (0-100).

```
MatNone Opacity=100
```

'None' Material Opacity Percent (0-100).

```
MatNone Refraction=10
```

'None' Material Refraction Index (1-64 where 10 equals no refraction).

```
MatNone Highlight Size=2
```

'None' Material Highlight Size (1-200).

```
MatNone Self-Illuminate=FALSE
```

If TRUE, 'None' Material is self-illuminated.

```
MatNone Render Backface=TRUE
```

If TRUE, 'None' Material will render both faces.

```
MatNone Has Texture=FALSE
```

If TRUE, 'None' Material will use assigned bitmap texture.

```
MatNone Texture Scale=1
```

'None' Material texture size defined in decimal meters.

```
MatNone Texture Name=
```

Name of 'None' Material bitmap.

```
MatNone Smooth Edges=TRUE
```

If TRUE, 'None' Material will smooth edges of adjacent polygons.

```
MatNone Texture Mask=FALSE
```

If TRUE, 'None' Texture will render black as transparent.

```
MatNone Texture Colorize=FALSE
```

If TRUE, 'None' Texture will colorize bitmap with diffuse color.

```
MatNone Texture Reflection=FALSE
```

If TRUE, 'None' Texture will reflect from surface of object.

[Sun Shader]

```
Apply Filters To Embedded Entities=TRUE
```

If TRUE, The Sun Shader entity filter will apply to entities contained within Symbols, Smart Entities, and XREFs. This is the default behavior.

[Symbol Attributes]

`New Database Linking=TRUE`

If TRUE, the default, the new symbol attribute database linking features are enabled.

`Databases Have Header Row=FALSE`

The default value is FALSE. If TRUE, DataCAD will assume the first row in CSV files linked to symbol attributes is a Header row.

New extended character codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" starting on page 591 of the Reference Manual.

```
1100: Reserved
```

New extended character codes have been added to set the state of the Highlight setting for Classic Walls.

```
1101: Highlight On
1102: Highlight Off
```

New extended character codes have been added to set the state of Multiple in certain editing commands.

```
1103: Copy Multiple On
1104: Copy Multiple Off
```

Note: The key, MultiRemembersStatus must be set to TRUE in the [General] section of DCADWIN.ini.

Enhancements to DCAL (DataCAD Applications Language)

The following routines have been added to DCAL.

```
PROCEDURE ExportAutoCADFile (acadfname: string; vernum, lyrmodenum:
aSInt); BUILTIN 652;
```

Where:

- "acadfname" is the fully qualified name of the DWG file to create.
- "vernum" is the DWG version to create (18=AC2004, 21=AC2007, etc.).
- "lyrmodenum" should be passed as either Lyr_On or Lyr_All.

```
FUNCTION LoadLinetype (name : string) : integer; BUILTIN 653;
PROCEDURE do_ChangePlotScale (NewScale : integer); BUILTIN 654;
PROCEDURE GetLicenseID (LiceseID : IN OUT string); BUILTIN 655;
PROCEDURE SortLayersByName; BUILTIN 656;
FUNCTION Contour_Search (cursor : IN point; Boundary : IN OUT pntarr) :
integer; BUILTIN 657;
FUNCTION Contour_Offset (cursor : IN point; Offset_Dis : IN real; color :
IN integer; pln : IN OUT entity) : boolean;
BUILTIN 658;
PROCEDURE SetPenStyle (PenStyleName : string); BUILTIN 659;
PROCEDURE SetPenSpacing (PenSpacing : IN real); BUILTIN 660;
PROCEDURE Ent_SetPenStyle (PenStyleName : string; Ent : IN OUT entity);
BUILTIN 661;
PROCEDURE Ent_SetPenSpacing (PenSpacing : IN real; Ent : IN OUT entity);
BUILTIN 662;
PROCEDURE Clear_Keys; BUILTIN 663;
```

Clears the function keys with a forced repaint.

```
PROCEDURE Set_Active_SSet (SSet : integer); BUILTIN 664;
PROCEDURE Unset_Active_SSet (SSet : integer); BUILTIN 665;
PROCEDURE Ent_SetLockSize (LockSize : boolean; Ent : IN OUT entity);
BUILTIN 666;
FUNCTION Ent_IsLockSize (Ent : IN OUT entity) : boolean; BUILTIN 667;
PROCEDURE GetDimTxtPnt (Ent : IN OUT entity; dmTxtPt : IN OUT point);
BUILTIN 668;
```

DataCAD 17

DataCAD 17 contains a collection of new features and enhancements designed to improve compatibility with SketchUp and increase your productivity. The DataCAD 17 drawing file format is currently compatible with DataCAD 16 and 15, however you must use the "Save As" command in the "File" menu to save files backward to older version formats.

All-New SketchUp Translator

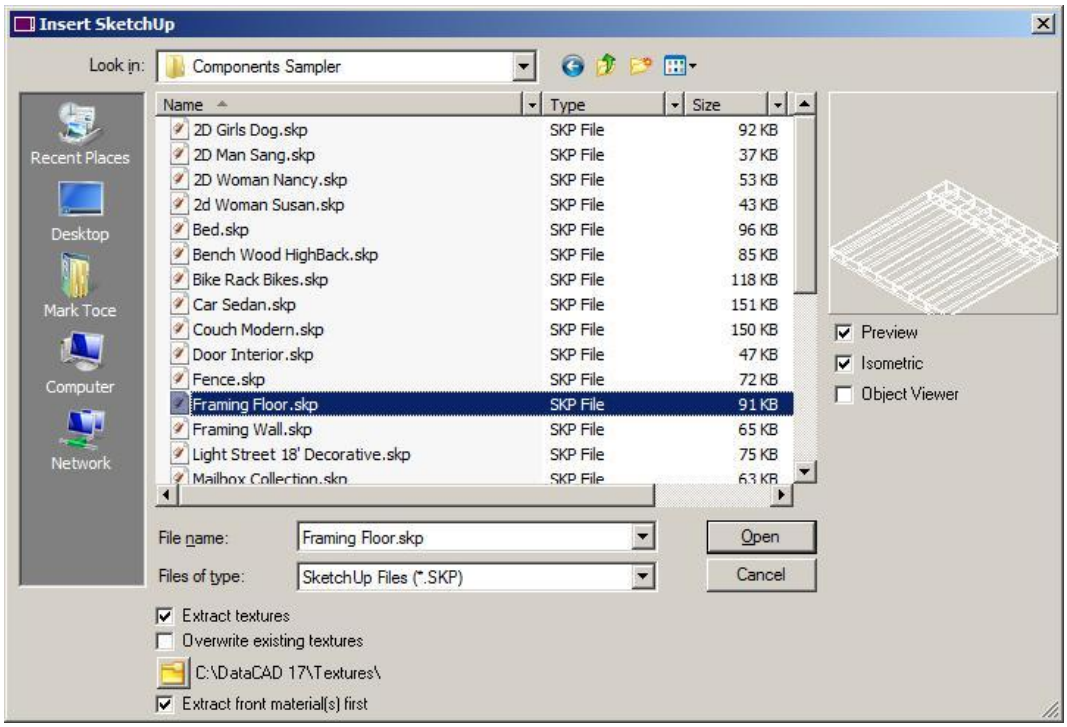
DataCAD 17 supports the ability to insert models from SketchUp 2013 and 2014, export DataCAD models to SketchUp 2013 and 2014, and to insert SketchUp 2013 and 2014 models into DataCAD drawings as external references (XREFs). This enables you to collaborate and share files with associates who use the latest versions of SketchUp.

➔ To insert a SketchUp 2013 or 2014 file into a DataCAD drawing file:

124. Run DataCAD and open the drawing file.

125. Choose "SketchUp" from the "Insert" pull-down menu.

126.



127. When checked, the "Extract texture" option extracts textures assigned in SketchUp, embeds them in the drawing, and assigned them to the objects.

128. When checked "Overwrite existing textures" will save the textures assigned in SketchUp to DataCAD. Use the folder icon below this setting to define the folder in which to save the textures.

129. When checked, "Extract front material(s) first" will extract and assign the material on the "front" face of a polygon. When un-checked, the material assigned to the "back" face is extracted and assigned.

130. Select the *.SKP file to insert, and then click "Open."

If "Preview" is checked, DataCAD displays a preview of the object in Plan view. If "Isometric" is checked, that preview is shown in Isometric view. If "Object Viewer" is checked (Preview must be enabled first), DataCAD will launch the SketchUp object into the o2c Object Viewer to preview the object.

---

131. Position your cursor in the drawing area, and then click or snap to insert the SketchUp model.

Note that the side menu changes to the "Ins Symbol" menu, which contains standard symbol insertion options. The SketchUp model will be inserted as a collection of polygons inside of a symbol. You can use the Symbol Editor to modify the contents of the symbol without exploding it, or you can explode the symbol to modify the individual entities within it.

---

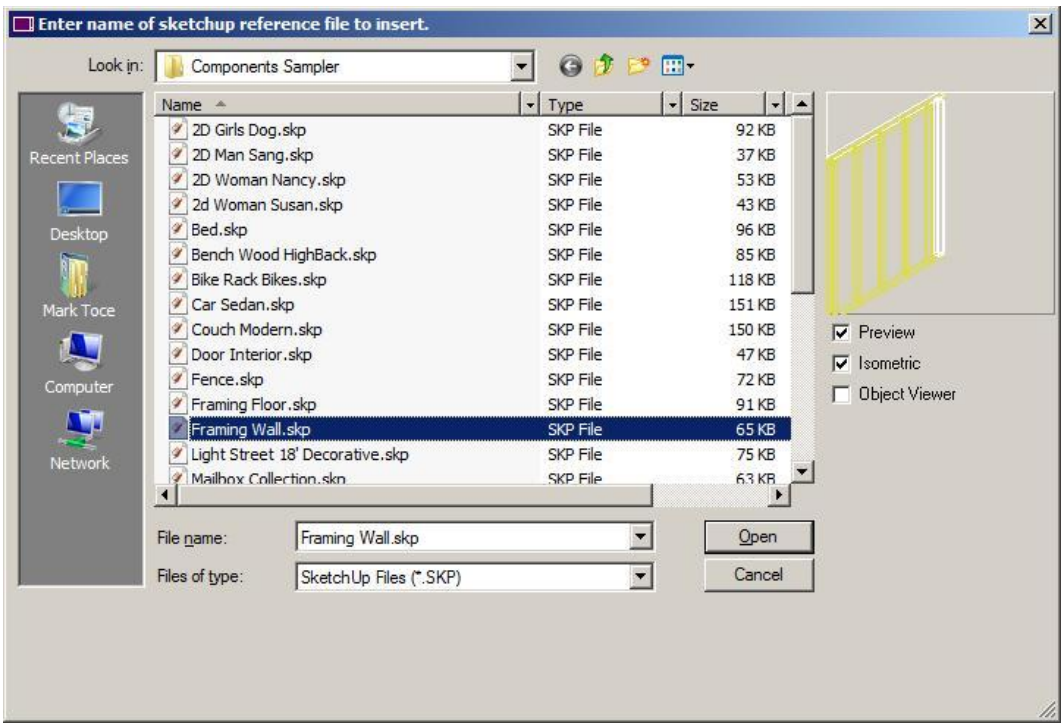
132. DataCAD inserts the SketchUp model, in the form of a symbol, into the drawing file.

It is recommended that you insert unfamiliar SketchUp files into a new drawing file to reduce the possibility of unwanted file corruption. SketchUp objects are available for download from a variety of sources, and their contents are not guaranteed to be accurate. After inserting a SketchUp file into a new drawing, and then reviewing it to ensure its integrity, you can copy and paste it into the destination drawing file.

➔ To insert an XREF of a SketchUp file:

133. Choose "SketchUp XREF" from the "Insert" pull-down menu.

134. Select the *.SKP file to insert as an XREF, and then click "Open."



135.

136. Position your cursor in the drawing area, and then click or snap to insert an XREF of the SketchUp file.

137. DataCAD inserts an XREF of the SketchUp file.

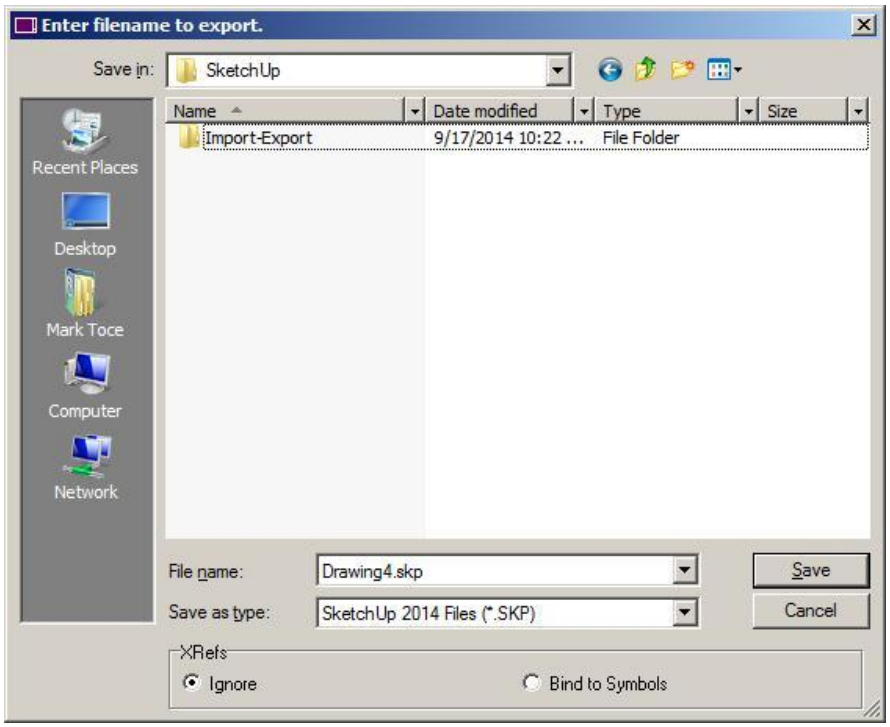
Note: This XREF behaves just like XREFs of DataCAD drawing files. If you move or rename the SketchUp file on your hard drive, it will become an orphaned reference. You must update the reference in the DataCAD drawing file, via the Insert/Orphaned References menu option, to maintain the XREF link. The SketchUp XREF will be listed in the Reference File Manager, along with any XREFs of DataCAD drawing files.

➔ To export a file to SketchUp 2013 or 2014 format:

138. Open the drawing in DataCAD.

139. Turn on the layers that you want to include in the SketchUp file. Turn off any layers that you do not want to include.

140. Click the "File" pull-down menu, choose "Export," and then pick "SketchUp."



141.

142. Use the "Save In" drop-down field to choose the folder on your hard drive in which to save the SketchUp file.

143. Use the "Save As Type" drop-down menu to define the SketchUp release format in which to save the file.

> If your model contains XREFs, use the "XREFs" field to decide whether to "Ignore" XREFs or "Bind to Symbols."

144. Type a name for the file and then click "Save.

DataCAD creates the SketchUp *.SKP file in the folder specified in the "Save In" field.

Inference Snapping

There is a new option labeled "Inference Snapping," located in the "Dynamic Snapping" section of the "Drawing" tab under Tools/Program Preferences. Either the dynamic snapping "Hint" or "Indicator" must be enabled to use this feature.

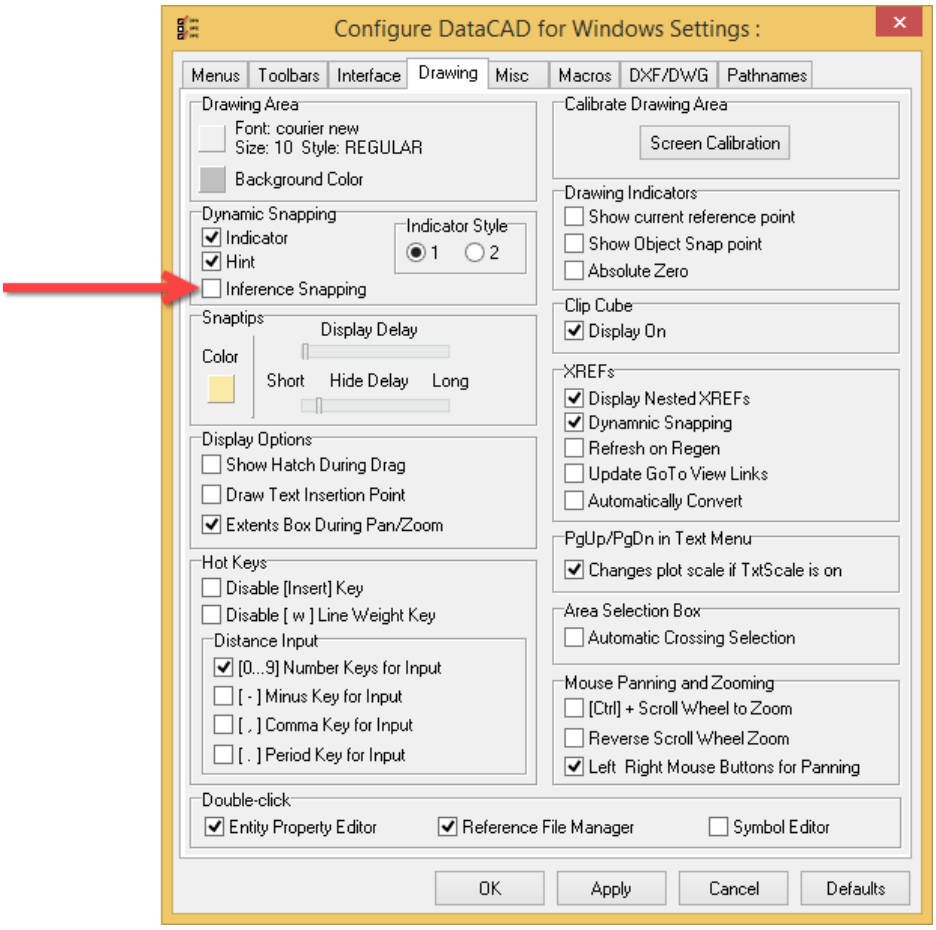
When this option is checked, you can use the left mouse button to object snap to an entity that is within the current object snap miss distance. If no entity is found within the miss distance, DataCAD will register a left click as a standard left click.

> You may find it helpful to adjust the Miss Distance in the Object Snap menu, which defines the search area for snapping. The Aperture can be enabled to provide a visual indicator of the Miss Distance.

Pressing the [Shift] key on the keyboard while simultaneously clicking the left mouse button will temporarily disable inference snapping for that click only. DataCAD will interpret this as a standard left-click.

The middle mouse button will summon the "Get Snap" popup menu. Previously, you would execute Get Snap by pressing [Shift]+[Middle-click]. In addition, you can use the middle mouse button to Object Snap while holding down the [Shift] key to disable Inference Snapping.

[Shift]+[Right-click] will be registered as a double-click to summon the Properties Editor, Reference File Manager and/or the Symbol Editor, depending upon your "Double-Click" settings on the "Drawing" tab under Tools/Program Preferences.



Productivity enhancements

New commands and functions

There is a new sub-menu labeled "Clean/Cap" in the Architect/Edit Walls menu (with Auto3D on). It provides the ability to change the status of Clean, Cap and Trim In/Out for smart wall nodes using Entity, Group, Area, Fence, Selection Set or Select All.



➔ To change the status of Clean or Cap, or to turn Trim In or Trim Out on:

1. Click the “Clean/Cap” button to enter the sub-menu.
2. Toggle "Cap" on to turn wall cap on or toggle it off to turn wall cap off.
3. Toggle "Clean" on to enable automatic intersection cleaning or toggle it off to disable automatic intersection cleaning.
4. The "Trim Out" and "Trim In" sub-options are mutually exclusive. They control whether wall lines are trimmed at the intersections of their interior or exterior lines.
5. Use Entity, Group, Area, Fence, Selection Set or Select All to select the entities to change.

When you select walls to change by Entity, Group, Selection Set or Select All both nodes are changed for each selected wall. If you select by Area or Fence, only the wall nodes that are enclosed within the selection rectangle or polygon will be selected.

Mask by Hatch Pattern

There is a new option in the “Mask” sub-menu of each editing command that enables you to select entities by their assigned Hatch Pattern. In the selection menu, choose "Mask" and then toggle “Pattern” on. Select the pattern to mask, right-click, and then select the objects to modify by Entity, Group, Area, Fence, or press [Ctrl]+[a] for Select All.

Geometry commands

The Utility/Geometry menu has some new commands. In the “Tangents” sub-menu, you’ll find that the “2 Points” method of aligning the snap grid now works while in parallel 3D views, such as elevation or isometric. The “Offset” sub-menu includes "Dist / 2" and "Dist * 2" options (when “Dynamic” is toggled off). They will divide the current offset distance by two, or multiply it by two, respectively. Also, there is a new "Offset Z" function which gives you the ability to offset objects in the Z direction. Enter a positive value to move an object up or enter a negative value to move it down.

Symbol Tools

The [Ctrl]+[Right-click] context menu for Symbols has a new command that will launch Windows Explorer and then open the folder in which the selected symbol is stored. To execute this command, [Ctrl]+[Right-click] on any symbol in the drawing area, choose "Symbol Tools," and then pick "Open this symbol's folder in Windows Explorer." This same command is also accessible when you right-click on a symbol in the Symbol Browser.

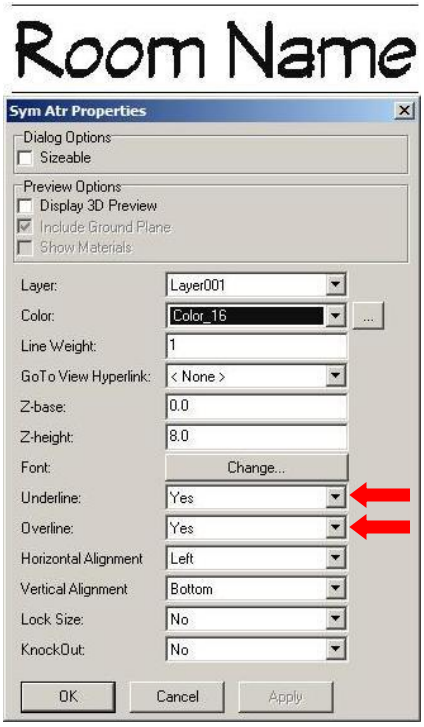


Smart Entities

If a Smart Door or Smart Window becomes detached from the Smart Wall into which it was originally inserted, you can use the new button labeled "Reassociate" in the "Architect" menu (when "Auto 3D" is enabled). Click "Reassociate," choose the Smart Wall, and then pick the Smart Door or Smart Window to associate with it.

You now can define a specific color for the pocket portion of Smart Pocket Doors. In the Door Type Manager, load a pocket door and then go to the "Swing" tab. Un-check "Match Door Color," and then use the "Color" drop-down field to define the color of the door pocket. Previously, the pocket matched the jamb color, as defined on the "Jambs" tab.

Symbol attribute text



Symbol Attribute Text entities now support the Underline and Overline properties. The Underline and Overline are variable length and match the length of the value text entered. DataCAD can object snap to the underline and overline as well.

These properties can be set in the Text/Font dialog prior to creating the Symbol Attribute Text, or in the "Entity Properties Editor," after the text attribute has been created. [Ctrl]+[Right-click] on the Symbol Attribute Text entity, and then choose "Sym Atr Properties" to open this dialog.

The Change/Text/Font command also supports changing the status of Underline and Overline on text attributes. To turn either property on, check the option in the Change/Text/Font dialog and then choose the Symbol Text Attribute to change. To turn either property off, un-check the option in the Change/Text//Font dialog, and then choose the Symbol Text Attribute to change.

Changing text

A new option labeled "Edit Contents" has been added to the [Ctrl]+[Right-click] context menu for single-line text, MText, and PText. Picking this option executes the Change/Text/Contents command for the selected text entity.

Changing MText and PText line factor

The Change/Text menu has a new command labeled "Factor." This option enables you to change the line spacing factor (the vertical space between individual lines of text) inside of PText and MText entities. Single-line text is not supported.

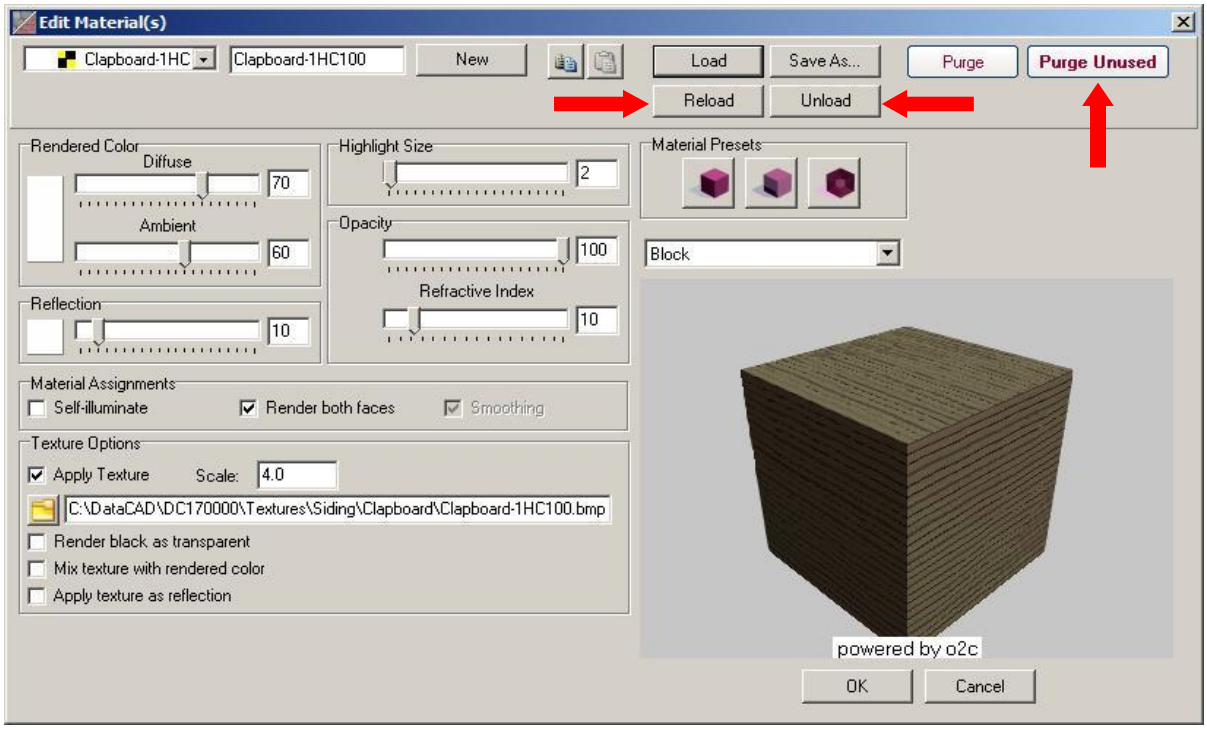
Managing drawing materials

The "Edit Materials" dialog contains three new buttons labeled "Reload," "Unload," and "Purge Unused."

Clicking the "Reload" button reloads the currently selected material definition from the hard drive. It is only available when the material definition has already been loaded.

Clicking the "Unload" button will remove the assignment of the selected material from any entities, colors, or layers within the drawing while simultaneously removing the embedded definition of the material from the drawing file. After opening the "Edit Materials" dialog from the View/Rendering pull-down menu, highlight the name of the material whose assignments you want to remove, and whose definition you want to purge from the file. Click the "Unload" button. DataCAD removes all assignments of this material from entities, colors, or layers in your drawing, and then purge the definition from the drawing.

Clicking the “Purge Unused” button will purge the definitions of materials assigned to the following: Empty layers; Colors, when the drawing is set to render "By Layer"; Colors which have not been used to draw any entities in the drawing; Symbols loaded in the drawing file header, but not used in the drawing.



Interface and program behavior changes

Dimensions

While in the Dimension/Linear/Arrow Style menu, you will now see “Color=” displayed on the “Attention” toolbar at the bottom of the program interface. This shows the current value of the dimension arrow/tick mark color setting.



XREFs

The "Entity Properties Editor" for symbols and XREFs, accessed via the [Ctrl]+[Right-click] context menu, now displays the "Line Spacing Factor." This value is the line spacing factor/enlargement. It is also shown in the [Ctrl]+[Right-click]/Identify context menu, and in the list of information returned by the Identify command.

XREFs on locked layers can now be refreshed (but not reloaded).

Layer Manager

When "Keep Layer Manager Open" is checked on the Layer Manager, it will now remain on-screen throughout an editing session, even if all drawings are closed.

Offset
When using "Dynamic" in the Geometry/Offset menu to offset a line, DataCAD now displays a rubber-band line to indicate the direction of the offset. This can be helpful, as it shows the direction of the cursor when using Direction/Distance input mode and then offsetting by a specific distance using keyboard coordinate input.

Text alignment point
When "Draw Text Insertion Point=TRUE" in the [Debug] section of DCADWIN.ini, DataCAD will display the text insertion point on the screen but will not print it.

GoTo Views
Previously, if a drawing contained more than 10 GoTo Views, and you accessed the second page of the list, chose Move View, picked a view to move, and then picked the view to move it in front of, DataCAD would revert to the first page of views when finished. Now, DataCAD remains on the page you were on when you began the process of moving the view.

Sun Shader
The "View" pull-down menu and the View toolbar in the Sun Shader have a new command labeled "Sun's eye view." Clicking this option will orient your model in the Sun Shader as if you were viewing it from the Sun's position.



New Configuration Settings
DataCAD 17 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 17 installation folder (C:\DataCAD 17\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

Symbol Browser
There are two new keys in the configuration settings file that can automatically alphabetize the "Recent Folders" and "Favorite Folders" lists in the Folder drop-down menu on the Symbol Browser.

Add (if absent) or modify (if present) the following keys in the [SymbolBrowser] section DCADWIN.ini:

```
[SymbolBrowser]
  Sort Recent=FALSE
  Sort Favorites=FALSE
```

Set either key to TRUE to have the list sorted alphanumerically.

Symbol Editor

There is also a new key in the configuration settings file related to editing symbols in the Symbol Editor. Add (if absent) or modify (if present) the following keys in the [General] section DCADWIN.ini:

```
[General]
 Close Symbol Editor Windows First=FALSE
```

When absent or set to TRUE, if a drawing file and a Symbol Editor window are open and the drawing is the active window, selecting File/Close All/Yes to All will result in DataCAD automatically switching to the Symbol Editor window to close it first. When set to FALSE, the windows will close in the current order, which may result in the "Save As" dialog being displayed for the Symbol Editor window, because the drawing from which the symbol originated has already been closed.

Nested symbols

Added support for the "Lock Size" property on nested-level symbols, independent of the status of this setting on the top-level symbol in which the nested symbols are inserted. To enable this feature, add (if absent) or modify (if present) the following key in the [General] section of DCADWIN.ini:

```
[General]
 Allow Scale Dependent Nested Symbols=TRUE
```

When FALSE or absent, DataCAD continues to function as it did previously; Lock Size is not supported on nested level symbols.

XREFs

Added support for updating the GTV Link parameters for an XREF that is inserted upon a locked layer. Add (if absent) or modify (if present) the following keys in the [XREFs] section DCADWIN.ini:

```
[XREFs]
 Always Update GTV Links=FALSE
```

When absent or FALSE (default) nothing is changed; XREFs that reside on locked layers cannot have their GTV Link updated. When TRUE, XREFs that reside on locked layers may have their GTV Link updated.

Text Scale

The option to completely disable “Text Scale” in the Text and Dimension/Text Style menus has been added. Add (if absent) or modify (if present) the following keys in the [General] section DCADWIN.ini:

```
[General]
 No Text Scale=FALSE
```

When absent or FALSE (default), the Text Scale button is available in the Text and Dimension/Linear/Text Style menus. When TRUE, The Text Scale button is absent from both menus, and the function is disabled.

GoTo Views

New in DataCAD 16, GoTo Views store the status and angle of Tangents, from the Utility/Geometry menu, and subsequently recall those values when the GoTo View is later accessed. To disable this, add (if absent) or modify (if present) the following keys in the [General] section DCADWIN.ini:

```
[General]
  GTV Remembers Tangents=TRUE
```

When absent or TRUE (default), GoTo Views store the status and angle of Tangents and the value of Tan Div from the Geometry/Tangents menu and recall them as GoTo Views are restored (added in 16.00.00). Setting this key to FALSE will omit all Tangents related settings from the parameters stored and recalled by GoTo Views.

New extended character codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# in a toolbar button sequence that contains more than one command, or 10XX# in a keyboard macro. For more information on toolbar programming, see the topic "Creating Custom Toolbars" starting on page 591 of the Reference Manual.

1096 - PText/MText Boundary On

1097 - PText/MText Boundary Off

1098 - Purge Unused Symbols

1099 - Reload All Symbols

DataCAD 16

New features in DataCAD 16 combine 2D productivity enhancements, 3D modeling tools, changes to the Sun Shader, and a collection of program optimizations which help to make DataCAD 16 faster than previous versions. The DataCAD 16 drawing file format is currently compatible with DataCAD 15, however you must use the "Save As" command in the "File" menu to save files backward to older version formats.

AutoCAD 2013/2014/2015 support

DataCAD 16 supports the ability to import and export AutoCAD 2013/2014/2015 files in DXF and DWG format. This enables you to collaborate and share files with associates who use the latest version of AutoCAD.

➔ To import an AutoCAD 2013/2014/2015 file:

145. Run DataCAD, and then choose "Open" from the "File" pull-down menu.

146. Click the "Files of Type" drop-down menu, and then select "DWG Files (*.DWG)."

Note: If you are importing a DXF file, select "DXF Files (*.DXF)" instead.

147. Use the "Look In" field to browse to the folder which contains the DWG file you wish to import.

148. Pick the DWG file, and then click "Open."

149. Review the settings on the "DWG Import Entity Assignments" dialog, adjusting as necessary, and then click OK.

DataCAD imports the file and displays it in the drawing area. For more information on importing DXF and DWG files, see page 30 in the Reference Manual.

➔ To export a file to AutoCAD 2013/2014/2015 format:

150. Open the drawing in DataCAD.

151. Click the "File" pull-down menu, choose "Export," "DXF" or "DWG," and then "All Layers" or "On Layers."

152. Use the "Look In" field to choose the folder on your hard drive in which to save the file.

153. Click the "Save As Type" drop-down menu and then select "R2013-R2014 DWG Files (*.DWG)" or "R2013-R2014 DXF Files (*.DXF)."

Note: If you are unsure as to what version of AutoCAD your associate's software supports, you should choose an older format in which to save the DXF or DWG file. Newer versions of AutoCAD can open files saved in older formats, but older versions cannot open files saved in newer formats.

154. Type a name for the file and then click “Save.

DataCAD creates the DXF or DWG file in the specified folder. For more information on exporting DXF and DWG files, see page 101 of the Reference Manual.

The DXF/DWG Translator has been optimized to reduce the size of exported DXF and DWG files. When exporting to DXF or DWG files using the "On Layers" option, only those symbols which are instanced on the exported layers are included in the file header.

Productivity enhancements

Associative dimension prefix and suffix

Options to display "Prefix," “Dimension,” and "Suffix" have been added to the "Dim Style" sub-menu of the Dimensions/Linear menu. Their status and custom data are included with the collection of information saved in the dimension style file (*.dimstyle).

The prefix text will be added in front of the dimension text. If you want a space between your prefix and the dimension text, you must make sure to include it at the end of your prefix text. Similarly, suffix text will be added after the dimension text. If you want a space shown in between, you must add it at the beginning of your suffix text. When “Dimension” (on by default) is toggled off, DataCAD will draw all the dimension components, but the dimension text will be absent.



➔ To create a dimension with a Prefix or Suffix, or without dimension text:

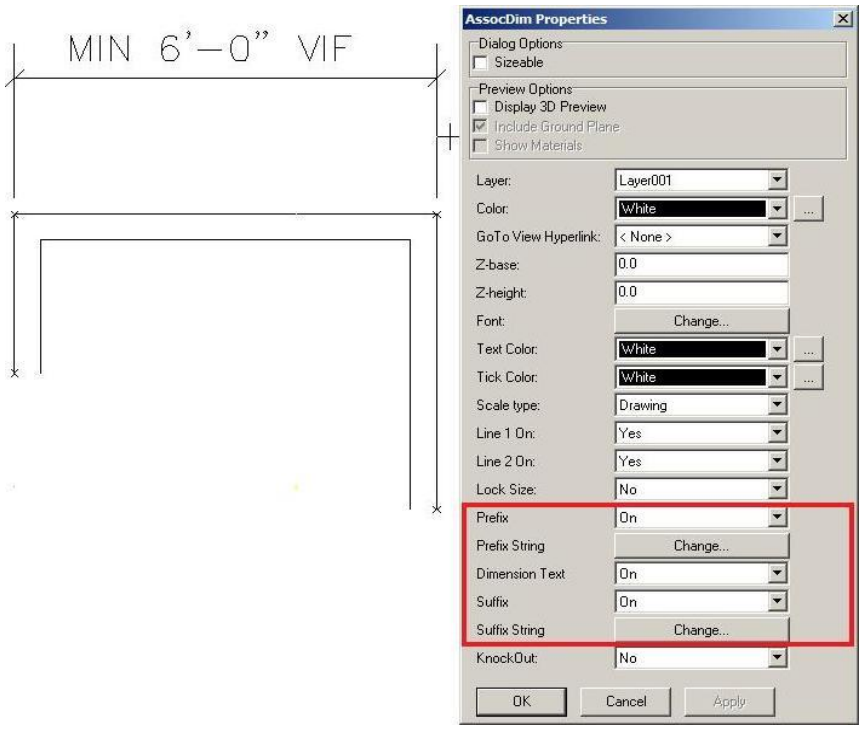
155. Toggle "Prefix" and/or "Suffix" on, and then type the custom data into the entry field. Press [Enter] to accept the data. New dimensions will be drawn with the specified Prefix and/or Suffix.

156. Toggle "Dimension" off to create dimensions that contain just the custom data with no actual dimension.

157. Toggle any of the settings back to their original state to return to drawing normal associative dimensions.

Options to change the "Prefix String" and "Suffix String" are available in the Entity Properties Editor for associative dimensions, along with access to the status of the "Dimension Text" setting. [Ctrl]+[right-click] on an associative dimension and then choose “AssocDim Properties” to access the Properties Editor.

The Geometry/Tangents function now supports the ability to select Associative Dimensions. When you select an Associative Dimension, DataCAD rotates the cursor to match the angle of the dimension line.



New selection method: Previous



Added a button labeled "Previous," which selects the previously selected set of entities, to the "Mask" menu of each selection menu.

➔ For example, let us say you wanted to move a set of entities, and then rotate those same entities by 90°:

158. Choose “Move,” define a distance, and then select an Area of entities to move. DataCAD moves the entities.

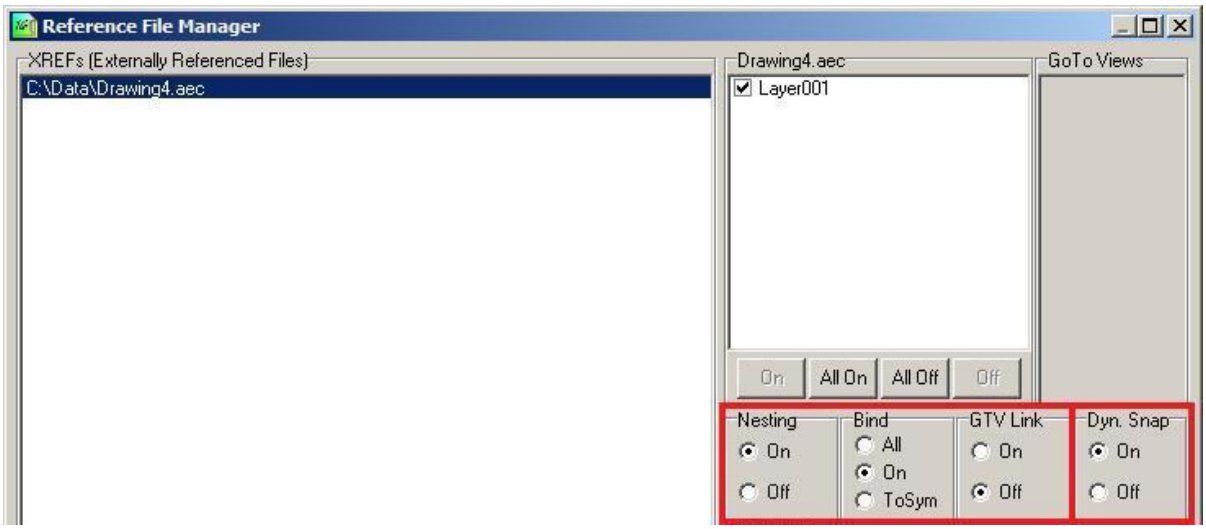
159. Next, select “Rotate,” define the center of rotation, and then set the rotation angle.

160. Click “Mask,” and then click on “Previous.” DataCAD will rotate the same entities that you had moved in the previous step.

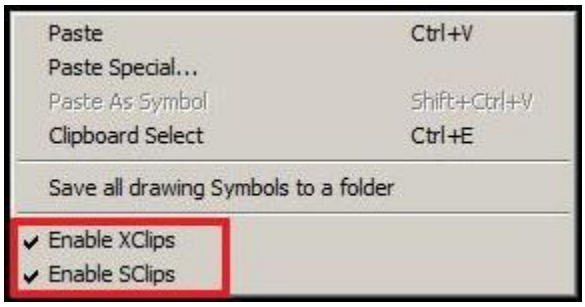
XREF enhancements

Added the "Dynamic Snapping" setting (On or Off), found in the [Ctrl]+[Right-click]/XREF Tools context menu for XREFs, to the Reference File Manager.

The "Nesting," "GTV Link," "Dyn. Snap," and "Smart Wall Hatch/Fill" sections of the Reference File Manager are grayed out until you select an XREF to modify. This works like the way the "Highlighting" section works.

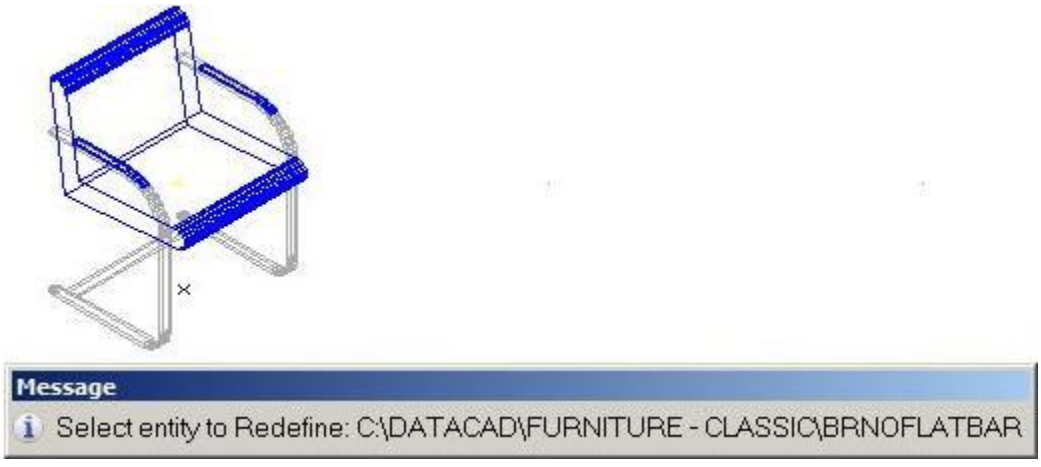


You now can disable XClips and SClips for the entire drawing. [Ctrl]+[right-click] in a blank section of the drawing area to access the Drawing Context Menu. Un-check "XClips On" and/or "SClips On" will disable display of XClips or SClips. DataCAD will display XREFs and Symbols as if no XClips or SClips are assigned. The individual clipping boundaries are retained.



Symbol enhancements

When replacing or redefining a symbol, the name of the symbol is now displayed on the "Message" toolbar at the bottom of the program interface.



DataCAD has a new "Auto Reload" option, located in the [Ctrl]+[Right-click]/Symbol Tools context menu for symbols. When this option is checked, DataCAD will automatically reload the symbol definition on the hard drive for each instance of the selected symbol every time you open the drawing. This setting is assigned and remembered on a per-symbol (but not per-instance) basis.



If a symbol marked for Auto Reload is not found in the original location, DataCAD will display a warning message when you open the drawing which notes the name and path of the missing symbol. DataCAD will then display any instances of that symbol in the drawing using the symbol definition from the drawing file header.

Note: A separate warning message is displayed for each symbol that is not found in its original location on the hard drive

A new "Save As" command has been added to the context menu that appears when you right-click on a symbol in the Symbol Browser. This enables you to save a copy of the symbol to a different folder, or with a different name.

There is also a new option labeled "Loaded Indicators" to the "Options" pull-down menu at the top of the Symbol Browser. When enabled, a small check mark is displayed in the upper right corner of cells on the Symbol Browser displaying symbols that have been loaded in the header of the current drawing.

Drag-N-Drop

DataCAD supports the ability to drag and drop any of the following file types:

AEC/DC5

These files may be dropped onto the DataCAD start screen or an open drawing to open them in new windows. Holding the [Ctrl] key when dropping the file will import it into the active drawing. Holding the [Alt] key when dropping the file will insert it as an XREF in the active drawing.

DXF/DWG

These files may be dropped onto the DataCAD start screen or an open drawing to open them in new windows.

Holding the [Ctrl] key when dropping the file will import it into the active drawing.

SKP

These files may be dropped onto an open drawing to insert them as a Symbol. Holding the [Alt] key when dropping the file will insert it as an XREF in the active drawing.

TXT
These files may be dropped onto an open drawing to insert them as a PText. The drop point is used the first point of the PText boundary. If you hold the [Ctrl] and [Alt] keys when dropping the file, DataCAD will prompt you to select the first point of the PText boundary.

Bitmaps (BMP/JPG/JPEG/GIF/TIF/TGA/PNG/PCX/PCD)
These files may be dropped onto an open drawing. DataCAD will use the drop point as the first point of the boundary rectangle. If you hold the [Ctrl] and [Alt] keys when dropping the file, DataCAD will prompt you for the first point of the boundary.

XLS
These files may be dropped onto an open drawing to insert them as an XREF.

o2c, ACO, 3DS, STL, DSF/SM3
These files may be dropped onto an open drawing to insert them as a Symbol.

Metafiles (EMF/WMF)
These files may be dropped onto an open drawing to add vectors to the drawing file.

Editing tools

There is a new "Fit" sub-option to the "Copy" menu when "Array" is toggled on. Use this command to copy selected entities in an array but have them fit within a specified area.

➔ To create an array that fits into a specified area:

161. Choose "Copy" and then select a start point and endpoint that define the overall distance of the array.

162. Toggle "Array" on and then define the number of copies for the array.

163. Toggle "Fit" on, and then select the entity to copy. DataCAD creates an array and fits the number of copies you defined within the two points that defined the distance.

We have added a "Dynamic" option to the 2D and 3D Stretch commands. 2D lines, 3D lines, and (open) polylines are supported. After selecting "Dynamic," click near the endpoint of the line or polyline you wish to stretch. You may then reposition it dynamically using the rubber-band method.

When using the "Point" selection method in the "Stretch" command and then using the left mouse button to click on a point, DataCAD will select all points that are within one pixel of the cursor position. This has been enhanced such that if no point is found within one pixel, DataCAD will now choose the closest available endpoint.

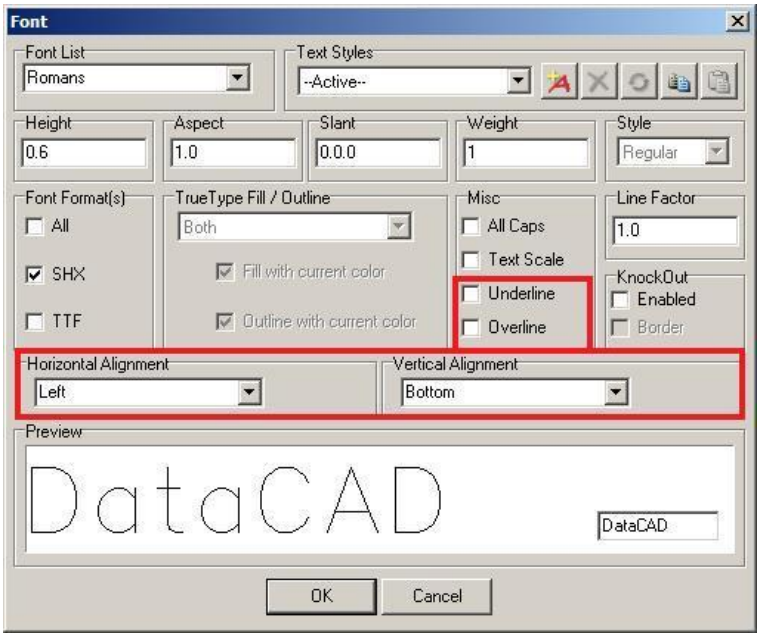
The "Stretch" command now supports the ability to select the quadrant points of ellipses.

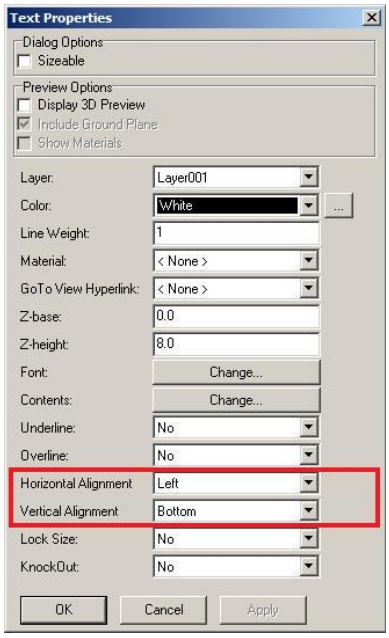
Two new fields for "X Radius" and "Y Radius" have been added to the Entity Properties Editor for ellipses. [Ctrl]+[Right-click] on an ellipse and then choose "Ellipse Properties" to access these fields.

Text enhancements

Access to the "Underline" and "Overline" properties for single-line text entities has been added to the Text/Font dialog. Checking either (or both) turns this property on for subsequent text. In addition, access to the "Horizontal Alignment" and "Vertical Alignment" settings is now available via drop-down menus in the Text/Font dialog.

Drop-down menus for "Horizontal Alignment" and "Vertical Alignment" have been added to the Entity Properties Editor for text entities. In the Horizontal Alignment section, you may select from the options "Left," "Center," and "Right." In the Vertical Alignment section, you may select from the options "Bottom," "Middle," and "Top."



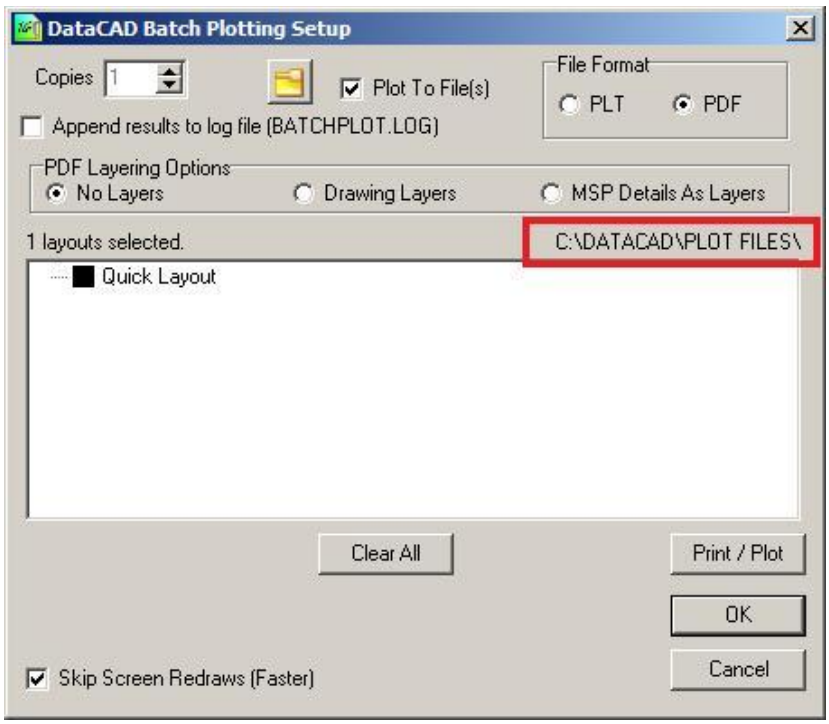


File management changes

When selecting "Save As" from the "File" menu, the "File Name" field is automatically populated with the name of the current drawing file.

The status of the "Preview" checkbox on the File/Open dialog has been separated from the "Preview" checkbox on other dialogs, such as Insert/SketchUp or Insert/o2c. Un-checking "Preview" on the File/Open dialog turns off the creation of the drawing file preview images, which are saved in the same folder as the drawing file and display a preview when you select a file. You may now turn this off while leaving the preview of other files types on.

The "Batch Plot" dialog now shows the current path when "Plot to File" is checked.



GoTo View enhancements

There is a new button labeled "Extents" in the "Add View" and "Update View" sub-menus of the "GoTo View" menu. Toggling this option on when adding a GoTo View or updating the parameters of an existing GoTo View will result in DataCAD automatically recalculating the extents of the view any time the view is recalled.

GoTo View parameters now include the status and angle of "Tangents" in the "Geometry" menu, and the number of Tangent Divisions.

Miscellaneous

Menus which have [Scroll Fwd] and [Scroll Back] buttons, such as the Hatch/Patterns, Line Type, or Layers/OnOff menus, now support the ability to use the scroll wheel on your mouse to scroll forward and backward. Your cursor must be positioned over the menu for DataCAD to execute this function.

We have added the ability to change the "At Head" or "At Tail" placement property for Smart Arrows via the Entity Properties Editor. This enables you to swap the head and tail of a Smart Arrow after it has been drawn.

The on/off state of the "Multiple" toggle in the "Move/Drag" or "Copy/Drag" menu has been separated from the "Multiple" toggle in the "Save Symbol" menu.

When working in the Door Type Manager, making changes to a door type, and then clicking the "Apply" button now updates the display of all instances of the door immediately. Previously, you would need to close the Door Type Manager to see the drawing update. This change also affects the Window Type Manager and Wall Type Manager.

The Measure/InclAngle and Measure/ExclAngle now support Smart walls. Previously, only 2D lines were supported.

The "Intersection" command in the "Geometry" menu now supports Smart walls. Previously, only 2D lines were supported.

Support for negative distances has been added to the Overshoot property, enabling lines to fall short of their actual endpoints.

Pressing the [Enter] key on the keyboard after making a change in the Entity Properties Editor now results in DataCAD applying the change immediately. Previously, you would need to press the [Tab] key first to change the focus to a different field or click the [OK] button.

We have updated the sample macros in the DCAL for Delphi\Samples folder (Complete or Custom installation only) for compatibility with DataCAD 15. There is also a corresponding "Compiled Macros" folder that contains a compiled DMX file for each sample macro.

3D modeling and viewing enhancements

Inserting a symbol in a non-plan view with "Current View" toggled on now supports using the "Nearest" Object Snapping option.

The ability to access the "Primary Divisions" and "Secondary Divisions" on a 3D Mesh entity has been added to the Entity Properties Editor.

"Show Edge" and "Hide Edge" options are now available in the 3D Polygons/Edit menu, enabling you to select individual polygon edges to show or hide.

There are new fields labeled "X Rotation," "Y Rotation," and "Z Rotation" in the Entity Properties Editor for Polylines. Use these fields to check or adjust the X, Y, and Z rotation angles of the selected polyline entity.

Note: When these values are not zero, you must use the 'Get Construction Plane' menu before you can edit the Polyline. Otherwise, the error message "You must be in this Polyline's construction plane to perform this function" will be displayed when you try to use the Polyline editing tools.

The "Viewer" toolbar buttons have changed. Rotate +/- Y has been removed. Rotate +/- Z previously rotated relative to the screen, but now rotates using "world" Z. The default rotation angle, previously 30°, has been changed to 5°. This is now consistent with the same toolbars in the Object Viewer and the Sun Shader.

The appearance of the 3D cursor has been updated to display the X, Y, and Z axes in red, blue, and green, respectively. These colors remain independent of the current color.

The "Add Vertex" and "Move Vertex" commands in the Polyline/Edit, 3D Polygon/Edit and 3D Slab/Edit menus have been enhanced. DataCAD will highlight the selected polyline, polygon, or slab with a dashed gray line type. If multiple edges or nodes are found within the miss distance, you may right-click and then select again to cycle through the coincident entities.

If you convert a polygon to a polyline, edit it, and then explode it back to polygons, faces that have four or more sides will no longer be triangulated.

New Configuration Settings

DataCAD 16 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 16 installation folder (C:\DataCAD 16\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

Show hatch

The following key will disable the display of hatching during any dynamic drag operation:

```
[General]
Show Hatch During Drag=FALSE
```

When FALSE, the default, or absent, display of hatch is suppressed while performing a dynamic operation, such as Move/Drag, Copy/Drag or when inserting a symbol. When TRUE, all hatch is displayed during dynamic operations.

Line weight hot key

The following key disables the [w] key on the keyboard:

```
[General]
 Disable Line Weight Hot Key=FALSE
```

When TRUE, the [w] key on the keyboard is disabled. When FALSE (default), pressing the [w] key increases the value of the current line weight by 1.

Drawing timer

The following key will keep the drawing timer running even if DataCAD is not the active application.

```
[General]
 No Timer Pause=FALSE
```

When TRUE, DataCAD will continue to increment its drawing timers even if it is not the active application. When FALSE (default), the drawing timers are paused if DataCAD is not the active application.

Printing

The following key will disable the Spacebar while the Plot Preview window is displayed:

```
[Plot Preview]
 No Spacebar=TRUE
```

When FALSE or absent, pressing the Spacebar while the Plot Preview window is displayed will result in DataCAD selecting the current active button, which is the "Plot" button.

The following set of keys can be used to define whether display menu settings affect the ability to print different drawing elements:

```
[Printer]
  Print Text=DEFAULT
  Print Hatch=DEFAULT
  Print Line Weight=DEFAULT
  Print Line Types=DEFAULT
  Print Associative Dimensions=DEFAULT
  Print Fills= DEFAULT
  Print Bitmaps=DEFAULT
  Print KnockOuts=DEFAULT
  Print Smart Wall Hatch=DEFAULT
  Print Smart Wall Fill=DEFAULT
```

Set any of the above to TRUE to force them to print, even if the attribute setting in the Utility/Display menu is turned off. If set to DEFAULT or missing, the drawing's display toggles T, H, L, U, D, F, B, and K in SWOTHLUDFBK will be used to determine whether the element is included in the printed output.

Display speed

Speed of display has been improved by up to 100%. The improvement is most noticeable when switching between GoTo Views or forcing a screen regeneration by pressing the [u] key on the keyboard. If these changes cause unintended effects, they can be disabled using the following key:

```
[General]
  New Smart Object Generation=FALSE
```

When absent or TRUE (default), DataCAD uses the new faster method of screen regeneration. When FALSE, the older method is used.

We recommend using this key to disable the speed enhancement only after consulting with a DataCAD support technician.

Fence selection

Fence selection now supports the same automatic crossing option used in Area selection. Creating a Fence by clicking points in a counter-clockwise order results in DataCAD automatically enabling "Crossing." Selecting the points in a clockwise order leaves "Crossing" off. The order and position of the first three selected points determines whether it is clockwise or counter-clockwise.

This feature requires the following key be enabled in DCADWIN.ini

```
[General]
  Automatic Crossing Selection=TRUE
```

When FALSE, the direction in which you choose Area or Fence points has no effect on whether Crossing is enabled; you must manually toggle Crossing on if you wish to use it.

The way symbols are selected when using "Fence" with "Crossing" enabled has been adjusted. Previously, the symbol would only be selected if the insertion point were within the Fence boundary, even with "Crossing" turned on. Now, the symbol will be selected if the Fence boundary crosses any part of the symbol, like the way Area/Crossing selection works.

There is a DCADWIN.ini key that can restore the command to its previous state:

```
[General]
 New Crossing Fence=FALSE
```

When absent or TRUE (default), DataCAD uses the new Fence/Crossing selection method on symbols. When FALSE, DataCAD uses the previous Fence/Crossing selection method on symbols.

Busy cursor

Use the following key to specify DataCAD's busy animated cursor. Windows cursors, .CUR, and animated cursors, .ANI, are in C:\Windows\Cursors\ by default.

```
[General]
 Busy Cursor=GoldenMean
```

Type the name of the cursor you wish to use for DataCAD's busy cursor after the equal sign.

o2c Object Viewer

You can add the following entries to the [o2cViewer] section of DCADWIN.ini to customize the rotation of the model and/or the texture about the o2c world Z-axis.

Set Model_Z_Angle to 180 to orient the model consistent with o2c's coordinate system.

Set Texture_Z_Angle to 90 to orient bitmap textures on horizontal surfaces to match the orientation of the source image that is read from the hard drive.

Note: The texture angle should be added to the model angle, so they rotate 'together'.

The default values; no rotation. Range: 0 - 360.

```
[o2cViewer]
 Model_Z_Angle=0
 Texture_Z_Angle=0
```

Recommended values for 'correct' orientation.

```
[o2cViewer]
 Model_Z_Angle=180
 Texture_Z_Angle=270
```

The ability to load the current DataCAD perspective view when launching the Object Viewer has been added.

Note: "Remember Last View" must be set to FALSE, otherwise the last o2c view will be restored instead.

```
[o2cViewer]
LoadDataCADView=True
```

When TRUE, the o2c Object Viewer will open using DataCAD's current perspective view. When FALSE, the o2c Object Viewer opens using its standard default view.

New extended character codes

Extended character codes are used when programming icon toolbars and keyboard macros. When using any of the following new extended character codes, you will use the syntax V= for a toolbar button which executes just the one single command, A=10XX# or A=30XX# in a toolbar button sequence that contains more than one command, or 10XX# or 30XX# in a keyboard macro.

Text underline and overline

The following extended character codes can be used to define the status of the Underline and Overline properties in the Text/Font dialog:

1089: Underline On

1090: Underline Off

1091: Overline On

1092: Overline Off

DWG Export

The following extended character codes can be used to export a DWG which contains all layers or on layers:

3017: DWG Export, All Layers

3018: DWG Export, On Layers

Polyline display

The following extended character codes can be used to set the state of the "Draw Marks" toggle which displays (or suppresses display of) polyline vertices:

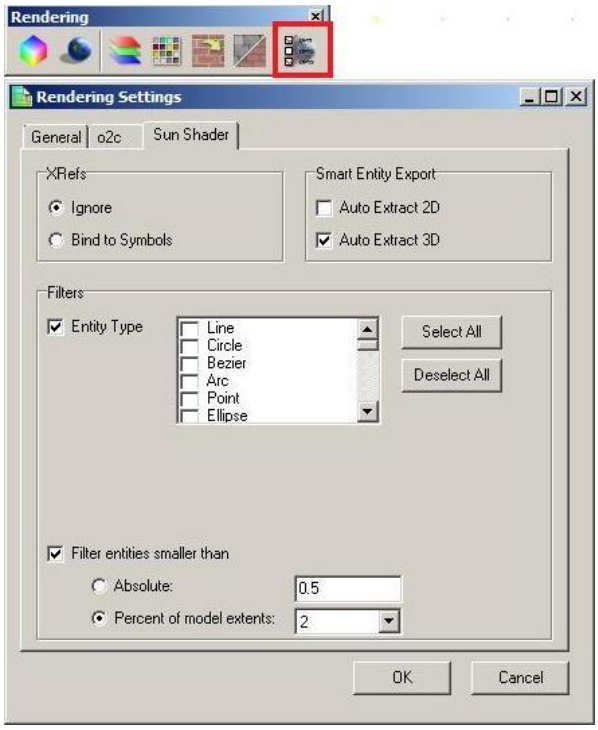
1094: 3D Settings/DrawMarks On

1095: 3D Settings/DrawMarks Off

Sun Shader 2.0.4.1

Entity Filters

The “Rendering Settings” dialog for the Sun Shader contains new “Entity Type” and “Entity Size” filters, which can selectively omit information from the model to improve display speed. You can filter certain types of entities, such as Revolved Surfaces or Cones, or you can filter entities by size, whether absolute or relative to the rest of the model.



➔ To filter entities from the Sun Shader:

164. Click the "Rendering Settings" button on the "Rendering" toolbar, highlighted in the image above, to launch the Rendering Settings dialog.

165. On the "Sun Shader" tab, check "Entity Type" if you wish to omit specific types of entities from the model. Check the entity types in the list.

166. Check "Filter entities smaller than…" if you wish to omit entities that are smaller than a certain size.

167. If you wish to filter by absolute size, click the "Absolute" radio button, and then enter a size.

168. If you wish to filter by a size that is relative to the rest of the model, click the "Percent of model extents" radio button, and then click the drop-down menu to select a percentage.

169. Click OK when you have finished configuring the options.

170. Launch the Sun Shader. DataCAD will omit entities which meet the defined criteria.

Render selected entities

The Sun Shader has two new methods of rendering selected information, instead of your entire model: using the Clipboard, and rendering symbols.

➔ To render information from the Clipboard in the Sun Shader:

171. Press [Ctrl]+[e] on the keyboard or choose "Clipboard Select" from the "View" pull-down menu.

172. Select the information you wish to launch into the Sun Shader, by Entity, Group, Area or Fence.

173. Click the "Display Model in Sun Shader" button on the "Rendering" toolbar to launch the Sun Shader. DataCAD displays only the selected information in the Sun Shader.



➔ To render a specific symbol in the Sun Shader:

174. Display the Symbol Browser by pressing [Ctrl]+[t] or by selecting "Symbol Browser" in the "View" pull-down menu.

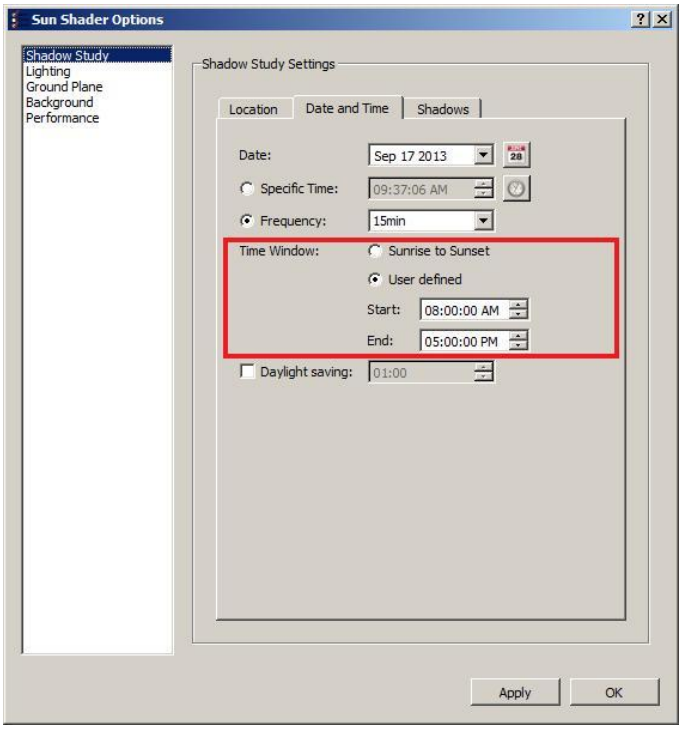
175. Right-click on the symbol you wish to display in the Sun Shader, and then choose "Sun Shader" from the context menu. DataCAD opens the selected symbol in the Sun Shader.

New settings

The Sun Shader has some new settings designed to improve the shadow study results.

Custom time window

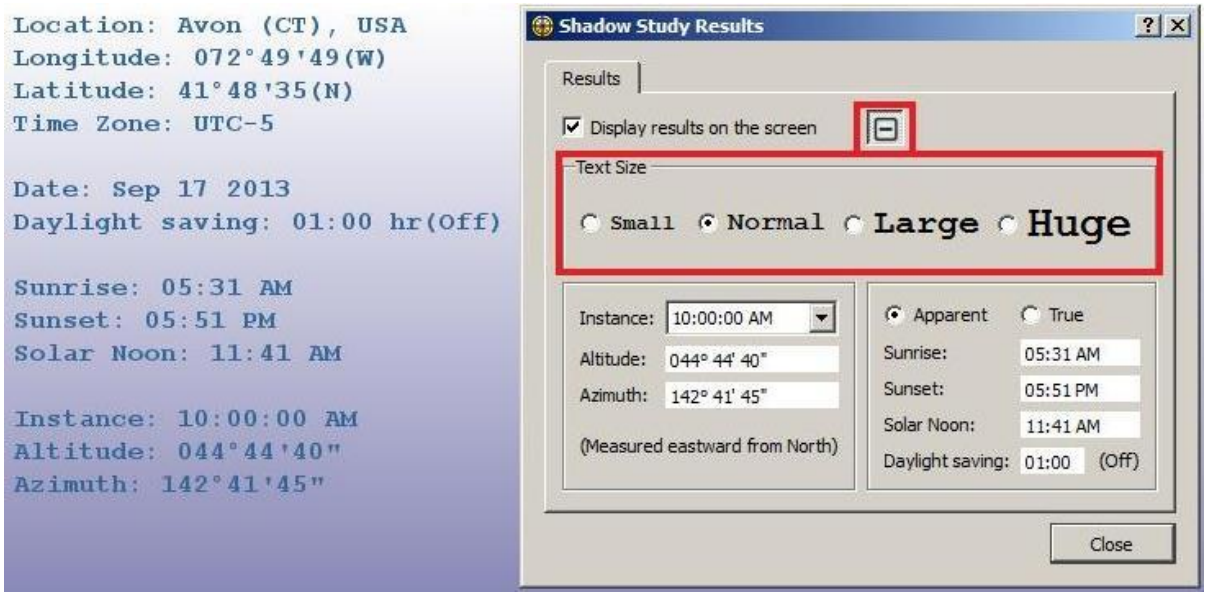
Now you can define a custom time window for shadow studies. Previously, only Sunrise to Sunset was supported. This option is on the "Date and Time" tab under "Shadow Study Settings."



Frequency

The smallest time interval for "Frequency" on the "Date and Time" tab of Shadow Study Settings is now 5 minutes. The 6-hour interval has been removed.

Customizable font size
The size of the text which displays the Shadow Study Results can now be customized.



Miscellaneous

Support for alpha channel in transparent bitmaps has been restored.

Note: Transparent bitmaps cannot be supported while shadows are being cast.

Pressing [Alt]+[x] locks rotation about the X-axis. Pressing [Alt]+[z] locks rotation about the Z-axis.

New Configuration Settings

DataCAD 16 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 16 installation folder (C:\DataCAD 16\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

```
[Sun Shader]
 Force Solid Background=TRUE
```

When FALSE (or absent) the Sun Shader background uses a gradient. When TRUE, the background uses a solid color.

```
[Sun Shader]
 Force Ground Plane display for Shadow Study=FALSE
```

When TRUE (or absent) the Sun Shader includes a ground plane when Shadow Study mode is activated. When FALSE, no ground plane is used.

DataCAD 15

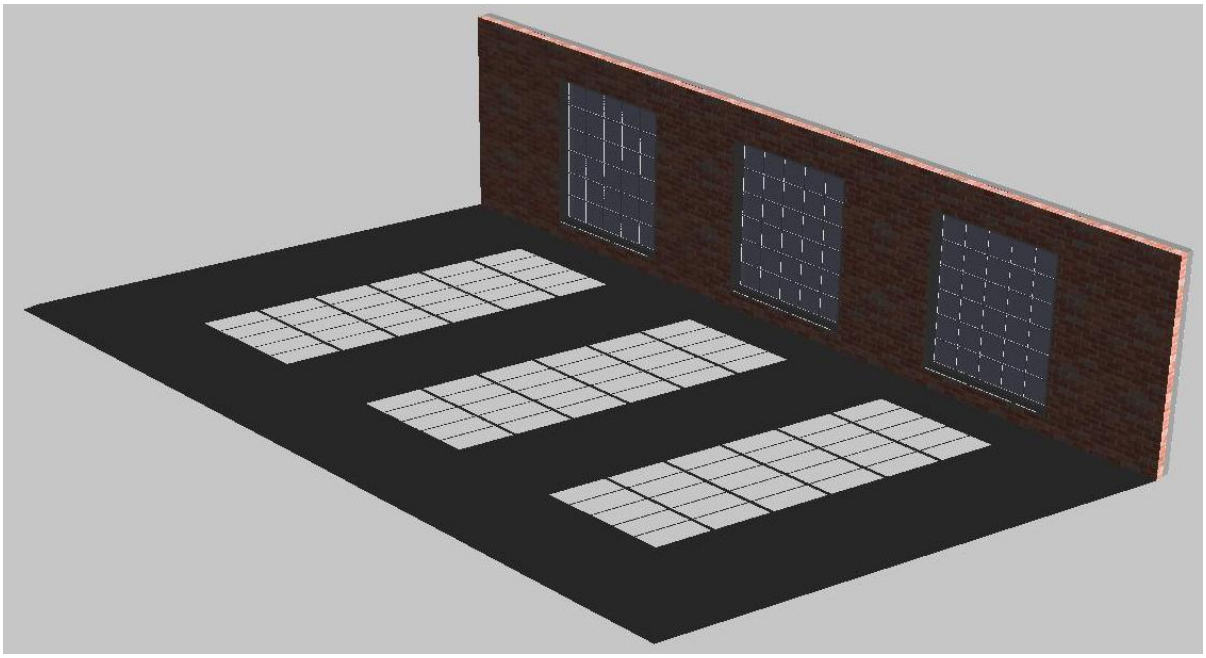
Sun Shader 2.0

Sun Shader 2.0 features a new rendering engine that has been optimized for speed of display, enabling you to review complex models with ease. It has support for smooth and transparent materials and features new toolbars to improve navigation. Features such as GoTo Views and a Layer Manager enable better control over your model using familiar commands from DataCAD. Sun Shader 2.0 is accessed via the "Sun Shader" option in the "View" pull-down menu, or the Sun Shader button on either the "Rendering" or "Viewer" toolbar.



Transparency

Sun Shader 2.0 has support for transparent materials, such as glass. When you assign a transparent material to an object, Sun Shader 2.0 will display it as transparent, enabling you to see through it. Shadow Study mode also supports transparency, so you can see the effect of sunlight through windows.



GoTo Views

The GoTo View toolbar in Sun Shader 2.0 enables you to save view parameters, including rotation angle and zoom level. Click the "Add View" button to add the current view to the list, click on "Update View" to update the selected view with the current view parameters, or click on "Delete View" to delete the selected view from the list. Click the drop-down view menu to select a saved view from the list and display it on the screen.



Layer Manager

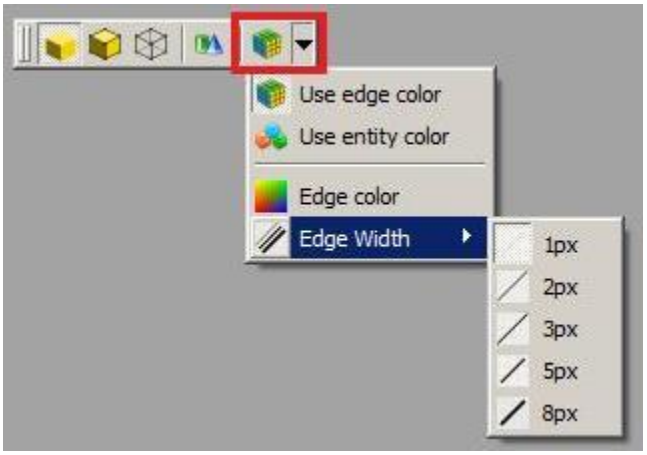
Click the Layer Manager toolbar button to open the Sun Shader Layer Manager. It provides access to the layers that were turned on in your model when you launched the Sun Shader from DataCAD. Use it to turn layers in the model on and off without having to close the Sun Shader and return to DataCAD, making it easier to explore construction options and see their effect on the Sun path and shadows.

The Layer Manager contains familiar commands, such as All On, Set Active and Active Only. In addition, options for Select All, Deselect All, and Invert Selection are available.


Layer Manager
On
Name
Count
1
Walls
2
2
Doors
0
3
Windows
0
4
Site
0
Close

Edge Properties

There is an Edge Properties drop-down toolbar button which contains options for defining the properties of edges in your model. It includes options to use the entity color or a specific color, and the ability to define the width (in pixels) that each edge should be displayed.



Smoothing

Sun Shader 2.0 has support for smoothing in material properties. When enabled, curved edges will not display facets, and will instead appear as smooth curves.



Other toolbars

Other toolbars, added for convenience, include the Zoom Toolbar, the Rotate Toolbar, and the Review Toolbar. From left to right, the Zoom Toolbar has buttons for zoom extents and zoom window. The Rotation toolbar has buttons that rotate the model counter-clockwise about the Z axis, clockwise about the Z axis, counter-clockwise about the X axis or clockwise about the X axis. When Shadow Study mode is off, you may use the Review Toolbar to check face winding, draw face normals, draw vertex normals, and to show the positive (outside) face, the negative (inside) face, or both.



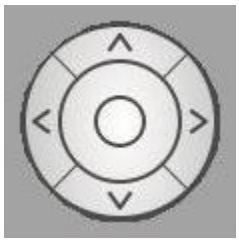
Shadow Study Results

Shadow study results, including location, date and time, and Sun position, are now displayed as text in the upper left of the Sun Shader viewing window when Shadow Study mode is enabled.

Pan/Zoom/Rotate Widget

The Pan/Zoom/Rotate widget is available in the "View" pull-down menu. When checked, it is displayed in the lower right corner of the Sun Shader 2.0 interface.

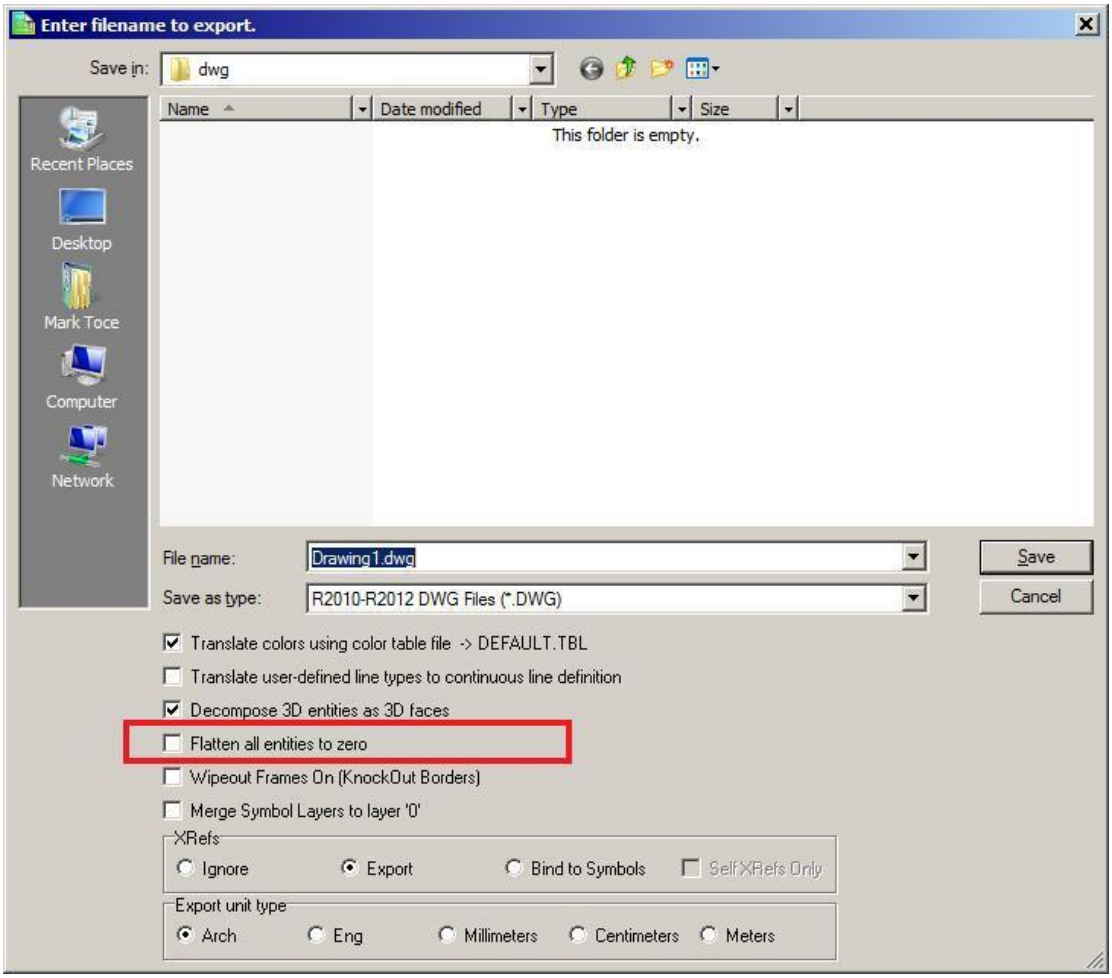
Clicking the left and right arrows rotates the model about the Z axis, while clicking the up and down arrows rotates the model about the X axis. Pressing and holding the [Shift] key while clicking the arrows will pan in the selected direction. Clicking the center circle restores the model to the initial view. Clicking the middle circle and then dragging the cursor clockwise about the center point zooms in on the model, while dragging counter-clockwise zooms out.



New Commands and Functions

AutoCAD compatibility

An option labeled “Flatten all entities to zero” has been added to the “Enter filename to export” dialog when exporting a file to DXF or DWG format for use in AutoCAD. When checked, DataCAD will automatically change the Z-Base and Z-Height of all entities in the resultant DXF or DWG file to zero, placing them flat on the ground plane.



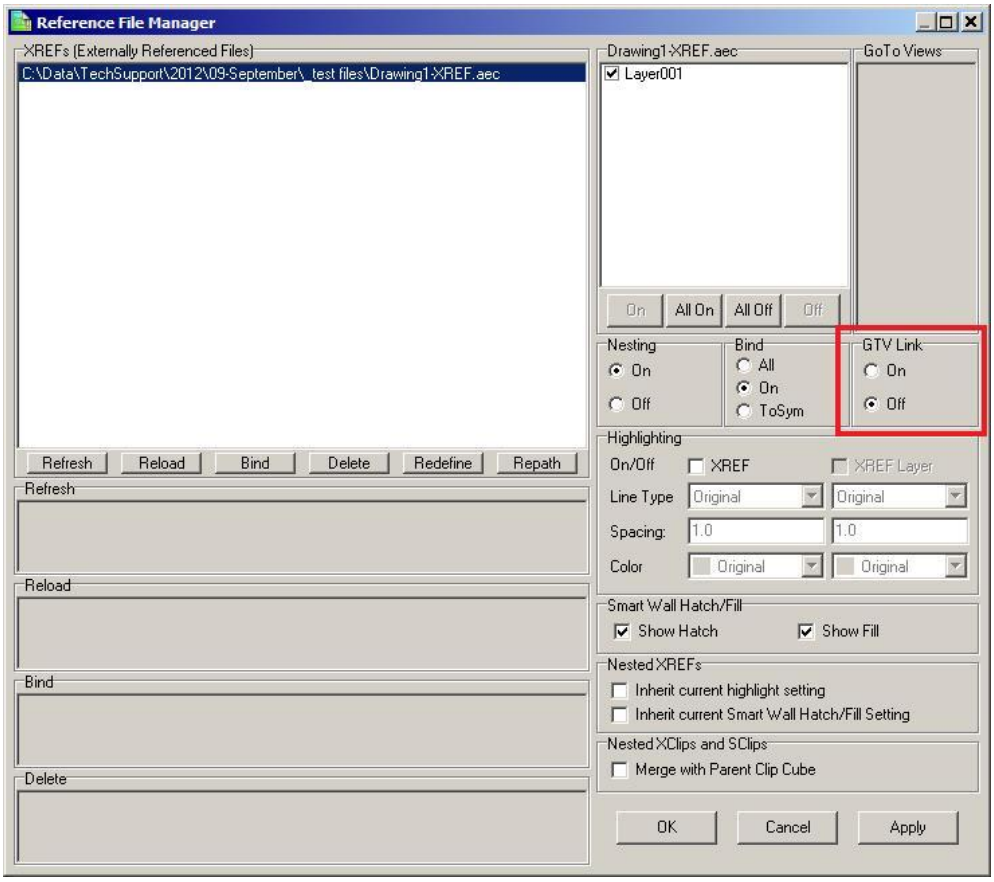
XREF changes

The option to ignore the drawing-level Clip Cube has been added to the [Ctrl]+[Right-click] context menu for XREF entities. It is remembered on a per-XREF basis and is off by default. If you check this option, the XREF will ignore the drawing-level Clip Cube and display the entire XREF outside of the Clip Cube. When un-checked, only portions of the XREF that lie inside the drawing-level Clip Cube will be displayed; any portion of the XREF which is outside the clipping boundary will be suppressed from the view.

Note: XREFs that have an XClip active will ignore the drawing-level Clip Cube.

The toggle "Remember Layer Settings for GoTo Views" has been removed from the "Reference File Management..." menu in the "Insert" pull-down. It has been renamed "GTV Link," and can be found in the Reference File Manager, the XREF Properties dialog, and the [Ctrl]+[Right-click] context menu for XREFs. This setting is remembered on a per-XREF basis.

Note: Even if this option is off, the GTV links are still remembered for the XREF. However, the XREF's layers will not be toggled on and off in response to changing GTVs unless this option is subsequently toggled on.



The GTV Link feature now supports per-XREF highlighting in addition to the per-XREF-layer highlighting that was previously supported. Using this feature, you can insert an XREF and assign highlight color, line type and line spacing, and then save a GoTo View in the host drawing. You can then assign different (or no) highlight color, line type and spacing, save another GoTo View in the host drawing, and DataCAD will remember these settings when switching between GoTo Views.

If the "GTV Link" in the Reference File Manager is set to "On," the status of the "Ignore Clip Cube" setting is remembered with the host-level GoTo Views in the drawing.

When an XREF is inserted with an enlargement factor, that same enlargement factor is now applied to the overshoot value for any objects in the XREF that have overshoot assigned by entity. Previously, no enlargement factor was assigned to overshoot.

Smart Arrow changes

The "Current Color" toggle in the Text/Arrow/Smart Arrows/Color menu will draw the arrow heads using the current layer color. Using this setting saves you the step of defining a color for arrow heads and is remembered on a per-drawing basis.

The "Current Wgt" option in the Text/Arrows/Smart Arrows/Weight menu will draw the arrow heads using the current line weight. Using this setting saves you the step of defining a line weight for arrow heads and is remembered on a per-drawing basis.

Smart Arrow styles "Closed" and "Dot" support the KnockOut setting. When enabled, they will obscure any other information which occupies the same coordinates in the drawing area.

“Smart Arrow" has been added to the list of entities supported by selection mask. When selecting entities, choose “Mask,” pick “Entity” and then toggle “Smart Arrow” on. When you return to the selection menu, DataCAD will only select Smart Arrows.

The "1st Ortho" toggle in the Smart Arrows menu has been enhanced. When on, only the first segment of the Smart Arrow leader will be orthogonal, regardless of whether "Ortho Mode" is on or off in the "Tools" pull-down menu. Previously, if Ortho Mode were checked all segments of the leader would be drawn orthogonal; to draw only the first segment orthogonal, you had to turn 1st Ortho on and turn Ortho Mode off.

2D drafting and drawing

The [Ctrl]+[Right-click] context menu has been enhanced to display new options when executed while the cursor is positioned over a blank space in the drawing area.

- Selecting "Paste" will paste the contents of the Windows Clipboard.
- Selecting "Paste Special" will open the "Paste Special" dialog enabling you to select from the available formats (if applicable) to paste the contents of the Clipboard.
- Selecting "Paste As Symbol" will enable you to paste the current contents of the Clipboard as a symbol in the drawing, provided the Clipboard contains DataCAD information.
- Choosing "Clipboard Select" invokes the Clipboard Selection mode so that you can choose information to Copy to the Clipboard.
- Selecting "Save all drawing symbols to a folder" enables you to save all symbols currently instanced in the drawing to a selected folder on your hard drive.

Note: DataCAD will not save nested-level symbols or symbols which are no longer instanced.



A temporary boundary box is displayed when creating or resizing MText and PText entities. Even if the MText or PText entity has “Boundary” turned off, this temporary box is displayed when you are placing or resizing the entity to show the limits of the object. This boundary is temporary and disappears as soon as you complete the process of defining the word wrap edge. It will not display or print. There is a corresponding DCADWIN.ini key that can disable this feature. See item 1 in the “New DCADWIN.ini keys” section for details.

Smart walls that are drawn on different layers support the ability to have their intersections cleaned using the "T Intersect," "L Intersect," and "X Intersect" commands in the Cleanup menu. Layer Search must be toggled on for these to work. Previously, only Smart walls that were drawn on the same layer could have their intersections cleaned.

Added "Relocate" to the [Ctrl]+[Right-click] context menu for associative dimensions. Selecting this option puts DataCAD into dimension placement mode, so that you may reposition the dimension line using the existing dimension points.

The "Bisect" function in the Geometry/Tangents menu supports the ability to select Smart walls. Previously, only 2D lines were supported. After selecting “Bisect” from the “Tangents” menu, choose two Smart walls. DataCAD will rotate your cursor to match the angle of a line that would bisect the angle between the two walls.

The "Justify" command in the "Text" menu supports the ability to select 2D Lines, 3D Lines and Smart walls as the line of justification, using the "Entity" option in that menu. After selecting a justification line, and then exiting and returning to the menu, a "Prev. Line" option is now available, enabling you to use the previously selected justification line.

The "1-Line Trim" command in the "Cleanup" menu supports the ability to select individual wall lines of Smart walls when defining the “Trim To” line. Previously, this function was limited to selecting the control line.

A "Prev. Line" option has been added to the Cleanup/1 Line Trim menu. It enables you to choose a previously selected line as the trim-to line for the command. After choosing "Prev. Line," you then pick the outside of the line, and then proceed with choosing lines to trim.

An "Entity" toggle has been added to the "Mirror" menu which enables you to select a 2D Line, 3D Line or Smart wall to act as the line of reflection. The status of this setting is remembered on a per-drawing basis.

DataCAD supports the ability to select Circles in the "Line To Poly" function of the Polyline/Edit menu.

Area, Perimeter and Volume have been added to the list of information returned on the Coordinates/Hints toolbar when you "Identify" a bitmap.

The new toggle named "WYSIWYG" has been added to the Plotter menu. This toggle is only available when "Pen Sort" is off. When enabled, print order is the same as screen display order, resulting in "What You See Is What You Get."

Added a "3-Sided Only" option to the 3D Explode/To Polygons command. When activated, exploding an object will result in a collection of 3-sided polygons. This can be useful when exporting a model to a rendering application.

The Layer Manager has new layer status indicators. If the layer name is drawn in black text, the layer is turned on. If the layer name is underlined, it is the current active layer. If the layer name is gray, the layer is turned off. If the layer name is red with a strikethrough, the layer is on and locked. If the layer name is gray with strikethrough, the layer is off and locked.



When you pick "Import" (and then either Replace or Merge) in the "Layers" menu to import a layer, the "Load from which file" dialog appears. The default name in the "File name" field is the same name as the layer which is currently active in the drawing and was previously limited to eight characters. This limitation has been lifted, and the function now supports long layer names.

New Configuration Settings

DataCAD 15 contains new configuration settings which you can customize to override the default behavior of new and existing features to better suit your personal workflow. Unless noted otherwise, the following INI keys correspond to values that are not directly accessible in Program Preferences or DataCAD's interface. Before making changes, close all drawings and exit DataCAD, then open DCADWIN.ini file using a text editor such as Notepad. DCADWIN.in is in the DataCAD 15 installation folder (C:\DataCAD 15\DCADWIN.ini by default).

Note: Prior to making any changes, you should make a backup copy of DCADWIN.ini in case you need to return the program to its previous state.

1) Added a key to DCADWIN.ini to facilitate turning off the temporary boundary box that appears around MText and PText when placing or resizing the entity.

```
[General]
 Show PText/MText Boundary On Entry/Resize=FALSE
```

When TRUE (or absent), a temporary boundary box is displayed around MText and PText entities when creating or resizing them. When FALSE, the temporary boundary box is not shown.

2) Added a key to DCADWIN.ini which disables the Lock Size feature on text and dimensions.

```
[General]
No LockSize=TRUE
```

When FALSE (or absent), Lock Size is available in the Text and Dimension/Text Style menus (with Text Scale enabled). When TRUE, the Lock Size button is no longer present in the Text or Dimension/Text Style menus. If a drawing contains text that has Lock Size turned on, DataCAD will continue to change the size of the text in the drawing area when you change the plot scale. Use the Change/More/Lock Size/Off menu command, or the "Lock Size" setting in the Entity Properties Editor, to turn Lock Size off if you wish to change this property for existing entities.

3) Add the following key to the [General] section of DCADWIN.ini to disable all hard-coded keyboard interrupts (single-letter key presses):

```
[General]
Shortcut Keys Invoke Alias=TRUE
```

When FALSE (or absent), single-letter keyboard interrupts continue to function as they always have. For example, pressing [a] sends DataCAD to the "Architect" menu.

When TRUE, DataCAD directly accesses the Command Line Alias function and executes the selected command. This mode of command entry more closely mimics that of AutoCAD, and enables you to customize the keyboard commands. For example, you could set the [a] key to take you to the "Arrow" menu instead of the "Architect" menu. Multi-character aliases are also supported, for example "ZE" for "Zoom/Extents."

For more information on creating a command line alias, see "Using the Command Line Alias" in Chapter 2 of the "DataCAD 14 Reference Manual."

4) Add the following key to the [General] section of DCADWIN.ini to disable direct distance input:

```
[General]
Spacebar For Distance Input=TRUE
```

When FALSE (or absent), the [Spacebar] is not necessary to invoke coordinate input mode.

New extended character codes

The following extended character codes have been added:

1066# : Pen Sort On

1067# : Pen Sort Off

1068# : WYSIWYG On

1069# : WYSIWYG Off

1079# : Hatch On

1080# : Hatch Off

1081# : Fill On

1082# : Fill Off

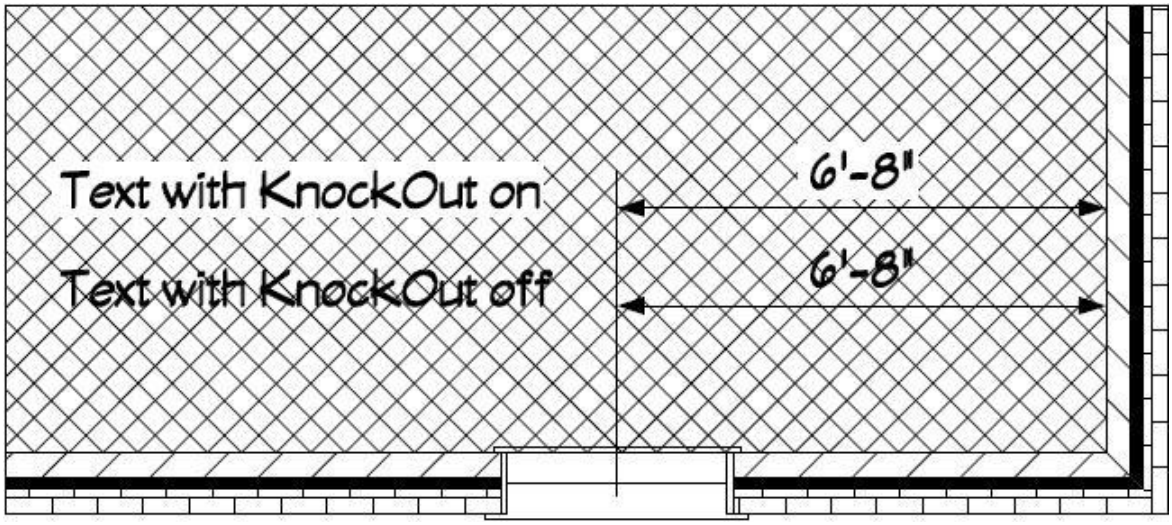
1083# : Bitmaps On

1084# : Bitmaps Off

DataCAD 14

KnockOut

KnockOut can be enabled on various types of entities to mask out information behind the object. When KnockOut is enabled, other drawing information around the entity is masked by a solid fill which has the same color as the drawing area background, making it appear transparent. This is particularly useful, for example, when adding text or dimensions which you want to display over hatching.



The KnockOut feature is supported by Text, including MText and PText, Associative Dimensions, 2D Arcs, 2D Circles, Ellipses, Polylines, Polygons and Slabs. Smart Arrows set to the "Closed" and "Dot" arrow style are also supported. Additionally, a sub-option can display or omit the KnockOut boundary, like the way in which hatching can be set to show the outline or not. The status of the KnockOut toggle in the Text menu and in the Dimension/Text Style menu is remembered in saved Text Styles and Dimension Styles, respectively.

➔ To draw text with KnockOut enabled:

1. Click the [F8] KnockOut on in the Text menu.
2. Toggle "Yes" on to include KnockOut on new text.
    a. Toggle "Border" on if you wish to display the KnockOut border.
3. All new text will have KnockOut enabled.

➔ To enable KnockOut on an object already in the drawing:

1. [Ctrl]+[Right-click] on the entity and mouse over "KnockOut."

2. Select "Yes."

After enabling KnockOut on an object, you may [Ctrl]+[Right-click] on it again, and set "Border" to "Yes" to display the KnockOut border

You may also change the status of KnockOut on entities using the standard selection menu. Select "More" from the "Change" menu and then pick "KnockOut." Toggle "Yes" on to enable the option, or toggle "No" on to disable the option. When "Yes" is on, the "Border" sub-option may also be selected. Right-click twice to return to the "Change" menu, and then select the objects you wish to change.

The KnockOut feature will only mask entities that were drawn before it. These entities are described as "behind" the KnockOut entity, both in terms of the draw order on the screen, and the position of the entities relative to the KnockOut entity in the drawing file database.

If you add an entity with KnockOut enabled, and then draw on top of it, the new information will display on top of the KnockOut. If both entities are on the same layer, and you would like the KnockOut to mask information drawn after it, you can use the Move/To Front command to move the KnockOut entity on top of the other information. You could also use Move/In Front and select the entities you wish to move the KnockOut entity in front of. Move/To Back and Move/In Back are also useful for defining the order in which the entities display.

Enabling KnockOut on an entity via the Change menu, the [Ctrl]+[right-click] menu or the Propertied Editor will also perform a "Move to Front" on the selected entity automatically. This makes the KnockOut entity the last entity on the layer, thus displaying it on top of other objects.

KnockOut enlargement

There are drawing-level settings for the default X and Y Enlargement factor for KnockOuts on Text, PText, MText, Symbol Attribute Text and Associative Dimensions. The values for Associative Dimensions are separate from the values for the other text-based entities. The menu buttons to access these settings are in the various entity creation menus, after toggling KnockOut on. Once an entity has been added to the drawing, the value of the X and Y Enlargement for the KnockOut is remembered (and can be changed) on a per-entity basis.

➔ To set the default KnockOut enlargement value:

1. Click "KnockOut" in the "Text" menu or in the "Text Style" sub-menu of the Dimension/Linear menu.
2. Toggle "Yes" on.
3. Click the "X Enlargement" button and set the enlargement size.
4. Click the "Y Enlargement" button and set the enlargement size.

➔ To change the values of these variables on entities already in the drawing:

1. Select "More" and then "KnockOut" from the "Change" menu.
2. Toggle on "Yes" to turn KnockOut on for selected entities, or "No" to turn it off.

3. Right-click twice to return to the "Change" menu.
4. Select the entities to change.

Related Settings

The [k/K] button on the SWOTHLUDFBK toolbar controls whether KnockOuts are displayed. When on, [K], KnockOuts are shown. When off, [k], no KnockOuts are displayed in the drawing. You will find the same setting, labeled "KnockOut Display," in the "View" pull-down menu under the "KnockOuts…" sub-menu.

The "View" pull-down also has a "KnockOuts…" sub-menu with settings related to the display of KnockOuts. The option "KnockOut Display" controls the display and printing of all KnockOut entities. When toggled off, entities with a KnockOut property will display and print as normal entities without the KnockOut. The "Show all KnockOut Borders" setting forces DataCAD to display all KnockOut borders regardless of their individual border settings. This is a display only setting and does not affect printing. When checked, the "Compatibility Mode" option draws and displays KnockOuts in their database order (the order in which they were created), using the same methodology as AutoCAD. You can uncheck this option to always display and print all KnockOuts last, or on top of other entities.

Note: The "Show All KnockOut Borders" and "Compatibility Mode" options are only available when "KnockOut Display" is enabled.

AutoCAD compatibility

AutoCAD has a similar feature named Wipeout. When you export a file that contains KnockOuts, they are converted to AutoCAD Wipeout entities. The result is that the file looks the same in AutoCAD. When you import a file that contains Wipeout entities, DataCAD converts them to polygons with KnockOut enabled. The result is that the file looks the same in DataCAD.

DataCAD can display KnockOut borders on a per-entity basis, but AutoCAD does not. When you export a file to AutoCAD format, you must decide whether to display the KnockOut borders for all KnockOut entities or for none. After you select File/Export/DWG and pick either All Layers or On Layers, the "Enter filename to export" dialog appears. If you wish to display KnockOut borders for all KnockOut entities, place a check next to "Wipeout Frames On." If you do not wish to display the KnockOut borders, leave this option un-checked.

Similarly, when you import a file from AutoCAD, you must decide whether to display the KnockOut borders. After you select the file to import, the Import Entity Assignments dialog is displayed. If you wish to display the borders for all KnockOut entities, check the "KnockOut Borders On" box. Leave this un-checked if you do not want all KnockOut borders shown. Keep in mind that you can change them individually after you import the file.

Extended character codes

The following extended character codes can be used to change the status of the KnockOut option and the KnockOut Border sub-option. This toggle is found in the Text, MText, PText, Text Attributes and Dimension/Text Style menus, as well as in the 2D Curves menu and the 3D Polygons and Slabs menus:

1056: KnockOut On

1057: KnockOut Off

1058: KnockOut Border On

1059: KnockOut Border Off

The following extended character codes can be used to control the status of KnockOut display in the View/KnockOuts menu:

1060: Display of KnockOuts On

1061: Display of KnockOuts Off

Wall Type Manager

The Wall Type Manager has been updated to provide the ability to add hatching and/or solid fill to the wall cavities. As part of this enhancement, we have changed the layout of the Wall Type Manager. There are tabs named "Line Settings," which contains settings related to the wall lines in 2D and in 3D, "2D Cavity Settings," which has settings related to hatching and fill for 2D display of cavities, and "Cap Settings," which is where you define the way end caps, top and bottom caps, and opening caps render in the 3D Object Viewer.

Line Settings tab

The settings on this tab are the same as the previous version, except that the "Caps and Openings" section has been removed. On the Line Settings tab, you will define the basic properties of the lines that make up your wall type. Set the number of lines and select which is used as the Control Line, choose the distance that each line is offset from the previous line to define the width of the wall, and set the 2D line colors and 3D rendering materials for the individual wall lines.

2D Cavity Settings tab

It is on this tab that you may apply hatching and/or solid fill to the wall cavities. In the case of a 2-line wall, the hatching or fill covers the entire wall cavity. In the case of a 3-line wall, you may choose to hatch or fill the inside cavity, the outside cavity, or both. 4-Line walls support hatch and fill on the inside, center, and outside cavities independently. These properties are type-dependent, so any changes you make affect all instances of the wall type throughout your drawing file.

➔ To apply hatching or solid fill to a wall type:

1. Open the Wall Type Manager, load a wall type and set it active.
2. Go to the "2D Cavity Settings" tab.

3. Click the "Cavity" drop-down to select which cavity to modify. For 2-line walls, "Inside" is the only option; for 3-line walls, you may select the "Inside" or "Outside" cavity; for 4-line walls, choose "Inside," "Center" or "Outside."
4. Check "Do Hatch" to apply hatching to the selected cavity.
    a. Click the "Pattern" drop-down to select which hatch pattern will be applied.
    b. Enter a value in the "Scale" field to define the scale of the hatching.
    c. When "Match Wall Angle" is unchecked, you define an absolute angle for the pattern in the "Angle" field. When it is checked, the angle value is relative to the angle of the wall. For example, if the angle is zero, the pattern matches the wall angle. If the angle is 45°, the pattern is displayed at a 45° angle relative to the angle of the wall segment.
    d. When "Origin at Zero" is checked, the hatch pattern origin is situated at absolute zero. When unchecked, the origin coincides with node 1 of the wall segment.
    e. You can match the color of the hatch to the wall line, or you can uncheck that option and click the color rectangle to open the Color Palette and select a different color.
5. Check "Do Fill" to apply a solid or pattern fill to the selected cavity.
    a. Under "Settings," you can either check the box to make the fill the same color as the line that borders the cavity, or you can uncheck the box and click the color rectangle to open the Color Palette and select a specific color.
    b. Click the "Pattern" drop-down if you wish to define a pattern fill.
    c. Check the box next to "Pattern Color" to make the pattern the same color as the line which borders the cavity or uncheck it to define a specific color.

Wall cavities support both hatching and solid fill at the same time. If the hatch and fill are different colors, you will see the hatch drawn on top of the solid fill.

6. Click OK when you have finished adjusting the settings.

The "Architect" menu contains toggles labeled "Hatch" and "Fill" that enable or disable the display of Smart wall hatching and Smart wall fill independent of other hatch and fill in the drawing. These settings affect both display and printing. The "Hatch Patterns" and "Fills" buttons in the "Display" menu and the corresponding [H] and [F] buttons on the SWOTHLUDFBK toolbar will suppress all hatching and fill, including those that are within Smart walls.

The following extended character codes are related to the display of Smart wall hatching and solid fill:

1062: Turn display of Smart wall hatch on

1063: Turn display of Smart wall hatch off

1064: Turn display of Smart wall fill on

1065: Turn display of Smart wall fill off

Cap Settings tab

Use the settings on this tab to define the rendering characteristics of the Top/Bottom Covers, the End Caps, and the Openings for Smart walls in the 3D Object Viewer. While the three categories of caps are defined independently, they all have the same settings available. Top/Bottom Caps refer to the horizontal plane on the top and bottom of each wall segment; End Caps refer to the vertical plane at the end of each wall segment; Openings refer to the 4 edges of a window or door void, which are only displayed if the layer that contains the window or door is turned off.

There are three mutually exclusive settings for the various caps, which you select by clicking the appropriate radio button. When "Inherit From Inside Line" is selected, the material assigned to the Inside line covers the cap from the inside line to the outside line. When "Inherit From Outside Line" is selected, the opposite is true; the rendering material assigned to the outside line covers the cap from the outside line to the inside line. Selecting "Assigned" gives you the ability to define the material on each wall cavity independently. Choose "Inside," "Outside" or "Center" from the "Cavity" drop-down, and then use the Material drop-down to set the material for that cavity. Refer to the preview window, which updates to reflect your changes in real-time, to see what your wall will look like.

Cleanup Routines

When you draw Smart walls with hatching or solid fill, DataCAD will continue to clean the intersections automatically. To display the hatching correctly, you will need to use the Cleanup menu commands to manually clean the intersections. There are new steps involved in the X-Intersect and L-Intersect routines, and a new result for T-Intersect cleanup that creates a more accurate representation of the intersection.

➔ To perform an X–Intersect cleanup:

1. Decide which two walls you would like to clean.
2. Choose "X Intersect" from the "Cleanup" menu.
3. Place an Area box around the intersection of the two walls. DataCAD prompts you to *"Select Master wall."*
4. Click the Master wall. This wall will remain one continuous wall, while the other wall will be broken and cleaned to the inside and outside face of the Master wall.

If you are performing an L-Intersect cleanup and the two wall segments are the same wall type, the command works the same as always; the two walls are connected at the control line, and the intersection of the interior wall lines is mitered. If the two wall segments are of different wall types, and the angle between then is 90 degrees, you will need to define the master wall; the master wall gets its end capped, and the other wall will butt up against it. If the angle is not 90 degrees, the walls connect at the control line and have their interior lines mitered.

The manual T-Intersect cleanup produces a similar result. While the automatic cleanup continues to function as it always has, with the two walls meeting at the control line and the interior wall lines being mitered, the manual cleanup routine butts the perpendicular wall segment where it meets the primary wall.

Walls that are drawn on different layers now support the ability to have their intersections cleaned using the "T Intersect," "L Intersect," and "X Intersect" commands in the Cleanup menu. Layer Search must be toggled on for these to work.

Lock Size on associative dimensions

The “Lock Size” property that maintains text size regardless of print scale can also be applied to associative dimensions. DataCAD will automatically adjust the size and offset of dimension text, the offset, overlap and overrun of dimension lines, and the size of the arrows, tick marks or dots.

Note: The “Increment” setting, which controls the length of witness lines, is not affected by the Lock Size feature. The result is that your dimension line placement remains the same, and only the size of the text, offset, overlap, overrun, and tick marks are changed when setting a new plot scale.

➔ To enable Lock Size on associative dimensions before you draw them:

1. Select “Text Style” from the Dimension/Linear menu.
2. Toggle “Text Scale” on.
3. Turn “Lock Size” on.
4. You may press the [PgUp] and [PgDn] keys on your keyboard to set the current plot scale.

➔ To enable Lock Size on associative dimensions that you have already drawn:

1. [Ctrl]+[right-click] on the associative dimension.
2. Mouse over “Lock Size” in the context menu.
3. Select “Yes.”

You may alternatively use the Change/More/Lock Size menu option if you wish to select multiple associative dimensions by Group or Area.

Lock Size on symbols

You can apply the "Lock Size" property to symbols that you insert into your drawing. This is particularly useful with notation symbols, which are typically printed at a fixed size regardless of the scale of the detail. It works in combination with the Symbol Scale feature, which is similar in concept to Text Scale for text and dimensions. When Symbol Scale is enabled, DataCAD enlarges the symbol by a factor that is determined by the current plot scale. The Lock Size property changes that factor each time you change the plot scale, resulting in symbols that print at the same size no matter what the print scale is set to.

When DataCAD changes the enlargement factor of the symbols in the drawing, the center of enlargement is defined by the symbol's insertion point. Keep this in mind when creating the library of symbols that you intend to use with this feature.

➔ To enable Lock Size on a symbol as you place it in your drawing:

1. Select the symbol that you wish to insert into the drawing by clicking on it in the Symbol Browser. DataCAD displays the *Ins Symbol* menu.
2. Toggle "Symbol Scale" on.
3. Toggle "Lock Size" on.
4. You may press the [PgUp] and [PgDn] keys on your keyboard to set the current plot scale.

➔ To enable Lock Size on a symbol you have already inserted into the drawing:

1. [Ctrl]+[right-click] on the symbol.
2. Mouse over "Lock Size."
3. Select "Yes."

You may alternatively use the Change/More/Lock Size menu option if you wish to select multiple symbols by Group or Area.

If you are creating your own library of symbols and you intend to use Lock Size in conjunction with Symbol Scale, you should not use Lock Size on any text that will be inside the symbols. Since Lock Size is being applied to the symbols directly, it is not necessary to apply it to text inside them.

Lock Size on hatching

To keep hatch scale at a fixed size regardless of print scale, turn the "Lock Size" property on. You might find this useful when drawing a ceiling grid using hatch. If you change the plot scale, DataCAD will automatically enlarge (or reduce) the scale of the hatch so that size of the pattern remains the same when you print your drawing.

➔ To enable Lock Size on hatching before you add it to the drawing:

1. Select "Hatch Type" from the "Hatching" menu.
2. Toggle "Lock Size" on.

➔ To enable Lock Size on hatching that is already in your drawing:

1. [Ctrl]+[right-click] on the hatching and choose "Polyline Properties."
2. Click the drop-down menu labeled "Lock Size" and select "Yes."
3. Click OK to dismiss the Properties editor.

3D Object enhancements

The maximum number of vertices on a 3D Polygon or Slab has been increased from 36 to 256. The maximum number of primary and secondary divisions for 3D Curves, Cylinders, Cones, Spheres, Tori, Contours, Mesh Surfaces and Revolved Surfaces has been increased from 36 to 128. If you use the "Save As" command to save a DataCAD 14 file back to DataCAD 13 or earlier format, Polygons and Slabs with more than 36 vertices are exploded to a collection of three-sided polygons. Quadrics with greater than 36 primary or secondary divisions are exported with 36 divisions.

Note: Add-on DCX macros which create or modify 3D objects are still limited to 36 divisions.

Clipping Boundaries

XREF Clipping boundaries (XClips) and Symbol Clipping boundaries (SClips) can be edited without having to redraw the entire boundary. [Ctrl]+[right-click] on the XREF or Symbol and choose "XClip" or "SClip" from the XREF Tools or Symbol Tools context menu. Click the "Edit" menu button to edit the boundary. You will use the standard polyline editing tools to edit the boundary.

GoTo Views and XREFs

The feature which enables GoTo Views in your drawing to remember the on/off status of layers in XREFs has been enhanced to provide greater control. If you define a highlight color and/or line type for individual layers in the XREF, those settings are now maintained when you use a GoTo View in the drawing to turn XREF layers on and off. In addition, the GoTo View will save and restore XClip boundaries.

The toggle "Remember Layer Settings for GoTo Views" has been removed from the "Reference File Management..." menu in the "Insert" pull-down. The new option "GTV Link" has been added to the Insert XREF menu, the RFM, the XREF Properties dialog and the [Ctrl]+Right-click context menu for XREFs. This setting is remembered on a per-XREF basis.

Note: Even if this option is off, the GTV links are still remembered for the XREF. The XREF's layers will not be toggled on and off in response to changing GTVs unless this option is subsequently toggled on.

XREFs have the option of obeying or ignoring the drawing-level Clip Cube. You will find this setting, labeled "Ignore Clip Cube," in the [Ctrl]+[right-click] context menu for each XREF instance in the drawing. It is remembered on a per-XREF basis and is on by default (to continue working the way it always has) when you insert an XREF. If you un-check this option, the XREF will obey the drawing-level Clip Cube; when the Clip Cube is enabled, any portion of the XREF which is outside the boundary will be suppressed from the view.

The “GTV Link” feature will remember the status of the “Ignore Clip Cube” setting for XREFs. It will also support any per-XREF highlight settings, in addition to the per-XREF – layer highlight settings that were previously supported.

XREF Manager

Smart Wall hatching and fill in XREFs now supports highlighting. As such, we have added the ability to selectively show or suppress hatching and solid fill in Smart walls in XREFs. This setting is remembered on a per-XREF basis. It is found in three places:

- In the Insert\XREF menu, the "Wall Hatch" and "Wall Fill" menu buttons control whether hatching and solid fill inside of an XREF is shown.
- In the Reference File Manager, the "Show Hatch" and "Show Fill" checkboxes in the "Smart Wall Hatch/Fill" section control whether hatching and solid fill inside of an XREF is shown.
- In the [Ctrl]+[right-click] context menu, the XREF Tools\Smart Wall Hatch/Fill setting defines whether hatching and solid fill inside of an XREF is shown.

In the Reference File Manager, the "Inherit current Smart Wall Hatch/Fill setting" controls whether nested XREFs use the highlight settings of their host. This option is also in the Insert\Reference File Management drop-down menu and is remembered in the top-level drawing.

If you insert an XREF and assign an enlargement factor, that same enlargement factor is applied to the overshoot value for any objects in the XREF that have overshoot assigned by entity.

Miscellaneous enhancements

Pen Sort

The Pen Sort toggle in the Print/Plot menu determines whether the draw order for information on the printed page is defined by the Pen Table or by layer order. When this option is on (default), DataCAD will continue to print objects based on their Pen Assignment order, as in previous versions. Colors assigned to Pen 1 are printed first, and then colors assigned to Pen 2 are printed next, continuing through the list of Pen Assignments. If you toggle Pen Sort off, then objects are drawn based on layer order and the order in which the objects were added to the drawing. For example, objects drawn on Layer001 are drawn first, and then objects on Layer002 are drawn next. If two objects on the same layer intersect, the one that was drawn first is on the bottom, and the one that was drawn second is on top. You can use the Move command to move objects in front of or behind each other.

The following extended character codes have been added for this feature:

1066 : Pen Sort On

1067 : Pen Sort Off

WYSIWYG

The new toggle named "WYSIWYG" has been added to the Plotter menu. This toggle is only available when "Pen Sort" is Off. When enabled, print order is the same as screen display order, resulting in "What You See Is What You Get."

The following extended character codes have been added for this feature:

1068 : WYSIWYG On

1069 : WYSIWYG Off

SketchUp Export

DataCAD can export files in both SketchUp 7 and SketchUp 8 format. This can be helpful if you are working with someone that uses an earlier version of SketchUp. Select “SketchUp” from the File/Export menu. Click the “Save As Type” drop-down on the “Enter filename to export” dialog and select the format in which to save. Supply a name and click “Save” to complete the process.

Smart Arrow enhancements

The "1st Ortho" toggle in the Smart Arrows menu has been enhanced. When on, only the first segment of the Smart Arrow leader will be orthogonal, regardless of whether "Ortho Mode" is on or off in the "Tools" pull-down menu. Previously, if Ortho Mode were checked all segments of the leader would be drawn orthogonal; to draw only the first segment orthogonal, you had to turn 1st Ortho on and turn Ortho Mode off. The “Current Color” toggle will draw the Smart Arrowhead using the current layer color. The “Current Weight” toggle will draw the Smart Arrowhead using the current line weight.

Layer Manager

The Layer Manager has new layer status indicators. If the layer name is drawn in black text, the layer is turned on. If the layer name is underlined, it is the current active layer. If the layer name is gray, the layer is turned off. If the layer name is red with a strikethrough, the layer is on and locked. If the layer name is gray and strikethrough, the layer is off and locked.

Layer Import

When you pick "Import" (and then either Replace or Merge) in the "Layers" menu to import a layer, the "Load from which file" dialog appears. The default name in the "File name" field is the same name as the layer which is currently active in the drawing and was previously limited to eight characters. This limitation has been lifted, and the function now supports long layer names.

Bitmaps

When you use the “Identify” command on a bitmap, the Area, Perimeter and Volume of the boundary are included in the list of information returned on the Coordinates/Hints toolbar.

Mirror

An "Entity" toggle has been added to the "Mirror" menu which enables you to select a 2D Line, 3D Line or Wall to act as the line of reflection. The status of this setting is remembered on a per-drawing basis.

1-Line Trim

A "Prev. Line" option has been added to the Cleanup/1 Line Trim menu. It enables you to define a previously selected line as the trim-to line for the command. After choosing "Prev. Line," you then pick the outside of the line, and then proceed with choosing lines to trim.

[Ctrl]+[Right-click] Context Menu

The [Ctrl]+[Right-click] context menu has been enhanced to display new options when executed while the cursor is positioned over a blank space in the drawing area.

- Selecting "Paste" will paste the contents of the Windows Clipboard.
- Selecting "Paste Special" will open the "Paste Special" dialog enabling you to select from the available formats (if applicable) to paste the contents of the Clipboard.
- Selecting "Paste As Symbol" will enable you to paste the current contents of the Clipboard as a symbol in the drawing, provided the Clipboard contains DataCAD information.
- Choosing "Clipboard Select" invokes the Clipboard Selection mode so that you can choose information to Copy to the Clipboard.
- Selecting "Save all drawing symbols to a folder" enables you to save all symbols currently instanced in the drawing to a selected folder on your hard drive.

Note: DataCAD will not save nested-level symbols or symbols which are no longer instanced.

Multi-View Windows

There is a “Zoom %” option in the Multi-View Window pop-up menu. Right click in a Multi-View Window and select it to set the zoom percentage for all Multi-View Windows. The default is 100%. This feature may be helpful if you are unable to see the entire image in the Multi-View Windows and need to reduce the image size.

Move or Copy/To Layer

The 2D and 3D Move/To Layer and Copy/To Layer commands have been updated to include a “New Layer” button which creates a new layer on-the-fly. If the drawing contains only one layer, the button label reads “To New Layer” or “ToNewLyr” and DataCAD automatically creates the new layer then prompts you to name it.

PText and MText

The PText and MText entry dialogs have a “Zoom Level” slider bar that enables you to increase the size of the text in the Window.

Dynamic Pan

You may click and hold both the left and right mouse buttons at the same time to enable dynamic panning of the drawing area.

This feature may be disabled using the following setting in the DCADWIN.ini configuration settings file:

```
[General]
 Left+Right Mouse Button Panning=FALSE
```

When TRUE, dynamic panning may be invoked by pressing and holding the left and right mouse buttons at the same time.

New DCADWIN.ini keys

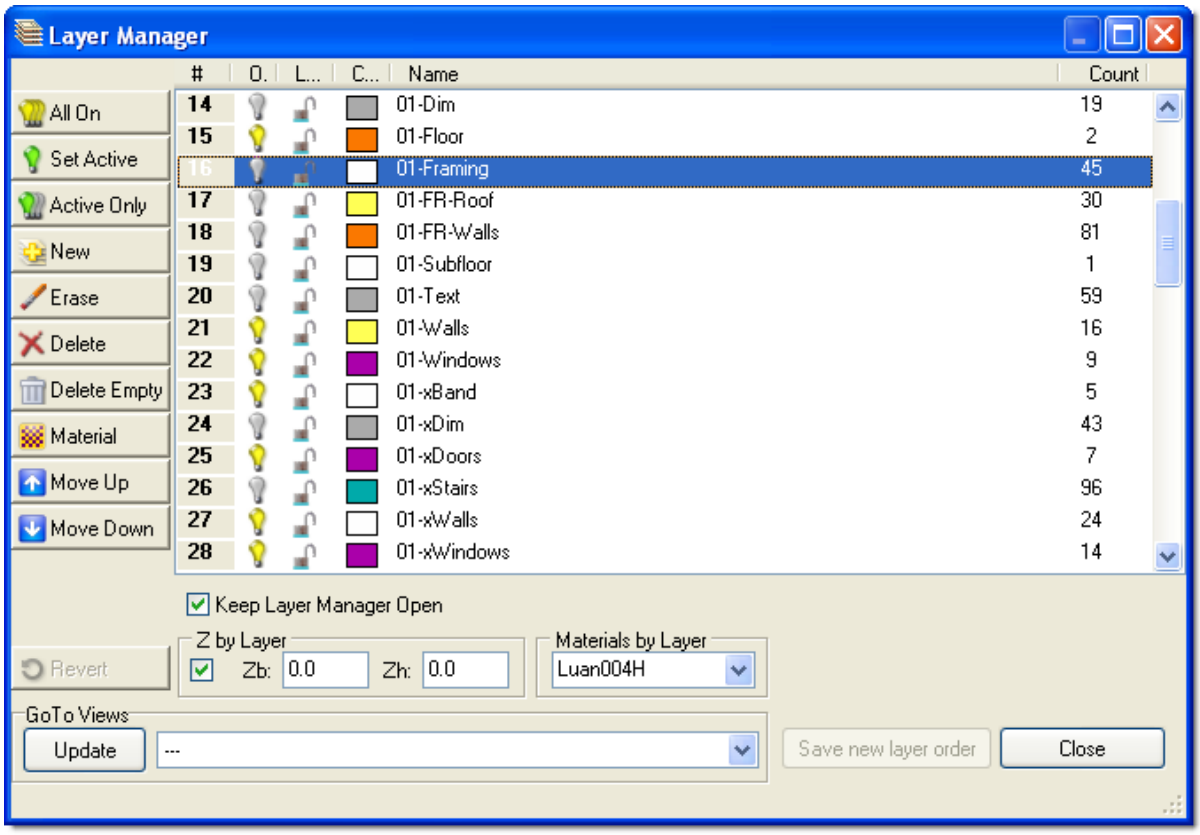
```
[General]
 LayerColorRemembersStatus=TRUE
```

When FALSE, the Layer Color toggle in the Move/To Layer command will always default to off.

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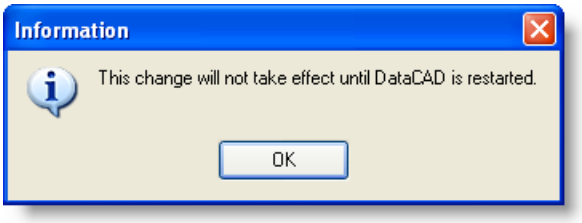
Persistent Layer Manager

The Layer Manager can now remain open while you are working in DataCAD. When you turn layers on and off, the result is shown immediately in the drawing.



The persistent Layer Manager is particularly beneficial if you are using a multi-screen configuration or a wide-screen monitor. You can position the Layer Manager on the second monitor or off to the side of the screen and continue working on your drawing while it is open. As you highlight layers in the Layer Manager, you can see the current Z-Base and Height of the layer, how many entities are present, and what material is assigned for rendering. You can also adjust which layers are included in your GoTo Views via the [Update] button in the GoTo Views section.

Changing the order of layers by clicking and dragging them to a new position in the list, or by using the "Move Up" or "Move Down" buttons, the new order is saved immediately. The "Save new layer order" button remains grayed out. If you click on the "On," "Lock," "Color," "Name" or Count" column headers to change the order, the "Save new layer order" button becomes active. If you wish to save the new order, you must click this button.



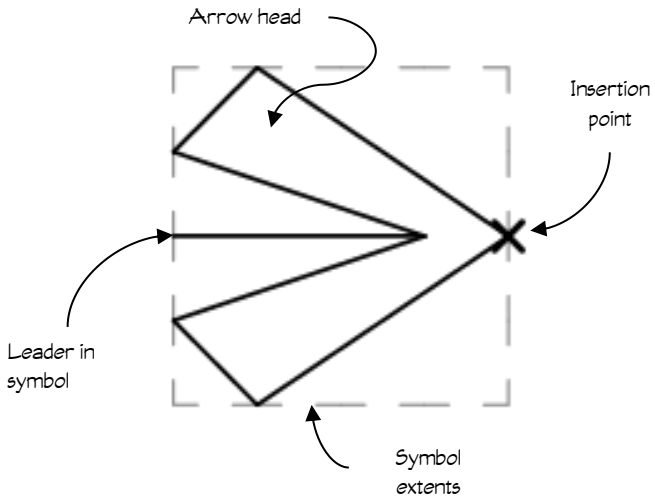
To enable this feature, open the Layer Manager in a drawing and click the check box which says, “Keep Layer Manager Open.” You will need to exit and reopen DataCAD for this setting to take effect.

New Arrow features

DataCAD supports the ability to draw curved leaders. Select “Arrows” from the “Text” menu, toggle “Smart Arrows” on, and then pick the first point of the arrow. [F1]2PtArc and [F2]3PtArc menu buttons appear. After selecting a second point, [F3] Tangent is available. These buttons enable you to add curved segments to your leaders. You can toggle “At Tail” on to draw arrows by selecting the tail end first, or toggle “At Head” on to draw them by selecting the arrowhead first. There is also a “1st Ortho” toggle, whose status is remembered on a per-drawing basis. When enabled, the first segment of the leader line is restricted to the ortho grid, even if Orthomode is turned off. The Snap Angle setting in the Grids menu determines the number of divisions.

A new style of arrowhead has also been added. Select “Symbol” from the “Style” sub-menu to select a symbol to act as the arrowhead. When creating the symbol, you must draw it pointing to the right, and define the insertion point at the tip of the arrowhead. The figure you draw must fit inside a square, as the square extents of the symbol are used when calculating the position of the arrowhead relative to the leader. The leader will stop at the square extents of the symbol, so make sure to include any portion of the leader that would be inside the square extents of the symbol. If you plan to use the arrow with Text Scale on, draw the symbol at the real-world printed size. If you typically have Text Scale off, draw the symbol scaled to the size at which it will be printed (for example, a 1/8” high printed arrow at 1/4"=1’ would be drawn in a 6” square).

Since arrows support Text Scale and the new Lock Size options in the Text menu, you can create the custom arrowhead at the printed size. Toggle "Text Scale" on to add the arrowhead and have DataCAD automatically scale it to the current plot scale. Toggle "Lock Size" on to keep the arrowhead scaled correctly even if you change your plot scale.



In addition, arrow heads have been enhanced so that when you stretch one end, the arrowhead rotates automatically to match the orientation of the leader line.

The Entity Properties Editor for Arrows has been enhanced to provide access to the Text Size, Arrow Size, Arrow Aspect, Arrow Weight, Arrow Color, Lock Size and Arrow Style settings.

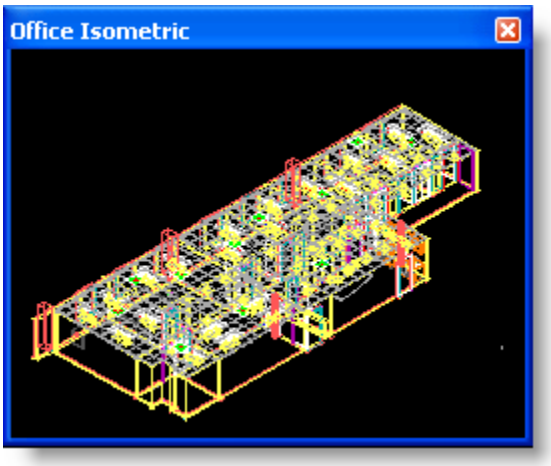
Note: When you change the Arrow Style from an open style (i.e. Open, Bridge or Tick) to a closed style (i.e. Closed or Dot), clicking "Apply" will activate a "Filled" field with the options "Yes" and "No." Setting the style to "Symbol" will prompt you to select a symbol. You may subsequently select a different symbol by clicking the [...] button to the right of the Arrow Style field.

New options for changing Arrows have been added to the Change menu. Select Change/Text/Arrows to access these options: Text Size, Style, Aspect, Weight, Color and Lock Size status. Match is also supported.

Arrows may now be displayed outside the boundary of an active Clip Cube, like Text. [Ctrl]+[right-click] on an arrow and mouse over "Clipping" to change the "Obeys Clip Cubes" or "Ignores Clip Cubes" status.

Named Multi-View Windows

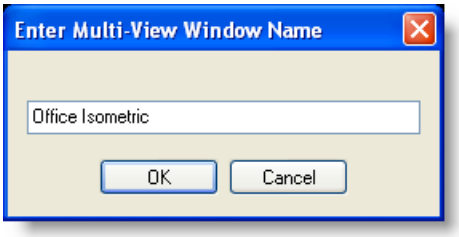
Multi-View Windows have support for custom names. These names are saved on a per-drawing basis, so they may be different from one drawing to another. Names of Multi-View Windows may be saved in your default drawing file.



To turn Multi-View Windows on, open your drawing and choose "Toolbars" from the "View" pull-down menu. Place a check mark next to each window that you would like to display. Alternatively, you may open the drawing and press [Ctrl]+[w] on the keyboard to turn on all Multi-View Windows.

Right click in a Multi-View Window to display the context menu and choose from the list of available functions.

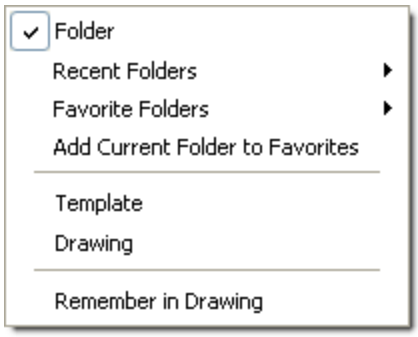
- Selecting "View In" will read the current view of the drawing into the Multi-View Window.
- If the drawing contains any GoTo Views, a "GoTo View" sub-menu with a list of available GoTo Views will appear. Selecting one of the views will read it into the Multi-View Window. The Multi-View Window will automatically take the name of the selected GoTo View.



After you have assigned a view to the Multi-View Window, you may rename it. Right click in the Multi-View Window and choose "Rename." Type a new name for the window and click OK.

Recent and Favorite Symbol browser folders

New options named "Recent Folders" and "Favorite Folders" have been added to the folder icon pull-down menu of the Symbol Browser. As the names suggest, a list of recently accessed symbol folders and favorite symbol folders will be displayed when you mouse over these menu options. Click on "Add Current Folder to Favorites" in the Symbol Browser's "Options" menu to add the folder you are currently browsing to the favorites list.

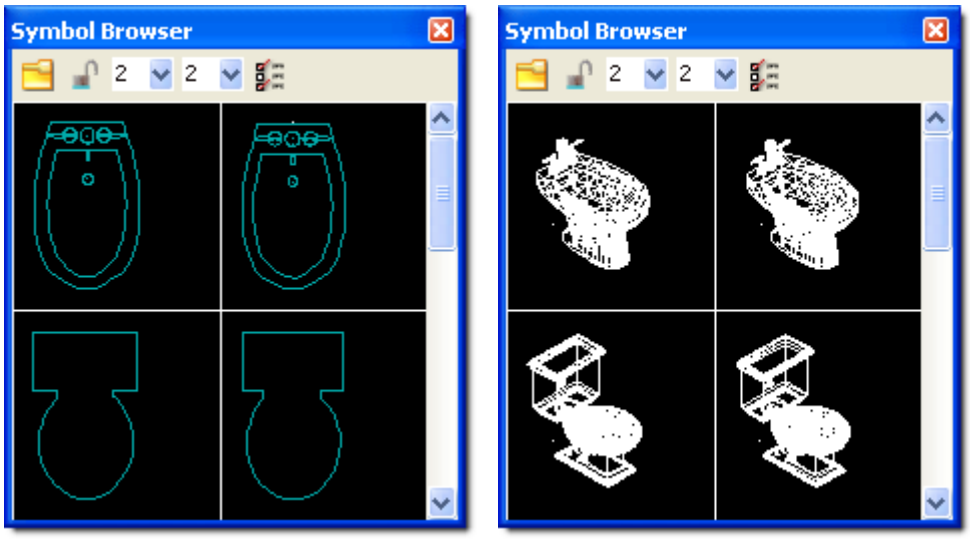


The maximum number of recent and favorite folders to display is controlled by a configuration setting in your DCADWIN.ini file:

```
[SymbolBrowser]
  Max Recent=4
  Max Favorites=4
```

View-dependent symbol layers

DataCAD can assign view dependency to layers inside symbols. A symbol may contain layers which display information only in the 2D (plan) view, layers which display information only in 3D (elevation, isometric, perspective, and axonometric) views, or layers which display information in both.



➔ To assign view dependency to layers inside symbols:

1. Save a symbol which contains all the information which will display in both 2D views and in 3D views.
2. Right click on the symbol in the Symbol Browser and choose "Edit Symbol" to launch the Symbol Editor.

If there is an instance of the symbol in the drawing, you could also [Ctrl] + [Right-click] on it and choose “Edit Symbol” from the “Symbol Tools” menu, or you could double click on it.

---

3. Open the Symbol Layer Manager and highlight the layers which you want to assign to 2D (plan) view projection only. Toggle the "Show in 2D" button on and toggle the "Show in 3D" button off.
4. Now highlight the layers that you want to assign to 3D views (elevation, isometric, perspective, axonometric). Toggle the "Show in 2D" button off and toggle the "Show in 3D" button on.
5. If there are layers in the symbol that you want to display in both 2D and 3D views, toggle both buttons on.
6. When you have finished assign view dependency to your layers, close the Symbol Layer Manager by clicking “Close.”
7. Close the Symbol Editor by clicking the [x] in the upper left corner and choose "Yes" to save the changes.

Just like in DataCAD 12, the changes you make to the symbol in the Symbol Editor apply only to the definition of the symbol in the current drawing. The original symbol on the hard drive, and the definition of the symbol in other drawings, is not affected.

To save the symbol out to the folder on the hard drive, click the folder icon at the top of the Symbol Browser and choose "Drawing" to browse symbols in the drawing. Locate the updated symbol, right click on it, and choose "Save As." Supply a name for the symbol and select the folder in which to save it. You may overwrite the original version of the symbol.

DataCAD X3 includes a collection of over 1,000 2D/3D symbols, located in the Symbols\ sub-folder of the program installation folder.

View-dependency toggle

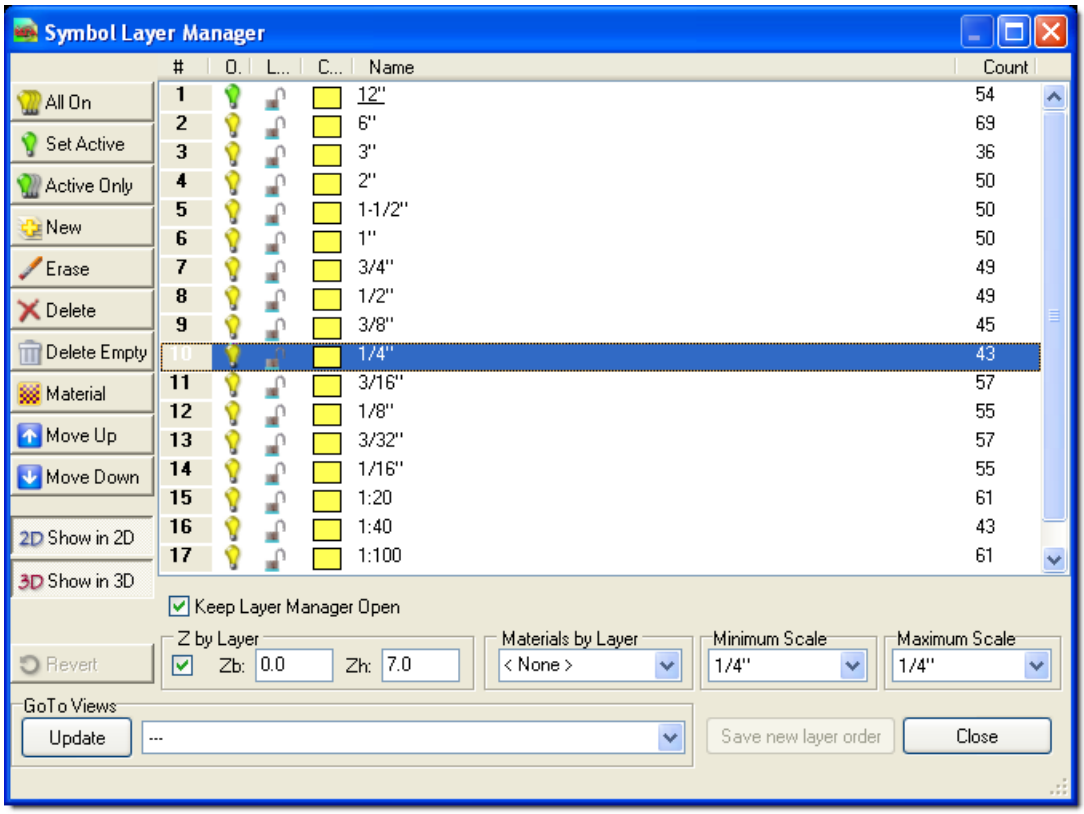
In conjunction with the support for view dependent layers within symbols, a drawing setting has been created to define whether view dependency is used. Click the "View" pull-down menu and choose "View Dependency" to turn this option on or off. When on (checked), if layers within symbols have a 2D and/or 3D view dependency assigned, DataCAD will display the proper layers based on the current view projection. When off (un-checked), all layers inside symbols will be displayed regardless of the current view projection.

Corresponding toolbar codes:

```
(V= in toolbar button, or 10XX# in keyboard macro)
1042 = View Dependency ON
1043 = View Dependency OFF
```

Scale-dependent symbol layers

Like the view dependent layers inside symbols, DataCAD X3 supports scale dependent layers as well. This enables you to assign minimum and maximum scales at which layers inside the symbols will be shown. If a layer falls outside the range of view scales, then it is restricted from view. This gives you the ability to assign different levels of detail to display at different scales. Scale dependency is recognized by both view scale (on screen) and print scale (on paper).



For example, you could place hatching on a layer that is inside your symbol. Using the Symbol Editor, assign a minimum scale of 1/16"=1' and a maximum scale of 1"=1'. When you view a drawing, which contains this symbol at a scale that falls in between the defined range, the information on the hatching layer is shown, providing a greater level of detail. When the current view scale for the drawing is outside the defined range, the information on the hatching layer is not shown. This can help to reduce clutter when viewing your drawing at small scales or prevent unnecessary information from showing at large scales.

The method for assigning scale dependency to layers inside symbols is like the method for assigning 2D and 3D view dependency.

➔ To assign scale dependency to layers inside a symbol:

1. Save the symbol which contains the information, separating the various levels of detail by layer.

2. Right click on the symbol in the Symbol Browser and choose "Edit Symbol" to launch the Symbol Editor.

If there is an instance of the symbol in the drawing, you could also [Ctrl]+[Right-click] on it and choose “Edit Symbol” from the “Symbol Tools” menu, or you could double click on it.

---

3. Open the Symbol Layer Manager and highlight one or more of the layers that you wish to assign to a scale or range of scales.
4. Click the "Minimum Scale" drop down menu and select the minimum scale at which this layer will be shown.
5. Click the "Maximum Scale" drop down and choose the maximum scale at which the layer will be shown.

If the same scale is selected for both minimum and maximum, the layer will only be displayed when the exact scale is selected.

---

6. When you have finished assigning minimum and maximum scales to layers, close the Layer Manager by clicking “Close.”
7. Close the Symbol Editor by clicking the [x] in the upper left corner and choose "Yes" to save the changes.

Before you can use this symbol in other drawings, you must browse symbols in the drawing, right click on the edited symbol and choose "Save As" to save the new definition out to the hard drive.

Scale independent text

A new "Lock Size" button has been added to the Text menu when “Text Scale” is active. This setting will control the size of text such that it always prints at the absolute size you define, regardless of the plot scale. Text which has this property assigned will change its size automatically, each time you change the current plot scale. In the case of a Multi-Layout Detail, the relative size of the text changes based on the scale of the detail, resulting in printed text of the defined absolute size. For example, you could place a detail on a sheet at 1/4" scale and have the text print 1/8” high. You could then place the same detail on a different sheet at 3/8” scale, but the text will still print 1/8” high, without requiring you to manually change the size of the text. DataCAD will do that automatically. Single line text, ParaText, MText and Symbol Attribute text are all supported.

➔ Adding scale independent text to your drawing:

1) Toggle “Text Scale” on in the “Text” menu.
2) Toggle “Lock Size” on.
3) Click “Size” and define the size as the absolute height that you want the text to appear on the printed page, for example 1/8” high.
4) Add your text to the drawing.

When you add the text to the drawing, DataCAD calculates the size relative to the current plot scale (because Text Scale is on) and draws the text. For example, if your text is 1/8" high, and your current plot scale it 1/8" = 1', DataCAD will draw 1' high text.

What makes "Lock Size" different is that the 1/8" height of the text is locked to the text entity. If you change the plot scale to 1/16" = 1', for example, DataCAD will automatically change the height of the text to 2'. You can [Ctrl]+[Right-click] on a text entity and mouse over "Lock Size" to change this property after you have added text to the drawing. You can also use the Change/Text/Lock Size menu option to adjust this property for multiple text entities using the standard selection menu.

There are new extended character codes that can turn Lock Size on and off in the Text menu:

```
(V= in toolbar button, or 10XX# in keyboard macro)
1048 = Lock Size ON
1049 = Lock Size OFF
```

When you change the current plot scale, any text which has Lock Size enabled will change its size. As a result, the position of the text will also change. This change in position is relative to the anchor point defined in the Text/Alignment menu, so you need to pay attention to this setting when creating your text.

A minor change to the Text menu has also been added to automatically adjust the current text size setting when you turn Text Scale on and off. If you go to the Text menu and Text Scale is off with Size set to 6", and the current plot scale is 1/4"=1', when you turn Text Scale on, DataCAD will automatically change the Size to 1/8". It is no longer necessary for you to set the size. Conversely, if you go to the Text menu and Text Scale is on, Size is set to 1/8", and the Plot Scale is 1/4" = 1', when you turn Text Scale off, DataCAD will automatically set the text Size to 6".

When you export your drawing to DXF or DWG format, DataCAD automatically converts the scaled text to the real-world size so that it looks the same.

Symbol Text Attribute enhancements

Symbol Text Attributes (SymAtr) support the same Clipping, Fix Text, and Lock Size properties that normal text supports. After adding the SymAtr entity to the drawing, use the [Ctrl]+[right-click] context menu to adjust the settings for these attributes.

In the "Text" menu, toggle "Attribute" on. Place the text cursor in the drawing to open the "Create Symbol Attribute" dialog. Enter the Attribute Name, Prompt and Value, and then click OK. You may now [Ctrl]+[right-click] on the Symbol Attribute entity and choose from the following new options:

Clipping > Obeys Clip Cube/Ignores Clip Cube

Fix Text > On/Off

Lock Size > Yes/No

Clipping
When "Obeys Clip Cube" is checked, portions of the Symbol Text Attribute which fall outside the boundary of a Clip Cube will be restricted from view.

When "Ignores Clip Cube" is checked, the entire Symbol Attribute entity is always displayed, even if it is partially or entirely outside the drawing's Clip Cube boundary.

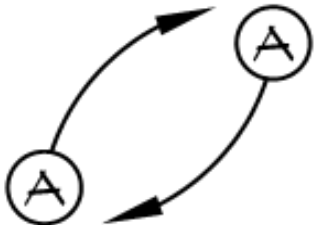
Fix Text
When "On" is checked, text is automatically rotated to be right and bottom readable.

When "Off" is checked, text is not rotated.

Lock Size
When "Yes" is checked, Symbol Attribute text size is an absolute value as defined for printed output, regardless of print scale.

When "No" is checked, Symbol Attribute text size is a relative value, and can be printed at different sizes by changing the plot scale.

Lock Text Angle
Text inside symbols can be kept at a fixed angle. This enables you to insert a symbol and define a rotation angle but keep the text inside the symbol displayed at the angle at which it was originally created. You will find the "Lock Angle" option in the "Ins Symbol" menu. "Lock Text Angle" is also listed as an option in the [Ctrl]+[right-click] context menu. This setting works for regular text and Symbol Attribute text. Lock Angle and Fix Text are mutually exclusive. Lock Angle may not be used with Dynamic Flip.



Symbols with Lock Angle on, rotated to different orientations

Lock Size on symbols
The Lock Size feature which automatically changes the size of text when you change the plot scale can also be applied to symbols. It applies an enlargement factor to the symbol which changes when you change your plot scale. The symbol insertion point acts as the center of enlargement, so keep this in mind when saving the symbol and defining the insertion point. The object you are drawing should be created at real-world size, since the Lock Size feature takes care of adjusting the size of the object for the print scale

For example, let us say you want to create a door tag symbol which prints a 1/8" high letter inside a 1/4" high circle. First, you will draw the circle with a 1/4" diameter. Then, add the text at 1/8" high, with the Alignment set to Center/Middle. Finally, when saving the geometry as a symbol, select the center point of the circle as the insertion point for the symbol. When you insert this symbol into a drawing with Lock Size enabled, and you later change the plot scale, the symbol will enlarge about its center point, as will the text inside it.

Note: When creating a symbol which contains text, **do not** enable Lock Size on the text which will be included in the symbol. Since Lock Size is being applied to the symbol when you insert it, it is not necessary to apply it to the individual objects inside the symbol.

Polygon Normal enhancements

There have been several enhancements that improve the handling or polygon normals.

In the 3D Polygon/Horizontal and Polygon/Rectangle menus, a "Normal Up" option has been added. When this option is toggled on, the front face (normal) of the polygon is oriented out of the screen, regardless of the order in which you select the points that define the polygon. Previously, selecting points in a clockwise direction would orient the front face into the screen away from the viewer, while selecting points in a counter-clockwise fashion would orient the front face out of the screen toward the viewer.

In the 3D Polygon/Edit menu, a "Flip Normal" option has been added. After choosing this command, you will select a polygon in the drawing. DataCAD will reverse the direction of the polygon normal for the selected polygon. This operation supports the standard Entity, Group, Area and Fence selection methods, including the ability to Mask.

New XREF Features

XREFs have been enhanced so that you can control the state of layers using GoTo Views in the host drawing, and to automatically remove hidden lines from the current projection.

Link to Drawing GoTo Views

GoTo Views that are native to the host drawing can control which layers are turned on and off inside of XREFs. This setting operates on a per-drawing basis. Click the "Insert" pull-down menu, mouse over "Reference File Management" and click "Remember Layer Settings for GoTo Views" to enable this option.

When you save a GoTo View in the host drawing, DataCAD will also include the on/off status of layers inside any XREFs which are present. When you recall the GoTo View, DataCAD recalls not only the drawing layers, but the layers in the XREFs as well.

Note: The status and position of an XClip is not remembered with the GoTo View parameters.

Remove hidden lines in XREFs

An option named "Hide" has been added to the [Ctrl] + [right-click]/XREF Tools context menu. When you select this option, DataCAD will perform the Hidden Line Removal operation on the selected XREF and store the result as a symbol. DataCAD automatically replaces the XREF instance with the symbol instance. The hidden line image inside the symbol is flat on the ground plane, but the symbol is then inserted in the current view projection. The result is a hidden line image of the XREF in the current view.

If you make changes to the model, you can [Ctrl]+[right-click] on the symbol and choose "Update Hide" to update the hidden line result with the changes you made. You can also choose "Unhide" to revert to a wireframe representation of the model.

Merge clipping boundaries

XREF Clip Cubes (XClips) and Symbol Clip Cubes (SClips) may now be merged with the parent XClips. You will find this option both in the "Reference File Manager," and in the "Reference File Management" sub-menu of the "Insert" pull-down menu.

When this option is unchecked, DataCAD X3 will treat XClips that are applied to nested-level XREFs and SClips applied to symbols within the XREF as separate clipping boundaries. This works the way it did in DataCAD 12. The information inside the XREF-level XClip, the information inside the nested-level XClip, and the information inside SClips will all be displayed.

When this option is checked, the nested level clipping boundaries are ignored. If you apply an XClip boundary to the top-level XREF, only the information inside the boundary is shown, even if the XREF contains a nested XREF or symbols with SClips.

New GoTo View features

GoTo Views have an optional link to any Multi-Layout Details that were created from them and can also have their hidden lines removed from the current view.

Linking GoTo Views with Multi-Layout Details

If you use GoTo Views to define your Multi-Layout Details, you can link your details to your views. When you adjust which layers are included in a GoTo View, either by turning existing layers on and off or by adding new layers or deleting existing ones, and then use the "Update" option in the GoTo View menu to update the saved view parameters, the linked Multi-Layout Detail updates automatically. You no longer have to use the "Layer Toggle" command in the Multi-Layout/Details menu to adjust which layers are included in the detail. Whether or not GoTo Views are linked to Multi-Layout Details is remembered on a per-drawing basis.

➔ To link GoTo Views with Multi-Layout Details:

1) Choose "Multi-Layout" from the "Print/Plot" menu.
2) Pick "GoTo View" from the "Multi-Layout" menu.
3) Toggle [S8] Linked on.

Note: When "Linked" is on, each Multi-Layout Detail in the drawing is linked to the GoTo View that was used to create it. This is a global drawing setting and cannot be used selectively on just one or some details. Turning "Linked" off will enable you to update GoTo View parameters without affecting existing Multi-Layout Details.

When you place a Multi-Layout Detail that is linked to a GoTo View, the default detail name has the same name as the GoTo View. Press [Enter] on the keyboard to accept this default name or type a new name and press [Enter] to proceed. In addition, if you rename the parent GoTo View, DataCAD will automatically rename the linked Detail. The names of linked Details are displayed in green text on the menu buttons, instead of the standard black text.

Remove hidden lines in GoTo Views

Using the "Hide GTV" button in the 3D Hide menu, you can select any GoTo View in your drawing and DataCAD will perform the hidden line removal process on it. A "Hide All" option is also available to perform the operation on all GoTo Views in the drawing.

Note: The time it takes to perform the operation can be lengthy, so you should only use the Hide All method if there are only a few GoTo Views, or if you are prepared to wait. The [End] key on the keyboard will skip the current view, and the [Del] key will abort the command.

The result of the hidden line removal operation is saved as a symbol in the current drawing. During this process, the Symbol Browser automatically changes its current view to browse the symbols in the drawing. You may then place instances of the symbols in your drawing. They work just like normal symbols and may be edited further in the Symbol Editor.

The Hide GTV procedure uses all the same settings that can be adjusted in the Hide menu. You can use "HLR Partial" to speed up the process, "Pierce" to calculate intersections between surfaces and edges, and "Clip Cube" to recognize the status and position of the Clip Cube. This option is extremely helpful because the Clip Cube is one of the parameters that are remembered with the GoTo View definition. In addition, the settings in the Hide/Options menu are also recognized by this feature.

If you make changes to the model, you can update the hidden line symbol. The "Update Hide" option is available in the [Ctrl]+[right-click]/Symbol Tools context menu, or by right-clicking on the symbol in the Symbol Browser. Keep in mind that if you used the Symbol Editor to make changes to the information inside the symbol, those changes will be overwritten by the Update Hide process.

Polyline enhancements

Polyline entities, created via the 2D Curves menu, may be rotated off the ground plane. You can use the 3D Rotate command to rotate them about the X or Y axis, resulting in an inclined polyline. You can also create them in any parallel view projection. Using polylines in this manner enables you to create complex 3D shapes which contain curved edges and voids.

The Entity Properties Editor for polylines has a "Height" field which defines the unit height of the polyline entity. This value represents the perpendicular distance from the bottom face to the top face, in the polyline's construction plane.

When you use the Identify command on a polyline, the "Z-Min" and "Z-Max" values returned on the "Attention" toolbar define the lowest and highest points of the polyline. The "Unit Height" value shown on the "Coordinates/Hints" toolbar is the difference between the lowest and highest points.

A "Push Pull" option has been added to the Curves/Polyline/Edit menu. This command enables you to dynamically stretch the top or bottom of a polyline.

Sun Shadow Studies

A new, OpenGL-based Sun Shadow rendering window provides you with sun angle and shadow data based on date, time, and location. A three-dimensional representation of the path of the sun across the sky from sunrise to sunset can also be displayed around your model for illustrative purposes. You can save individual views out to various image formats or combine them into a time-lapse animation. Click the "Display model in Sun Shader" button on the "Rendering" toolbar or choose "Sun Shader" from the "View" pull-down menu to open the Sun Shadow rendering window.



Navigation

Positioning your model in the Sun Shader window is like using the o2c-based 3D Object Viewer. Click your left mouse button and drag the mouse to spin the model around. You can use the scroll wheel on your mouse or click and hold the right mouse button to zoom in and out. Pressing [Shift] + [Left button] will pan the model.

Options dialog

The options dialog accessed via the "Sun Shader Options" toolbar icon or the "File" pull-down menu, contains the configuration settings for the Sun Shader.

Shadow Study section

The Shadow Study section of the Options dialog contains settings that define the location of the model, and the relative position of the Sun.

Location tab

The Shadow Study Settings section contains tabs that enable you to select the location of your site, the date and time or range of time, and adjust the properties of the shadows that are cast.

On the "Location" tab, select a Country from the drop-down list and then select a City. If the city you wish to use is not shown, click the globe icon to the right of the "Country" drop-down to access the "Manage Locations" dialog. In "Manage Locations," click the [+] icon to add a new location. Choose a country from the "Location" drop-down, or just type a name. Choose the City from the drop-down to the right of the Country, or just type a name. You may then proceed with defining the longitude and latitude of the location.

Longitude is an angular measurement ranging from 0° at the Prime Meridian to 180° Eastward (+) and 180° Westward (-). Each degree of longitude is sub-divided into 60 minutes, each of which divided into 60 seconds. Latitude is an angular measurement ranging from 0° at the Equator to 90° at the poles, with North being (+) and South being (-). Each degree of latitude is sub-divided into 60 minutes, each of which divided into 60 seconds. Longitude and latitude of locations around the world are available on the Internet. Decimal expressions of longitude and latitude are not currently supported, so if the information you find is noted in decimal form, you will need to convert it to degrees, minutes, and seconds.

Date and Time tab

In the "Date" field, click the drop-down menu to select a specific date from the list. You can click the Calendar icon to the right of this field to set the value to today's date, based on your Windows system settings. Select the radio button marked "Specific Time" to set the exact time of day for the shadow or click the clock icon to use the current time. Alternatively, you can select the radio button marked "Frequency" to play an animation which shows the path of the shadows from sunrise to sunset at the selected time frequency. If Daylight Saving Time is in effect, click the check box and define the value in hours.

Shadows tab

You can define the "Minimum altitude to cast shadows" by entering a value into the field. The default is 5. When the Sun position is lower than the defined altitude, shadows are not cast on the model. When “Cast Shadows” is checked, you are working in Shadow Study mode, and shadows will be displayed in the model.

Check the box next to "Display Sun trajectory" to include lines which show the position of the Sun relative to the model. You may also define the radius of the symbolic Sun, and the distance from the model to the symbolic Sun. If a specific time is selected on the "Date and Time" tab, the line represents the Sun trajectory at the selected time. If a frequency is selected, there are three lines which show Sunrise, Solar Noon, and Sunset.

The “Animation Speed” section determines the speed at which the Sun Shader cycles through the animation of the Sun path, in milliseconds, when you press “Play.” Pressing “Fast Forward” doubles the speed and pressing “Fast Fast Forward” triples it.

In the “North” section, you may decide whether to display a compass graphic on the ground plane, and whether to use DataCAD’s “North” angle. If you do not use DataCAD’s North angle, you may define a specific angle to use for North.

The "Rendering" section enables you to define a color for the "Shadow tint" by clicking the color selection button. Alternatively, you can pick "Shadow contrast" and use the slider bar to define the level of contrast to use when displaying the shadows.

Lighting section

The "Sunlight" must be enabled to display shadows in your model. This light is positioned based on the real-world position of the sun relative to the location that you define on the "Shadow Study" section of the Sun Shader Options dialog. It produces shadows that correspond to the real shadows you would see on the site. Set the intensity using the slider bar or the input field. The default value is 80.

The "Key Light" does not cast shadows but may be used to illuminate the dark side of the model while using the Sunlight to show the path of shadows. Use the radio buttons around the globe icon to define the position of the Key Light relative to the model. Set the intensity using the slider bar or the input field. The default value is 80.

"Ambient Light" is used for general illumination of the model. The "Headlight" adds another level of ambient lighting to the model. Set their intensity using the slider bar or the input field. The default values are 20.

The "Custom Lights" section adds up to five positional light sources. These correspond to the lights in DataCAD's "Shader" menu. Any changes you make to the settings in this section will affect the same lights in the drawing, and vice versa. In terms of defining the position of these lights, you are limited to setting the X, Y and Z coordinates while working in the Sun Shader, so you may find it easier to set the positions using the options available in DataCAD's Shader menu. Use the "Color" column to set the intensity (white is highest, black is lowest).

Ground Plane section

In the "Ground Plane Settings" section, place a check in the box marked "Display ground plane" to add a polygon which represents the ground plane in the model. If your model does not include a ground plane or other ground surface, this option is necessary to have a surface on which to display shadows. Without it, shadows will only display on other portions of the model.

The "Scale" section includes a "Factor" setting which describes the size of the ground plane. The value is a multiple of the extents of the model. The "Elevation" section indicates the position of the ground plane in the model. When "At base of model" is checked, the ground plane is situated at the lowest calculated point of the model extents. When un-checked, you may enter a value into the "Height" field which represents a real-world Z-location of the ground plane.

The "Material" section provides the ability to map a DataCAD rendering material to the ground plane, giving you the option of showing grass, for example. To remove a previously set material, highlight the value in the field and press [Del] on your keyboard to delete the information.

Background section

You may select from three different background types, a gradient, a solid color, or an image. In the "Background Settings" section, choose the radio button labeled “Gradient” to define a gradient background. You will then define a “Top Color” and “Bottom Color” using the color squares to the right. Alternatively, you may select "Background color" to set a solid color for the background. Click the "Set background color" button to the right and then select a color from the palette and click OK. Finally, you may choose the "Background image" radio button to define an image for the background. Click the "Set background image" button to the right to choose an image from your hard drive. To remove the selected background image, highlight the value in the field below and press [Del] on your keyboard to delete it.

Performance section

The "Rendering method during Pan/Zoom/Rotate" may be set to "Render as wireframe," "Render with entity colors" or "Render with materials." The value for this setting is remembered on a per-drawing basis. Performance varies from one computer to another, based on processor type and speed, available memory, and graphics card, so you may want to try different settings to see which works best for you.

Shadow Study Results

After you have configured the location and time for the Shadow Study Settings, you can click the "Shadow Study Results" toolbar icon to review the data. It includes the Altitude and Azimuth of the Sun, and the apparent or true time for Sunrise, Sunset and Solar Noon.

If you have selected the option to show a frequency of shadows, you may click the "Play" toolbar icon to review an animation which shows the path of the Sun and the resultant shadows on the model. You can alternatively click the slider bar to select various times of day, or select a specific time from the drop-down menu, and the Sun Shader will display the Sun position and resultant shadows in your model.

Other toolbar icons enable you to select from pre-defined view projections, including perspective, isometric, plan, or various elevation views. When Shadow Study mode is enabled, you can render the model with shaded faces or with shaded faces and edges. When Shadow Study mode is disabled, wireframe and hidden line modes are also supported.

Click the "Save Image" icon or select "Save Image" from the "File" menu to save out an image from the Sun Shader window. You may specify a resolution that is higher than your screen resolution, limited only by your graphics hardware.

3D Object Viewer Enhancements

The 3D Object Viewer interface has had several toolbars added to improve ease of navigation. In addition, the 3D Object Viewer supports saved views, like GoTo Views in DataCAD.

Saved Views

Saving a view in the 3D Object Viewer is like saving a GoTo View in DataCAD. After you save a view, you may recall it later. Parameters saved with views include View Name, Eye Point (X, Y, Z), Focal Point (X, Y, Z), Cone Angle, Parallel or Perspective Projection, Zoom Factor, View Rotation about X-Axis (screen), View Rotation about Z-Axis (world), Background Mode (Color only, Single image, Tiled image), Background Color, Background image, Background Picture Offset (X, Y), Lights (1, 2, 3, and User-defined: On/Off), Walk-through Mode (On/Off), and Anti-aliasing (On/Off).

➔ To save a view in the 3D Object Viewer:

1) Make sure the "Views" toolbar is displayed. If it is not, select it from the View/Toolbars pull-down menu.
2) Position your model in the viewer, adjusting any of the parameters named above as desired.
3) Click the "Add View" button on the Views toolbar.
4) Supply a name for the view, up to 80 characters.

176. The view name is now available to recall from the drop-down list. All the parameters named above are saved to the view definition.

177. Saved views may also be updated after they have been created.

➔ To update view parameters:

1) Select the saved view that you wish to update from the list.
2) Adjust the view parameters as desired.
3) Click the "Update View" button on the Views toolbar.
4) Click "OK" to confirm that you wish to update the view parameters.

178. DataCAD updates the view parameters.

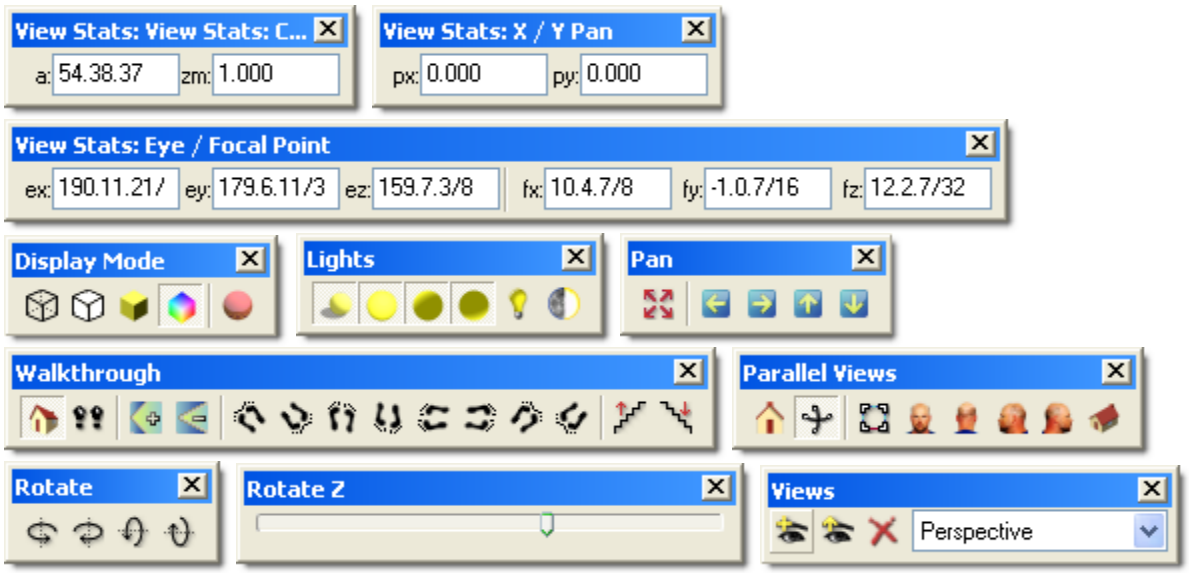
179. If you no longer wish to store a saved view in the drawing, you may delete it from the list.

➔ To delete a saved view:

1) Select the view you wish to delete from the list.
2) Click the "Delete View" button on the Views toolbar.
3) Click "OK" to confirm that you wish to delete the view.

180. DataCAD deletes the saved view.

New Toolbars



The interface of the 3D Object Viewer has been updated to include new toolbars. You may turn them on and off by selecting them from the View/Toolbars menu. Options for "All On" and "All Off" are available, along with a "Lock Toolbars" option to keep them in place once you have configured the interface.

The following toolbars are included:

Display Mode, Lights, Pan, Message, Parallel Views, Rotate, Rotate X (slider bar), Rotate Z (slider bar), View Stats: Eye/Focal Point, View Stats: Cone Angle Zoom, View Stats: X/Y Pan, View Stats: X/Z Rotation, Views and Walkthrough.

Fixed Distance

There is a new "Fixed Distance" option in the "View" pull-down menu. When off (default), increasing or decreasing the field of view will result in a change to the distance between the eye and focal points. When on, the distance between the eye and focal points remains fixed, causing the increase/decrease field of view buttons to operate more like a zoom lens on a camera.

Limit Rotation Angles

If this option is checked in the "View" pull-down menu, the rotation of the model in the 3D Object Viewer is limited to 360° in any axis.

Copy, Copy (Raytrace) and Copy HTML

These options are available in the right-click context menu which appears in the 3D Object Viewer. When you select Copy, the Object Viewer copies the current image to the Clipboard. You may then paste it into a paint program, or any other application that supports pasting images. The Copy (Raytrace) option performs the same function, except that the result is raytraced to include shadows from light sources. The Copy HTML option will copy HTML code required to display the object on a Web site to the Clipboard. You may then paste it into an HTML editor while creating a Web page.

Miscellaneous Enhancements

Save As previous version

Although DataCAD X3 files use the same *.AEC file extension as DataCAD 11 and DataCAD 12, internally the file format is different. To work with users of previous versions, you will need to use the "Save As" command in the "File" menu to save your file back to an earlier format. If your associate is using DataCAD 12, set the "Save As Type" to "DataCAD 12 Files." Similarly, if your associate is using DataCAD 11, set the Save As Type to "DataCAD 11 Files."

When saving back to DataCAD 11 or DataCAD 12 format, the file is automatically renamed. As an example, a file named "Example.aec" in DataCAD X3 will become "Example.d11.aec" when saved to DataCAD 11 format, or "Example.d12.aec" when saved to DataCAD 12 format.

What happens when you save your file back to an older format?

Since DataCAD X3 has new features that previous versions did not have, saving back to DataCAD 11 or DataCAD 12 format will change some of the data in your file. Smart arrows are exploded to groups of lines. Any text which has Lock Size enabled has its scaled size converted to the real-world size, so that it does not look different on the screen. MText gets exploded to multiple, single line text entities.

Smart Entities

The Change/Match/More menu can now match a Smart entity's type. After you choose Change/Match and click "More…," select "Smart Type." Right click to return to the Change menu, and then select the object(s) to change. When prompted, select the Smart entity whose type you wish to match.

A "Creation Method" field has been added to the Entity Properties Editor for Smart doors and windows. It shows whether the Smart door or window was created "By Sides" or "By Center." You may click this drop-down field to change the setting for the selected Smart door or window. In effect, it changes the anchor point of the opening. If you change the size of the opening in the type definition, DataCAD resizes the opening relative to the anchor point.

You may turn off the display of node markers, which appear as an x at each end of a Smart wall and as a diamond at each side of a Smart door or window, via the "Node Markers" toggle button in the "Architect" menu. Although node markers never print, turning off their display can reduce screen clutter when zoomed out.

SketchUp 8 support

DataCAD X3 supports the ability to insert and XREF SketchUp version 8 files. Files are still exported to SketchUp version 6 format, to preserve compatibility with older versions. Newer versions of SketchUp can open older format files, however older version may not open newer files.

Measures

The Measure\PntToPnt and Measure\Line commands now return Length, Run, Rise and Angle measurements, all of which can be added To Drawing. The values are shown on the "Attention" toolbar portion of the interface.

Smart Walls may now be selected when using "Line" and "Line Angle" in the "Measures" menu.

Dimensions

DataCAD X3 has toolbar codes that you can use to set the On/Off status of dimension witness lines:

```
  (V= in toolbar, or 10XX# in keyboard macro)
1044 : Suppress witness line 1 = TRUE
1045 : Suppress witness line 1 = FALSE
1046 : Suppress witness line 2 = TRUE
1047 : Suppress witness line 2 = FALSE
```

DataCAD no longer exits "Entity" mode in the Dimension/Linear menu until you right-click or choose "Exit." Previously, it would return to the Linear menu after you selected the entity to dimension and then placed the dimension in the drawing.

There is a key in the configuration setting file, DCADWIN.ini, that will omit the leading zero from associative dimensions of less than one meter when working in metric scale type:

```
[General]
Meters Show Leading Zero=TRUE
```

Set this to FALSE to remove the leading zero. For example, when set to FALSE, a dimension of 0.65m would become .65m instead.

Smart walls, doors and windows are supported by "AutoDim" mode in the Dimension/Linear menu. After turning "AutoDim" on, simply draw a line which crosses through the nodes of the Smart walls, doors, and windows you wish to dimension, and then choose the side on which to draw the dimensions. DataCAD automatically adds the dimensions to the drawing. There is also an option in the AutoStyle menu to include Smart door and window jambs in the dimensions.

Dimensions may be displayed outside of the boundary of a Clip Cube, like text and Smart arrows. To enable this feature, [Ctrl]+[Right-click] on an associative dimension and choose "Ignores Clip Cube" under "Clipping." You may also use the Change/More/Clip Cube menu option to change multiple entities at once.

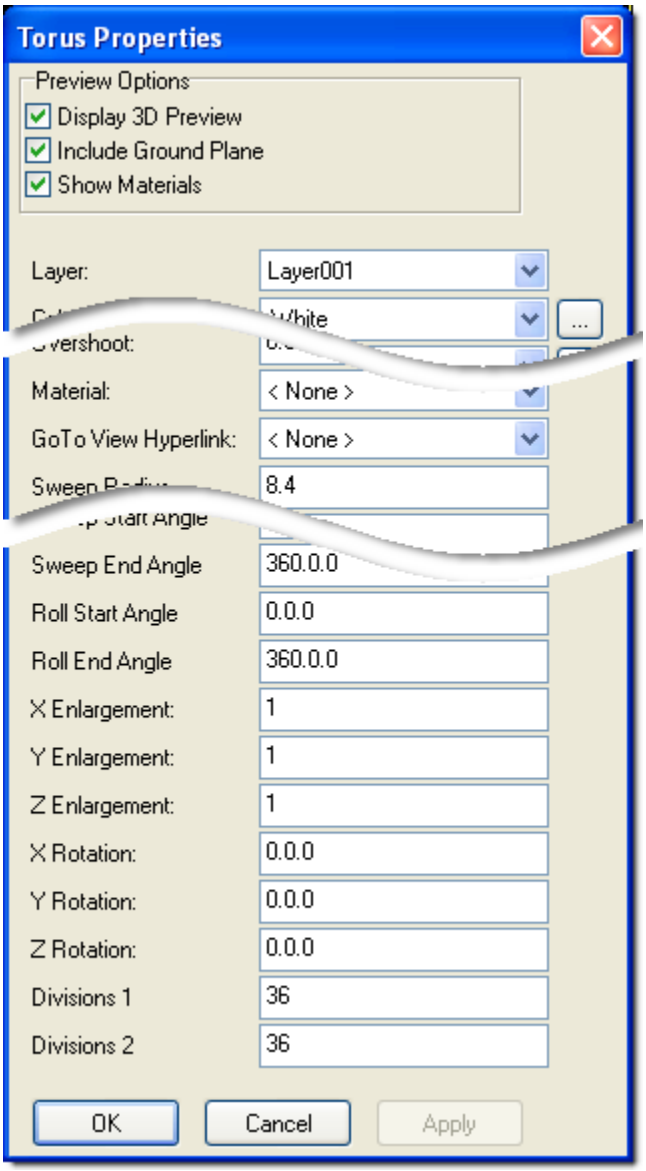
DXF and DWG files

DataCAD X3 supports the ability to import and export AutoCAD DXF and DWG files up to release 2010-2011 format.

When importing a DXF or DWG, the way the "Move drawing to origin" setting on the "DWG Import Entity Assignments" dialog works has been updated to provide more accurate results. It calculates the center of the extents of the entities in the drawing and sets that point at absolute zero. You should only use this setting if you know that all the data in the DXF or DWG file you are importing is far away from absolute zero. This function cannot selectively move some of the information closer to the origin, so if the data in the file is spread over a large expanse of space in the original file, it will remain that way after import. You will need to use the "Move" command to move the portion of the drawing that is far away closer to the rest of the information.

Entity Properties Editor

New options to alter the "Scale" and "Rotation" of symbols, XREFs and quadrics have been added to the Entity Properties Editor. When you [Ctrl] + [right-click] the entity and choose "Properties," you can see the current settings and adjust if needed.



The ability to change the Scale and Rotation angle of symbols, XREFs and quadrics has also been added to the Change menu. Choose “More…” and then pick which setting to change.

A “GoTo View Hyperlink” field has been added to the Entity Properties Editor. If a GoTo View is hyperlinked to the selected entity, it will display here. You may also use the drop-down list and then choose a GoTo View from the drawing to link to the selected entity.

Enlarge

There is a new "By Points" option under "CalDist" in the "Enlarge/Enlargement" menu. When this option is toggled on, you click two points to define the known distance, and then click two more points to define the new distance. DataCAD uses this information to automatically calculate the enlargement factor.

Symbols

Symbols may now be displayed outside of the boundary of a Clip Cube, like text and Smart arrows. To enable this feature, [Ctrl]+[Right-click] on a symbol and choose “Ignores Clip Cube” under “Clipping.” You may also use the Change/More/Clip Cube menu option to change multiple entities at once.

When "Symbol Scale" is on in the "Ins Symbol" menu, a trap door to the "Plot Scale" menu is available. This enables you to change the current plot scale without having to first exit symbol insertion mode. Symbol Scale automatically sets the symbol enlargement factor based on the current plot scale.

The "By Center" option in the "Ins Symbol" menu enables you to insert symbols by the center of their extents, excluding the insertion point.

There is a new "DelEnts" option in the Save Symbol menu. This setting, remembered on a per-drawing basis, is on by default. When turned off, the entities that you select to be saved into a symbol are no longer deleted from the current drawing.

A "Save As" option has been added to the Symbol Tools context menu. You can [Ctrl]+[Right-click] on a symbol in the drawing, mouse over "Symbol Tools" and then select "Save As" to save a copy of the symbol to a folder on the hard drive.

Object Snapping

"Nearest" object snapping will now work on 3D entities.

Clipboard

DataCAD X3 can automatically save information from the Windows Clipboard to a symbol in the drawing. After copying data to the Clipboard, choose "Paste as Symbol" from the "Edit" pull-down menu. The symbol insertion point is automatically set to absolute zero, so you will generally use the “By Center” option in the Paste menu. The symbol definition is only present in the current drawing, so if you wish to add it to your symbol library, click the folder icon on the Symbol Browser and choose “Drawing.” Locate the new symbol, right-click on it and choose “Save As.” Supply a name and select a folder in which to save it. Alternatively, you could use the new [Ctrl]+[Right-click]/Symbol Tools/Save As command to select the symbol from the drawing area.

The "Clipboard Select" command has a "By Center" option that is available when "Ins Point" is toggled on. It will automatically calculate the center of the extents of the selected entities when you copy the information to the Clipboard. If you later use the Edit/Paste As Symbol function, the symbol insertion point will be set to the center of the extents of the entities, rather than absolute zero.

Printing and Plotting

There is a new "Extents" button in the Multi-Layout/Layout menu when creating a multi-scale plot sheet. While in layout mode, toggle this button off to see the actual drawing information in the detail, rather than the extents box you typically see by default. This option improves accuracy when placing your detail on a sheet.

A new Plot Scale stamp has been added to the Insert/Stamp menu. The token for this stamp is @PLOTSCALE. The Plot Scale stamp will update automatically to show the current plot scale, so if you change the scale after inserting the stamp, it will change to show the new scale. When you place a Multi Scale Plot detail which contains the stamp, it will show the selected plot scale for the detail. In addition, the Insert/Stamp function now supports the ability to use Text Scale to define the size of text relative to the plot scale, and Lock Size to lock the size of the text to the real-world printed size.

You may customize the stamp by editing the [Stamp] section of your DCADWIN.ini file:

```
[Stamp]
 PLOTSCALE_1MenuText=Plot Scale 1
 PLOTSCALE_1=Scale: @PLOTSCALE = 1'-0"
 PLOTSCALE_2MenuText=Plot Scale 2
 PLOTSCALE_2=This is the current plot scale: @PLOTSCALE
```

Settings

You may now Load, Edit and Save the "Decimals" file, Dcadwin.dec, via the Utility/Settings/EditDefs menu.

Texture Origin

The View/Rendering/Texture Origin pull-down menu has options that enable you to "Show" and "Clear" the texture origin of entities in your drawing.

There is also an extended character code for Set Texture Origin:

```
 (V= in toolbar button, or 10XX# in keyboard macro)
```

1052 = Set Texture Origin

Other New Extended Character Codes

```
  (V= in toolbar button, or 10XX# in keyboard macro)
 1050 = Orthmode On
```

1051 = Orthmode Off

Move/To Layer and Copy/To Layer

There is a "Layer Color" toggle in the Move/To Layer and Copy/To Layer menus. This option appears after you select the destination layer. When enabled, the selected entities will inherit the color currently assigned to the destination layer.

Curves

Beziers and B-spline curves, in the 2D "Curves" menu, may now have up to 20 control points. The previous limit was 8. In addition, you may define different Z-Base and Z-Height values for Beziers and B-spline curves.

DataCAD 12

DataCAD 12 has many new and improved features which are designed to help you increase productivity. Some changes affect compatibility with previous versions of DataCAD and with other programs.

Compatibility Enhancements

Forward/Backward Compatibility with Other DataCAD Versions

DataCAD 12 is compatible with drawing files, symbols, templates, line types, hatch patterns, fonts, and DCAL® macros from DataCAD versions 4 through 11. That means migrating your designs to DataCAD 12 is effortless.

DataCAD 11 cannot open drawings from DataCAD 12, however, you can save your DataCAD 12 (AEC) files to DataCAD 11 (AEC) file format using the File \ Save As DataCAD 11 AEC menu option within DataCAD 12. This is especially helpful if your office has copies of both DataCAD 11 and 12 running on various computers and you need to exchange files with another user.

DataCAD versions 4 through 10 cannot open drawings from DataCAD 11 or 12. If some of your associates are running these older versions, you will not be able to share your DataCAD 12 files directly with them. You will have to use DXF/DWG as a common file format.

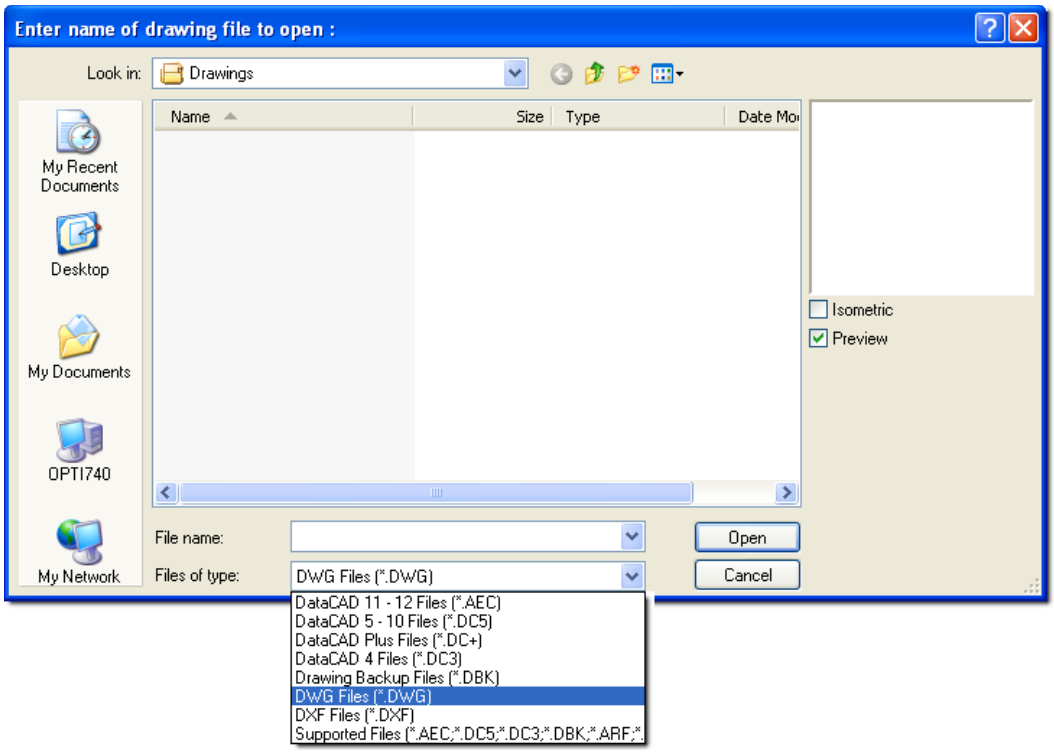
Compatibility with AutoCAD® Drawing Files (DXF/DWG)

DataCAD 12's drawing translator can import DXF and DWG files compatible with AutoCAD R12-R14, R2000-R2002 (R15), R2004-2006 (R16), and R2007-R2009 (R17). You can choose an automatic translation or an interactive one, where you can decide how each line type and font should be translated and displayed in DataCAD.

Block Attributes appear as Symbol Attributes when you open a DWG file.

➔ To import a DWG or DXF file and open it in DataCAD:

1. Select Open from the File pull-down menu. The Enter name of drawing file to open dialog box appears.
2. Select DWG or DXF from the Files of type drop-down box. Choose DWG to display all DWG files or select DXF to display all DXF files.



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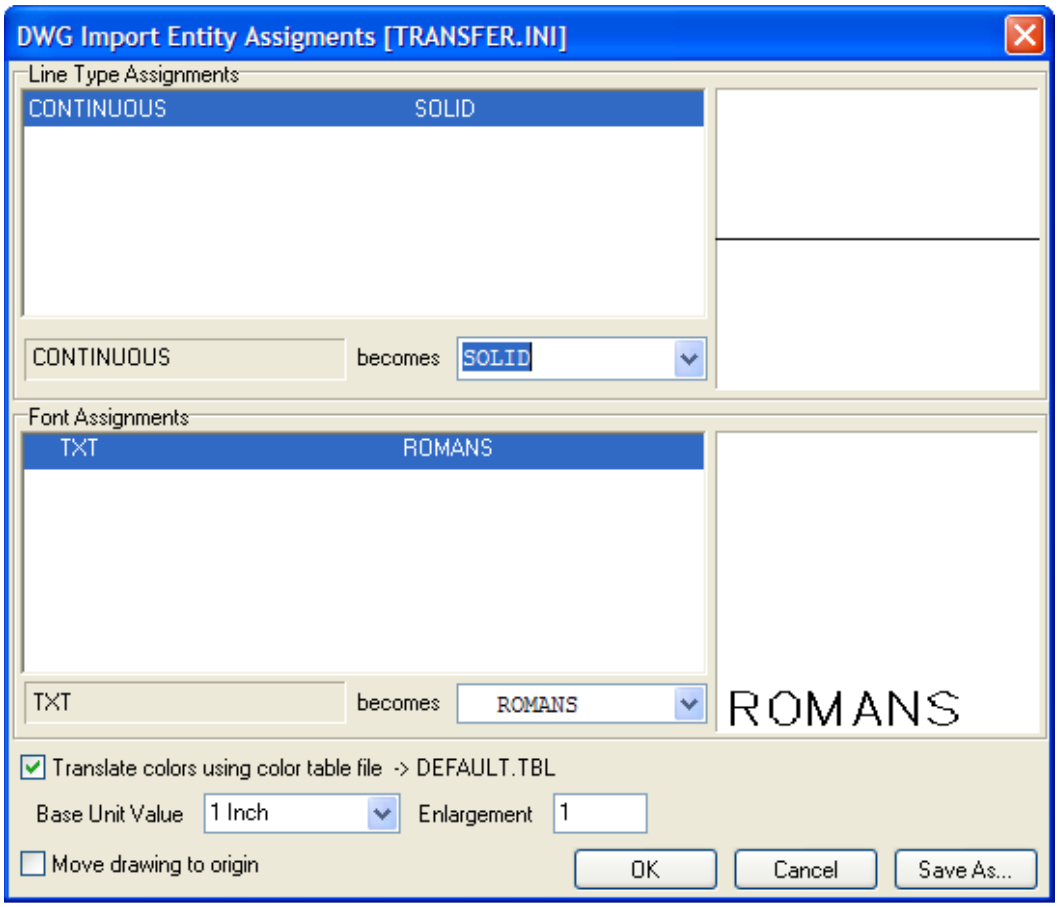
3. Select a file to import from the list or type the name of the file to import in the File name input box. By default, DataCAD looks for DXF and DWG files in your DataCAD\Transfer folder. If your DXF or DWG files are in a different folder, change to that folder using the "Look in:" drop-down and then click on the file you want to import.

   You can open multiple files at the same time. Just highlight the first file, then press (Ctrl), and continue highlighting other files you want to open. DataCAD adds all the files you selected to the Filename field and will open all of them when you click on Open or press (Enter).

4. Click Open. The DWG Import Entity Assignments dialog box appears if the Import section of the DXF/DWG tab of the Configure DataCAD for Windows Settings dialog shows that "Interactively assign . . ." is toggled on. The options in the DWG Import Entity Assignments dialog box allow you to choose how DataCAD will translate line types and fonts.

5. Look at the options in the Line Type Assignments box; this lists each AutoCAD line type used in the file and suggests a DataCAD equivalent. To change any of these assignments, click on the line type to change. The line type you selected appears immediately below the Assignment list box with the translation line type in a drop-down box. Choose a new line type from the drop-down box; your selection appears in the preview window. When you click on the line type in the list box again, the name of the line type changes to reflect your choice.

6. Repeat step 5 for the Font Assignments. You can specify DataCAD-supplied or TrueType fonts.
7. Click on OK to close the dialog box and begin importing the file. Progress is noted in the Message toolbar. Or click on Cancel to stop the import process and close the dialog box.



More About Importing Files Into DataCAD

The settings and assignments that are displayed in the DWG Import Entity Assignments dialog box are contained in a file called TRANSFER.INI in your DataCAD\Support Files folder. If you change any of the settings in the DWG Import Entity Assignments dialog box, you have the option to save those settings in a new .INI file to use when translating other files. This new .INI file is saved in the \Support Files folder.

You can affect how importing files and the DWG Import Entity Assignments dialog box work through settings on the DXF/DWG tab in the Tools/Program Preferences Configure DataCAD for Windows Settings dialog box.

This could be useful if you normally exchange files with several different offices. If you change the settings and save a separate .INI file for each office, then you can easily switch between .INI files without having to go through entity assignments repeatedly.

➔ To save entity assignments:

1. Change settings and assignments in the DWG Import Entity Assignments dialog box as described in the step-by-step instructions on importing DWG files.
2. Click on Save As. The Save Settings As dialog box appears.
3. Type a filename for the new .INI file and click on Save or click on Cancel to stop the save. When you save the .INI file, the setting for the Translator Settings File on the DXF/DWG tab of the Configure DataCAD for Windows Settings dialog box is changed to that file.
4. Continue with step 7 (above) in the instructions for importing a DWG or DXF file and opening it in DataCAD.

SketchUp File Import

If you use SketchUp to create models, you can insert them directly or externally reference them in your DataCAD projects. DataCAD will automatically extract materials and bitmap textures from the SketchUp file and embed them into your DataCAD drawing. You can also convert SketchUp files to o2c format for raytraced views.

➔ To insert a SketchUp file into your drawing:

1. Select SketchUp from the Insert pull-down menu. The Insert SketchUp dialog box appears.
2. Go to the folder that contains your SketchUp files and highlight the one you want to insert into your drawing.
3. Check the boxes that you want to activate:

- Extract textures – takes the textures that you applied in SketchUp.
- Overwrite existing textures –places textures that you used in the SketchUp file into DataCAD. If you select this option, specify the folder where you want to store the extracted textures.
- Extract front material(s) first – materials are extracted from front to back of the SketchUp drawing.
- Preview – shows the SketchUp file.
- Isometric – shows an isometric view of the SketchUp file.
- Object Viewer – shows a 3D raytraced view of the SketchUp file.

4. Click Open. The SketchUp drawing is attached (like the way a symbol is) to the cursor in your DataCAD drawing window and the Ins Symbol menu appears.

5. Make decisions about the way you want the SketchUp drawing to appear by using the options in the Ins Symbol menu. This menu allows you to set the X, Y, or Z enlargement factors, dynamically rotate or explode the drawing, change the line factor and Z offset, toggle Fix Text to control legibility, and alter the symbol scale and maximum lines.
6. Position the cursor in your DataCAD drawing window where you want the SketchUp drawing to appear. Then click the left mouse button. If you want to place additional copies of the SketchUp drawing into your DataCAD drawing, reposition the cursor and left-click where appropriate. When you are finished placing the SketchUp drawing(s), right-click.

➔ To insert a SketchUp file as an XREF:

1. Select SketchUp XREF from the Insert pull-down menu. The Insert SketchUp dialog box appears.
2. Go to the folder that contains your SketchUp files and highlight the one you want to insert as an XREF into your drawing.
3. Click Open. The SketchUp drawing appears as an XREF box attached to your cursor and the Insert XREF menu appears.
4. Make decisions about the way DataCAD should treat the SketchUp drawing based on the options in the Insert XREF menu.
5. Position the cursor where you want the SketchUp drawing to appear as an XREF and left-click.

The layers you create in SketchUp are retained in DataCAD when you insert the .skp file into your drawing. If you insert your SketchUp file as an XREF, you can manage the on/off layers via the Reference File Manager. If you use the Insert menu to add a SketchUp file to your drawing as a symbol (versus an XREF), you can later use the Symbol Explode command to create original layers. SketchUp groups and components convert to symbols in DataCAD.

Excel Spreadsheet Import

➔ To import an Excel spreadsheet into your drawing:

1. Select Excel from the Insert pull-down menu.
2. Select the Excel spreadsheet that you want to import from the files on your computer.
3. Select Open to import the spreadsheet into your drawing.
4. Choose the insertion point for the spreadsheet.

SHX Fonts

DataCAD 12 provides direct support for SHX fonts and TrueType fonts (TTF). DataCAD CHR fonts are no longer used. However, your existing DataCAD fonts are automatically converted to SHX format.

Note: To convert CHR fonts to SHX format, simply add them to the DataCAD\Fonts folder, then run DataCAD. The program will scan this folder and convert any CHR fonts that do not already have an SHX equivalent.

Productivity Enhancements

Smart Entities

Now you can quickly draw walls, windows, and doors in 2D, automatically clean up stray lines, and seamlessly convert your design into a 3D model by using smart entities. A smart entity is a drawing element (such as a wall, door, or window) that contains routines and parameters to define its characteristics and to determine how it interacts with other smart entities.

In older versions of DataCAD, when you drew two walls, they did not know anything about each other until after you joined them and cleaned their intersection. In DataCAD 12, walls of the same type automatically clean to each other, allowing you to skip the cleanup step manually. Imagine how much time you can save when you take advantage of smart entities.

When you add doors and windows to a wall, DataCAD 12 automatically cuts the wall to accommodate them. If you move, copy, or delete a door or window from a wall, DataCAD 12 automatically heals the wall.

These smart entities know what they should look like in both plan and perspective views. In plan view, you will see the 2D doors just as you did in prior versions of DataCAD. But when you switch to perspective view, you will see 3D doors, complete with jambs, casing, and trim. When you look at your model in the object viewer, you will also see the rendered materials you selected for the walls and other entities.

Of course, you can still use the traditional lines and arcs to create your designs. You can also convert smart entities to simple entities (lines and arcs). Both standard and smart entities happily coexist in DataCAD 12.

What are some of the advantages of using smart entities?

- You can make changes quickly.
- You can change the width of a wall and all its intersections will update automatically.
- You can change a door from double to bi-fold without removing and redrawing it.
- You can copy a window from one wall to another.

Note: Wall, door and window type definition files are stored in folders on your hard drive. You may create new wall, door, and window type files, which contain the parameters that define how each instance of the wall, door or window will look in both 2D and 3D. The external files may be loaded into your drawings, then used and modified as desired.

If you make changes and want to use the modified type in other files, you may save out the definition, either overwriting the existing type file on the hard drive or saving to a new name. If you overwrite a type file on the hard drive, the changes will not be realized in other drawing files unless you reload the type file in those drawings.

To delete a type file from the hard drive, open Windows Explorer (or My Computer) and go to the DataCAD\Support Files folder, open the appropriate Wall Type, Door Type or Window Type sub-folder, then delete the type file.

Key Terms and Concepts

To use smart entities effectively, you should learn a few new terms. Some terms (for example, *Type*) apply to walls, doors, and windows. Other terms (for example, *Control Line*) apply only to walls.

Type refers to smart entity definitions (walls, doors, and windows) that you can use in your drawing. The available types of smart entities are listed on the left in each Manager dialog box. Many walls, doors, and windows are already defined, so you can quickly activate them and put them to work in your drawing. However, you can also customize or create your own smart wall, door, and window types very easily.

Some properties are intrinsically linked with a particular type of smart entity and can only be controlled by the definition you established for it in the corresponding Manager. Intrinsically linked properties are called *Type-dependent*. (For example, the width of a wall is type dependent.) If you change a type-dependent property, all instances of that particular type will reflect the change.

You can change some properties on a case-by-case basis. These properties are *Type-independent*. (For example, the swing angle of a door is type-independent since you can change the angle for each smart door in your drawing, regardless of its type.) These properties have a default value that defines how new instances of the entity will appear, but the value may be changed independently on each instance once the entity has been added to the drawing.

Smart Entity Glossary

The following is a list of technical terms and their definitions which relate specifically to smart entities.

Smart Entity

A smart entity is a drawing object designed for a specific purpose and is governed by a fixed set of parameters and variables. Since the object has internal awareness of how it should behave, it is considered to be "smart". Smart entities are controlled by the user via dialogs that provide access to certain settings and their corresponding values.

Type

A "type" is a named set of settings and their corresponding values which define a smart entity. Types can be saved to and loaded from external files, or they may be stored within a drawing file exclusively.

Type-dependent
Type-dependent settings are shared by all instances of a given type. Modifying a type-dependent setting will automatically affect all instances of that type.

Type-independent
Type-independent settings may be modified on a per-entity basis, despite their common entry in the Type Manager.

Control Line
A control line is specific to a smart wall and is defined by the beginning and ending nodes of each wall segment. All geometric aspects of a smart wall are defined relative to its control line.

Node
A node defines the endpoint of a wall segment and includes parameters that can be set by the user to determine the behavior and appearance of wall ends, corners, and intersections.

Virtual Node
A virtual node defines the intersection of two wall segments, or the sides of a door or window as they relate to a wall segment. Virtual nodes are automatically generated when walls on the same layer intersect, or when a door or window is placed in a wall. The behavior of virtual nodes is predefined and cannot be customized by the user. However, virtual nodes at wall intersections can be converted to nodes using the X and T Intersection cleanup commands.

Using Smart Walls

Using smart walls will save you a lot of time, but understanding a few things will make it easy to master them:

- Type rules how the wall looks in both 2D (Plan) and 3D (Perspective).
- Control Line determines the reference line (or "anchor") for a wall.
- Node determines the look and behavior of wall ends and intersections.

Types - Various wall types are listed in the leftmost panel of the Wall Type Manager. Once you load a wall type, you can activate it and use it in your drawing. Some wall properties (number of lines, width, and caps and openings) are type-dependent, so you can change them only in the Wall Type Manager – but not while you are drawing or editing your design. Other wall properties (control line) are type-independent, so you can change them while you are drawing. Display / Rendering Attributes can be either type-dependent, or type-independent (Use current settings).

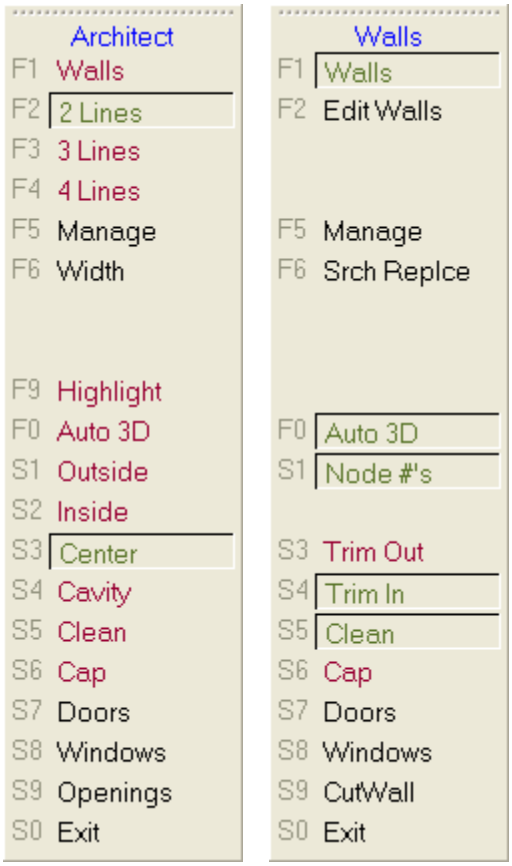
Control Line – You decide which line (outside, center, inside, line 2, or line 3 options are available, depending on the wall type you loaded) you want to use when you are drawing your structure. The control line is type-independent, so you can change it when necessary while you are drawing.

Node – At intersections and wall ends, nodes influence how two wall surfaces interact as far as cleaning, moving, and stretching are concerned. DataCAD automatically inserts nodes (indicated by an X) when you start or end a wall or when you make a corner. Virtual nodes (indicated by an open diamond) are automatically inserted when two walls cross (for example, at an X intersection) or when you place a smart door or window on a wall. You can use the Edit Walls option in the Architect menu (with Auto 3D enabled) to add nodes to smart walls. You can also use the Weld Wall and Weld Line commands in the Cleanup menu to remove nodes from smart walls.

Before you set up your drawing, there is one important fact to remember: smart walls must all be on the same layer if you want them to clean to each other. That means exterior walls will not clean to interior walls if they are on different layers. Doors and windows do not have to be on the same layer as walls (for example, walls can be on Layer 1 and windows on Layer 2).

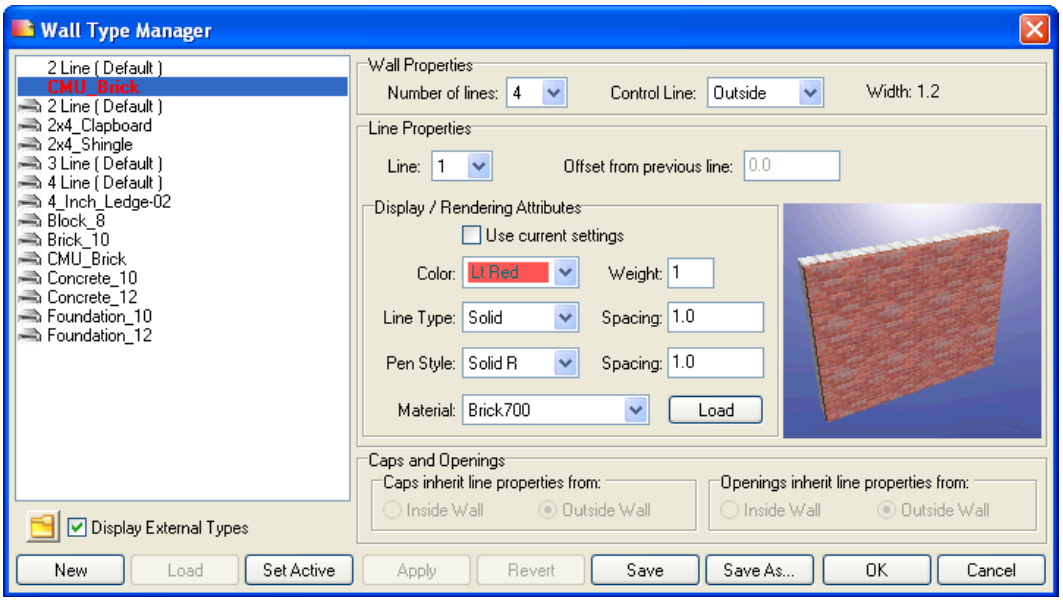
➔ To create walls:

1. Make sure you are on the layer that contains your walls. This assures that the walls will be able to clean properly.
2. Go to the Edit menu in the Menu Window and select Architect.
3. Toggle on Auto 3D in the Architect menu. The Walls menu appears. This allows you to work with the smart entities. If Auto 3D is toggled off, you can draw walls the old-fashioned way.



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4. Select Manage to display the Wall Type Manager dialog box. Notice that the default is a 2-line wall suitable for an interior wall. If this is what you want, just select OK and begin drawing walls. Otherwise, make sure a checkmark appears in the Display External Types box and continue to refine your choices.



5. Select the wall type you would like to use instead of the default by double-clicking or by highlighting it and clicking on Load. Notice that when you make a selection, the illustration in the preview window and the wall and line properties change.
6. Refine the wall and line properties by using the options in the Wall Properties, Caps and Openings, and Line Properties sections of the Wall Type Manager.

- Number of lines – select from the pull-down options (2, 3, or 4) to indicate how many lines will appear in the 2D drawing.
- Control Line – select from the pull-down options (Outside, Center, Inside, Line 2, or Line 3) to indicate which line is dominant when you are drawing.
- Caps inherit line properties from – select Inside Wall or Outside Wall. (This option is available for 2-line walls only. On 3- and 4-line walls, material is applied from the outside line to the next one in and from the inside line to the next one in.)
- Openings inherit line properties from – select Inside Wall or Outside Wall. (This option is available for 2-line walls only. On 3- and 4-line walls, material is applied from the outside line to the next one in and from the inside line to the next one in.)

When you use a 3- or 4-line smart wall, the material extends from the outside face to the next line on the interior of the wall and from the inside face to the second line from the outside wall.

- Line – select the line number you want to describe and then make offset and display/rendering attributes choices to control how each line will appear in your drawing. If you are not satisfied with your choices, click Revert. When you want to test your choices for each line, decide which field you want to be active, then click Apply and look at the results in the preview window.
- Offset from previous line – use this option to indicate the width of a 2-line wall or to show the offset for 3- or 4-line walls. Changing the offset values, affects the overall Width shown in the Wall Properties section. Do this for each line except line 1.
- Use current settings – controls your ability to change display/rendering attributes. If you want to make changes to the color, line type, pen style, and material defaults supplied by DataCAD, click to remove the checkmark from this box.
- Color – select the line's color from the pull-down options. Do this for each line.
- Weight – control the line's weight for the 2D drawing. Do this for each line.
- Line Type – select the line's appearance (Solid, Dotted, Dashed, Dot-Dash, or -dash-) for the 2D drawing. Change the value in the Spacing field to control the line. Do this for each line.

- Pen Style – select the option you want from the pull-down menu and indicate a Spacing value. Do this for each line. This scale-independent feature always appears and prints in one size.
- Material – select an option from the pull-down menu to describe the material associated with each line. If you are not satisfied with the available materials, click Load to display the Load Material File dialog box, highlight the option you want, click Open to add that material to the list of available materials, then select it from the pull-down menu. Do this for each line.

7. Make sure you are satisfied with your choices for each line of the wall, click Save or Save As, name the wall type in the dialog box that appears, and click Save. Your new wall type appears in the Wall Type Manager list.

What is the difference between Save and Save As? When you select Save, the changes you made are stored on the hard disk in place of the original file. That means the original file no longer exists because you wrote over it with your changes. When you select Save As, you supply a new name for the changes you made to the original. That means the original file still exists and the new file you just named contains your customized version.

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8. Highlight a wall from the list and select Set Active to indicate which type of wall you want to draw. Then select OK and begin to draw the wall.

➔ To quickly access the Wall Type Manager:

1. Press A to display the Architect toolbar, toggle Auto 3D on in the Walls menu, and select S from the Architect toolbar or Manage from the Walls menu to open the Wall Type Manager. If Auto 3D is toggled off in the Walls menu and you select S from the Architect toolbar, the old Wall Style Manager dialog box appears.



2. Or select the first button in the Types toolbar.



➔ To create your own smart wall type:

3. Select New in the Wall Type Manager.
4. Enter a distinctive name in the New Wall Type dialog box and select OK.
5. Highlight the name in the Wall Type Manager's list and define the wall and line properties.
6. Select Set Active. Then select OK to exit the Wall Type Manager and begin using it in your drawing.

➔ To draw with smart walls:

1. Highlight the wall you want to use in the Wall Type Manager, select Set Active, and select OK to exit to the drawing window.
2. Activate Walls in the Walls menu.
3. Decide which options you want to use in the Walls menu:
   - Trim Out – trims wall segments by the outermost line. If you activate this option, you cannot use Trim In. This option is available only when Clean is activated and Cap is not.
   - Trim In – trims wall segments by the innermost line. If you activate this option, you cannot use Trim Out. This option is available only when Clean is activated and Cap is not.
   - Clean – automatically cleans wall intersections.

   Shortcut: Press the \ key to toggle Clean on while creating a smart wall

   - Cap – places a cap at the beginning and ending of each wall segment.

   Shortcut: Press Shift-\ to toggle Cap on while creating a smart wall.

   If you activate both Cap and Clean, the beginning of the wall is capped, the linked segments are cleaned, and the ending segment is capped.
4. Draw your walls.

➔ To quickly access activated smart wall types:

1. Make sure the Types toolbar is displayed. If it is not, select Toolbars from the View pull-down menu, check the Types box, and click OK.
2. Select the wall type that you want to use from the Wall pull-down list on the Types toolbar.

➔ To edit smart walls:

1. Activate Edit Walls in the Walls menu.
2. Decide which function(s) you want to use on a particular wall segment:
   - Add Node – lets you add segments to an existing wall. Just click near the wall where you want to add the node, then drag your mouse and click to establish the position of the new node.
   - Poly to Wall – converts existing polyline edges into wall segments.
   - Swap In/Out – lets you swap the outside wall line with the inside and vice versa. This is easiest to see when the outside and inside wall lines are different colors.
3. Activate the function(s) you want to use, then follow the prompts shown on the Message toolbar.

➔ To add an adjoining wall to your drawing:

1. Press [A] to display the Walls menu and make sure Auto 3D is on.
2. Toggle on Clean and either Trim Out or Trim In (depending on the way you want to trim your walls).
3. Open the Wall Type Manager, highlight the wall you want to use, select Set Active, and select OK.
4. Draw the additional walls, starting at one of the existing smart walls.

➔ To cut an opening in a smart wall:

1. Press [A] to display the Walls menu and make sure Auto 3D is on.
2. Select Cut Wall to display the Openings menu.
3. Select the Layer that contains the wall you want to cut.
4. Toggle Cap on if you want to cap each end of the cut.
5. Select the wall where you want the cut to begin; then select the wall where you want it to end. If you toggled Cap on, each end is capped.

➔ To change a smart wall's base elevation (Z-Base), height elevation (Z-Height), and overall height:

1. Go to the Change menu by pressing [Alt] + [C].
2. Toggle on Z-Base, type a different value in the insert field, and press [Enter].

   If you change only the Z-Base of a smart wall, the bottom of the wall will move to the specified Z-Base. The top of the wall will be determined by the wall's height property. For example, if the original Z-Base was 0 and the Z-Height was 8, the wall was 8 feet high. By changing the Z-Base alone to 4, the wall would still be 8 feet high, making the top reach a height of 12.

3. Toggle on Z-Height, type a different value in the insert field, and press [Enter].

   If you change only the Z-Height or a smart wall, the top of the wall will move to the specified Z-Height. The base of the wall will be determined by the wall's height property. For example, if the original Z-Base was 0 and the Z-Height was 8, the wall was 8 feet high. By changing the Z-Height alone to 6, the wall would still be 8 feet high, making the base extend down to -2 feet.

   If you change both the Z-Base and Z-Height in the same operation, both the top and bottom of the smart wall will change. For example, if the original Z-Base was 0 and the Z-Height was 8, the wall was 8 feet high. By changing the Z-Base to 6 and the Z-Height to 16, the wall would now be 10 feet high.

➔ To switch between drawing smart walls and regular lines:

1. Draw the smart walls.
2. Press the [=] key on the keyboard and draw using regular lines.
3. Press the [=] key on the keyboard again and return to drawing smart walls.

When you are entering smart walls, and have the Walls menu displayed, snapping works like this:

- If Clean is activated, Pick or Snap projects the node point to the control line of the intersecting wall and cleans the intersection.
- If Clean is off, Pick or Snap places the node point at the selected point and does not clean the intersection.

Using Smart Doors

Of course, smart walls are fun to draw, but installing smart doors is even easier. You simply activate doors that you want to use in your drawing and then place them into the smart walls.

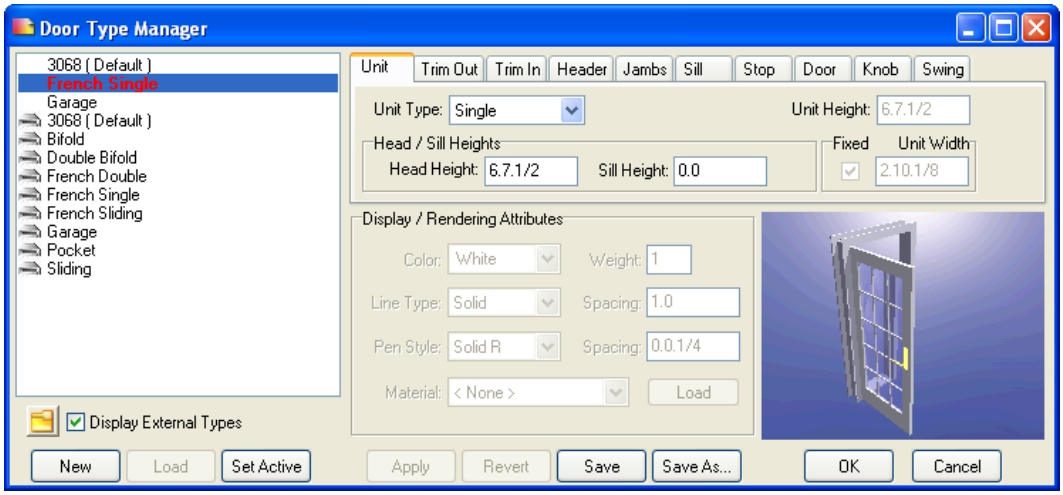
➔ To activate doors for insertion into smart walls:

1. Select the middle button on the Types toolbar to open the Door Type Manager dialog box. Alternatively, you can Press [A] to display the Walls menu, make sure Auto 3D is highlighted, select Doors to display the Doors menu, and select Manage.

Notice that the Door Type Manager has multiple tabs. This gives you more control over the components of the doors you include in your drawings. Each tab offers different display/rendering attributes that you may be able to change. Options that you cannot change are grayed out.

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2. Select the door type you would like to use instead of the default by double-clicking or by highlighting it and clicking on Load. Notice that when you make a selection, the illustration in the preview window and the door and line properties change.



3. Refine the door properties by using the options in the various tab sections of the Door Type Manager.

For most of the tab sections, you can change the display/rendering attributes to customize the doors for your drawing. Your alterations appear in the preview window when you change the focus to the next field.

- Unit – you can change the unit type (single, double, bi-fold, double bi-fold, sliding, pocket, and overhead) in addition to head and sill heights.

- Trim Out and Trim In – you can control the exterior and interior trim by specifying head and jamb width and thickness as well as head extension.
- Header – based on the options you checked, you can change the header's thickness, depth, and offset from the wall.
- Jamb – based on the options you checked, you can change the jamb's thickness, depth, and offset characteristics.
- Sill – if Include is checked, you can control the sill's thickness and its inside, outside, and side extensions.
- Stop – if Include is checked, you can control the stop's thickness and width.
- Door – toggle Include on to display the door in both 2D and 3D views. A parametric door will be drawn for both. If you check Use Symbol in the 2D section, you can select a symbol that will be displayed in 2D views in place of the Trim In, Trim Out, Header, Sill, Stop, and Knob. If Include Parametric Door is not checked, it will also include the Door and Swing. If Include Parametric Door is checked, you do not need to include the Door or Swing in your 2D symbol because they will be drawn parametrically. Make sure the symbol you create has the correct depth to match the wall's width, is wide enough to match the opening's width, and has the insertion point at the lower left outside corner of the wall opening. When Flush is checked, the door is flush with the wall opening; if it is not checked, you can enter an Offset value. When Use Symbol 3D is checked, you select a 3D symbol to use in place of the parametric door for 3D views.
- Knob – if Include is checked, you can control the appearance and position of the inside and outside door knobs. If you check Use Symbol and select a specific knob, you cannot change its diameter and extension.
- Swing – use this tab to describe the way the door's swing should appear in both 2D and 3D versions, including swing type, color, and angle. If you do not check Match Door Color, you can specify any color for the 2D swing arc or line. The Swing Angle for both 2D and 3D are applied to the door when the door is inserted. Once the door is created, they become a property of the door entity, not the door type. To change them after you created a door, you must change the property of each door with the Entity Properties Editor.

4. Select Apply to finalize your choices; then select OK if you want to use this door in your drawing without changing the basic description in the file.

Note: If you want to use this door with all the attributes you changed in future drawings, select Save As. Give the door a distinctive file name and select Save in the Enter door type filename dialog box. Whenever you want to use it later, just select it from the list that appears in the Door Type Manager, activate it, and insert it in future drawings.

Caution: If you select Save, your changes will overwrite the original door file.

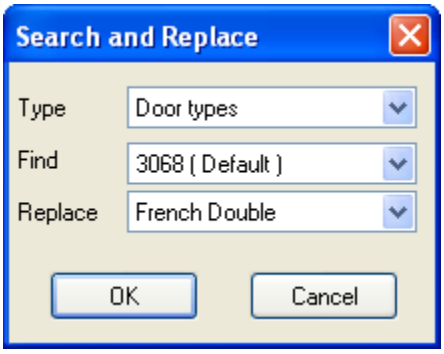
➔ To insert a smart door into your drawing from the Door Type Manager:

1. Highlight the door that you want to use from the ones you loaded into the Door Type Manager.
2. Click on Set Active and then select OK to close the Door Type Manager. Notice that the active door's name is red and the inactive ones that you loaded are black.
3. Make decisions about how you want to place the smart door into your drawing:
   - Toggle Sides on in the Doors menu if you want to place the smart door by sides. You are prompted to *Click hinge side of door*.
   - Toggle Sides off in the Doors menu if you want to place the smart door by its center. You are prompted to *Click center of door*.
   - Toggle Center Point on to add a snapping point to the center of the door.
   - Toggle Cut Wall on to automatically remove the smart wall where you place the smart door.
   - Anchor the door by its sill or head. Toggle At Sill on to anchor the door by its sill. Toggle At Sill off to anchor the door by its head.
   - Decide which layer you want to search for walls. Toggle One Layer on if you want to search only one layer. Toggle One Layer off if you want to search more than one layer. If you toggle One Layer off, another option appears on the Doors menu to allow you to toggle on Any Layer if you want to search all the "on" layers for smart walls where you can place the door.
4. Select the point on the smart wall where you want to install the door. You are prompted to *Click strike side of door and indicate direction of door swing*.
5. Click to indicate the way the door should open.
6. Continue placing copies of that door into your drawing where needed.
7. Place other smart doors that you loaded in the Door Type Manager by selecting them from the pull-down menu in the Types toolbar.

➔ To replace one smart door with another:

1. Select Search/Repl. from the Doors menu. The Search and Replace dialog box appears.

Note: If you select Search and Replace from the Edit pull-down menu, select Door types from the Type pull-down menu in the Search and Replace dialog box.



2. Select the door type you want to eliminate from the ones available in the Find pull-down menu. Only loaded smart doors are available.
3. Select the door type you want to take the place of those you indicated in step 2. Only loaded smart doors are available.
4. Click OK. The Search/Repl. menu appears.
5. Toggle on the search parameter you want to use:
   - Entity – lets you replace the doors you select on a case-by-case basis, leaving the other ones as you originally indicated.
   - Group – automatically replaces all the doors at once.
   - Area – prompts you to place a rubber band around the rectangular area where the doors need to be changed. Doors outside the area you indicated will not change.
   - Fence – prompts you to create a rubber band around the polygon-shaped area where the doors need to be changed. Doors outside the fence you indicated will not change.
   - Mask – lets you search for specific entities based on their properties.
   - Replace All – provides the ability to replace all entities on "On" layers.

➔ To change a smart door's Z-Base, Z-Height, and door height:

1. Go to the Change menu by pressing (Alt-C).
2. Determine which option (At Sill or At Head) was used when the door was created:
   - If At Head was toggled off, select Z-Base. This is the only way to affect the door's z-position. Selecting Z-Height will do nothing.
   - If At Head was toggled on, select Z-Height. This is the only way to affect the door's position. Selecting Z-Base will do nothing.

Using Smart Windows

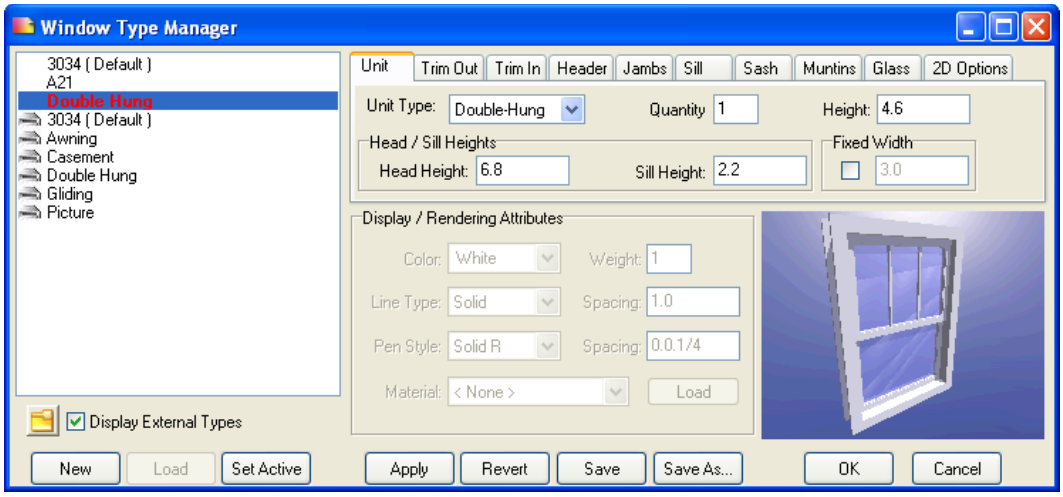
Installing smart windows is much like smart doors. You simply activate windows that you want to use in your drawing and then place them into the smart walls.

➔ To activate windows for insertion into smart walls:

1. Select the rightmost button on the Types toolbar to open the Window Type Manager dialog box. Alternatively, you can Press A to display the Walls menu, make sure Auto 3D is activated, select Windows to display the Windows menu, and select Manage.

Notice that the Window Type Manager has multiple tabs. This gives you more control over the components of the windows you include in your drawings. Each tab offers different display/rendering attributes that you may be able to change. Options that you cannot change are grayed out.

2. Select the window type you would like to use instead of the default by double-clicking or by highlighting it and clicking on Load. Notice that when you make a selection, the illustration in the preview window and the window and line properties change.



3. Refine the window properties by using the options in the various tab sections of the Window Type Manager.

For most of the tab sections, you can change the display/rendering attributes to customize the windows for your drawing. The changes are displayed when you change focus to another field.

- Unit – you can change the unit type (fixed, casement, awning, hopper, double-hung, sliding), quantity, plus head and sill heights.
- Trim Out and Trim In – you can control the exterior and interior trim by specifying head, jamb, and sill width and thickness as well as head and sill extension.
- Header – based on the options you check, you can change the header's thickness, depth, and offset from the wall.
- Jambs – based on the options you check, you can change the jamb's thickness, depth, and offset characteristics.

- Sill – if Include Sill is checked, you can control the sill's thickness and its inside, outside, and side extensions.
- Sash – if Include Sash is checked, you can control its thickness, width, and offset. The Use 3D Symbol option lets you use a 3D symbol to represent your window in 3D views instead of the parametric window. The % Open 3D setting defines the percentage that the window is open in 3D views. This setting is applied to each window when you place it in your drawing; however, it is a property of the window entity, not its type. To change the percent opening after adding a window to your drawing, use the window Entity Properties Editor. For casement or hopper windows, you can check Opens Inward.
- Muntins – if Include Muntins is not checked, the window is plain. If Include Muntins, Centered, and Use Slabs are checked, you can control their thickness, offset, and width. On the window's edges, you can use the full-width or half-width muntins. Alternatively, the edge can contain no muntins if you select None.
- Glass – if Include Glass is checked, you can control the thickness of the window, its offset position, and the number of horizontal and vertical panes. Depending on the Unit Type, options for Upper and Lower panes are available separately. If you check Centered, the Offset option is unavailable.
- 2D Options – you can specify a symbol to use in place of the Sill, Sash, and Glass, or any combination of the three in 2D views of your drawing. Remember that the depth of the symbol must match the width of your wall; the width of the symbol must match the width of your opening. The Unit Width will be defined by the width of the symbol you select.

4. Select Apply to finalize your choices; then select OK if you want to use this window in your drawing without changing the basic description in the file.

If you want to use this window with all the attributes you changed in future drawings, select Save As. Give the window a distinctive file name and select Save in the Enter window type filename dialog box. Whenever you want to use it later, just select it from the list that appears in the Window Type Manager, activate it, and insert it in future drawings.

➔ To insert the window into your drawing.

1. Make sure the Walls menu is displayed (if it is not, press A) and select Windows.
2. Decide which smart window you want to use. Either go to the Window Type Manager, highlight the loaded window you want, click Set Active, and select OK to exit the dialog box. Or select the window you want from the pull-down options available on the Types toolbar. The Windows menu appears.
3. Make decisions about how you want to place the smart window into your drawing:

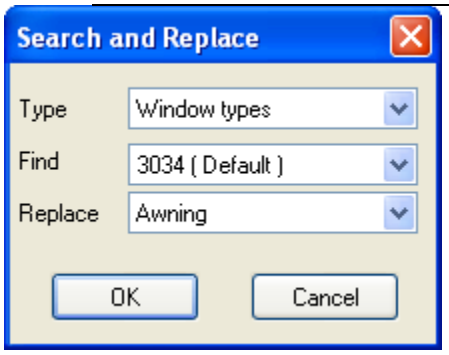
- Toggle on Sides if you want to place the smart window by its sides. You are prompted to Click one jamb of window to pick where the first side should go; then you are prompted to Click second jamb of window for the other side.
- Toggle Sides off if you want to place the smart window by its center point. You are prompted to Click center of window.
- Toggle on Center Point to automatically add a snapping point to the center of the window.
- Toggle Cutout on to automatically remove the smart wall where you place the smart window.
- Anchor the window by its sill or head. Toggle At Sill on to anchor the window by its sill. Toggle At Sill off to anchor the window by its head.
- Decide which layer you want to use. Toggle One Layer on if you want to search only one layer. Toggle One Layer off if you want to search more than one layer. If you toggle One Layer off, another option appears on the Windows menu to allow you to toggle on Any Layer if you want to search all the "on" layers for smart walls where you can place the window.

5. Select the point on the smart wall where you want to install the window.
6. Continue placing copies of that window into your drawing where needed.
7. Place other smart windows that you loaded in the Door Type Manager by selecting them from the pull-down menu in the Types toolbar.

➔ To replace one smart window with another:

1. Select Search/Repl. from the Windows menu. The Search and Replace dialog box appears.

If you select Search and Replace from the Edit pull-down menu, select Window types from the Type pull-down menu in the Search and Replace dialog box.



2. Select the window type you want to eliminate from the ones available in the Find pull-down menu. Only loaded smart windows are available.
3. Select the window type you want to take the place of those you indicated in step 2. Only loaded smart windows are available.

4. Click OK. The Search/Repl. menu appears.
5. Toggle on the search parameter you want to use:
   - Entity – lets you replace the windows you select on a case-by-case basis, leaving the other ones as you originally indicated.
   - Group – automatically replaces all the windows at once.
   - Area – prompts you to place a rubber band around the rectangular area where the windows need to be changed. Windows outside the area you indicated will not change.
   - Fence – prompts you to create a rubber band around the polygon-shaped area where the windows need to be changed. Windows outside the fence you indicated will not change.
   - Mask – lets you search for specific entities by their properties.
   - Replace All – provides the ability to replace all entities on "On" layers.

➔ To change a smart window's Z-Base, Z-Height, and window height:

1. Go to the Change menu by pressing [Alt] + [C].
2. Determine which option (At Sill or At Head) was used when the window was created:
   - If At Head was toggled off, select Z-Base. This is the only way to affect the window's z-position. Selecting Z-Height will do nothing.
   - If At Head was toggled on, select Z-Height. This is the only way to affect the window's position. Selecting Z-Base will do nothing.

Hint: Switching to an elevation view and using 3D Move is another way to accomplish this.

Search and Replace

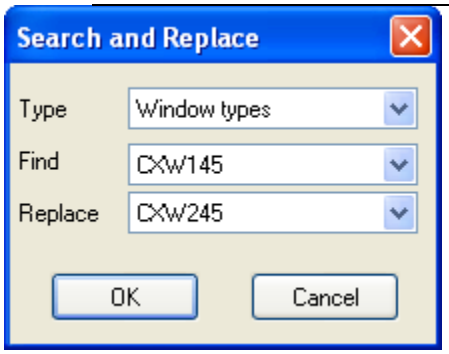
You can quickly replace smart walls, smart doors, smart windows, and materials by using this handy feature.

➔ To replace one activated smart entity or material with another:

1. Select Search and Replace from the Edit pull-down menu. The Search and Replace dialog box appears.
2. Use the options in the pull-down field to indicate what you want to find in your drawing and what you want to replace it with:
   - Type - choose one option from Wall types, Door types, window Types, or Materials.
   - Find – select what you want to eliminate from a list of the smart entities or materials activated in your drawing.

- Replace – select what you want to replace it with from a list of the smart entities or materials activated in your drawing.

You cannot access smart entities or materials that you did not use in your drawing. For example, you can replace smart window CXW 145 with CXW245 since both were already loaded within your drawing; however, you cannot replace it with C24 if you had not previously loaded it within the Window Type Manager.



3. Select OK. Select the entities to replace by using the standard selection menu or choose Replace All to replace all instances of the smart entity in your drawing.

Object Snapping

The enhancements make object snapping faster and easier to use. This faster response time is particularly helpful in larger drawings. You can now snap between and within symbols and XREFs (including nested levels). Also, you can snap to polyline bulge centers and XClip boundaries.

The dynamic snap indicator automatically displays available object snap locations in real-time, based on your object snap settings.

The Object Snap menu (accessed by typing Shift-X or selecting Object Snap from the Utility menu) has changed:

- No. Divisions – (replaces No. Points) allows you to search for a specified number of divisions.
- Offset – lets you snap to a specific offset from the endpoint or midpoint. Use Offset Dist to define the offset distance. For example, setting and Offset Dist of 0.4 will enable object snapping to points four inches from endpoints and midpoints.
- More Options – leads to a submenu that contains some of the options that were moved from previous versions of the Object Snap menu: Fast Symbol, Fast 3D, Quick, and Sel. Set.

3D Boolean Operations

This addition allows you to combine, intersect, and subtract portions of 3D entities in your drawing. You can access these operations via the 3D Edit or the Create pull-down menus.

➔ To use 3D Boolean operations:

1. Select Boolean 3D from the 3D Edit menu or select Boolean 3D from the Create pull-down menu. The main Boolean 3D menu appears. You are prompted to *Select first object*.
2. Select a 3D object in your drawing. The secondary Boolean 3D menu appears. You are prompted to *Select second object*.
3. Select the operation (these are mutually exclusive options) you want to perform:
   - Combine – merges (or adds together) two or more 3D objects.
   - Intersect – shows the portion where two or more 3D objects overlap.
   - Subtract – eliminates parts of 3D objects.
4. Select the second 3D entity to interact with the first one. Toggle Multiple on if you want to select more than one entity. At this point, DataCAD will make the necessary calculations and create a symbol which contains the 3D geometry defined by the Boolean operation.
5. Change the enlargement, rotation, offset, or scale of the resultant object if necessary, based on the options available in the Ins Symbol menu.
6. Position the symbol box where you want the results of the 3D Boolean operation to appear in your drawing.

Edit Planes

You can recall construction planes on a per-entity basis.

➔ To change your current view projection to match the edit planes of a 3D entity in your drawing:

1. Press and hold [Ctrl] while you hover your cursor over the entity.
2. Right-click to access the context menu
3. Choose Get Construction Plane.

Multi-line Text

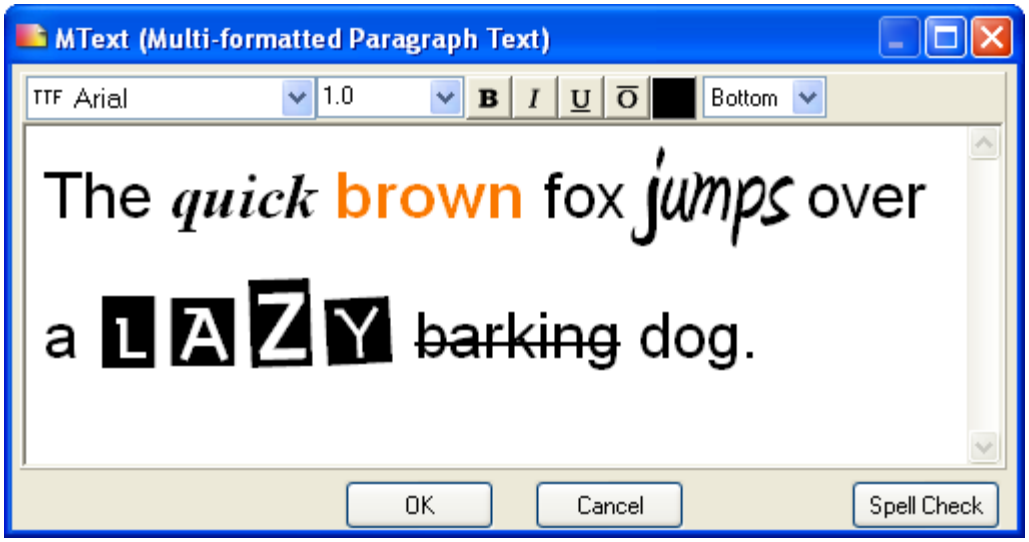
Now you can format multi-line text. It features wrap-around text boundaries and the ability to format the font, size, amendments (bold, italic, underline, overstrike, and color), alignment, and line spacing factor. Multi-line text is based on RTF (Rich Text Formatting) and is compatible with AutoCAD's MText.

➔ To use multi-line text:

1. Highlight Text in the Create pull-down menu, drag your cursor to the right, and select MText from the submenu. Alternatively, you press Alt-T to access the Text menu and select MText. The Text menu appears, and you are prompted to *Enter 1st point of paragraph text*.
2. Select features you want to modify in Text menu:

- Margins – sets the distance between the text and the boundary.
- Boundary – displays a boundary line around the text if you toggle this option on. If you toggled Boundary on, a Box Property button becomes available, allowing you to control the line type and weight, color, spacing overshoot, pen style, and spacing of the boundary box. Also, the Print toggle lets you enable (on) or disable (off) printing of the boundary box.
- Word Wrap – wraps text within the boundary when toggled on.
- Line Spacing – lets you select the amount of space between lines of text.
- Alignment – defines the text alignment properties (left, right, or center).
- Angle – defines the rotation angle of the text.

3. Point in your drawing where you want to place the text and click. This serves as an anchor point. The Edit Multiline Text dialog box appears.
4. Type the text in the dialog box and format it before placing it in your drawing.



- Select the font you want for various parts of your text from the pull-down menu.
- Select the font size from the pull-down box or enter a new size.
- Highlight portions of your text and use the B (bold), I (italics), U (underscore), or O (overstrike) buttons to add emphasis.
- Change the color of portions of your text by highlighting the word or phrase, clicking on the button beside O, picking the color you prefer from the Color Palette, and selecting OK.
- Select text position (Bottom, Center, or Top) from the pull-down menu.

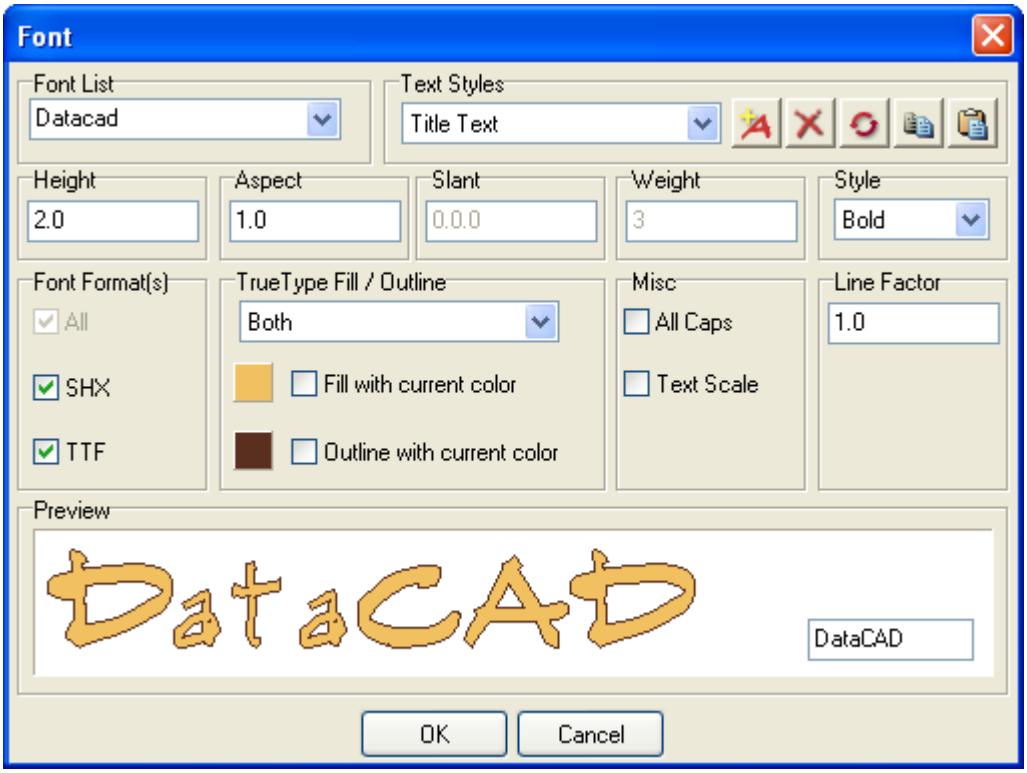
5. Select OK to place the text into your drawing. You are prompted to *Enter point to calculate text wrapping width*.
6. Move the cursor about to position the block of text. Click when you are satisfied with the way it looks.

Font Dialog Enhancements

Several additions to the Font (formerly, Set Text Parameters) dialog box make it easier to define the font and its characteristics. Characteristics that were once controlled via the Font menu are now included in the Font dialog box, including height (size), aspect, slant, weight, line factor (line spacing), text scale, and all caps. Perhaps the most useful new feature is the ability to create, save, and load text styles.

➔ To control font characteristics:

1. Point to Text in the Create pull-down menu, slide your cursor to the right, and select Text from the submenu. Alternatively, select  from the Icon I Draw toolbar or press Alt-T. The Text menu appears.
2. Select Font from the Text menu to open the Font dialog box.



3. Define the font's characteristics by selecting from pull-down menus, entering measurements in fields, and checking boxes. The results of your decisions appear in the Preview window.

- Font Format(s) – check the types of fonts (TTF, SHX, or All) you want to have available in the Font List.

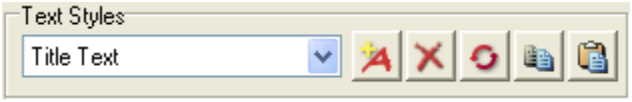
The CHR fonts from previous DataCAD versions are no longer used. DataCAD 12 automatically converts all existing CHR fonts to SHX format.

- Font List – select the font you want to use.
- Height, Aspect, Slant, and Weight – enter values into the fields.
- Style – select regular, bold, italic, or bold italic from the pull-down menu.
- TrueType Fill/Outline – define the fill and outline colors. If you check Fill with current color or Outline with current color, DataCAD uses the active layer's color for the text. If you want to select your own fill and outline colors, click on the color swatch, and pick from the Color Palette options.
- All Caps – turns all text you type to uppercase if checked.
- Text Scale – sets text size relative to current print/plot scale if checked.
- Text Styles – select from available styles.
- Sample text – type in the input field within the Preview window.

4. Select OK when you are satisfied with your font decisions. When you return to the Drawing window, the cursor changes to a text tool so that you can begin typing information.

➔ To create and use text styles:

1. Define font characteristics.
2. Select Text Styles options:



- Add – allows you to name your text style. Just type the style's name in the input field and select OK.
- Delete – lets you eliminate a text style. Display the style name, select the Delete button, and select Yes in the Confirm dialog box.
- Update – lets you change a text style's characteristics. Display the style name, make changes to the font's characteristics, and select the Update button.
- Copy – copies text style settings to the Windows clipboard. This lets you use the text styles you created in another drawing file.
- Paste – pastes text style settings from the clipboard. This lets you retrieve text styles you placed on the Windows clipboard via the Copy button from another drawing file and insert them into the current one.

3. Display the text style you want to use in the pull-down Text Styles box.

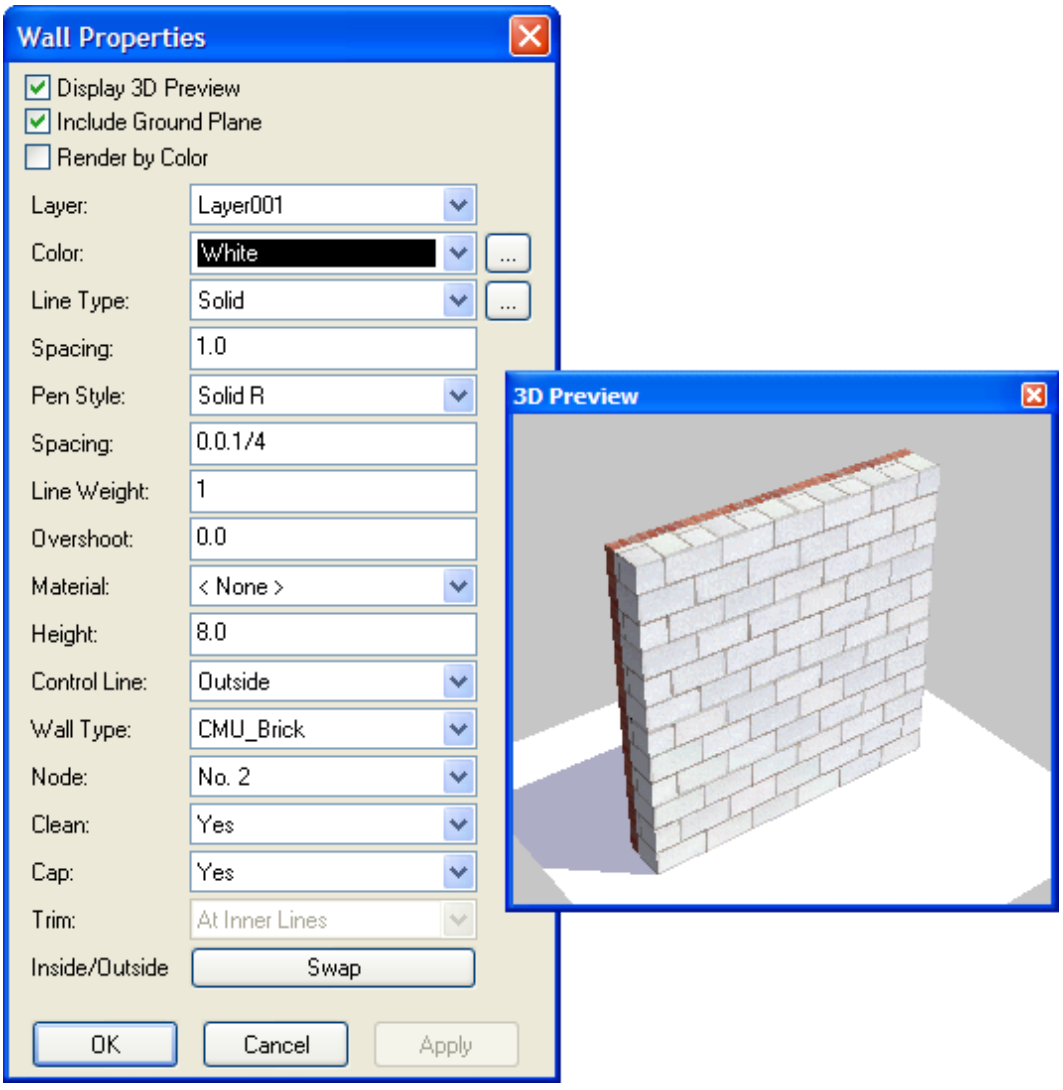
4. Select OK to exit the Font dialog box, position the font cursor in your drawing, and begin typing text.

Entity Properties Editor

You can access the properties of any entity in your drawing, change them, and apply the results immediately. The preview window lets you see how your changes affect three-dimensional entities.

➔ To control an entity's properties:

1. Place your cursor on an entity in your drawing. Then hold down the Ctrl key and simultaneously right-click (Ctrl-right click).
2. Select Properties from the pop-up menu. This displays the Properties dialog box and the Preview window.



3. Define the entity's properties:

- Preview options – use Display 3D Preview, Include Ground Plane, and Render by Color boxes to determine the way the object appears in the Preview window.
- Layer – select the layer that contains the object.
- Color – select the color of the line that will appear in your drawing.
- Line Type and Spacing – set the way the line will be drawn.
- Pen Style, Spacing, Line Weight, and Overshoot – set Pen Style for display.
- Material – select from materials you defined previously.

4. Select Apply to view the results in your drawing as well as the Preview window. If necessary, you can refine your decisions by making changes in the definition fields.
5. Select OK when you are satisfied with the results.

Rendering Settings for o2c

You can assign material definitions on a per entity basis. All these material definitions are embedded in your drawing. This lets you apply the same material to multiple entities in your drawing.

➔ To assign defined materials to other entities in your drawing:

1. Place your cursor on an entity in your drawing. Then hold down the Ctrl key and simultaneously right-click ([Ctrl] + right-click).
2. Select Material by Entity from the pop-up menu. This displays the Material Assignment (Entity) dialog box. It contains the embedded materials settings you created for individual entities in your drawing in the Drawing Materials pull-down menu.
3. Select the material definition you want to use and pick OK to exit to your drawing.
4. Display the model in the object viewer. DataCAD applies the material to the object you selected in step 1.

Symbol Enhancements

You can edit unexploded symbols on the fly. You can save these changes to the current drawing only and/or to your hard disk. Also, you can save the changes to a new symbol definition.

➔ To edit an unexploded symbol in your drawing:

1. Place your cursor on the symbol and press Ctrl-right click to expose the pop-up menu.
2. Select Symbol Tools, slide your cursor to the right to see the submenu, and pick Edit Symbol. The symbol you selected appears along with the Edit menu.
3. Make changes to the symbol.

4. Select Save As from the File pull-down menu. Supply a new file name and select Save to store the edited symbol to your hard drive. To overwrite the symbol definition on the hard drive, you must first save the changes to the symbol in the current drawing. Next, click the folder icon on the Symbol Browser and choose "Drawing" to browse symbols in the current drawing. Locate the revised symbol, right-click on it and choose "Save As," then choose the existing file to overwrite.

Textures, Backgrounds, Hatch Patterns

Seamless textures and backgrounds are available to add realism to your renderings. Both textures for various materials and backgrounds are found in the Textures folders.

Many new hatch patterns are in Support Files in the Hatch Patterns folder.

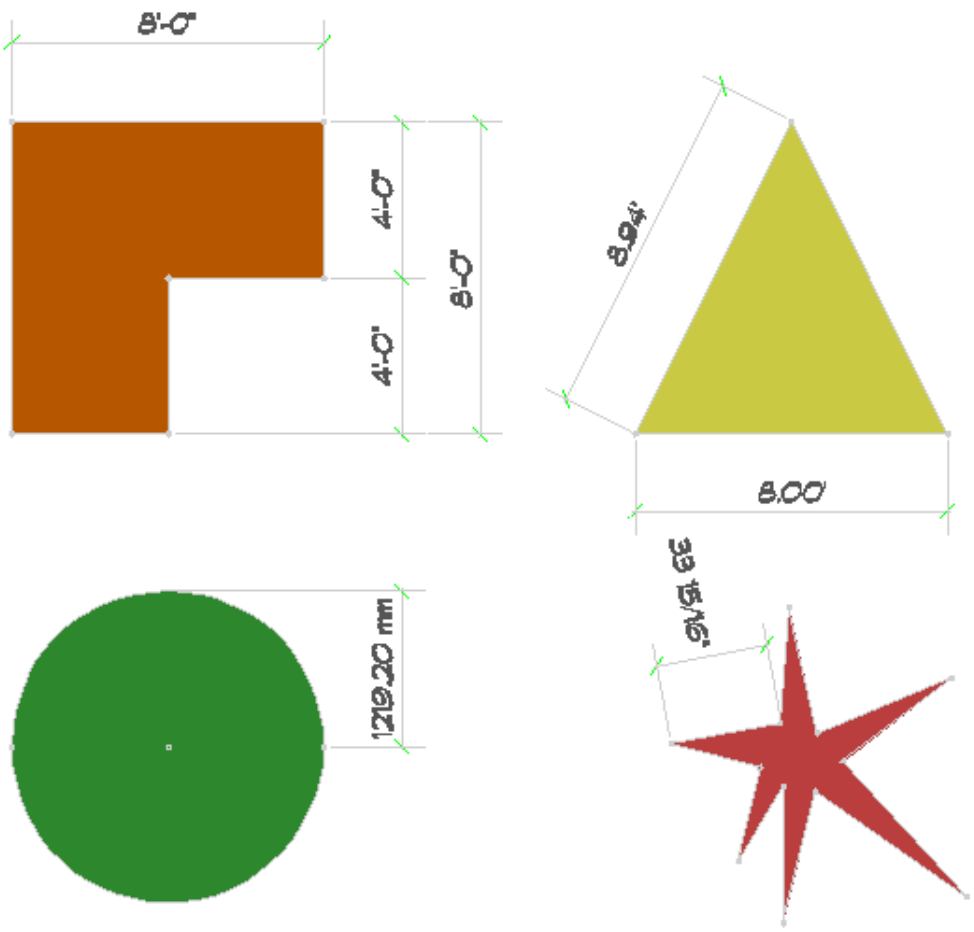
Dimension Enhancements

You can assign a unique scale type to any associative dimension. This allows you to maintain multiple dimensioning formats within the same drawing.

➔ To assign a unique scale type to different parts in a drawing:

1. Select Dimensions from the Utility menu or press D to display the Dimensions menu.
2. Select Linear.
3. Select Lock Scale.
4. Choose the measurement scale type (Drawing, Arch., Eng., Decimal, etc.) you want to use to dimension something in your drawing. Right-click to return to the previous menu.
5. Toggle on the placement option (Horizontal, Vertical, Aligned, or Rotated) you want to use.
6. Object snap to the first point of the distance you want to dimension.
7. Object snap to the second point of the distance you want to dimension.
8. Pull the dimension line and click when you are satisfied with its position. If DataCAD cannot automatically position the dimension measurement, you can place it where it will fit on your drawing.

In the following example, Lock Scale allowed us to use different scale types to dimension selected edges of closed polylines.



Clipping Changes

You can clip symbols using either rectangular or irregularly shaped polyline boundaries.

➔ To use an irregular polyline to clip a symbol:

1. Select Clip Cube from the 3D Views menu. Alternatively, click on the Clip Cube icon in the Viewer toolbar.
2. Select Symbol Clip from the Clip Cube menu. The SClip menu is blank.
3. Select the symbol in your drawing that you want to clip. The SClip menu contains options.
4. Select New Cube. The New Cube menu appears.
5. Select Polyline and draw the shape you want by extending the polyline and clicking where appropriate. When the polyline meets your wishes, right-click to end the clip.
6. Toggle Clip On in the SClip menu to display the results in your drawing window.

➔ To use an irregular polyline boundary to clip an XREF:

1. Insert an XREF into your drawing.

2. Select Clip Cube from the 3D Views menu. Alternatively, click on the Clip Cube icon in the Viewer toolbar.
3. Select XREF Clip from the Clip Cube menu. The XClip menu is blank.
4. Select the XREF in your drawing that you want to clip. The XClip menu contains options.
5. Select New Cube. The New Cube menu appears.
6. Select Polyline and draw the shape you want by extending the polyline and clicking where appropriate. When the polyline meets your wishes, right-click to end the clip.
7. Toggle Clip On in the XClip menu to display the results in your drawing window.

Pen Styles/Pen Widths

Based on the Windows line type format, you can apply scale-independent patterns to your DataCAD line types. These patterns are compatible with the Windows Metafile format and convert directly to Adobe PDF format. This allows you to apply non-standard patterns such as a property line to curves.

New Toolbars

The Notate and Types toolbars are helpful additions that can speed up the drawing process.

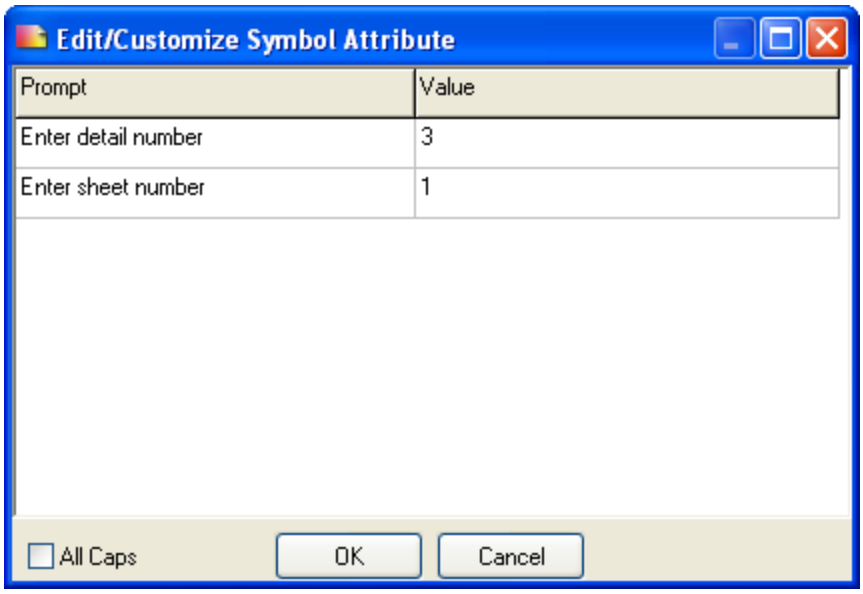


➔ To control the scale of notations:

1. Display the Notate toolbar.
2. Open the Set symbol scale pull-down menu on the toolbar.
3. Select the scale option that you want to use.

➔ To add and control notations in your plots:

1. Select the option you want to use from the Notate toolbar.
2. Point where you want that notation to appear. Then click. For many options, the Edit/Customize definition box appears.



3. Supply information in the Value fields. Select OK when you are finished. The notation is added to your plot.

The Types toolbar lets you quickly manage and use the smart walls, doors, and windows.

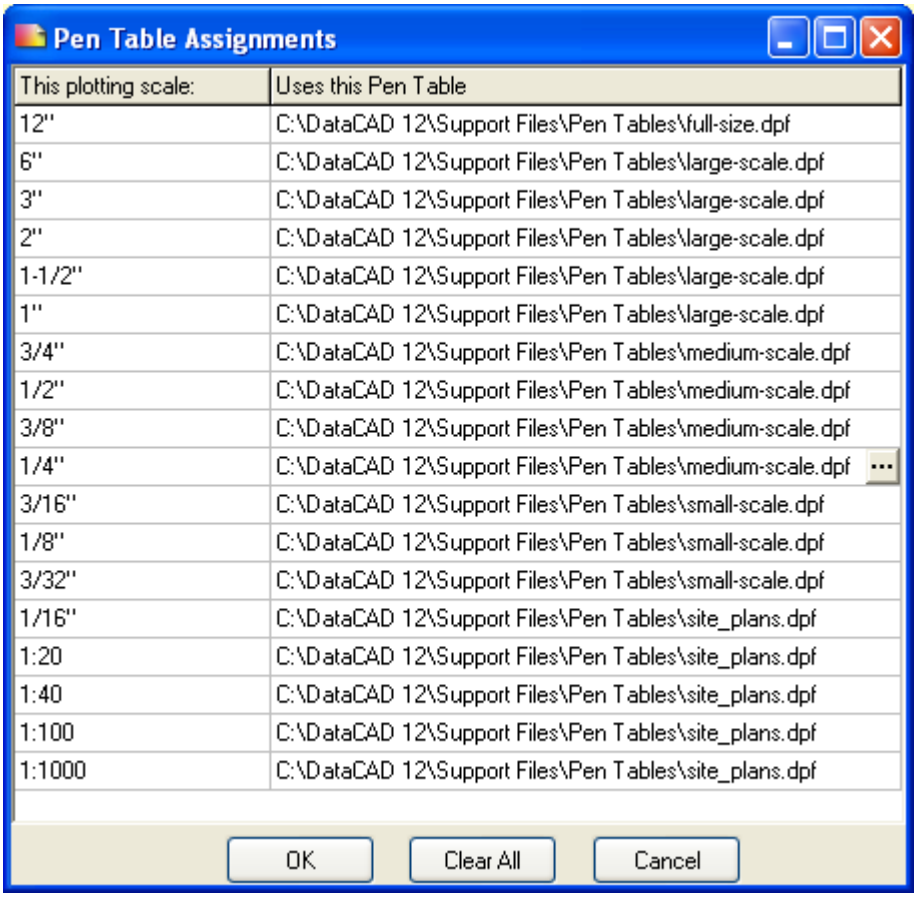


Plotting Enhancements

You can save your current plotter and Quick Layout settings to a file that you can load into other drawings. Also, you can assign unique pen tables to specific scales. This means that large-scale drawings and details can have thicker pens and small-scale drawings can have thinner ones. You can assign unique pen tables to specific multi-scale plotting details.

➔ To assign pen tables to specific scales:

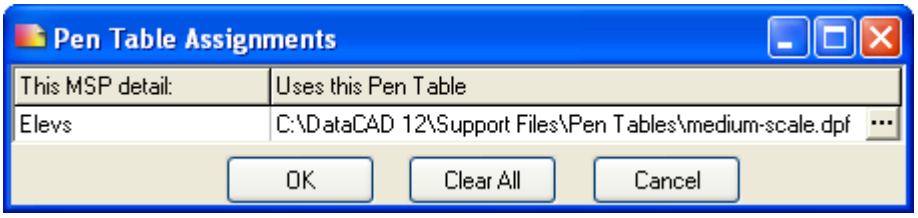
1. Select Scale to Pen in the Print/Plot menu to display the Pen Table Assignments dialog box.
2. Click in the appropriate *Uses this Pen Table* field.
3. Open the Load pen file dialog box by clicking on the three-dot button that appears at the end of the field you selected.
4. Select the pen file you want to use for that scale and click Open.



➔ To assign unique pen tables to specific multi-scale plotting details:

1. Select Multi-layout from the Print/Plot menu.
2. Add one or more details to the sheet. When you hover over a detail with your cursor, DataCAD highlights its extents, provides its scale, and displays its name as a tooltip.

   Detail names may contain up to 80 characters.183.
3. Place your cursor on a detail and press Ctrl-right click. This displays a pop-up menu.
4. Select Pen Table. The Pen Table Assignments dialog box appears.
5. Supply the pen table you want to use for that detail and click OK.

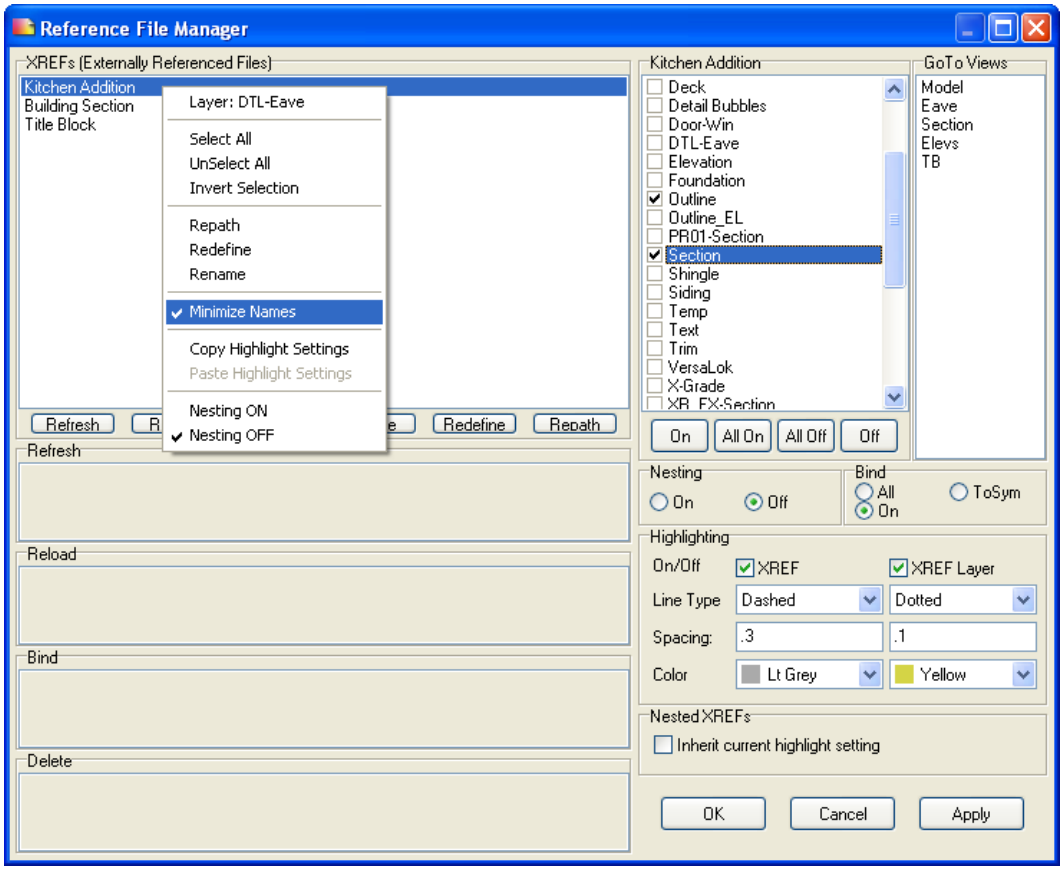


Multiple Private Clipbooks with Preview

DataCAD stores up to 10 private Clipbooks that contain the most recent data you copied from your drawing to the Windows Clipboard. Whenever you select Paste, you can re-select any of your Clipbooks. A preview of each Clipbook's contents is shown when you highlight the item in the menu.

Reference File Manager Enhancements

You can assign XREF Highlight settings on a per-XREF and/or XREF Layer basis. The Reference File Manager dialog box allows you to drag-and-drop between the Loaded, Refresh, Reload, Bind, and Delete lists. You can also assign custom names to XREFs. The Inherit Current Highlight Setting option for nested XREFs is remembered on a per-drawing versus global basis.



➔ To assign highlight settings:

1. Select Reference File Management from the Insert pull-down menu, slide your cursor to the right, and select Manager from the submenu. Alternatively, you can press Ctrl-R to display the Reference File Manager dialog box.
2. Select a loaded reference file to display its layers and views.
3. Set highlighting options:

- XREF – sets highlights for the entire XREF when this box is checked. You can select the line type and color from the pull-down menus. Supply a value in the Spacing field.
- XREF layer – sets highlights for one layer at a time when this box is checked. You must first highlight the name of the layer you want to use in the list of available XREF layers.

If XREF highlighting is on and a layer within the XREF is also highlighted, the layer highlight settings supersede the overall XREF highlight settings.

Change Menu Enhancements

Two additional options are available in the Edit/Change/Text menu. You can now change the text angle and alignment.

For the angle option, you simply supply the new value and press Enter.

For the alignment option, the Alignment submenu offers additional choices. Left, Center, and Right are mutually exclusive; the same is true for Top, Middle, and Bottom. Reversed lets you draw text reversed about its height. Mirrored lets you draw text mirrored about its width.

DataCAD 11

DataCAD 11 has many new and improved features. Some of these features are designed to help you increase productivity. For example, the new Symbol Browser allows you to rapidly find, place, customize, and manage symbols that you use in your drawings. The Triangulated Irregular Network (TIN) modeler and other improved polygon tools have been added to DataCAD 11.

Many interface enhancements are included in DataCAD 11. All the interface elements in DataCAD 11 are based on the visual style of your current desktop theme. DataCAD 11 provides Windows® 2000-style properties and allows you to apply Windows XP Themes. It is easy to dock and undock the toolbars and menus; you can even have them "float" on your desktop so that you can increase the drawing area.

Compatibility with other programs is improved. The new double-precision floating point database (accurate to ~14 decimal places instead of the ~7 of earlier versions) makes DataCAD 11 as accurate as AutoCAD®. Exchanging drawings with colleagues using other CAD programs is easier as a result.

Program directory and file maintenance changes also affect your productivity. New import and export enhancements improve your ability to work with drawings from other programs. Backup and recovery routines have been improved, too.

Productivity Features

Let us look at the new and/or improved productivity features that you can put to work immediately.

The new Symbol Browser makes it easy to use supplied and custom symbols and templates. Inserting a symbol into your drawing involves little more than selecting it from the Symbol Browser and dropping it where you want it.

The new polygon tools include the Triangulated Irregular Network (TIN) modeler, the ruled surface modeler, 3D knife, and sectioning tool. The TIN modeler is especially helpful for developing a site model based on a surveyor's data. The ruled surface feature is especially helpful when you are designing roof contours. The 3D knife provides a multitude of options for slicing polygons. With the sectioning tool, you can generate a 2D section from your 3D model.

Symbol Browser

DataCAD makes it easy to use symbols and templates in your drawings. With just a few mouse clicks, you can open the appropriate folder, display the symbols in the browser, and select the ones you want to use into your drawing. If you developed custom templates with older versions of DataCAD, you could open them in the Symbol Browser, too. In effect, the Symbol Browser treats file folders as templates that contain collections of symbols.

Shortcut: The hotkey [Ctrl]+T toggles the Symbol Browser on and off.

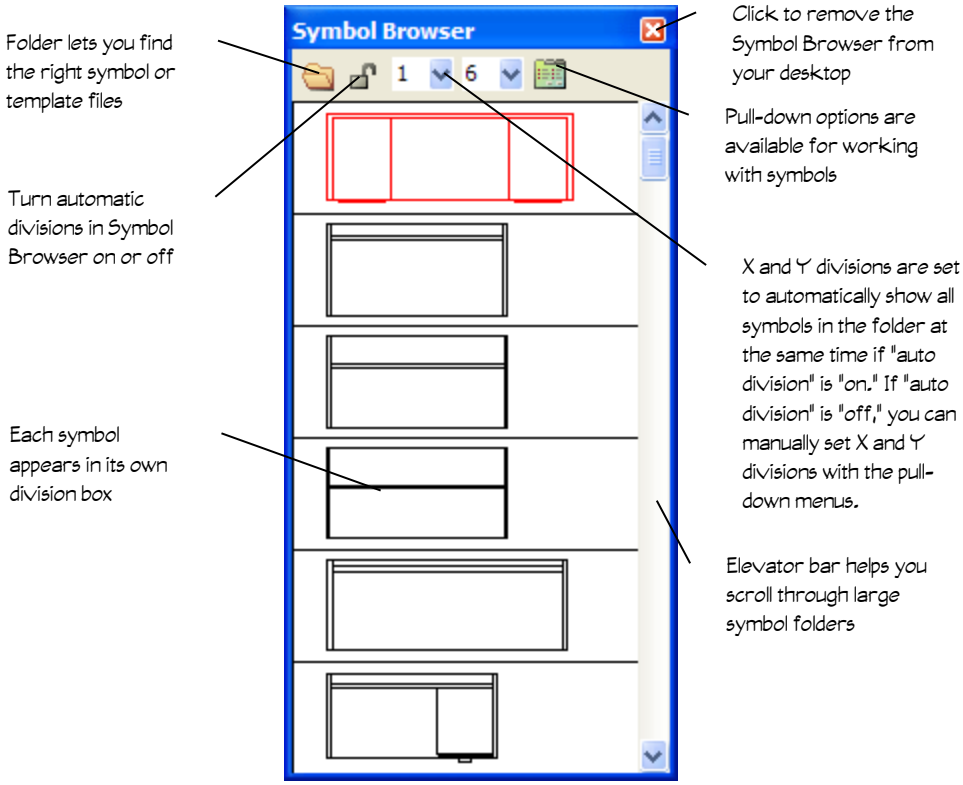
Note: In the Template Window, Symbol Browser, and Insert Symbol dialog, .DSF files supersede .SM3 files.

Positioning the Symbol Browser on your DataCAD Desktop

When you first open DataCAD, the Symbol Browser is docked along the right side of your Drawing Window. Since it is a toolbar, you can undock the Symbol Browser and position it anywhere on your desktop or hide it from view altogether.

➔ To undock the Symbol Browser:

1. Place the cursor along the upper margin of the Symbol Browser. Move the cursor until it is shaped like a cross with arrows at its tips.
2. Click and keep the mouse button depressed to grab the Symbol Browser.
3. Drag the Symbol Browser away from the side of the Drawing Window and position it elsewhere. Notice that Symbol Browser appears at the top of it.

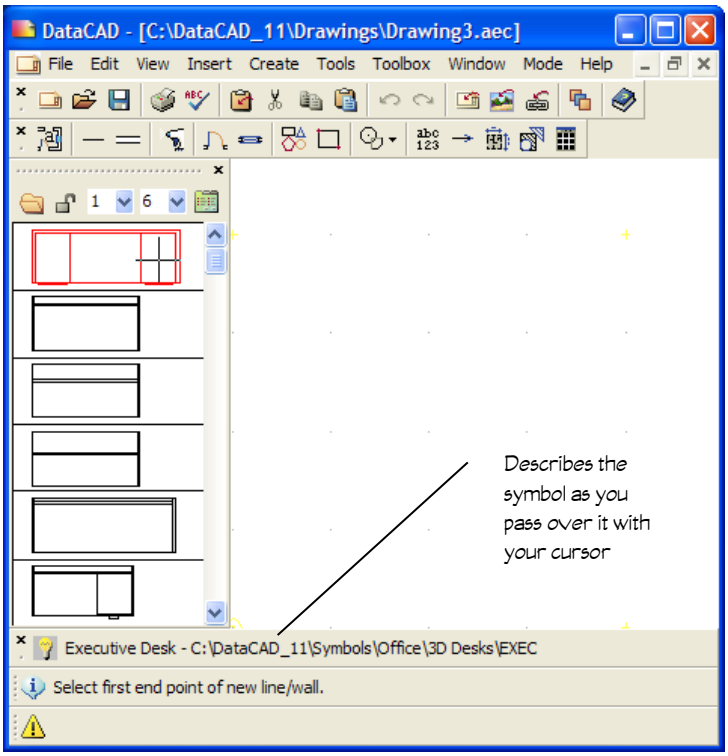


Undocked Symbol Browser

You can dock the Symbol Browser at either the right or left edge of the Drawing Window; however, you cannot dock it at the top or bottom edge. When you originally open DataCAD, the Symbol Browser is docked at the right edge.

➔ To dock the Symbol Browser:

1. Click and hold on the title bar near Symbol Browser.
2. Drag the Symbol Browser to the right or left margin of the Drawing Window until the title bar disappears. To dock the Symbol Browser to the left of the Edit/Utility menu bar, simply continue dragging it leftward until it pops into place.

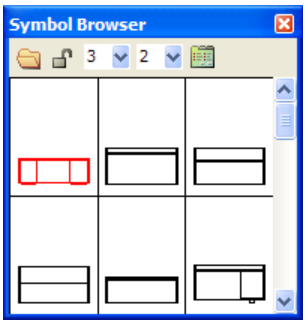


Symbol Browser docked at the leftmost edge of the screen

DataCAD automatically calculates the divisions to display all the symbols in the folder you selected. This occurs when the lock on the Symbol Browser menu bar is "on" (or depressed) and the pull-down number menus are grayed (this means you cannot change them).

➔ To specify the number of X and Y divisions for the Symbol Browser:

1. Click on the auto divisions icon on the Symbol Browser menu bar. When the drop-down arrows appear next to the X and Y division numbers, you can change these values manually to suit your needs.
2. Select the number of X divisions you want the Symbol Browser to display.
3. Select the number of Y divisions you want the Symbol Browser to display.



X and Y divisions can be set manually

Selecting and Placing Symbols

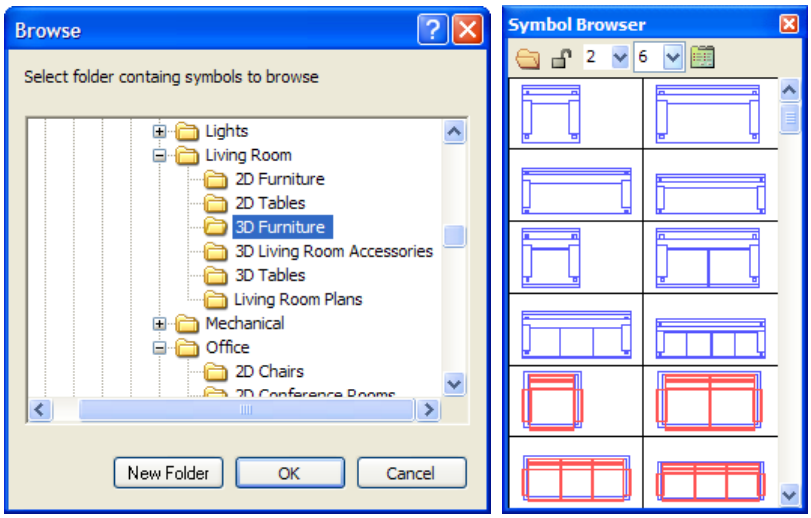
Symbols that you can use in your drawing are contained in either DataCAD's Symbol or Template directories.

Clicking the arrow to the right of the folder gives you three options:

- *Folder* shows you all the symbol files in the DataCAD Symbol directory.
- *Template* displays the files in the DataCAD Template directory. The templates in this directory were either supplied in an earlier version of DataCAD or were created in your office to meet specific clients' needs. Templates hold collections of symbols.
- *Drawing* contains just the symbols you placed in the current drawing. DataCAD remembers this information so that you can have quick access to the symbols you have already used and may want to re-use elsewhere in your drawing.

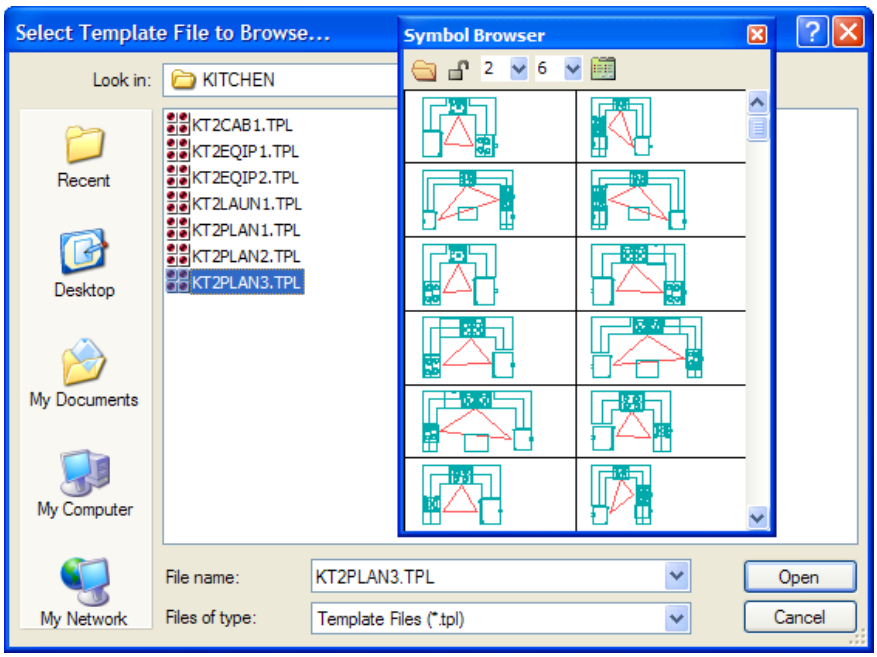
➔ To open a collection of symbols:

1. Click on the arrow to the right of the folder in the Symbol Browser.
2. Select Folder, Template, or Drawing from the pull-down list.
    - If you select Folder, the Browse window opens. Notice that as you click on different folders, their contents appear in the Symbol Browser. Click OK when you find the folder that contains the symbol(s) you want to use in your drawing.



Symbols contained in the folder in the Browse window simultaneously appear in the Symbol Browser

- If you pick Template, the Select Template File to Browse window opens. When you click on a file in the list, its collection of symbols is displayed in the Symbol Browser. Click Open when you find the template file that contains the symbol(s) you want to use in your drawing.



Template file contents are displayed in the Symbol Browser

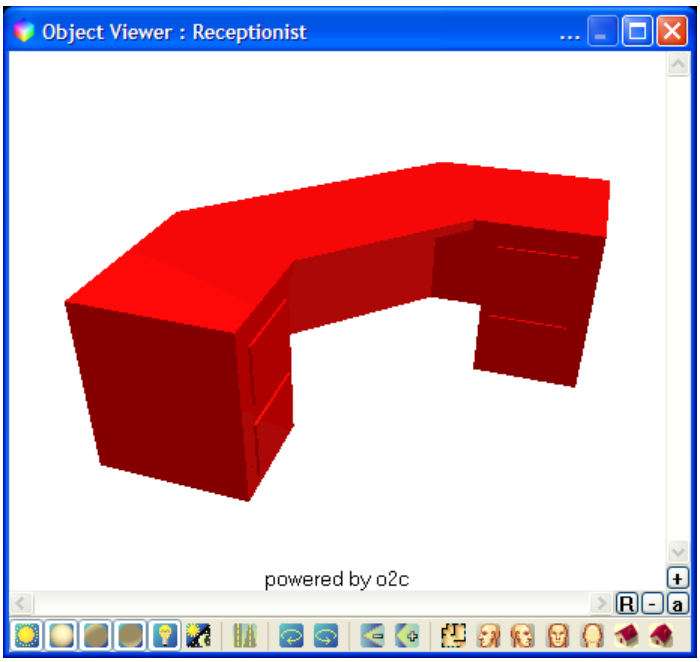
- If you choose Drawing, DataCAD displays the symbols you used already in the current drawing.

3. Open the file that contains the symbols you want to use in your drawing. Once you open a file, the Browse or Select Template File to Browse window closes, allowing you to work directly with the symbols.

You are now ready to place the symbols into your drawing. Basically, you select a symbol from the Symbol Browser and place it into your drawing where you want it to appear.

➔ To look at an object you are considering placing in your drawing:

1. Move your cursor over the symbol you want to examine.
2. Right-click to display a pop-up menu.
3. Select Object Viewer from the menu. The item appears in the Object Viewer window where you can examine it.

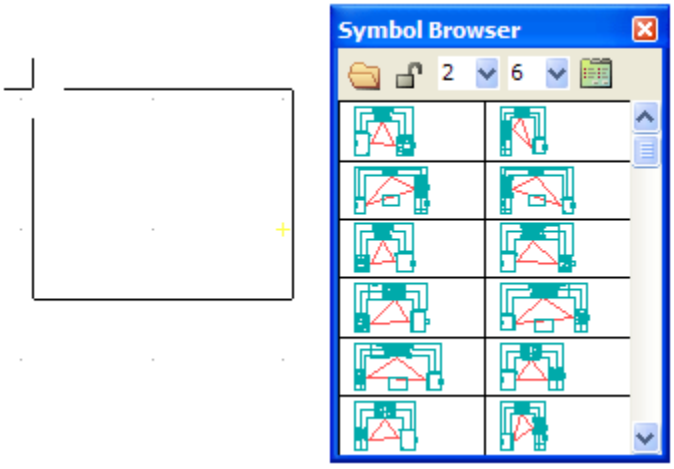


The symbol appears in the Object Viewer so that you can examine it

4. Click on the X in the upper right corner to close the Object Viewer.

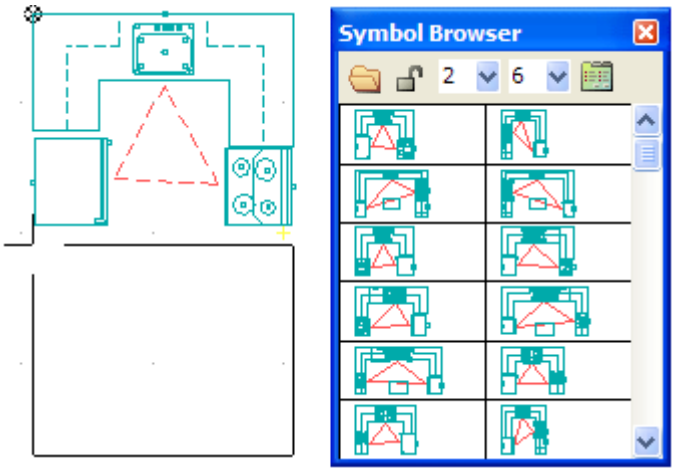
➔ To insert a symbol into your drawing:

1. Click on the symbol you want in the Symbol Browser. This attaches a particular symbol to your cursor.
2. Position your cursor where you want the symbol to appear in your drawing. Notice that the symbol assumes a rectangular shape until you decide where you want to place it.



The symbol assumes a rectangular shape as you drag it into your drawing

3. Click when the rectangular shape is positioned where you want to place the symbol into your drawing. Notice that a rectangular shape is still attached to your cursor. This allows you to "place" many copies of a symbol into your drawing. (For chairs, replication may be a convenient feature, but most houses only require one kitchen.)

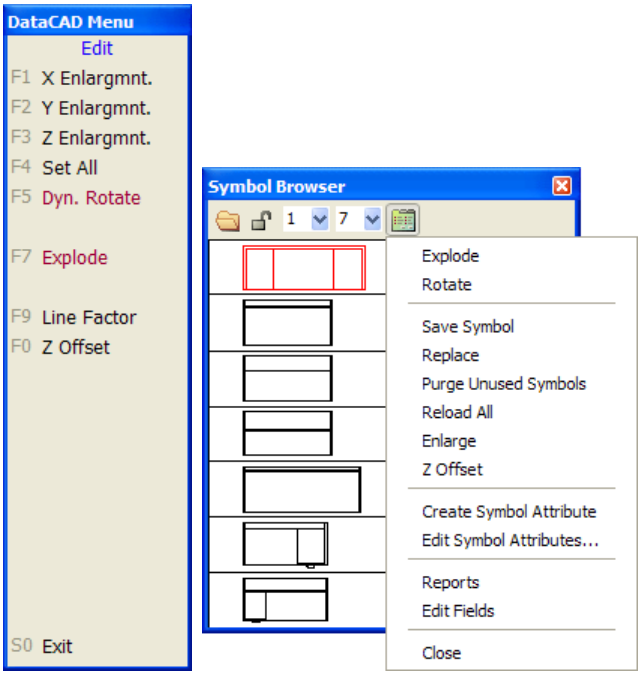


You can place many copies of the symbol into your drawing

4. Right-click when you are finished placing the symbol(s) into your drawing. The cursor returns to its normal shape, allowing you to continue working in your drawing or to select and place other symbols.

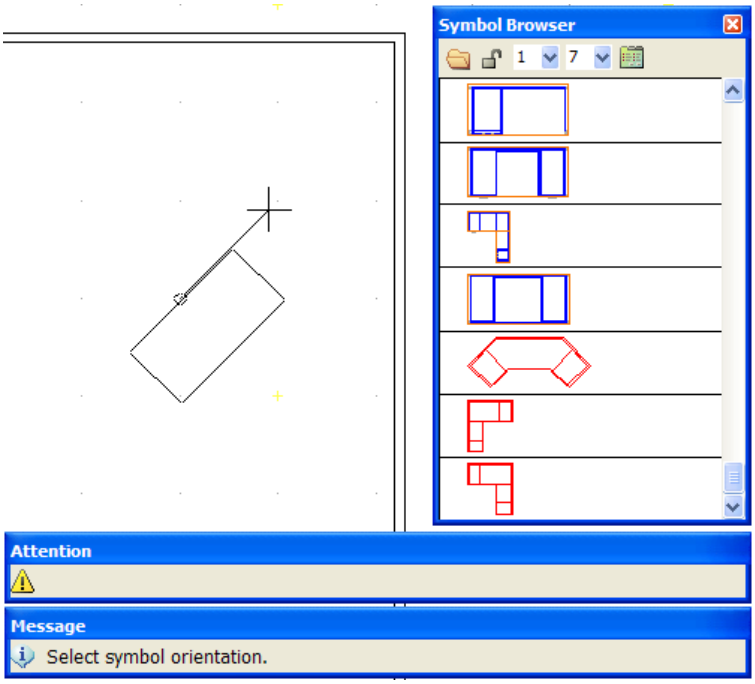
Controlling Symbols

You do not have to live with the symbols as they are; you can change them in several ways by using the Options pull-down menu. For example, you can enlarge, offset, or rotate them.



The Options menu lets you further control the symbols you add to your drawing. The left menu offers related options when you insert a symbol.

The Error Bar tells how the symbol will behave within the drawing. In the following example, the desk symbol will be rotated, enlarged, and offset based on the options that you set. These settings remain in effect for placing all future symbols until you change one of the options.



The Error Bar summarizes settings you selected through the Options menu

➔ To rotate a symbol:

1. Select Rotate from the Symbol Browser's Options pull-down menu. The Edit menu appears and you are prompted to *Position symbol on drawing*.
2. Decide whether you want to rotate the symbol dynamically with your cursor or use a fixed rotation angle. When Rotate is on, you can place the symbol dynamically; when Rotate is off, you are prompted to specify the angle you want.

If you opted for a fixed angle instead of dynamic rotation, remember to set the angle back to zero. If you do not do this, all future symbols will be placed at the rotation angle you specified. For example, if you set a 30-degree rotation angle while placing a desk symbol and neglect to change it back to zero, the next symbol (perhaps a conference table) will also appear at a 30-degree angle.

➔ To enlarge a symbol:

1. Select Enlarge from the Symbol Browser's Options pull-down menu. The Enlarge menu appears and you are prompted to *Select symbol enlargement factor to change*.
2. Choose X Englargmnt, Y Enlargmnt, Z Enlargmnt, Line Factor, or Set All from the Enlarge menu; select an enlargement value from the list or type your own; and press (Enter). Notice that the enlargement factor(s) you entered are displayed on the Error Bar.

Hint: If you want to reduce the size of a symbol, use a decimal value (such as .25). If you want to mirror the symbol, enter a negative value (such as –1).

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3. Right-click, or click on Exit, or press (Shift-F10) to leave the Enlarge menu.
4. Click on the symbol that you want to drag into your drawing.
5. Drag the symbol into your drawing with your mouse. You are prompted to *Position symbol on drawing*.
6. Click the left button when the symbol is in the correct place. The enlarged symbol appears in the drawing. Continue placing additional copies of the symbol by repeating this step.
7. Right-click to stop placing additional copies of the symbol into your drawing.

➔ To offset the insertion height of symbols:

1. Select Z Offset from the Symbol Browser's Options pull-down menu. The Z Offset menu appears, and you are prompted to *Enter Z-offset for symbols*.

184. 2. Supply the value and press (Enter). Notice that the Z-offset you entered is displayed on the Message Bar.

185. 3. Click on the symbol that you want to drag into your drawing.

186. 4. Drag the symbol into your drawing with your mouse. You are prompted to *Position symbol on drawing*.

5. Click the left button when the symbol is in the correct place. The symbol appears in the drawing at the Z-offset you supplied in step 2. Continue placing additional copies of the symbol by repeating this step.

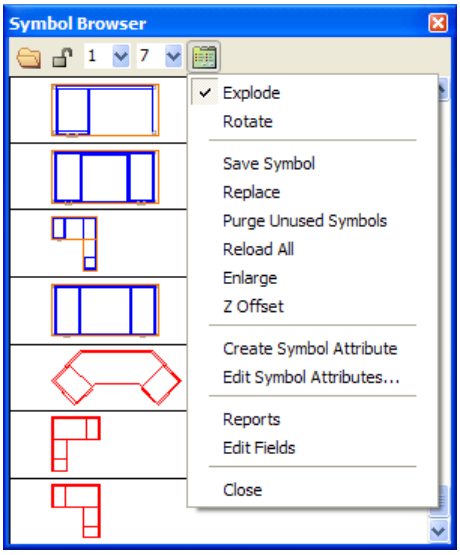
187. 6. Right-click to stop placing additional copies of the symbol into your drawing. You can use the Object Viewer in the View pull-down menu to see the effect of the Z-offset you applied.

Editing Symbols

If you want to edit or change the symbol, you must first convert it into separate lines and/or arcs. In other words, you will "explode" the symbol back into its component drawing elements. You can do this when you insert the symbol into your drawing or after the symbol has been inserted. Once the symbol has been edited, you can reform the symbol lines and arcs into a single symbol entity and save it back into the Symbol Browser and then update the symbols already in your drawing.

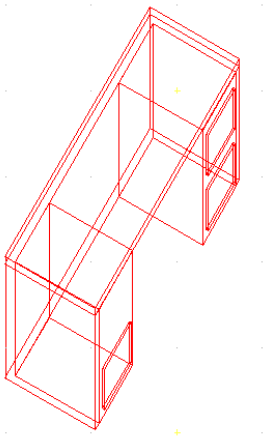
➔ To explode a symbol:

1. Click on the Options icon in the Symbol Browser.
2. Select Explode. When this function is "on," a checkmark appears to the left of the word "Explode."



When Explode is activated, you can convert a symbol into lines and/or arcs

3. Click on the symbol you want to use and drag it into your drawing.
4. Click the left mouse button to place it. The exploded symbol appears in your drawing. You can repeat this step to continue placing copies of the exploded symbol.
5. Right-click to stop placing copies of this symbol.
6. Make changes to the exploded symbol.



In this exploded version of the desk symbol, the upper left drawer was erased

1. Select and place other symbols you want to drag into your drawing as exploded lines and/or arcs.
2. Deactivate Explode in the Symbol Browser's Options menu when you are finished. Until the checkmark to the left of Explode disappears, all symbols that you place will be converted to lines and/or arcs in your drawings.

When you activate Explode in the Symbol Browser's Options menu, the left Layers menu includes an Explode button. This is how you explode a symbol when you place it. If you want to explode a symbol that you previously placed in your drawing, select Explode from the 3D Edit menu.

Creating New Symbols

You can create and save your own symbols in a new or existing folder.

➔ To create and save a symbol:

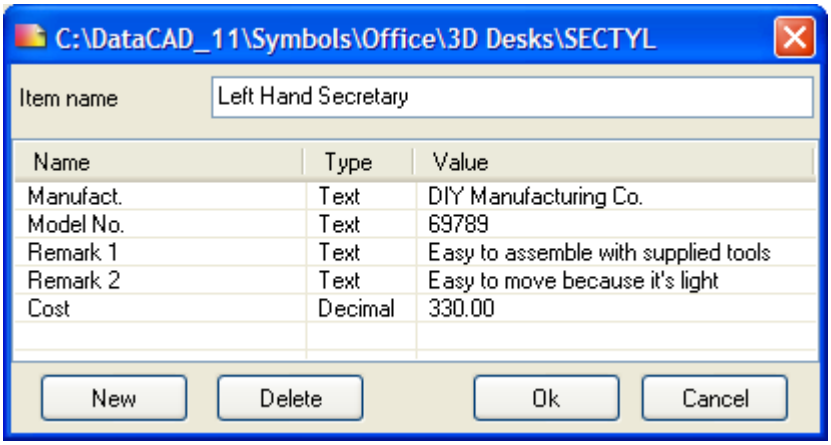
1. Draw something that you want to use as a symbol.
2. Select Save Symbol from the Options pull-down menu in the Symbol Browser. The contents of the active symbol folder appear in a window and you are asked to *Enter name of symbol file to be saved*.
3. Type a name for the item you drew in step 1. Then press (Enter) or click on Save. The Save Symbol menu appears.

   The file name is limited to 255 characters.

   You could save the item in another folder or create a new folder by using the icons at the top of this window.

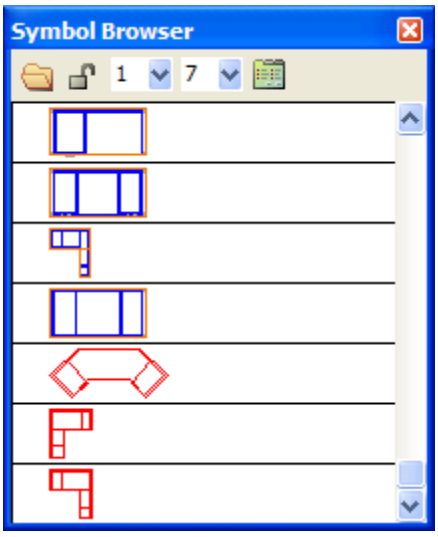
   ---

4. Select the entities you drew in step 1. The items you selected are highlighted. You are prompted to *Select an insertion point for symbol*.
5. Click once in the Drawing Window to create a "handle" that will help you place your symbol. A symbol descriptor window appears.



Describe the item you are saving as a symbol

6. Fill in the fields with information about the item. Double-click in a field and supply information in the Name or Value columns. When you double-click on the Type column, you can select Text, Decimal, or Integer for the information that should appear in the Value column.
7. Click on Ok when you have finished describing the item. The object you created appears in the Symbol Browser. Once an item you created is designated as a symbol, you can put clones of it anywhere in the drawing on your screen.



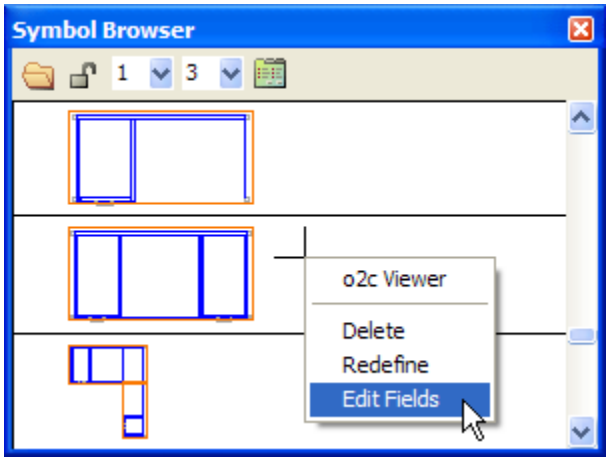
The new item appears in the Symbol Browser

Editing Symbols

What if you want to edit information about a symbol or get rid of it in your Symbol Browser? That is easy.

➔ To edit information about a symbol:

1. Move your cursor in the Symbol Browser to the symbol you want to edit.
2. Right-click to display the pop-up menu.



The Symbol Browser's pop-up menu

3. Select Edit Fields. The symbol descriptor box appears.
4. Double-click in the field you want to change and supply the new information in the Name or Value columns. When you double-click on the Type column, you can select Text, Decimal, or Integer for the information that should appear in the Value column.
5. Click on Ok when you have finished editing the description of the symbol.

➔ To delete a symbol from the Symbol Browser:

1. Move your cursor in the Symbol Browser to the symbol you want to delete.
2. Right-click to display a pop-up menu.
3. Click on Delete. Then click on Yes or press (Enter) to confirm that you really want to eliminate the symbol. The undesirable symbol disappears from the Symbol Browser and from your computer's hard drive.

➔ To replace one symbol with another in your drawing:

1. Select Replace from the Options pull-down menu in the Symbol Browser. You are prompted to *Select symbol to replace.*
2. Click on the symbol in your Drawing Window that you want to replace with another one that appears in your Symbol Browser. You are prompted to *Select symbol to replace with*.
3. Click on the symbol you want in your Symbol Browser. You are prompted to *Select entity to replace*.
4. Click on the undesirable symbol in your Drawing Window again. The undesirable symbol disappears and its replacement that you selected in step 3 appears in your Drawing Window. Continue using the replacement symbol by clicking on other undesirable symbols in your Drawing Window.
5. Right-click in your Drawing Window to discontinue the replacement process.

If you select Reload All from the Options pull-down menu, DataCAD gets the most recent definition of a symbol from the hard drive. Otherwise, it goes to the drawing itself for the definition.

Once you place a symbol in your drawing, DataCAD will no longer read the definition from your hard drive. That is why Reload All is important.

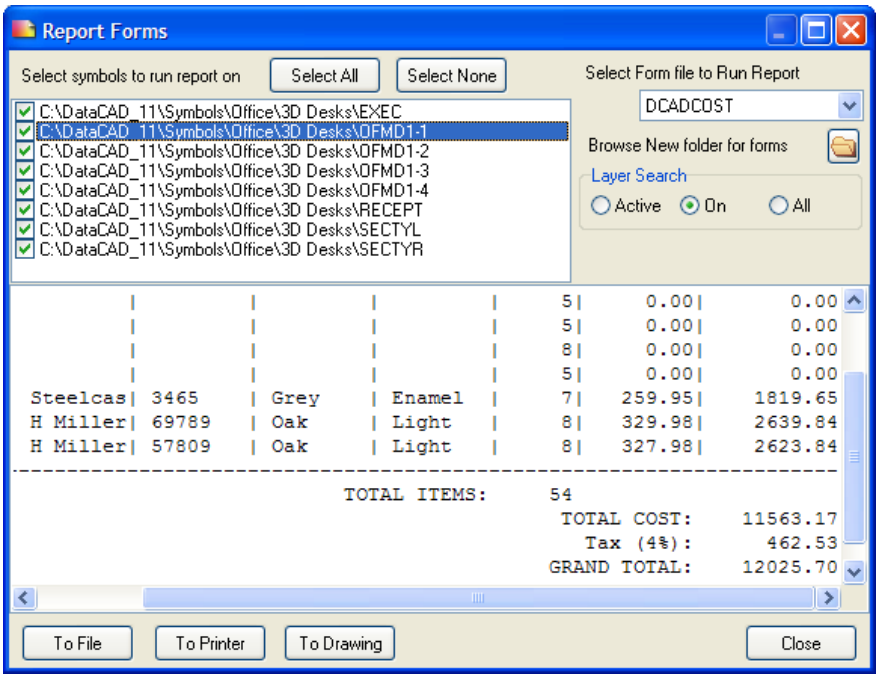
Symbols you insert "travel" with your drawing. If you insert symbol A into drawing 1, then redefine symbol A from drawing 2, symbol A will look different in drawings 1 and 2. You can use Reload All to make symbol A look the same in drawings 1 and 2.

Generating Reports About Symbols

You can generate reports based on the symbols that appear in your drawing.

➔ To generate reports about symbols used in your drawing:

1. Select Reports from the Options pull-down menu. The Report Forms dialog box appears.

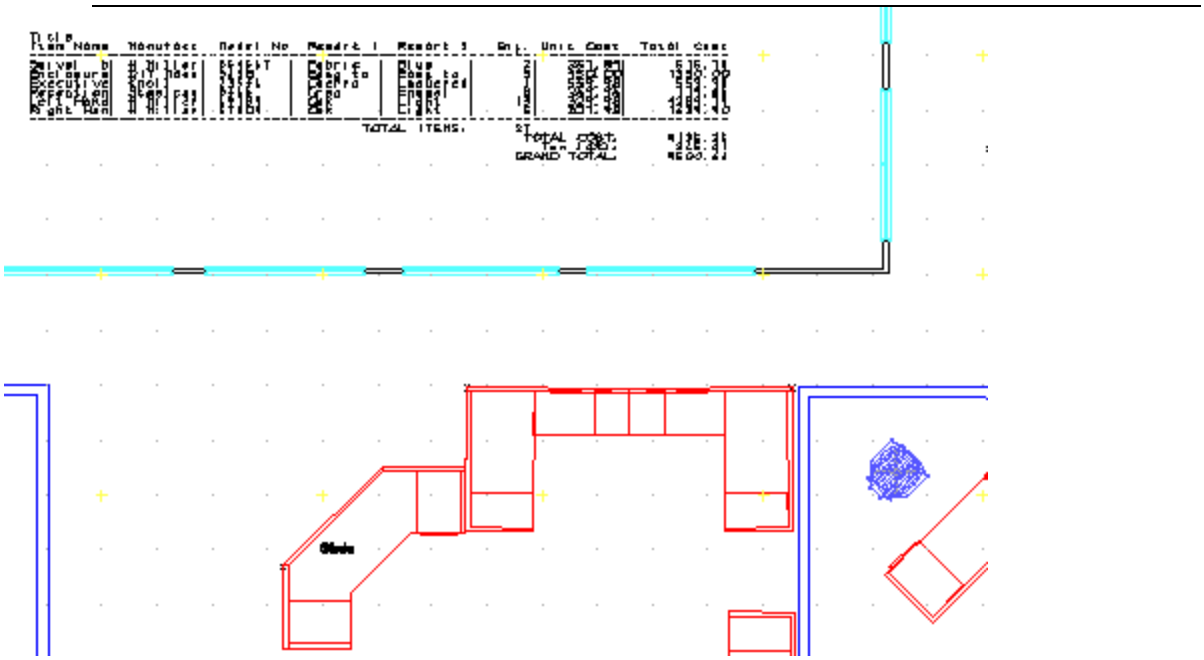


The Report Forms dialog box

2. Click in the box to the left of the items you want to include in your report. If you want reports on all the items, click on Select All. If you want to start over with a clean slate, click on Select None. Symbols that are not currently used in your drawing but still "live" in your drawing's database are grayed out or unavailable for reports.
3. Use the drop-down box in the right corner to select the type of report you want to generate. If you want to use forms that are in another folder, click on the browse icon and make your selection.

4. Decide which layer(s) you want to include in your reports by clicking on the appropriate option in the Layer Search box.
5. Choose an output option in the lower left portion of the Report Forms dialog box:
   - If you select To File, you are asked to supply a file name. The file will be in .txt format.
   - If you select To Printer, the report goes to your default text printer.
   - If you select To Drawing, you are prompted to *Select point to position text*. You can change the appearance of the text by selecting Size, Angle, Weight, Slant, Aspect, Factor, or Font from the left menu. Place the text insertion icon where you want the report to appear in your Drawing Window.

Hint: To keep report column spacing consistent, use a fixed-width font (such as ARCWY2FW).



Reports you generate can be placed in your drawing

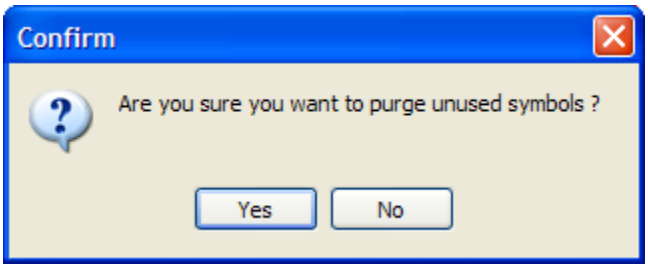
6. Right-click to return to the Report Forms dialog box. You can generate other reports and select the appropriate output option by following steps 2 through 5.
7. Click Close when you are finished generating reports.

Purging Unused Symbols

DataCAD remembers all the symbols you used even though you may have already erased some of those symbols from the drawing on your screen. When you add a symbol to your drawing, DataCAD stores that symbol with your drawing. This definition is not deleted when you erase the symbol and continues to take up drawing file space. When you erase symbols from your drawing, it is important to *purge* the symbol if you do not plan to use it again.

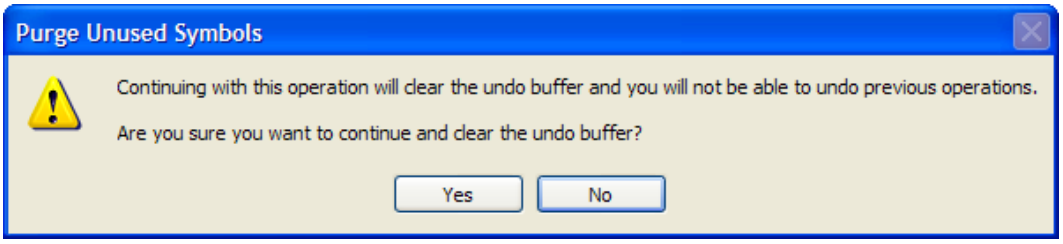
➔ To eliminate unused symbols from your drawing:

1. Select Purge Unused Symbols form the Options pull-down menu. A confirmation box appears.



You can change your mind about purging unused symbols

2. Press (Enter) or click on Yes to continue the purge. Another warning box appears.



You can still change your mind at this point

3. Click on Yes or press (Enter). All the unused symbols as well as all prior actions (such as erased entities) are eliminated from your Undo buffer.

Text Attributes for Symbols

Text attributes can be defined and added to symbols. This lets you use the same symbol multiple times, supplying a unique text string for each one. For example, you could use one desk symbol several times and label them "Jim's desk," "Nancy's desk," and "Bob's desk."

When you create a text attribute for a symbol, you use the Drawing Window as a scratch pad. There are several ways to create these attributes: using Sym Attrib in the Text menu, choosing Create Attribute in the Symbol Browser's Options menu, or selecting Symbol Attributes from the Create pull-down menu. You control the appearance of the attribute by selecting options from the Text menu.

You associate the text attribute you created with an exploded symbol by using Save Symbol from the Symbol Browser's Options menu. Make sure Explode is off when you place the symbol back into your drawing.

➔ To create a symbol attribute from the Text menu:

1. Place an exploded symbol in your Drawing Window.
2. Select Text from the Edit menu and make decisions about the text's appearance by using the Size, Angle, Weight, Slant, Aspect, Factor, Font, Text Style, Text Scale and All Caps options.

Hint: Save time by selecting Font from the Text menu and use the Set Text Parameters dialog box to control many of your options and view a sample in the Font Preview window.

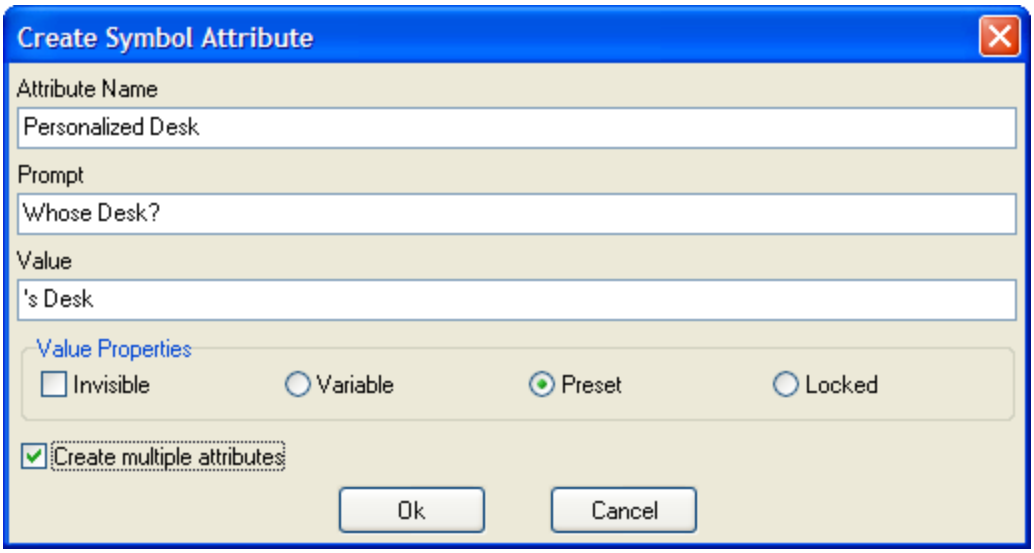
3. Click on Alignment and use the toggles to control the way your text will be inserted; then right-click to return to the main Sym Attrib menu.

Left	Text inserted from left to right
Center	Text inserted from the center
Right	Text inserted from right to left
Top	Cursor is at the top of the characters you input
Middle	Cursor is at the midpoint of the characters you input
Bottom	Cursor is at the bottom of the characters you input
Aligned	Adjusts text to fit between two given points
Fit	Adjusts text to fit a certain width and height
Reversed	Draws each character backward from right to left
Mirrored	Draws each character upside down from left to right

Note: The text cursor coincides with the current text alignment setting. A "+" marker is incorporated into the carat as a visual indicator of the current alignment setting. There are nine text alignment points.

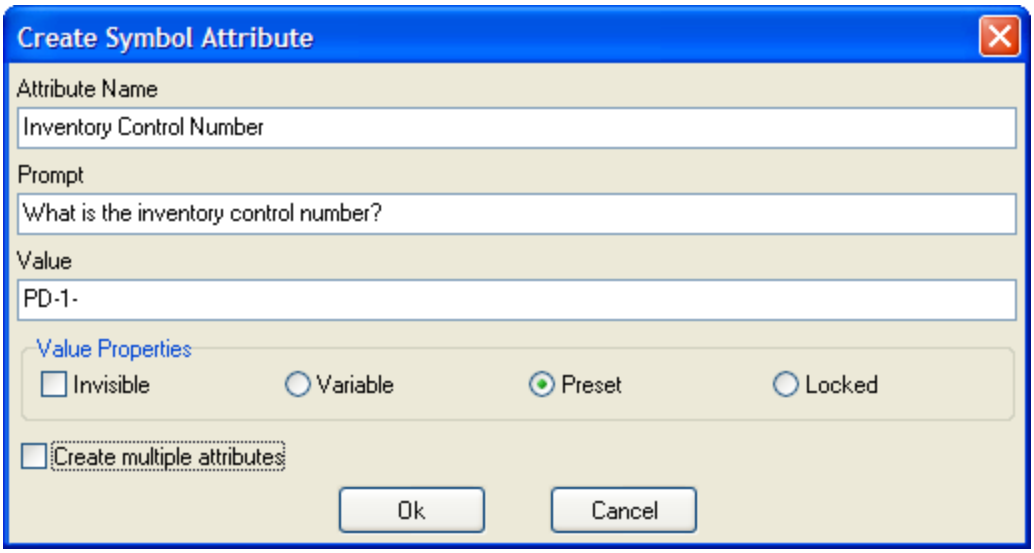
4. Click on Sym Attrib. The text cursor appears and you are prompted to *Select point to position text*. Once you position your cursor, the Create Symbol Attribute dialog box appears.

Attribute Name	Name of the attribute
Prompt	Reminder question
Value	Information that should appear on the symbol. This can include constant text.
Value Properties	
Invisible	Information that appears in the Value field will be invisible if you check this box. If there is no check in the box, the Value text will appear in your drawing. This can be applied to either Locked or Preset
Variable	Supply new information when prompted.
Preset	Add new information. This allows you to use constant text either before or after the new information.
Locked	Supply information that cannot be changed
Create multiple attributes	If this is checked, you can supply more symbol attributes. Each symbol can have many attributes.



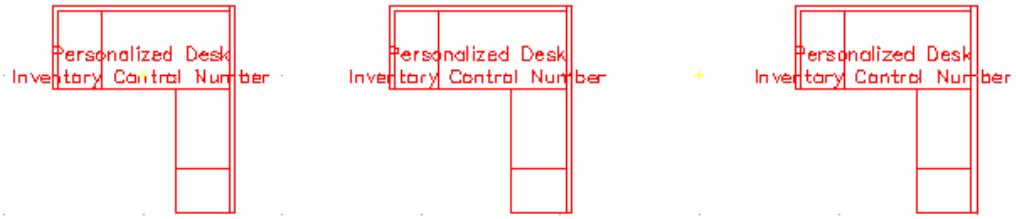
A symbol can have multiple attributes if the Create multiple attribute box is checked

5. Click on Ok or press [Enter] to leave the Create Symbol Attribute dialog box. If you enabled (the box is checked) Create multiple attributes, repeat steps 4 and 5. When you are finished creating attributes for this symbol, make sure you disable Create multiple attributes (the box is not checked).

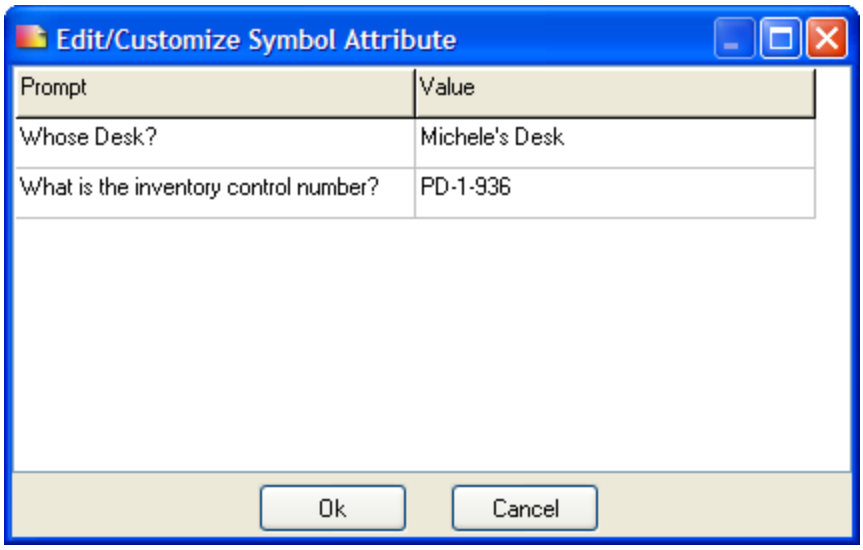


The last (or only) symbol attribute should not have a check in the Create multiple attributes box

6. Turn off Explode in the Symbol Browser's Options pull-down menu. Then save the symbol and its attribute by following the directions under "Creating New Symbols." Make sure you use Area in the Save Symbol menu rather than Group. (Group ignores the attribute.) DataCAD creates a .DSF file for the symbol. When you are finished saving the symbol and its attribute, right-click to leave the Sym Attrib menu.
7. Place the symbol into your drawing as often as necessary.

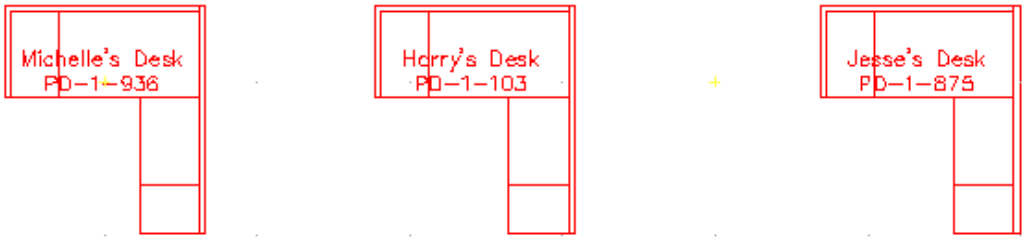


8. Select Edit Symbol Attributes from the Symbol Browser's Options pull-down menu. Then click on the symbol. The Edit/Customize Symbol Attribute dialog box appears.



The Edit/Customize Symbol Attribute dialog box prompts you for the value that should appear on the symbol in your drawing

9. Supply the information in the Value column and click on Ok. (In this example, "'s Desk" and "PD-1-" were constants; "Michelle" and "936" were added to these constant values.) If you placed the same symbol into your drawing several times and want to use different values, repeat steps 8 and 9 as often as necessary.



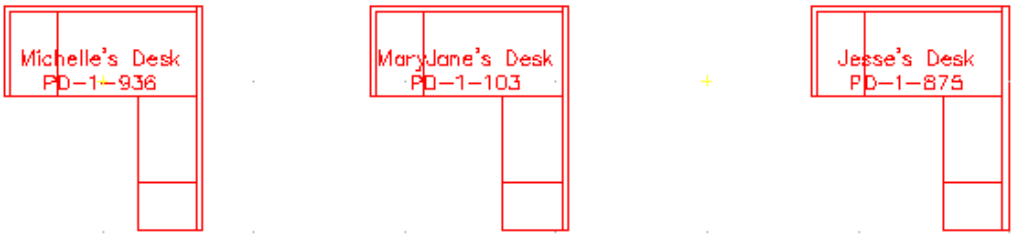
Several personalized desks were placed in the drawing

If you selected Locked in the Value Properties portion of the Create Symbol Attribute dialog box, you cannot edit the value. If you selected Variable, you supply new information when responding to the Prompt question.

What if some of the information in a symbol changes? For example, what if Harry leaves the company and his desk is reassigned to Maryjane?

➔ To edit an existing symbol attribute:

1. Select Edit Symbol Attributes from the Symbol Browser's Options menu.
2. Click on the symbol attribute you want to edit. (In this case, Harry.) The Edit/Customize Symbol Attribute dialog box appears.
3. Change only the relevant information. (In this case, change Harry to Maryjane.) Then click on OK.



Notice that the inventory control number stayed the same, but Maryjane replaced Harry as the desk's owner.

4. Edit other existing symbol attributes by repeating steps 2 and 3.

Symbol Attributes appear as Block Attributes when you open a DWG file.

Layers in Symbols

Symbols retain layer information. This lets you customize on/off layer settings for each symbol. When a symbol is exploded, its constituent entities are returned to their proper layers or new layers are created automatically if necessary.

Symbol Browser Settings

The Symbol Browser retains the following settings between DataCAD sessions.

- Last browse type (folder, template, or drawing)
- Last path browsed for symbols (independent from Template and Insert Symbol menus)
- Last path browsed for templates (independent from Template menu)
- Auto-divisions On/Off status

Shortcut: You can use [Ctrl]-Click on either the Folder or Template menu item in the browse pull-down menu to bypass the folder/file dialog. This lets you go directly to browsing the last symbol folder or template file.

Polygon Tools/TIN Modeler

The Ruled Surf function allows you to mesh polygons between Contours and Polylines. If you are 3D modeling, investigate the new TIN (Triangular Irregular Network) modeler in the 3D Polygon menu. The TIN modeler can connect a random series of survey points (3D markers) with triangular polygons. Once the polygons are generated, you can calculate the surface area of TIN models, use the flip valley option to "flip" the valley between coincident polygon edges, or create roads, foundation cuts, etc. with the 3D Knife. The drop point option lets you place 3D markers on the surface of inclined polygons. You can create polyline contours from polygon site models.

The Triangulated Irregular Network (TIN) modeler uses a set of points, polylines, or contours to help you accurately plan site changes that will be necessary to accommodate your building. Often, the surveyor will provide the points or contours you need to generate the TIN model. However, you can also generate your own points or contour lines using Contours or Markers from the 3D Entity menu.

Once the TIN is generated from the points or contour lines, you can cut, fill, and sculpt the surface of the building site. DataCAD calculates the surface area and volume for each operation.

Generating a TIN Model from Contour Lines or Markers You Created

You can use the Contours or 3D Markers functions in the 3DEntity menu to represent the surface of your building site. Then, you can generate a TIN model.

➔ To create your own contour lines:

1. Choose Contours from the 3D Entity menu. The Contours menu appears.
2. Activate one of the mutually exclusive toggles Natural (open-ended), Cyclic (connects the first and last points with a smooth closed curve), or Tangent (requires two more points at the start and end of the contour line), depending on the type of contour you want to create. For a tangent contour line only, you must select a first point before the curve; this point determines the curve's tangent direction when you enter the first control point.
3. Set the number of line segments (from 4 to 36) between control points by clicking on Divisions, typing a number when prompted to *Enter number of divisions per contour segment*, and pressing [Enter]. The farther apart your control points, the more divisions you need to create a smooth curve.
4. Set the curve tangent factor by clicking on Stiffness, typing a number when prompted to *Enter new contour stiffness tangent factor*, and pressing [Enter]. The higher the number, the flatter the line as it passes through each control point.
5. Set elevation values by clicking on Set Z User 1 or Set Z User 2, typing a number when prompted to *Enter new Z-user1 (or Z-user2) height*, and pressing [Enter].
6. Use Set Index to control the Z-coordinate index distance.

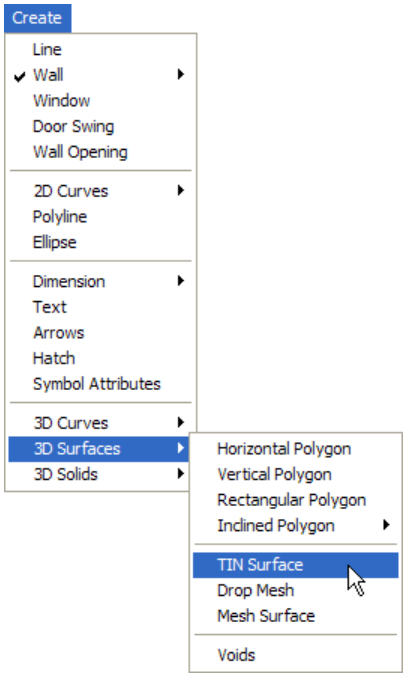
7. Select up to 36 control points for each contour line. To accurately position each control point, use coordinate entry by pressing [Spacebar], supplying the X and Y values, and pressing [Enter]. You can use Add Index or Sub Index for a steadily rising or declining line. You can use Z-Base, Z-User 1, Z-User 2, and Z-Height to change elevation values.
8. Right-click when you have entered the final control point. DataCAD generates the contour line. For a tangent contour line only, you must also specify the ending tangent point after the curve; this point determines the curve's tangent direction when it enters the last control point.
9. Generate more contour lines if necessary. You can use these lines to generate the TIN model.

➔ To draw concentric contour lines that steadily rise at specified intervals:

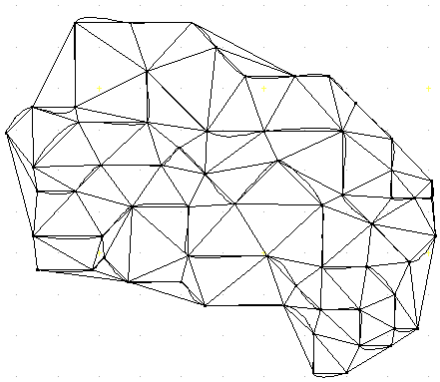
1. Draw the first contour line at Z-Base.
2. Click on Set Index, specify a value, and press [Enter]. This controls the Z-coordinate index height of the second and subsequent contour lines. For example, if you specify the Set Index value as 2, the second contour line will be 2' above the first, the third will be 2' above the second, and so on.
3. Click on Add Index and draw the second contour line. When DataCAD generates this line, it will be higher than the first one, based on the index you set in step 2.
4. Generate more contour lines using Add Index if necessary, by repeating step 3.

➔ To generate a TIN model from contour lines:

1. Open the drawing that contains the lines you entered using Contours.
2. Rename the file to distinguish it from the contour lines. For example, if the lines were in a file named My Contours, you may want to use My Contours TIN for the TIN model. To do this select Save As from the File pull-down menu, supply the new file name, and click on Save or press [Enter].
3. Select Polygons from the 3D Entity menu and click on TIN Surface. The TIN Surface menu appears. Another way to arrive at the TIN Surface menu is to select 3D Surfaces from the Create pull-down menu and then click on TIN Surface.



4. Select Area, click above the top left contour, draw the rubber band around the set of contours, and click to end the box. DataCAD generates the TIN model.



TIN Model generated from contour lines

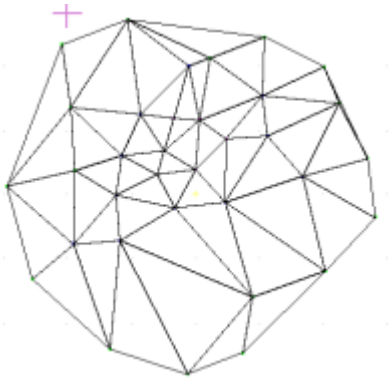
➔ To use Marker to generate a set of points for the TIN model:

1. Set the Z-Base for the points by choosing Settings from the 3D Edit menu. Alternatively, you can choose 3D Settings from the Tools, Settings pull-down menu. The 3D Settings menu appears.
2. Click on Z-Base, supply the new value, and press [Enter].
3. Choose 3D Markers from the 3D Entity menu. The 3D Markers menu appears.
4. Click on Z-Base. If you changed the Z-Base in steps 1 and 2, the new value will appear in the Information bar. You are prompted to *Select the snapping point or marker*.

5. Use the coordinate entry method to accurately place the points on your screen. A small dot appears each time you supply the X and Y coordinate values and press [Enter]. These dots are markers that you can use to generate a TIN model.

➔ To generate a TIN model from points you entered using Marker:

1. Open the drawing that contains the points you entered using 3D Markers.
2. Rename the file to distinguish it from the data points. For example, if the points were in a file named My 3DMarkers, you may want to use My 3D TIN for the TIN model. To do this select Save As from the File pull-down menu, supply the new file name, and click on Save or press [Enter].
3. Select Area, click above the top left point, draw the rubber band around the set of markers, and click to end the box. DataCAD generates the TIN model.

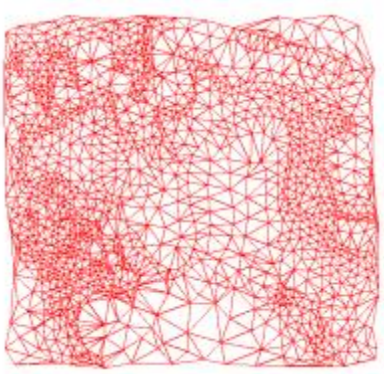


Generating a TIN Model from Surveyor's Data

If the surveyor provides you with data in a point file, you can import that information into DataCAD. Then, you can create the TIN model.

➔ To generate a TIN model from a file containing the surveyor's points:

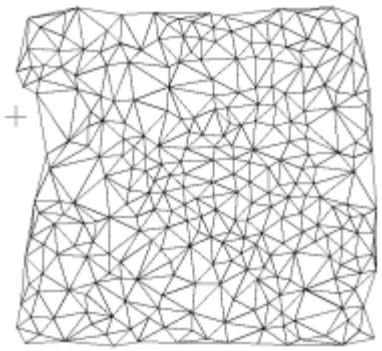
1. Select 3D Surfaces from the Create pull-down menu, then click on TIN Surface in the submenu. Alternatively, select Polygon from the 3D Entity menu, then click on TIN Surface. The TIN Surface menu appears.
2. Open the file that contains the surveyor's set of points by selecting Import from the TIN Surface menu.
3. Highlight the file that contains the data for the site and click on Open. The surveyor's points appear on your screen.
4. Select Area, click once above the top leftmost point, draw the rubber band around all the points, and click again. DataCAD generates the TIN model.



The surveyor may have inadvertently duplicated points in the data file. This could result in a TIN model that takes up more storage space than necessary on your computer. To control the size of your file, you can eliminate duplicate points before you generate the TIN model.

➔ To delete duplicate points:

1. Use Import in the TIN Surface menu to bring the surveyor's information into DataCAD.
2. Click on Delete Dupes in the TIN Surface menu.
3. Select MissDist. You are prompted to supply the *Maximum Distance between points to combine*.
4. Choose a distance from the ones offered in the menu or supply your own value. Press [Enter]. The Miss Distance lets you determine what "duplicate" means in terms of your file. For example, if you want to eliminate points that are within 1 foot of each other, you would input 1 as the miss distance. The larger the value you supply for the miss distance, the more points will be eliminated and the smaller your file.
5. Click at the top leftmost corner of the points, drag the rubber band diagonally downward until you surround the area, and click again. DataCAD eliminates the duplicate points that fall within the miss distance you specified. If you specified a large value for the miss distance, you should see a lot less points on your drawing screen. If you specified a small miss distance value, the difference may not be as obvious.
6. Right-click to return to the main TIN Surface menu. You are prompted to *Select first corner of area to Process Points for TIN*.
7. Click above the top leftmost corner of the area, surround the points with the rubber band, and click again. DataCAD produces the TIN model. Depending on the miss distance you selected, the resulting TIN model will be much simpler, and your file will be much smaller.



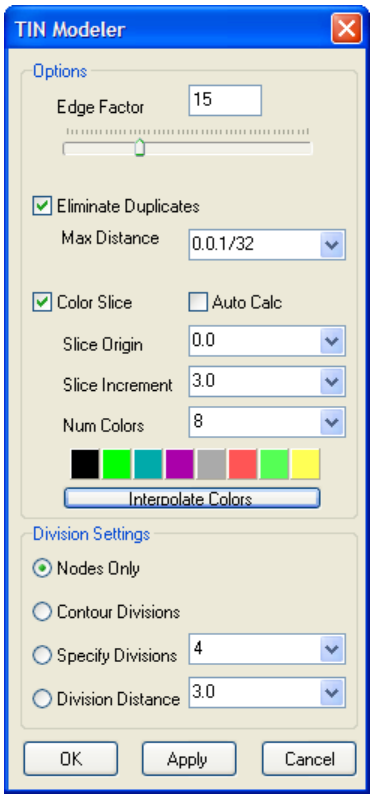
Refining the TIN Model

The TIN Modeler dialog box, available through Options in the TIN Surface menu, offers several ways to refine or further control your model. This dialog box allows you to set the edge factor of the triangles or to eliminate duplicate points.

The Eliminate Duplicates selection in the Options part of the dialog box serves the same function as Delete Dupes in the TIN Surface menu. If you activate this feature in the dialog box, you can select from the pull-down offerings or supply your own value in the Max Distance input box. You may find the Eliminate Duplicates selection saves you time since you won't have to go through several menus to enter the maximum distance between points.

You can divide the TIN model into levels designated by different colors to aid in site preparation (excavation or augmentation). The Color Slice selections allow you to specify the Z-height where you want to begin the slice, the size of each level, and the color(s) associated each increment.

The Divisions portion of this dialog box works with TIN models developed from contour lines instead of point data. You can specify how the contours are divided to control the number of polygons DataCAD creates while generating your TIN model.

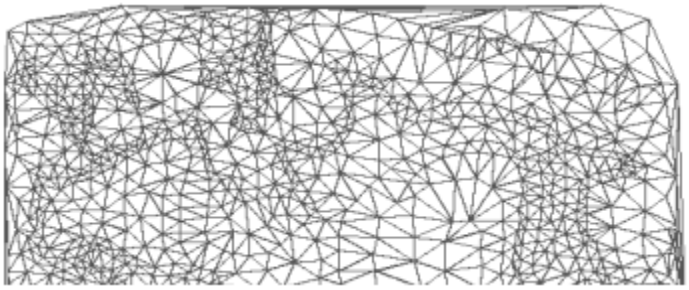


Using the Edge Factor

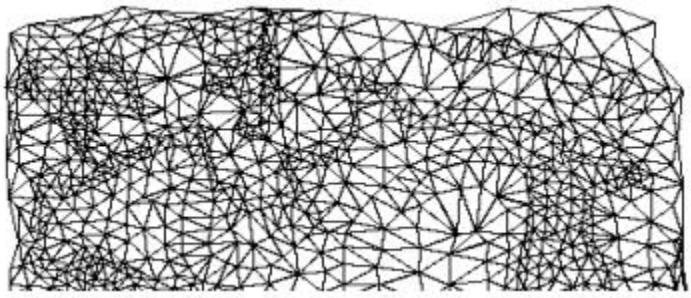
The edge factor affects the length of triangles at the TIN model's boundary. The minimum edge factor is 1; the default factor is 15; and the maximum is 50. If you input a low value, the triangles at the perimeter of the TIN model will have short, jagged edges. In comparison, a high edge factor value produces triangles with longer edges and a smoother perimeter.

➔ To generate a TIN model with smoother edges:

1. Open the file that contains the point data that you or the surveyor supplied.
2. Click on Options in the TIN Surface menu. The TIN Modeler dialog box appears.
3. Use the slide bar or type a value in the Edge Factor input field to indicate the degree of smoothness. The higher the value, the longer triangles and the smoother the perimeter of the model. The lower the value, the shorter the triangles and the more jagged the perimeter of the TIN model.
4. Click on OK or press [Enter] to accept the value and return to the drawing window.
5. Activate Area in the TIN Surface menu and surround the points with a rubber band box. DataCAD generates the TIN model.



Edge factor of 50 produces longer triangles and a smoother perimeter



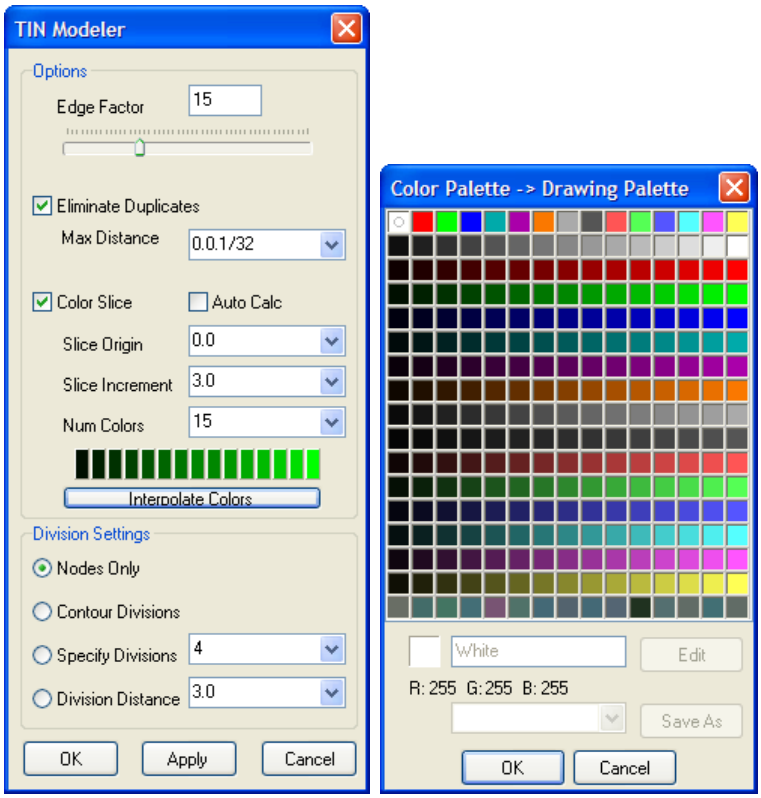
Edge factor of 1 produces shorter triangles and a jagged perimeter

Using the Color Slice

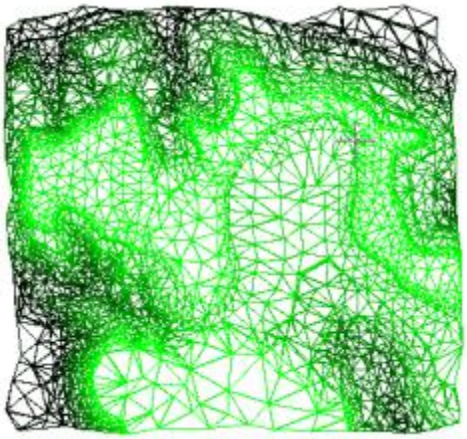
You can slice or divide the TIN model into several levels, designated by separate colors. If Auto Calc is activated, DataCAD uses default values; however, you can select the colors for each slice. If you want to control the base and size of the slice, you must deactivate Auto Calc and supply slice origin and increment values. The slice origin is the Z-height of the base point; DataCAD produces the slices based on this value. The slice increment controls the height for each level. You can select the color for each level as well as the number of colors.

➔ To slice the TIN model and control the color of the levels:

1. Open the file that contains the point data that you or the surveyor supplied.
2. Click on Options in the TIN Surface menu. The TIN Modeler dialog box appears.
3. Activate Color Slice in the TIN Modeler dialog box.
4. Deactivate Auto Calc if you want to supply your own specifications for each slice.
5. Supply the Z-height for the first slice or select from the pull-down values beside Slice Origin.
6. Specify the height that will apply to all the levels or choose from the pull-down values for the Slice Size.
7. Indicate in the No Colors box how many colors you want to use.



8. Click on one of the colored boxes to reveal the Color Palette, make your selections, and click on OK or press [Enter]. You can use between 2 and 15 colors to indicate different elevations. You can select shades of one color (for example, light green to dark green) or you can use a different color for each slice. The TIN Modeler dialog box reappears.
9. Click on OK to make your selections take effect.



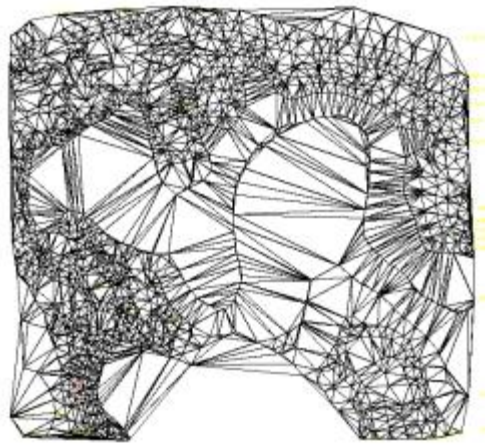
Using the Division Settings

If you are using contours to generate a TIN model, you can control the number of polygons that are created. You do this by specifying how the contours are divided through the dialog box that appears when you select Options from the TIN Surface main menu. The Division Settings portion of the dialog box offers four mutually exclusive alternatives:

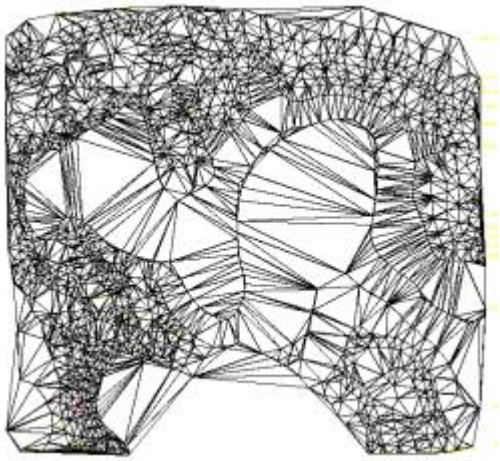
- Nodes Only – This is the default. When this option is activated, the contours will not be divided. Only nodes will be used to generate the TIN model.
- Contour Divisions – This option uses the division setting from each contour.
- Specify Divisions – This overrides the division setting for all contours. You indicate how many divisions the TIN model should have. The minimum number of divisions is 2; the maximum is 36.
- Division Distance – This allows you to specify divisions by distance.

➔ To generate a TIN model and control contour divisions:

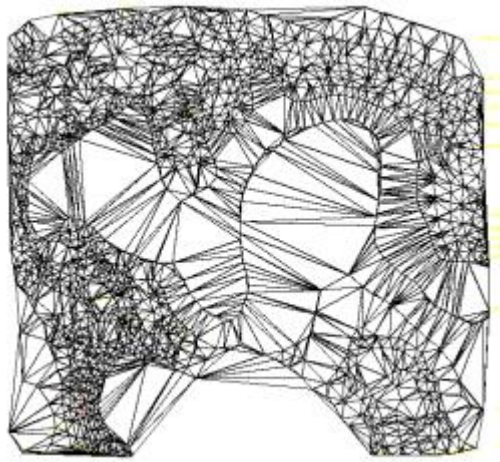
1. Open the file that contains the contours that you input, or the surveyor supplied.
2. Click on Options in the TIN Surface menu. The TIN Modeler dialog box appears.
3. Activate one of the alternatives (Nodes Only, Contour Divisions, Specify Divisions, or Division Distance) in the Division Settings portion of the dialog box. If you activate either Specify Divisions or Division Distance, you must also select a value from the pull-down list or supply your own.
4. Click on OK.
5. Click on Area in the TIN Surface menu and surround the contours with the rubber band. DataCAD produces the TIN model.



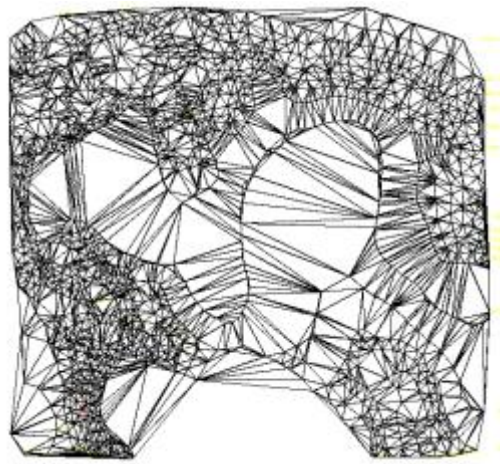
Nodes Only option



Contour Divisions option



Specify Divisions, set at 15



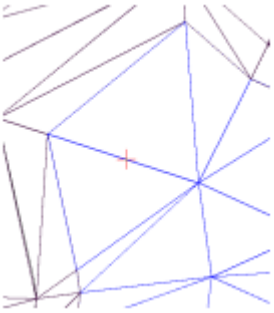
Division Distance, set at 10 meters

Using the Flip Valley

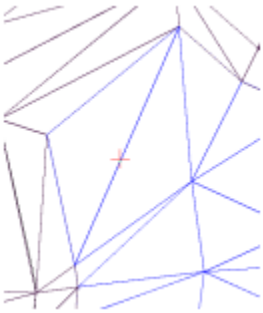
You can flip the valley seam that the TIN modeler generated between two adjoining triangular polygons. This gives you greater flexibility and control when you work with the TIN surfaces.

➔ To flip the valley seam between two triangles:

1. Open a file that contains triangles generated with the TIN modeler.
2. Select Polygons from the 3D Entity menu. The Polygons menu appears.
3. Click on Flip Valley in the Polygons menu. You are prompted to *Select triangle junction to flip*.
4. Zoom to enlarge the triangle junction you want to flip and place your cursor on the line between the two triangles.



5. Click on the line that separates two adjoining triangles. DataCAD flips the valley.



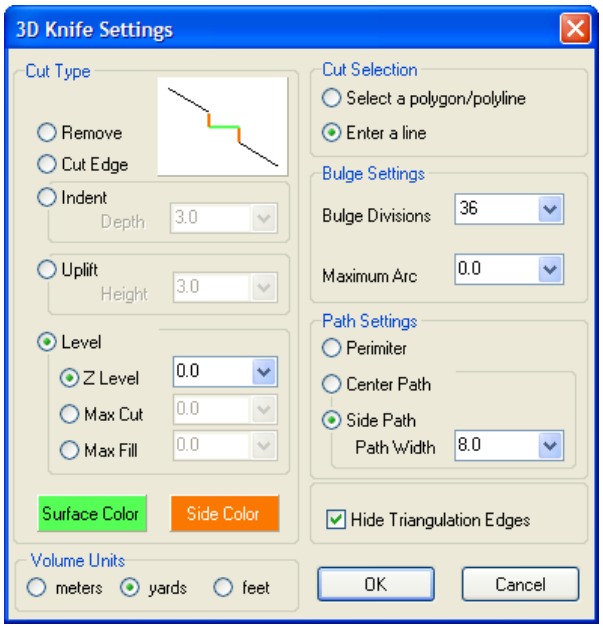
Using the 3D Knife

You can use your TIN model to cut out, raise, or depress irregular areas and paths on the building site. Since DataCAD also calculates the volume of the affected area, you can estimate the amount of fill that must be removed (if you are digging for a foundation or a roadway) or added (if you are building up part of the site). To differentiate the cut area, you can specify a different color from the rest of the TIN model. Further, you can select distinct colors for each level and/or side of the cut area.

➔ To cut polygons from the TIN model:

1. Open the TIN model of the building site.
2. Select Polygon from the 3DEntity menu. The Polygons menu appears.

3. Click on 3D Knife in the Polygon menu. The 3D Knife menu appears.
4. Click on Options in the 3D Knife menu. The 3D Knife Settings dialog box appears. The choices you make in this dialog box affect the type of cut you create based on your TIN model. The choices you make will be shown in the small preview window in the dialog box. If you are unhappy with your choices, you can change them until the representation in the preview window is correct.



5. Make selections from the Cut Type options. The options you activate in Cut Type portion of this dialog box affect the number of settings you can control in other parts of the 3D Knife Settings dialog box. If an option is gray in the dialog box, it is unavailable.

Remove	Eliminates the cut polygons from your drawing.
Cut Edge	Cuts the edge of the boundary but does not remove the polygons. You can select the color of the surface from the palette.
Indent	Produces a depressed area or path with visible sides. You can select separate colors from the palette for the surface and the side of the depression. You can control the depth of the cut using the pull-down selections or input your own value.
Uplift	Raises the cut polygons, producing visible sides. You can select separate colors from the palette for the surface and the side of the raised polygons. You can control the height of the cut using the pull-down selections or input you own value.
Level	Depresses or raises the cut polygons to a fixed level that you designate. You can use this to create terraces on a sloping site. This lets you control the maximum depth of the cut or the maximum height of the fill in addition to the surface and side colors.

6. Set the measurement you want (meters, yards, or feet) in the Volume Units portion of the dialog box.
7. Select one of the options in the Cut Selection portion of the dialog box. You can either select an existing polygon/polyline or create your own line.
8. Indicate how to deal with bulges by changing the values in the Bulge Divisions and Maximum Arc input boxes. These control the curved boundaries.

9. Click on one of the mutually exclusive options in the Path Setting portion of the dialog box. If you select either Center Path or Side Path, you must also supply the path width in the input field.
10. Activate Hide Triangulation Edges to hide the edges of cut polygons.
11. Click on OK when you are satisfied with your responses in the dialog box.

Drop Point

You can place a three-dimensional marker on a polygon at an inclined point.

➔ To place a 3D marker on a polygon:

1. Select Polygons from the 3D Entity menu.
2. Select Drop Point from the Polygons menu. The Drop Point menu appears.
3. Select Area. You are prompted to Select first corner of area to drop 3D markers on.
4. Click in your drawing window where you want the area to begin; then extend the rubber band by dragging your mouse.
5. Click again when you have enclosed the entire area of polygons that should contain 3D markers. You are prompted to *Place markers*.
6. Position your cursor where you want the 3D marker to appear in one of the polygons you selected. If you want to place markers in additional polygons in the area you selected, just click to indicate where they should appear.

Make Contours

You can make a topological contour map based on a group of three-dimensional points or polygons by specifying an interval for the contours or using a list of colors for each level. Also, you can label the contours with their respective Z-heights.

➔ To generate contours based on 3D points or polygons:

1. Select Polygons from the 3D Entity menu.
2. Select Gen. Contour from the Polygons menu. The Gen. Contour menu appears.
3. Click on From Polys. If you are working from polygons or From Points if you are basing the contours on points.
4. Make decisions about variables:

Base	Set the Z-base.
Interval	Set the Z-distance between contour lines.
Highlight	Highlight contours at specific height intervals. If you select this option, Color Slice is unavailable.
Highlt. Inc.	Set the Z-distance between highlighted contours.
Highlt. Clr.	Select the highlight color you want.
Color Slice	Change the color of the TIN model at specific intervals.
Slice Int.	Indicate size of the color slice.
Slice Colors	Select colors.
Label	Turn labels on.

Label Spec.	Set text attributes (font, size, color, etc.) for labels and indicate the label's position (top end, bottom end, etc.).

5. Select Area. You are prompted to Select first corner of area to Interpolate Contours.
6. Click where you want the Area rubber band to begin, drag diagonally until the points or polygons are enclosed, then click to end it.

Surface Area

You can calculate the surface area of the polygons you cut, duplicated, or indented.

➔ To calculate the surface area of the polygons:

1. Select Polygons from the 3D Entity menu.
2. Choose Surface Area from the Polygons menu.
3. Indicate the selection method (Entity, Group, Area, Fence, Mask) that you prefer and follow the prompts in the Message toolbar. DataCAD calculates the surface area of the polygon(s) you selected.

Ruled Surface

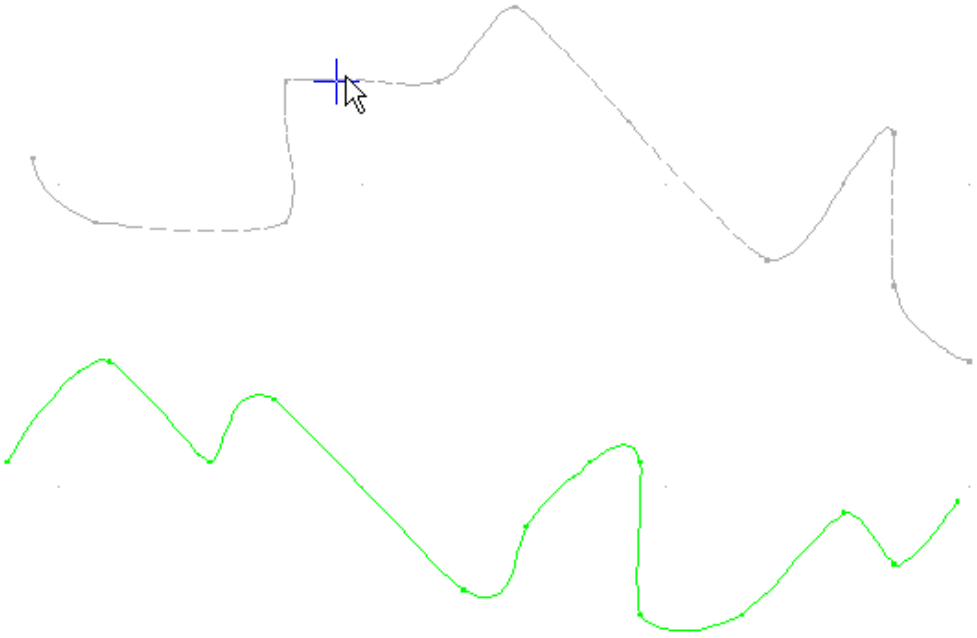
You can join two contour lines or two polylines with a ruled surface. Each contour line or polyline can have its own Z-height and shape.

Drawing direction (clockwise or counterclockwise) can have a significant impact on concentric closed polylines. If you want to stretch a ruled surface between two concentric closed polylines, they must both be drawn in the same direction. For example, if you draw the outer closed polyline clockwise, you must draw the inner closed polyline clockwise, too. Likewise, if you draw the outer closed polyline counterclockwise, you must draw the inner one clockwise, too. If you draw one closed polyline clockwise and the other counter clockwise, you will not be able to stretch a ruled surface between the two. In fact, you will end up with a jumbled mass of polygons.

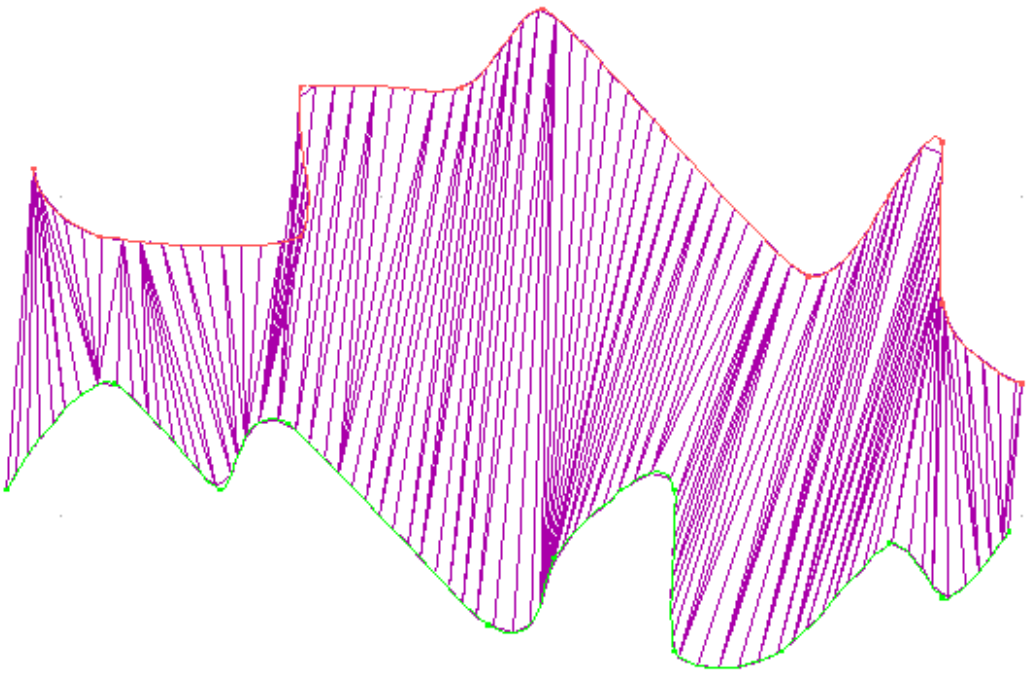
➔ To create a ruled surface between two contour lines:

1. Make sure the two contour lines you want to connect with a ruled surface appear on your drawing screen. Each contour line can have a different Z-height.
2. Click on Polygons in the 3DEntity menu. The Polygons menu appears.
3. Click on Ruled Surf.
4. Decide how you want the polygons to be drawn on the ruled surface. If you want the rules to be evenly distributed along the length of the two contour lines, activate Even. If you want the rules to be weighted based on the relationship between the two contour lines, deactivate Even.

5. Click on Div. Dist to set the distance between contour divisions. You can control the smoothness of the ruled surface by the distance between divisions. For example, selecting a small distance between divisions (such as 3 inches) produces a smoother ruled surface than a larger division distance (such 3 feet). The larger your division distance, the more jagged the resulting edges of your ruled surface. Either select a value from the menu or type your own in the input field. Then press [Enter].
6. Click on the first contour line. The solid contour line becomes a lighter colored, dashed one. You are prompted to *Select second contour line to process*.



7. Click on the second contour line. DataCAD stretches the ruled surface between the two contour lines. In this example, the distance between divisions was set at 3 inches to produce a very smooth ruled surface.



8. Use the o2c viewer to get a better picture of the ruled surface.

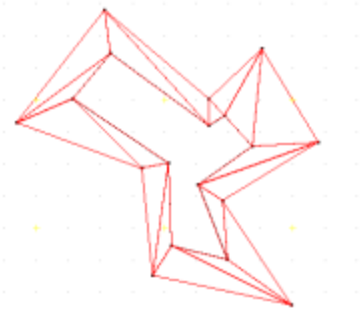


Creating a ruled surface between two polylines is similar creating it between two contour lines. Just begin with two polylines instead of two contour lines. You can place a ruled surface over a closed polyline, too.

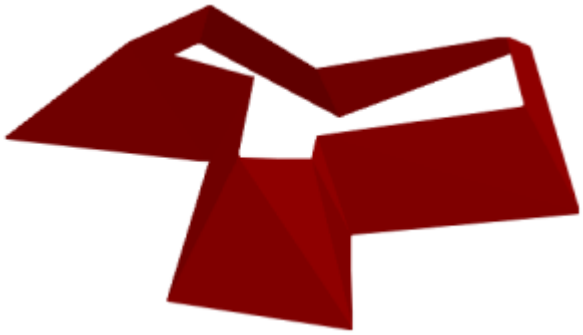
➔ To stretch a ruled surface between two closed concentric polylines:

1. Create two closed concentric polylines. Make sure you draw the second closed polyline in the same direction as the first. For example, if you draw the first closed polyline clockwise, you must draw the second closed polyline clockwise, too. Otherwise, if you draw the first clockwise and the second counterclockwise, the resulting ruled surface will be a jumbled mass of polygons.
2. Click on Polygons in the 3D Entity menu. The Polygons menu appears.
3. Click on Ruled Surf.
4. Decide how you want the polygons to be drawn on the ruled surface. If you want the rules to be evenly distributed between the two concentric closed polylines, activate Even. If you want the rules to be weighted based on the relationship between the two closed polylines, deactivate Even.

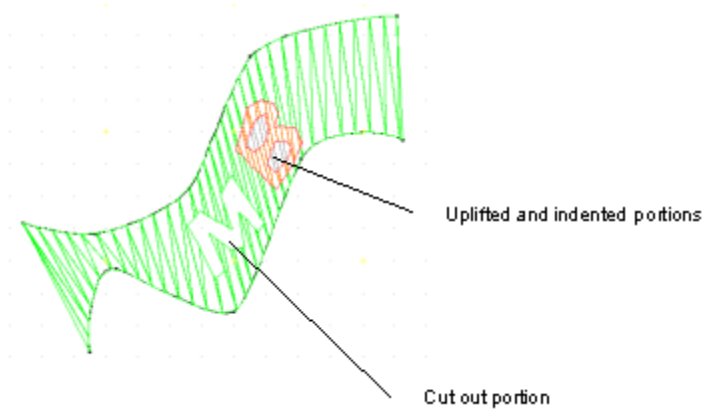
5. Click on Div. Dist to set the distance between divisions. You can control the smoothness of the ruled surface by the distance between divisions. For example, selecting a small distance between divisions (such as 3 inches) produces a smoother ruled surface than a larger division distance (such as 3 feet). The larger your division distance, the more jagged the resulting edges of your ruled surface. Either select a value from the menu or type your own in the input field. Then press [Enter].
6. Click on the first polyline. The solid polyline becomes a lighter colored, dashed one. You are prompted to *Select second polyline to process*.
7. Click on the second polyline. DataCAD stretches the ruled surface between the two concentric closed polylines. In this example, the distance between divisions was set at 8 inches to produce a very smooth ruled surface.



8. Use the o2c viewer to examine the ruled surface.



Once you have created a ruled surface between two contour lines, two polylines, or two concentric closed polylines, you can use 3D Knife functions to cut out, uplift, or indent irregular shapes or areas. Just treat the ruled surface as if it were a TIN model.



Use the o2c viewer to get a better picture of the cut out, raised, and depressed areas on the ruled surface.

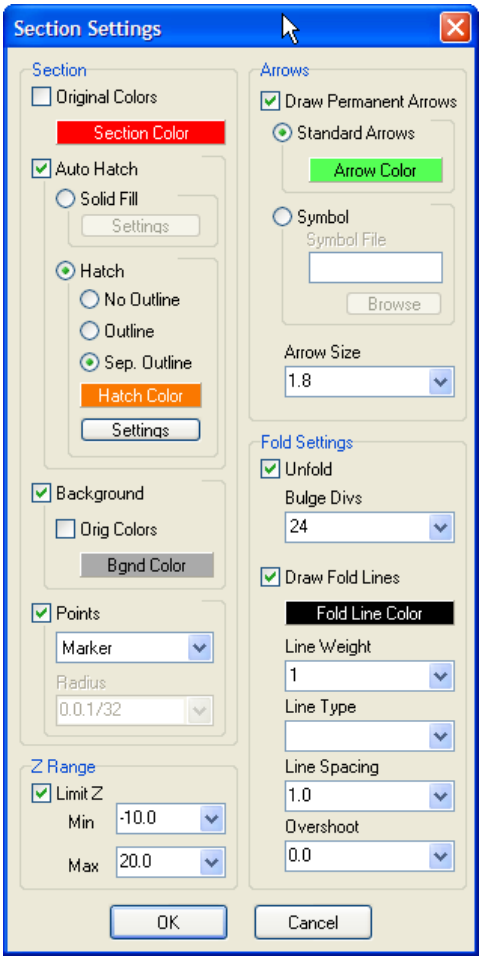


3D Sectioning Tool

You can use the sectioning tool to create 2D sections from 3D models. Draw a section line through your model and indicate a direction of view. From there, you can generate a sectional line drawing from the boundary. Several of the options available in the Sections Settings dialog box allow you to customize hatching and shading.

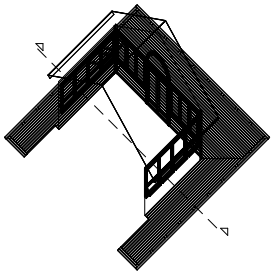
➔ To create 2D sections from a 3D model:

1. Select Section from 3D Menus. The Section menu appears.
2. Click on Options. The Section Settings dialog box appears.



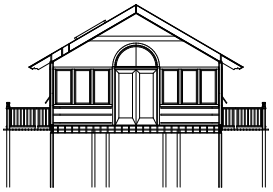
Section Settings dialog box

3. Make decisions based on the options available in the Section Settings dialog box. Press [Enter] or click on OK when you are finished.
4. Select Cut Line from the Section menu. You are prompted to *Select first point on Section Cut Line*. Then, you are prompted to select the second point of the cut line. A dotted line appears on your drawing. You are prompted to *Select a point to define direction of view*.



The cut line is a series of dashes; the arrow indicates the view direction

5. Click in your drawing to indicate the direction.
6. Select Begin from the Section menu. The section is attached to your cursor in the shape of a box. You are prompted to *Select location for Section*.
7. Position the cursor where you want the section to appear in your drawing and click the left mouse button. You can place the section on any existing layer, or you can create a new one (just select New Layer from the Section menu).



If you change your drawing, you can select Update from the Section menu so that the section will also be current.

Toolbars

Some new toolbars have been added to provide quick access to frequently used DataCAD features. The former .KEY files were automatically converted to the new DTB, INI-based DataCAD Toolbar format. The following examples show the differences between the former KEY file and new DTB toolbar formats.

KEY File Format

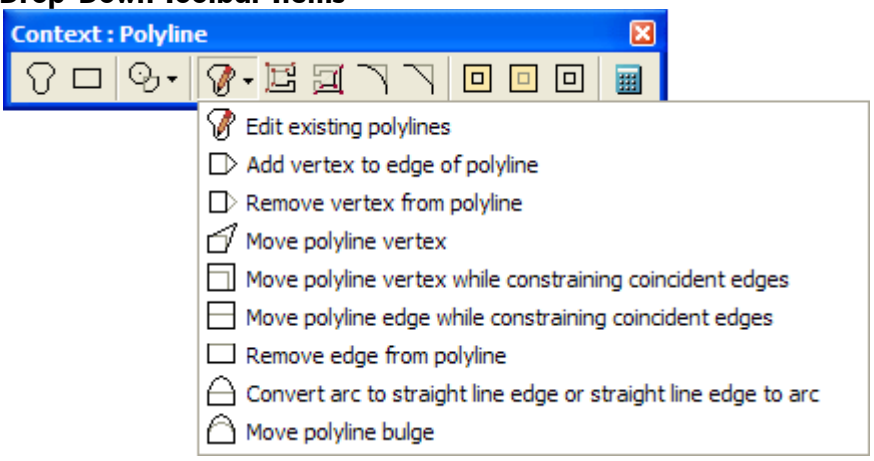
```
188.    !|  | |        |                |
|
189.    *|01| |        |                |
|
190.    L|  | |undo    |119             | UNDO last action
|
191.    L|  | |redo    |120             | REDO previous action
|
192.    L|  | |LAYERS_S|23              | Layers menu
|
193.    L|  | |LINTYP_S|15              | LineType menu
|
194.    L|  | |ARCTCT_S|11              | Architect menu
|
195.    A|  | |2DWALL_S|^·^È^;^S3^F1^¸^É  | Toggle Walls on/off -
Architect menu  |
196.    A|  | |2LWALL_S|^·^È^;^S3^F2^¸^É  | Select 2 line walls -
Architect menu  |
```

```
197.    A|  | |3LWALL_S|^·^È^;^S3^F3^¸^É  | Select 3 line walls -
Architect menu  |
198.    A|  | |4LWALL_S|^·^È^;^S3^F4^¸^É  | Select 4 line walls -
Architect menu  |
```

DTB File Format

```
199.    [undo]
200.    Hint=UNDO last action
201.    Icon=undo
202.    L=119
203.
204.    [redo]
205.    Hint=REDO previous action
206.    Icon=redo
207.    L=120
208.
209.    [LAYERS_S]
210.    Hint=Layers menu
211.    Icon=LAYERS_S
212.    L=23
213.
214.    [LINTYP_S]
215.    Hint=LineType menu
216.    Icon=LINTYP_S
217.    L=15
218.
219.    [ARCTCT_S]
220.    Hint=Architect menu
221.    Icon=ARCTCT_S
222.    L=11
223.
224.    [2DWALL_S]
225.    Hint=Toggle Walls on/off - Architect menu
226.    Icon=2DWALL_S
227.    A=^·^È^;^S3^F1^¸^É
228.
229.    [2LWALL_S]
230.    Hint=Select 2 line walls - Architect menu
231.    Icon=2LWALL_S
232.    A=^·^È^;^S3^F2^¸^É
233.
234.    [3LWALL_S]
235.    Hint=Select 3 line walls - Architect menu
236.    Icon=3LWALL_S
237.    A=^·^È^;^S3^F3^¸^É
238.
239.    [4LWALL_S]
240.    Hint=Select 4 line walls - Architect menu
241.    Icon=4LWALL_S
242.    A=^·^È^;^S3^F4^¸^É
```

Drop-Down Toolbar Items



You can add drop-down items to your own toolbars. To add a drop-down section to a toolbar, use the following format in the INI file. For more information on this, see "Creating Custom Toolbars" in the Appendix of the DataCAD User's Manual.

```
[SECTION]
Icon= (insert the bitmap filename)
Hint= (insert the tool tip)
A= (insert the action form; e.g., Alt-???)

DropDownCount=3 (change the number if more or less than 3 new icons)

Icon00=
Hint00=
A00=

Icon01=
Hint01=
A01=

Icon02=
Hint02=
A02=
```

Selecting the parent icon will perform the action if one is defined or will drop down the child icons if no action is defined. Hints for child icons will be used as menu labels.

Toolbar Icon Size

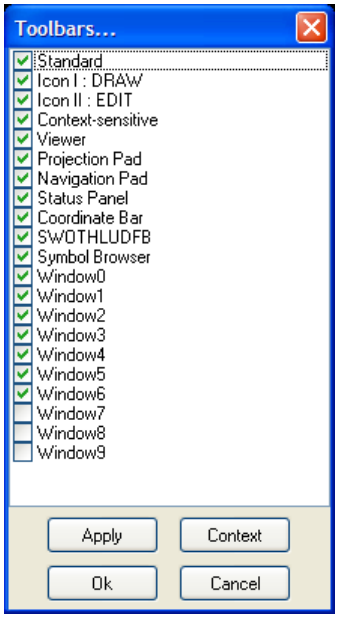
The default size of icons used in toolbars is 16x16 pixels. However, if you would like to use larger icons, you can add the following setting to the [KeyFile] section of the DCADWIN.ini file:

```
[KeyFile]
IconSize=16
```

Valid values are 16, 24, and 32. This setting only changes the available area for icon bitmaps. It does not make small icons larger or large icons smaller.

Toolbars Dialog

We've added a Toolbars dialog to the View pull-down menu. This lets you select the toolbars you want to display. Toolbars you don't want to display have no checkmark in the box.

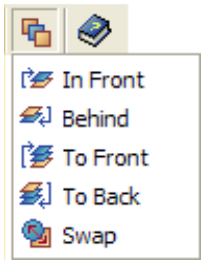


Standard Toolbar

The Standard Toolbar provides direct access to common Windows-based functions and to some frequently used DataCAD ones.



Going from left to right, the Standard Toolbar icons give quick access to these functions: Create a new file; open an existing file; save changes to the current file; output your drawings to printer or plotter; check file for spelling errors; select entities to cut, copy, or paste; cut selected entities; copy selected entities to the clipboard; paste entities from the clipboard; undo utility; redo; reference DataCAD files; reference bitmaps; hyperlink a web URL, file, or go-to-view; change the order of entities; and open the reference manual.



You can change the order of entities in your drawing from the Standard Toolbar

You can add the following entry to the [KeyFile] section of the DCADWIN.ini file to automatically append the toolbar (.DTB) of your choice to the DataCAD Standard toolbar.

```
263.    [KeyFile]
264.    Standard=My_Toolbar.DTB
```

Projection (view) Toolbar

The Projection Pad Toolbar controls the type of view that appears in your Drawing Window. You can display this toolbar lengthwise or in the traditional square format. The icons in this toolbar (from left to right on the lengthwise version) display the following types of views: parallel; front elevation; perspective; left elevation; plan; right elevation; isometric; back elevation; and oblique (axonometric).



Two versions of the Projection Pad Toolbar

View-sensitive Viewer Toolbar

The Viewer Toolbar changes based on the type of view you select in the Projection Pad.

If you are displaying the plan or oblique (axonometric) view of your drawing, the Viewer Toolbar contains the following icons (from left to right): refresh display; display model in object viewer; display shaded view of model; remove hidden lines from 3D view; save current view; update selected view based on current view; set a new clip cube; and enable (on) or disable (off) clip cube.



Viewer Toolbar for plan or oblique (axonometric) view

If you display the parallel, elevation (front, back, right, left), or isometric view of the model, the Viewer Toolbar adds several rotation icons to the basic eight: rotate +X; rotate –X; rotate +Y; rotate –Y; rotate +Z; and rotate –Z.



Viewer Toolbar for parallel, elevation, or isometric view

If you display the perspective view of the model, the basic options remain, but the clip cube and rotational options are replaced by others with different functions (from left to right following the basic options): walk forward; walk backward; step left; step right; step up; step down; look up; look down; turn left; and turn right.



Viewer Toolbar for perspective views of your model

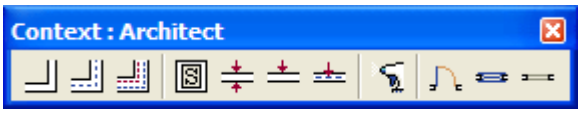
Context-sensitive Toolbar

Context-sensitive Toolbars appear when you perform various functions. To determine what function each icon performs, place your cursor on it for a few seconds to display a tool tip.

Cleanup options:



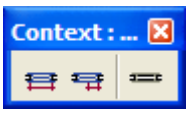
Architect options:



Door swing options:



Window options:



Polygon options:



Polyline options:



Modeling options:



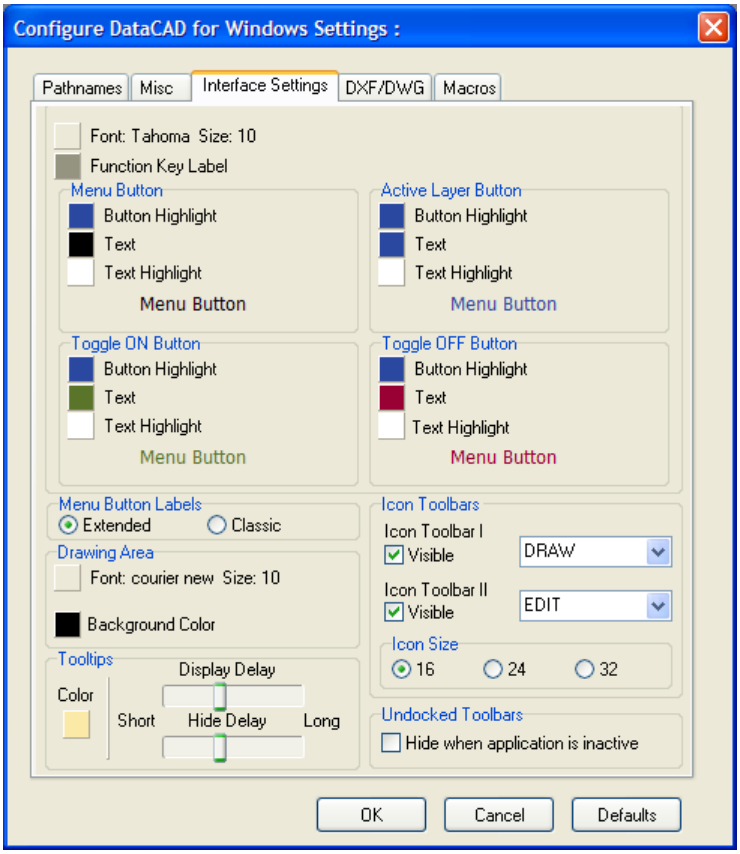
Options shown as icons in context-sensitive toolbars perform the same functions as those in the traditional left-hand menu

A user-definable, context-sensitive toolbar automatically changes to present related icons based on the menu you choose. A configuration dialog allows you to easily set which user-defined toolbar is related to a particular menu selection.

A new .CST file (Context-sensitive Toolbar) located in \Support Files\Toolbars contains a list of menus that can be associated with toolbars. You do not need to edit this file manually.

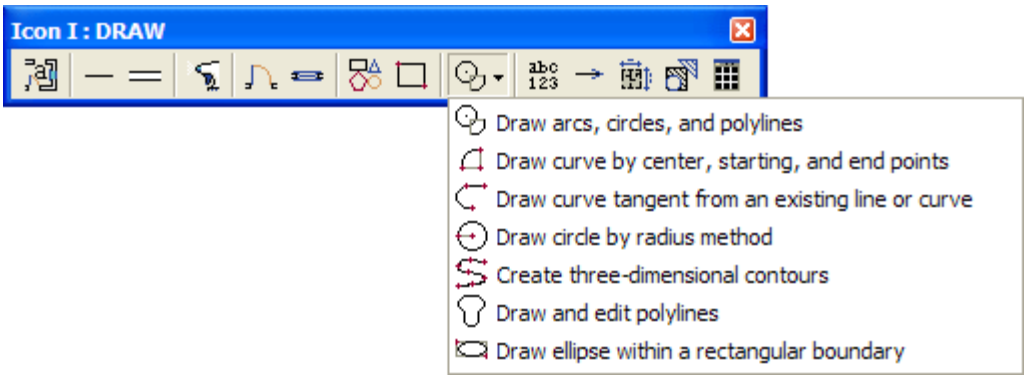
Default Toolbars

There are two default user-defined toolbars that can be active simultaneously. You can configure these toolbars by selecting the Interface Settings tab in Program Preferences from the Tools pull-down menu.



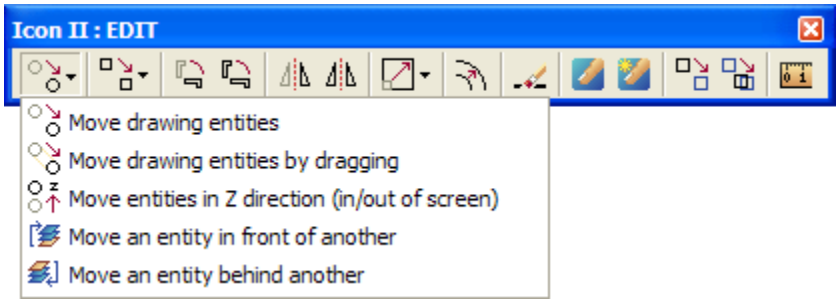
The Default Toolbar section allows you to configure icon toolbars 1 and 2 based on selections from pull-down menus

You can select any of the available toolbars from the pull-down menu for the two default toolbars. Your options are: Architect, Cleanup, Doorswing, Draw, Edit, Model, Polygon, Polyline, and Windows. In this example, the default toolbars are Edit and Draw.



The default Draw Toolbar with pull-down menu for one icon

In the Draw Toolbar, the icons (from left to right) are: Architect menu – draw walls, doors, and windows; draw lines; draw walls; cleanup intersections of lines and walls; place doors in walls; place windows in walls; draw 2D polygon shapes; draw rectangular shapes; draw arcs, circles, and polylines (with additional options available from a pull-down menu); add text to the drawing; draw arrow or select arrow settings; dimension entities in the drawing; hatch entities in the drawing; and browse symbol directories.



Default Edit Toolbar showing one of three pull-down menus

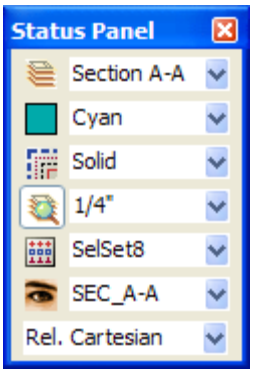
In the Edit Toolbar, the icons (from left to right) are: move drawing entities (with additional options available from a pull-down menu); make copies of drawing entities (with additional pull-down menu options); rotate drawing entities around a point; rotate and keep the original entities; mirror drawing entities about a line; mirror drawing entities about a line and keep the original entities; scale the size of the entities (with additional pull-down menu options); offset (copy entities parallel to existing entities); delete entities from the drawing; identify (display the properties of an entity); identify/set all (change current settings to match those of an existing entity); change the properties of existing entities; change the properties of existing entities to match those of another entity; and measure drawing entities and perform takeoffs.

Status Toolbar

The Status Toolbar provides quick access to color, layer, line type, scale, selection sets, go-to-views, and input mode. An icon located to the left of each drop-down list accesses the related menu (i.e., the Layer Manager icon appears next to the layer list). If you click on the icon, the appropriate dialog box or left menu appears so that you can make your selection. Pull-down arrows on the right offer other options for each icon (e.g., the input modes are displayed on the pull-down menu in the example).

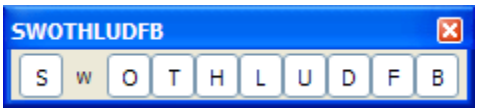
You can set the number of pixels to add (positive value) to or subtract (negative value) from the status toolbar. In the DCADWIN.ini, you can adjust the drop-down width:

```
[StatusArea]
DropDownWidth=
```



SWOTHLUDFB Toolbar

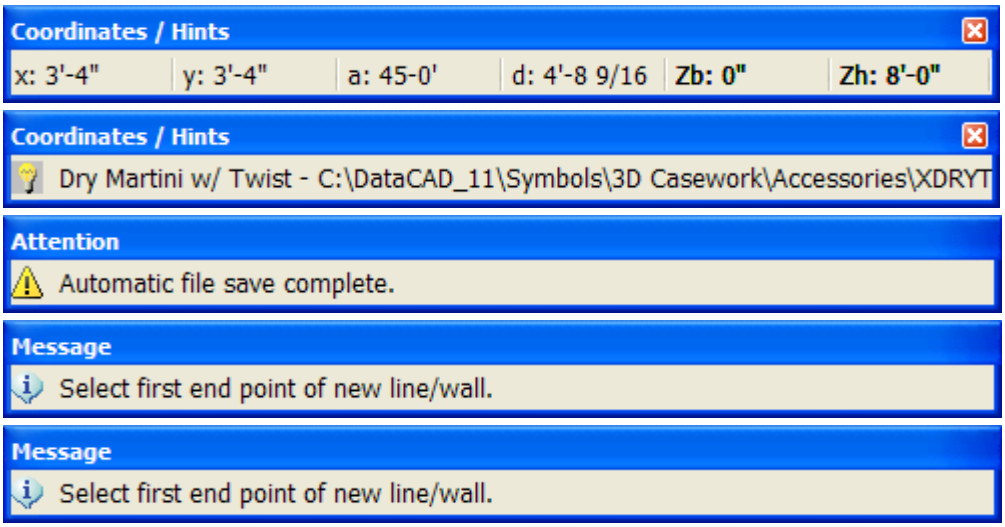
The [S]nap, [W]alls, [O]rtho, [T]ext, [H]atch, [L]ine weight, [U]ser-line, [D]imension, [F]ills, and [B]itmap toggles are now located on their own toolbar.



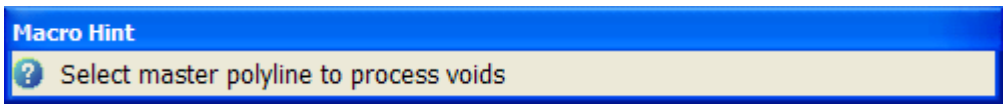
Toggles that are off appear as lower-case letters

Coordinate, Error and Message Toolbars

The Error, Message, and Coordinate Bar Toolbars supply you with helpful warnings, input requirements and input fields, and coordinate information. The information that appears in each toolbar depends on the function you are currently performing and the location of your cursor. If your cursor is on a symbol in the Symbol Browser, the Coordinate Bar displays information about the location of the symbol file. The Coordinate Bar Toolbar can be resized when you dock it.



The Pause Hint Toolbar appears to remind you of information you need to supply or displays the appropriate left menu.



MultiView Windows (a.k.a. MVTOTB™ MultiView Tear-Off Toolbars)

The visual GoTo View Windows can be displayed in a toolbar that is turned on or off from the View/MultiView pull-down menu. You can also use the [Ctrl]+[W] hotkey to turn this toolbar on and off.

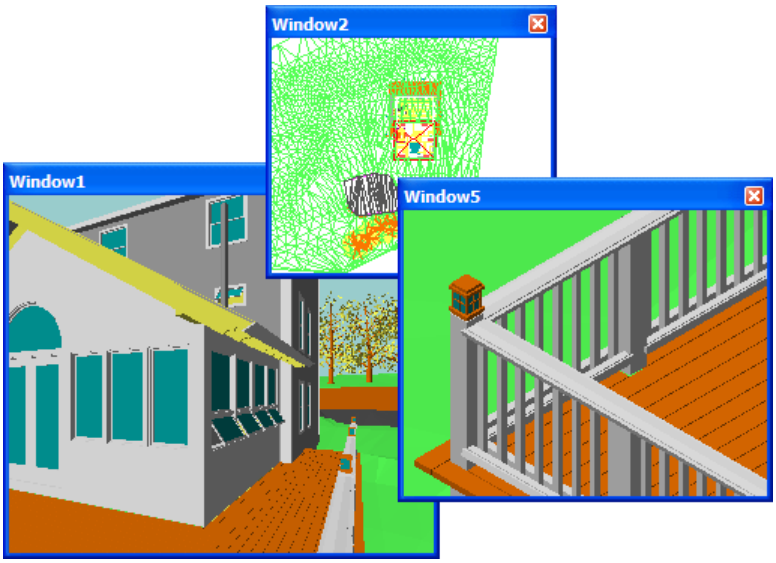
➔ To use MultiView Windows:

1. Create and name several GoTo Views.
2. Set the number of MultiView windows you want by selecting Toolbars from the View pull-down menu and checking the appropriate number of Window boxes.
3. Select MultiView from the View pull-down menu.
4. Right-click within a window, select GoTo View, and choose a view that you created in step 1. The view appears in the window.



5. Close the windows that do not display GoTo Views.

You can display up to 10 GoTo View windows plus undock and resize them to meet your needs. Once displayed, right click on the GTV window for options. These windows may be torn off, re-sized, and repositioned as desired as shown in this example. When docked, they return to their original size.



Navigation Toolbar

The Navigation Pad Toolbar helps you quickly move about in your Drawing Window.



Two configurations of the Navigation Pad Toolbar

Traditionally, the second configuration is used so that the arrows are more ergonomically correct. In the traditional configuration, beginning from the upper left and going clockwise, the icons allow you to: zoom view in; pan view up; identify (display the properties of an entity); pan view to right; zoom to area; pan view down; zoom view out; and pan view to left. The center icon lets you zoom view to the drawing extents.

Action Codes for Toolbars

The following action codes have been added for use in Toolbars:

Action Code	Number	Action
265. L	266. 171	267. Partial Erase menu
268. L	269. 172	270. 2D Polygon by Rectangle
271. L	272. 173	273. Arrows menu
274. L	275. 174	276. Drop Mesh menu
277. L	278. 175	279. Ruled Surface menu
280. L	281. 176	282. TIN Surface menu
283. L	284. 177	285. 3D Mirror menu
286. A	287. 1000#	288. 2D Polygon Vertex On
289. A	290. 1001#	291. 2D Polygon Vertex Off
292. A	293. 1002#	294. 2D Polygon Diameter On

295.	A	296.	1003#	297.	2D Polygon Diameter Off
298.	A	299.	1004#	300.	2D Polygon Inscribe On
301.	A	302.	1005#	303.	2D Polygon Inscribe Off
304.	A	305.	1006#	306.	2D Polygon Rectangle On
307.	A	308.	1007#	309.	2D Polygon Rectangle Off
310.	A	311.	1008#	312.	Polyline Rectangle On
313.	A	314.	1009#	315.	Polyline Rectangle Off
316.	A	317.	1010#	318.	Symbol Browser On
319.	A	320.	1011#	321.	Symbol Browser Off

Action Codes for toolbars

Keyboard Macros and Nested Aliases

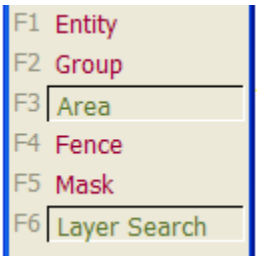
Keyboard macro sequences used in [ALT] + [KEY] combinations, toolbars, or command line aliases can include up to 1,024 commands. ^F1, or ^Enter this line of text$, and ^12.5$ each equal one command, so there is essentially no limit to the number of keystrokes per macro string.

You can use the PAUSE character ([ALT] + [0170] "ª") when defining a keyboard macro string. Inserting this character after a carat "^ª" causes the macro sequence to halt until you click or type. If the pause character is followed by text (i.e., "^ªThis is a comment"), the text will be displayed in DataCAD as a prompt. You may not use the dollar sign [$] character in comment strings.

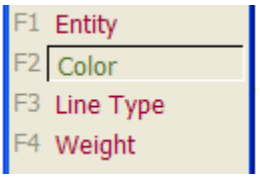
You can call a command line alias from a keyboard, toolbar, or command line alias macro sequence, allowing you to chain together existing aliases by name. To call a command line alias by name, precede the command name with the special character [ALT] + [0169] "©". For example, (B^;^F7^ªSelect entity to erase^©cp) calls the "cp" alias after going to the Erase menu and waiting for one input.

Mask on the Fly via EGAF

Mask replaces the Selection Set option in the selection method portion of many DataCAD menus. Entity, Group, Area, and Fence options are frequently abbreviated as EGAF.

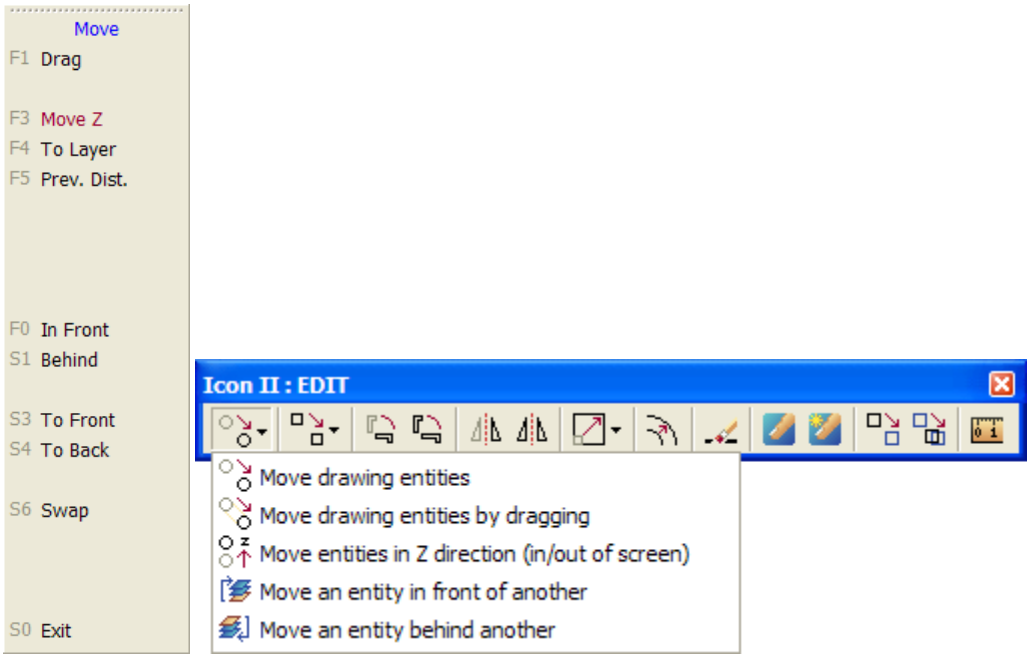


Mask lets you define selection filters on the fly. The Mask filters you can activate, and set are Entity, Color, Line Type, and Weight. Previously-defined masks are retained for subsequent editing operations.



Local Bitmap/Fill Order

New options in the Move menu and the Edit Toolbar let you selectively set the order of bitmap and filled entities on a per-layer basis. You can move an entity to the front or back of a layer; alternatively, you can move an entity in front of or behind another entity. Also, you can change the order of entities by using Swap.



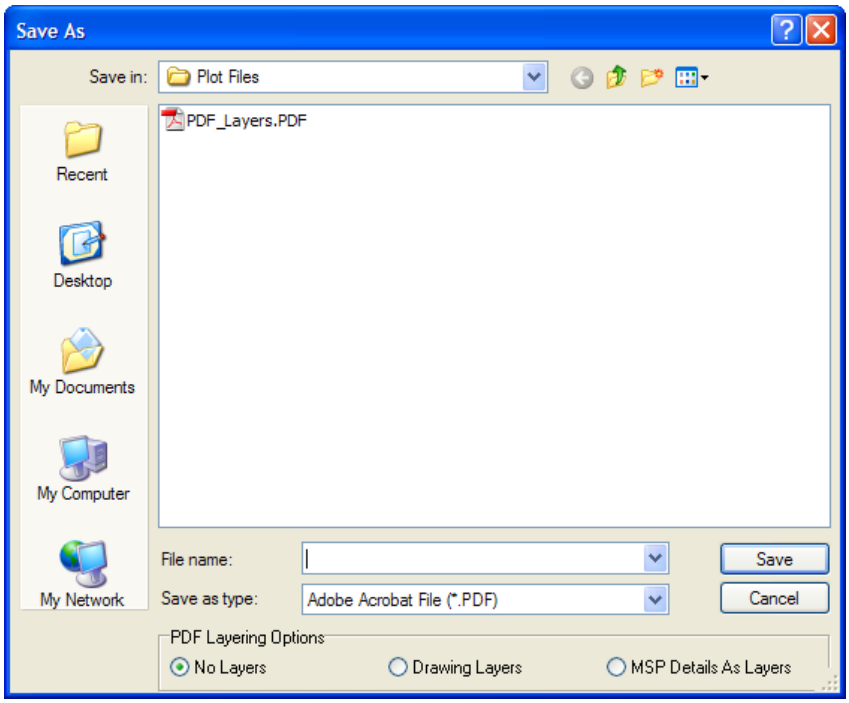
Use either the left menu or the Edit Toolbar to use the different Move options

PDF Files with Layers

You can include drawing layers when you create a PDF file directly from DataCAD. You have three options when saving a plot preview as a PDF document: No Layers, Drawing Layers, and MSP Details as Layers (this option is only available when there are MSP sheets defined in the drawing; otherwise, the only valid options are No Layers and Drawing Layers). You must have Adobe Reader version 6 to view layers. However, PDF files created by DataCAD 11 can be read by Adobe Reader versions 4 and 5 as well.

➔ To create a PDF file of your drawing:

1. Select Print from the File pull-down menu. The Print/Plot menu appears.
2. Make sure Preview is enabled.
3. Select Print/Plot. The DataCAD Plot Previewer appears.
4. Click on Save As or select Save Image As from the File pull-down menu. The Save As dialog box appears.



5. Select the PDF layer option you prefer.

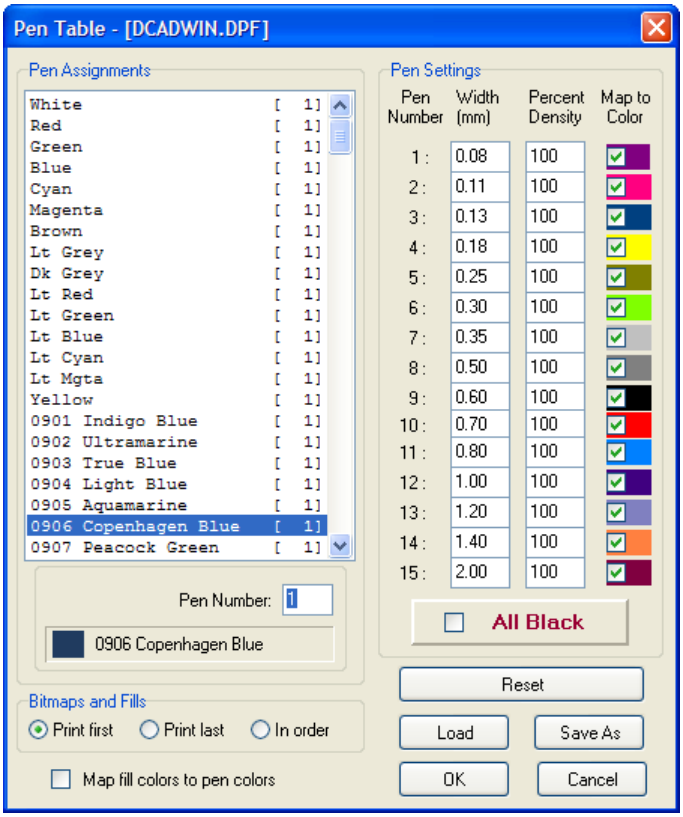
Multi-scale Plotting (MSP) Improvements

You can add rotated clip cubes to multi-scale plotting sheets. In addition, you can add perspective views to your multi-scale plotting sheets.

We've added new options for copying or moving the contents of one MSP sheet to another. You can also move or copy details from one MSP sheet to another.

Pen Table Enhancements

Custom color names now appear in the pen definition list. When you map a pen to a color, the color is now remembered when you re-select the color to map to. You'll also find a new "In Order" option to print SPB-fills in order instead of first or last.



Pen settings include custom colors and printing order options for bitmaps and fills

XREF Changes

The XREF manager provides access to GoTo Views within XREFs. The purpose is to set on/off layers for each XREF, based on GoTo Views.

You can add the following entry to the DCADWIN.ini file to enable automatic conversion of referenced DC5 files to AEC format:

```
[XREFs]
Auto Convert=TRUE
```

The default value is FALSE; changing it to TRUE automatically updates referenced DC5 files to AEC.

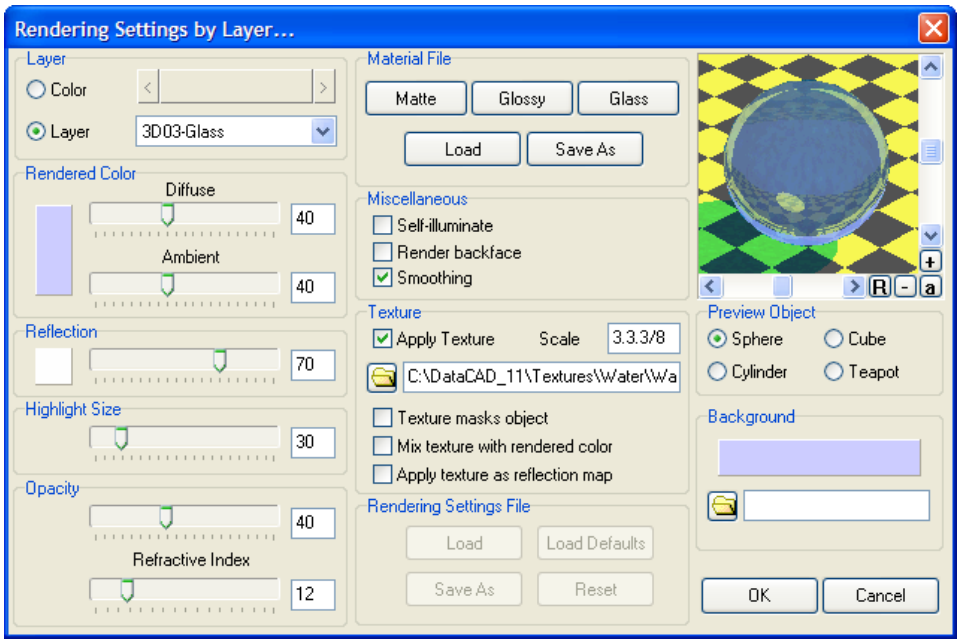
o2c Rendering

Use the Texture Origin option in the View pull-down menu to set the starting point of bitmap textures for each polygon.

➔ To select a starting point:

1. Select Texture Origin from the View pull-down menu.

2. Select the polygon entity for which you want to define an origin.
3. Pick (or snap) to the origin point. A marker appears.
4. Apply a texture to this entity's color-to-material assignment using the Rendering Settings dialog box. Click on OK when you are satisfied with the sample in the Preview window.



The Rendering Settings dialog box

Hint: When you apply bitmap textures, keep these facts in mind:

The texture scale input uses the current scale type. This is the same as the scale used for [Spacebar] input.

To achieve the best rendered quality, your bitmap textures should have a square aspect ratio with a resolution of 2^n power. That means 128 pixels x 128 pixels, 256x256, 512x512, or 1024x1024, etc.

If you apply a bitmap texture that is not square, it will be "squashed" to fit in a square repeating pattern. If you apply a bitmap texture that does not have a resolution of 2^n power, it will be re-sampled during the conversion to o2c format. This may degrade the quality of the texture.

Layer Sets

In the Layers menu, Layer Sets replaces the former layer utility. Layer Sets controls setting on a per drawing basis and retains them with the drawing file.

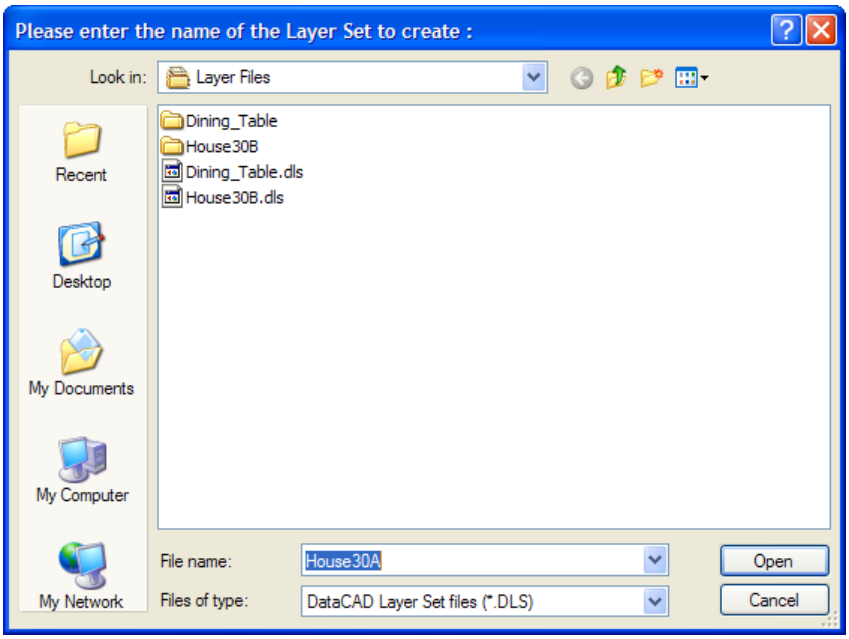
➔ To create a layer set:

1. Select Layers from the Utility menu. Then choose Layer Sets from the Layers menu. The Layer Sets menu appears.
2. Click on Create and determine what you want in the current layer set.

   All Layers Creates a layer set with all layers

On Layers	Creates a layer set with only the layers that are on
Views	Includes saved views in the layer set
Details	Includes multi-scale plot details in the layer set

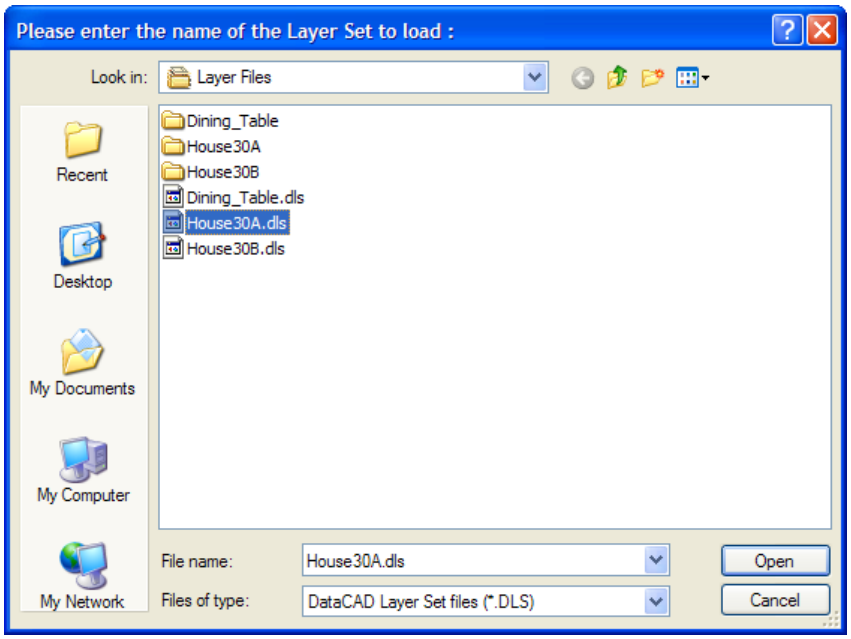
3. Click on Begin. A dialog box appears, prompting you to enter the name of the layer set you want to create.



4. Click in the File name input box, supply a name, and click Open or press [Enter].

➔ To load a layer set:

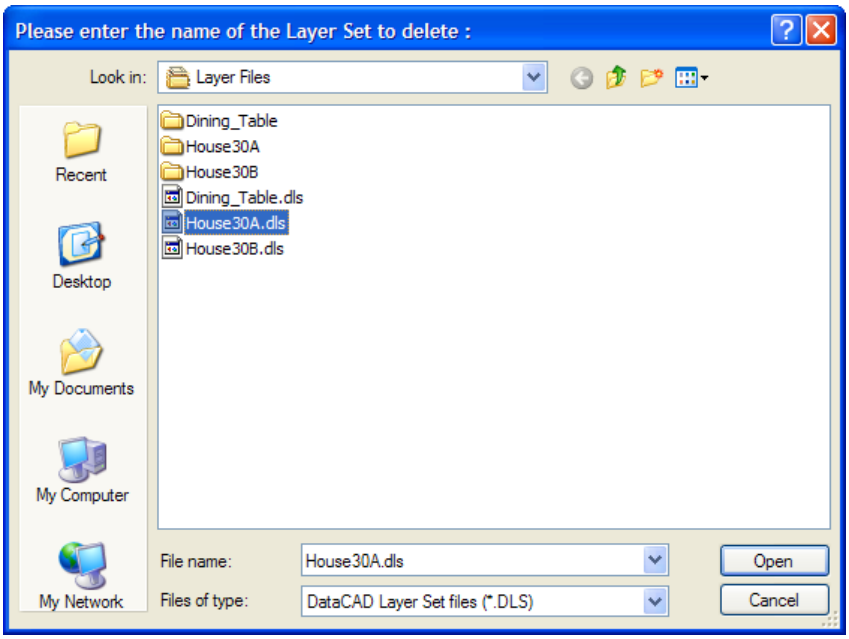
1. Select Layers from the Utility menu. Then choose Layer Sets from the Layers menu. The Layer Sets menu appears.
2. Select Load from the Layer Sets menu. A dialog box appears, prompting you to enter the name of the layer set you want to load.



3. Select the layer set you want to load from the *.DLS files in the list and click on Open or press [Enter].

➔ To delete a layer set:

1. Select Layers from the Utility menu. Then choose Layer Sets from the Layers menu. The Layer Sets menu appears.
2. Select Delete Set from the Layer Sets menu. A dialog box appears, prompting you to enter the name of the layer set you want to delete.



3. Select the layer set you want to delete from the *.DLS files in the list and click on Open or press [Enter]. If you want to delete another layer set, repeat this step. If you do not want to delete another layer set, click Cancel.

Additional Layer Changes

Layer names support extended characters.

You can assign materials on a per-layer basis.

Note: You can select either the Color or Layer radio button in the Rendering settings dialog box to define materials by color or by layer. This global setting is stored in DCADWIN.ini. Launching the Object Viewer or exporting to o2c format will use this setting.

The maximum number of layers per drawing or symbol is 32,768.

➔ To specify Z Base and Z Height settings for each layer:

1. Select Settings from the Utility menu. The Settings menu appears.
2. Toggle on Z By Layer.

Checking Text for Spelling Errors

Although not a new feature, spell-checking was not documented in recent versions of the DataCAD User's Manual.

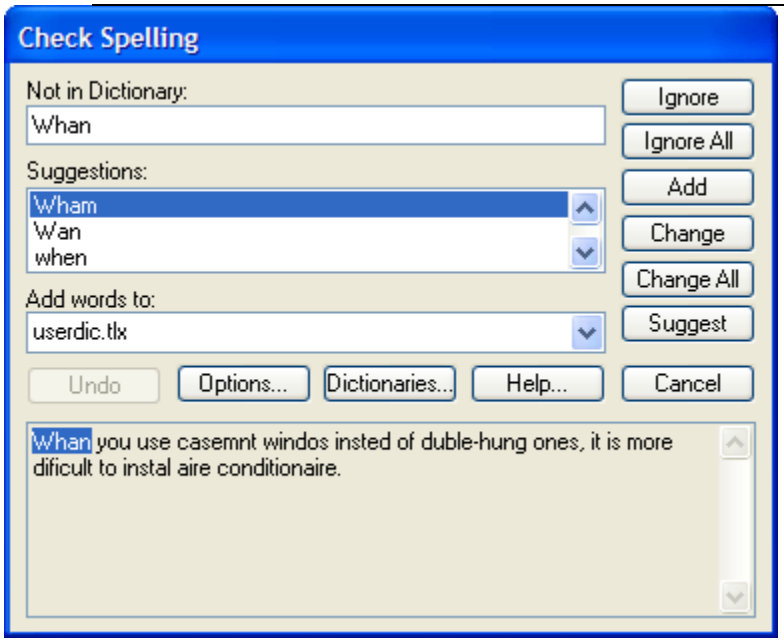
When you type text in your Drawing Window, you don't have to worry if you lost the spelling bee when you were in school. DataCAD provides a spell-check function much like the ones found in word processing programs.

➔ To check spelling and correct errors:

1. Type text in your Drawing Window.

2. Select Spelling from the Tools pull-down menu or press [Ctrl]+[F7]. The Spell Check menu appears.
3. Select the text you want to spell-check, by using Entity, Group, Area, Fence, Mask, Layer Search, or All (which applies to all visible layers).
4. Click on the text you want to check for errors. The Check Spelling dialog box appears. The text you selected appears in a preview box. DataCAD highlights the first misspelled word it encounters, copies it into the Not in Dictionary field, offers alternatives in the Suggestions box, or gives you access to one or more dictionaries in the Add words to box.

Note: If DataCAD doesn't detect an error in the text, the Check Spelling dialog box will not appear. The labels of some buttons and text boxes in the Check Spelling dialog change according to the context.



The Check Spelling dialog box offers suggestions and other options.

5. Use the buttons to indicate your choices.

Ignore	Skips the highlighted word.
Ignore All	Skips all instances of the highlighted word in the selected text.
Add	Lets you put a word (such as your last name) in the spelling dictionary you selected in the Add words to drop-down list.
Change	Replaces the current highlighted word with the one you selected from the Suggestions box. If you edited the word, DataCAD uses that as the replacement.
Change All	Replaces the highlighted word throughout your selected text. If you edited the word, that is used as the replacement word.
Suggest	Searches more thoroughly each time you click on it. This button is disabled when all possible suggestions have been located.
Undo	Removes the last change made. Pressing Undo several times removes the last several changes.
Options	Opens the Options dialog box.

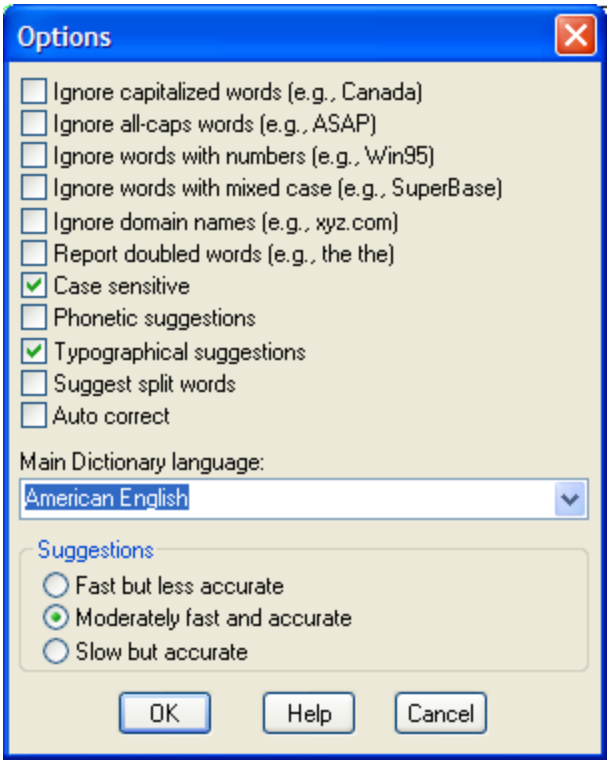
Dictionaries Opens the Dictionaries dialog box
Help
Cancel Stops the current spelling check

6. Continue making decisions about other misspelled words. Once DataCAD corrects the highlighted word, it automatically goes to the next misspelled one. If there are no more misspelled words, the Check Spelling dialog box closes automatically. If you decide not to continue checking spelling, just click on Cancel.

You can change the way the spelling checker operates.

➔ To modify the spell-checking criteria:

1. Click on the Options buttons in the Check Spelling dialog box. The Options menu appears.



The Check Spelling Options dialog box

2. Click in a box to select an option, indicated with a checkmark. You can click in a box that contains a checkmark to remove it.

Ignore capitalized words: Ignores (skips over without checking) any words beginning with a capital letter. This is useful if the text being checked contains many proper names.
Ignore all-caps words: Ignores (skips over without checking) any words containing all capital letters. This is useful if the text being checked contains many acronyms.
Ignore words with numbers: Ignores (skips over without checking) any words containing embedded digits. Examples of such words include "Win98" and "Q4." This is useful if the text being checked contains many code words or other symbols containing digits.

Ignore words with mixed case: Ignores (skips over without checking) any words containing an unusual mixture of upper- and lower-case letters. Examples of such words include "MicroHouse" and "CapsLock." This is useful if the text being checked contains many variable names or other symbols which use case changes to distinguish words.

Ignore domain names: Ignores (skips over without checking) any words that appear to be Internet domain names (such as "wintertree-software.com").

Report doubled words: Reports any word that appears twice in a row.

Case sensitive: Distinguishes between capitalized and non-capitalized words. For example, "canada" is considered different from "Canada," so "canada" would be reported as a misspelling. When the option is disabled, "canada" and "Canada" are considered identical. Disabling this option reduces the performance of the spelling checker.

Phonetic suggestions: Makes suggestions based on phonetic (sounds-like) similarity to the misspelled word. This tends to improve suggestions for badly misspelled words. This option increases the time required to locate suggestions.

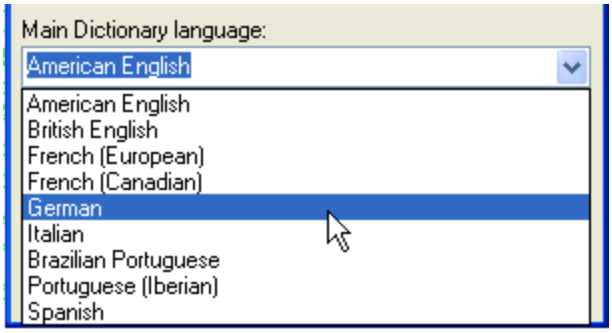
Note: Either the Phonetic suggestions or Typographical suggestions option must be enabled, or no suggestions will be offered.

Typographical suggestions: Makes suggestions based on typographical (looks-like) similarity to the misspelled word. This is appropriate for people who are generally good spellers.

Suggest split words: Suggests two separate words as a replacement for a misspelling containing two joined words. For example, "is the" would be suggested as a replacement for "isthe."

Auto correct: Automatically changes words marked with "Auto Change" actions to their specified replacements. When disabled, you are prompted before the words are changed.

3. Check the Main Dictionary language option. You can set the language of the main dictionary used to check spelling. The list shows only languages for which dictionaries are installed on your system. To check spelling in a different language, select the language in the list.



Select the dictionary's language

4. Select one of the options in the Suggestions area. These options determine the speed and accuracy of the initial search for suggested replacements for misspelled words. When a misspelled word is detected, a search is automatically made for suggestions. This option controls the speed and accuracy of this automatic search. Pressing the Suggest button in the Check Spelling dialog causes an increasingly more accurate (but slower) search for suggestions.

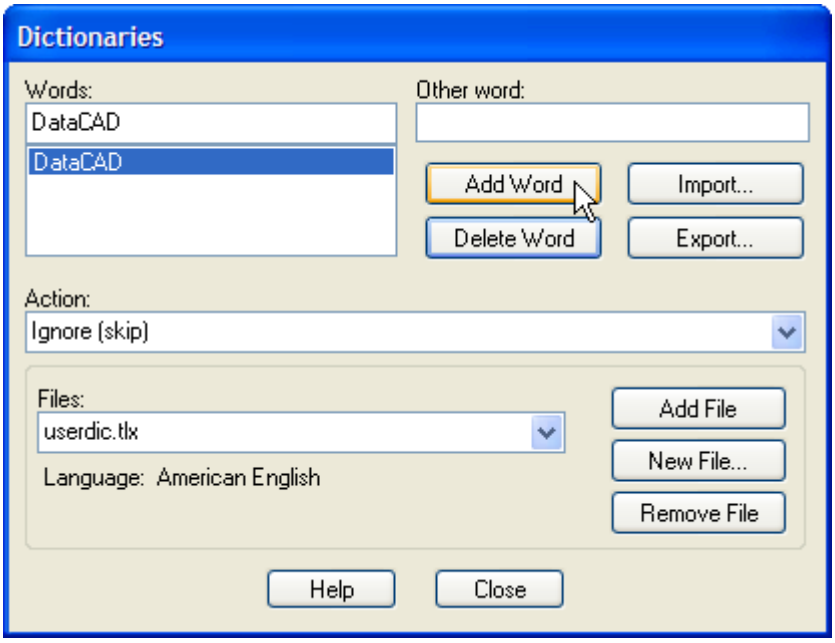
5. Close the Options dialog when you are ready to resume checking spelling in your file.

OK	Closes the Options dialog and saves any changes made to the option settings.
Cancel	Closes the Options dialog and discards any changes made to the option settings.

The Dictionaries dialog box lets you open and close user dictionaries and edit the contents of an open user dictionary. The contents of dictionaries are saved in disk files. You can open some or all user dictionary files at any time. Only open dictionaries are searched during a spelling check.

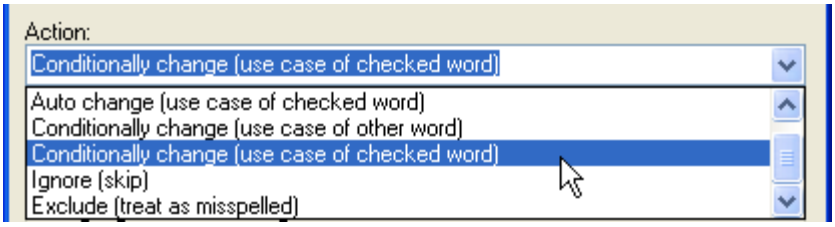
➔ To add a word to the user's dictionary:

1. Click on the Dictionaries button in the Check Spelling dialog box. The Dictionaries dialog box appears.



The Dictionaries dialog box

2. Click on the arrow to display options in the Action area. Then choose the appropriate option from the drop-down list.



The Action pull-down menu

Auto change (use case of checked word): Automatically replaces one word with another. For example, if you often type “recieve” instead of “receive,” you might enter the word “recieve” with “receive” as the other word and "Auto change (use case of checked word)" as the action. The spelling checker automatically corrects “recieve” wherever it appears. If it is capitalized (“Recieve”), the spelling checker automatically replaces it with “Receive.” The replacement is made automatically only if the "Auto change" option is enabled (see the Options Dialog for information on the Auto change option).

Auto change (use case of other word): Automatically replaces one word with another, always with the same case pattern as the other word. This is useful for automatically expanding abbreviations. For example, you could enter “TBD” with “to be determined” as the other word and "Auto change (use case of other word)" as the action. The spelling checker automatically replaces “TBD” with “to be determined” wherever it appears. The replacement is made automatically only if "Auto change" is enabled (see the Options Dialog for information on the Auto change option).

Conditionally change (use case of checked word): Lets you optionally replace one word with another. For example, if you often type “receive” instead of “receive,” you might enter the word “receive” with “receive” as the other word and "Auto change (use case of checked word)" as the action. The spelling checker asks if you want to replace “receive” with “receive.” If it is capitalized (“Receive”), the spelling checker asks if you want to replace it with “Receive.”

Conditionally change (use case of other word): Lets you optionally replace one word with another, always with the same case pattern as the other word. This is useful for optionally expanding abbreviations. For example, you could enter the word “TBD” with “to be determined” as the other word and "Conditionally change (use case of other word)" as the action. The spelling checker asks if you want to replace “TBD” with “to be determined.”

Exclude (treat as misspelled): Tells the spelling checker that the word is misspelled, even if it is listed in another dictionary. Words marked with “Exclude” will never be offered as suggestions for misspelled words and they will be reported as misspellings when they are encountered by the spelling checker. The spelling checker looks up words in user dictionaries in the order in which they appear in the Files list. If you want to exclude a word, make sure it doesn't appear in a previous user dictionary.

Ignore (skip): Tells the spelling checker that the word is spelled correctly and can be skipped over. This is the most common action.

3. Click on the button in the Words portion of the Dictionaries dialog box that performs the action you want. This portion lists words in the currently selected user dictionary.

Add Word button: Adds the word you type in the Words input box to the currently selected dictionary. The currently selected action and other word are associated with the word. You can use the Add Word button to change the action or other word associated with a word. The Add Word button is enabled only when a new word is typed in the edit area of the Words list. The words you add may contain virtually any character, but only words which contain embedded periods should have trailing periods (e.g., “U.S.A.” is OK, but USA. is not).

Delete Word button: When you highlight a word in the list, DataCAD places it in the Words input box. When you click Delete Word, DataCAD removes the highlighted word from the currently selected dictionary. The associated action and other word are also removed.

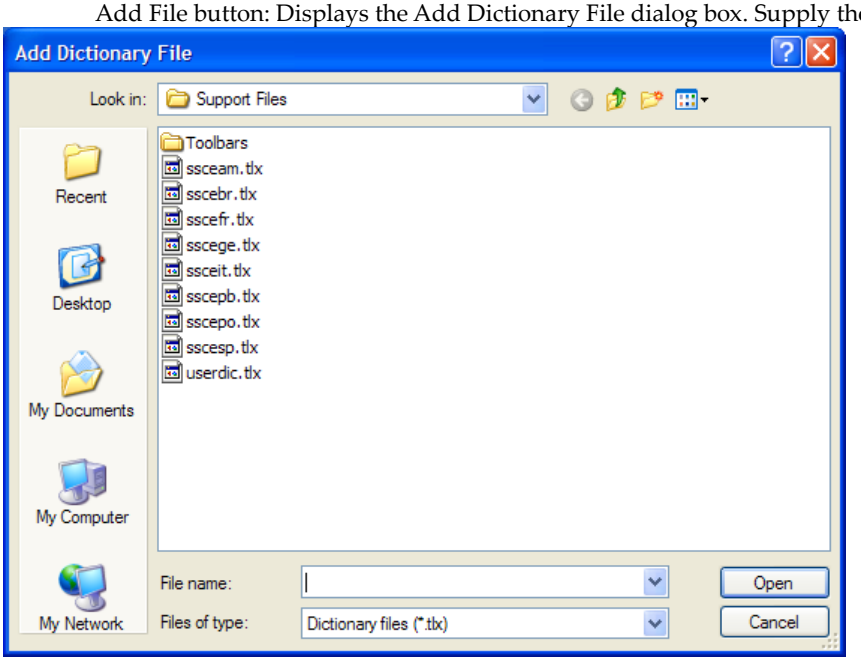
Import button: Adds the words contained within a text (*.txt) file to the currently selected dictionary. When you select Import, a dialog box lets you select the text (*.txt) file you want. Each word in the selected file is loaded into the dictionary in alphabetical order. Importing a large list of words may take some time.

Export button: Saves the contents of the currently selected dictionary to a text (*.txt) file. When you click Export, a dialog box lets you select the name of the text (*.txt) file to which words in the dictionary will be exported. The words are written to the file one per line.

Other word box: Contains an alternate word associated with the currently selected word. The other word is used in the "Auto change" and "Conditionally change" actions to supply a replacement word. You can enter more than one word in the Other Word box, but the total length should be limited to 63 characters.

4. Click on the appropriate button in the Files portion of the Dictionaries dialog box. The pull-down list displays the open dictionary files. When you select a file from the list, its contents are displayed in the Words list. Language: Displays the language (e.g., English or French) of the words in the currently selected dictionary.

Add File button: Displays the Add Dictionary File dialog box. Supply the name of the file.



The Add Dictionary File dialog box

New File button: Creates a new user dictionary file. When you select this button, a dialog appears which you can use to specify attributes of the new dictionary. See the New Dictionary dialog box for details.

Remove File button: Closes the currently selected dictionary file. Closed dictionaries are not checked during a spelling check. Although the file is closed, it is not deleted. Closed dictionary files can be reopened later using the Add File button.

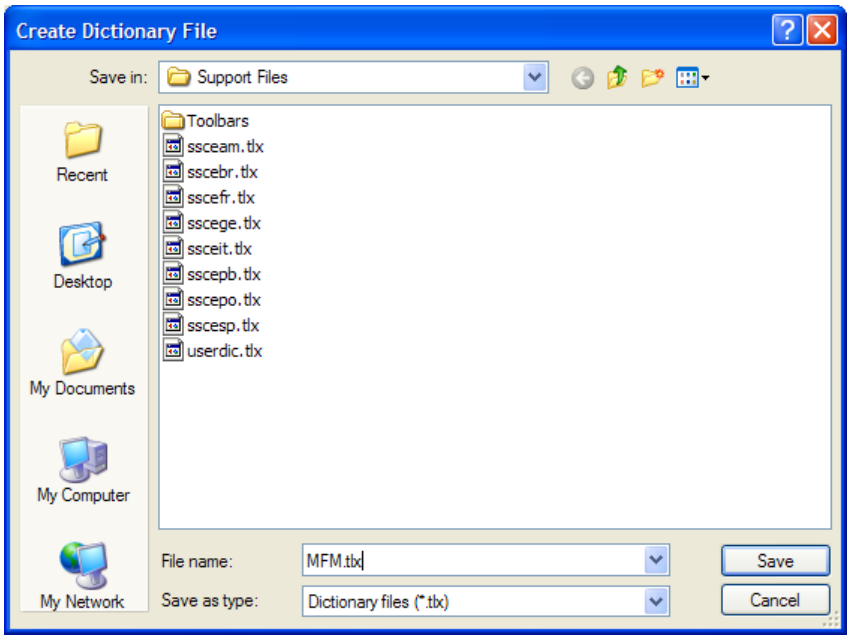
Close button: Closes the Dictionaries dialog.

You can use the New Dictionary dialog box to specify the attributes of a new user dictionary.

➔ To select a new dictionary:

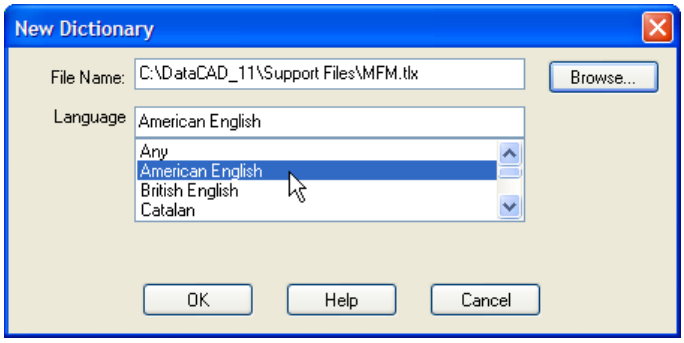
1. Click on New File in the Dictionaries dialog box. The New Dictionary dialog box appears.

2. Click Browse to display the names of other user dictionary files in the Create Dictionary File dialog box. You can use this dialog box to view the names of existing dictionary files or to enter the name of the new dictionary file. Dictionary files end with the *.tlx extension.



The Create Dictionary File dialog box

3. Type the name of the new user file and click Save to exit the Create Dictionary File dialog box. The new dictionary appears in the File Name input field in the New Dictionary dialog box. (Alternatively, you can click Cancel to abort the operation if you don't want to create a new dictionary.)

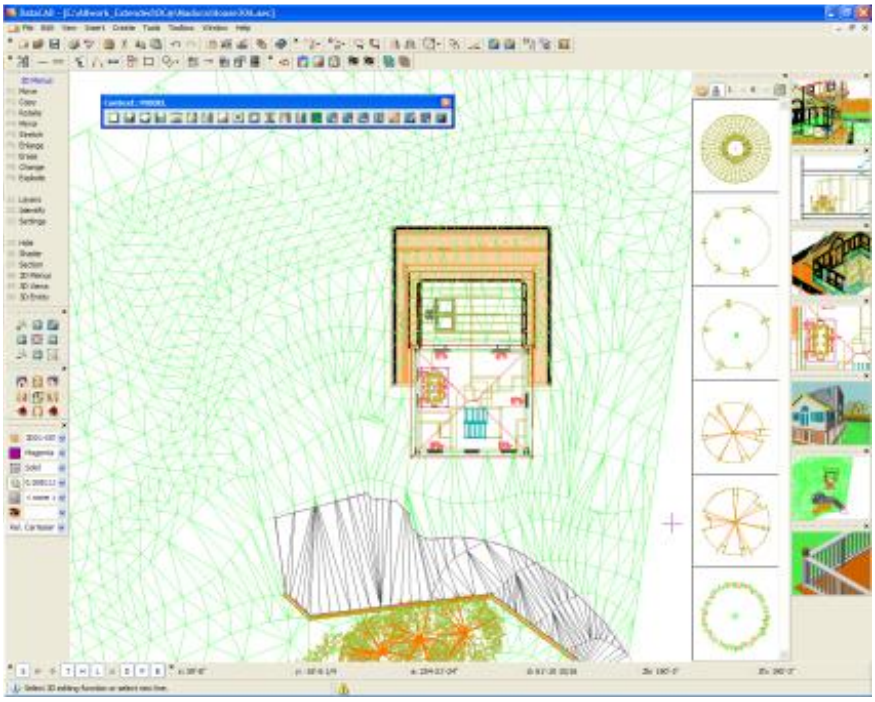


The New Dictionary dialog box

4. Select the language of the new dictionary you are creating by highlighting it in the list. If the language you want to use is not listed, select "Any."
5. Click OK to close the New Dictionary dialog box and create the new dictionary.

Interface Enhancements

Several enhancements give you more control over the way your drawings appear on the screen. For example, you can position toolbars where you want them, select default toolbars, and control the appearance of menu options and tooltips.



Interface enhancements let you control the appearance of your drawing, toolbars, and menus

Program Interface

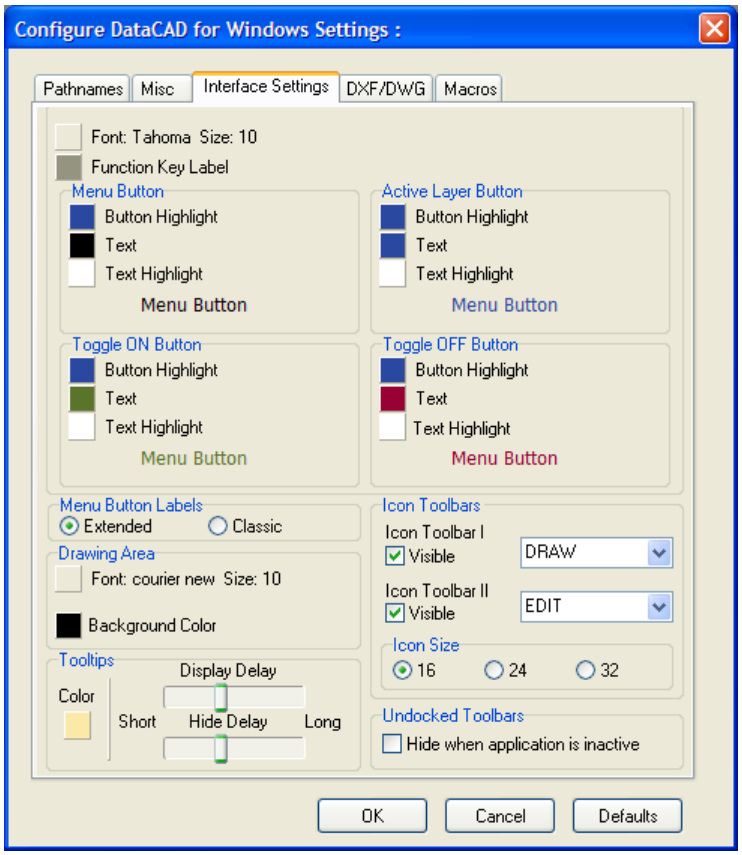
DataCAD 11 features an updated program interface that provides Windows 2000-style properties and support for Windows XP Themes. You can position toolbars and menus where you want by tearing them off and docking them to the top, bottom, left, or right side of the application window. You can also place toolbars and menus outside of DataCAD to "float" on your desktop, allowing you to resize the drawing area without adversely affecting the user interface. In addition, all of the interface elements in DataCAD 11 will inherit the visual style of your current desktop theme. For more information about Windows XP Themes, go to http://www.themexp.org.

12-Character Labels and Tooltips

The “left-hand” menu option labels have been expanded from 8 to 12 characters. Menus such as Architct and Dimenson now read Architect and Dimension respectively. The logic used to calculate the default width and height of menu buttons has been adjusted to make them more compact. A “Classic” option has been provided so you can restore the 8-character labels if you wish. In addition, tooltips for each menu item have been added to help you use each option.

➔ To change the menu labels:

1. Select Program Preferences from the Tools pull-down menu. The Configure DataCAD for Windows Settings dialog box appears.



Make interface changes in this dialog box

2. Click on the Interface Settings tab.
3. Go to the Function Key Captions area and select either Long (12 characters) or Classic (the traditional 8 characters of previous DataCAD versions).
4. Make other changes to the interface settings if desired. Click OK when you are finished. The decisions you made take effect immediately.



Comparison of Extended 12-character (left) and Classic 8-character (right) menu labels

You can personalize other aspects of the DataCAD graphical interface to suit your needs (especially helpful if you are colorblind) or your tastes (eclectic versus conservative).

➔ To change other interface settings:

1. Select Program Preferences from the Tools pull-down menu. The Configure DataCAD for Windows Settings dialog box appears.
2. Click on the Interface Settings tab. The settings affect the left menu and message lines; pull-down menus cannot be changed.
3. Decide what colors you want to change, click on the appropriate sample swatch, and select the color you want from the Color Palette dialog box.

Function key label	Located at the left edge in the left-hand menu
Buttons	Each menu button has a highlight, text, and text highlight color that you can change. Highlight Color appears when you run your cursor over a regular (not a toggle) menu button; Text Color affects the text on the non-highlighted menu button (the TestBtn shows a sample); Text Highlight Color appears on a highlighted button as your cursor passes over it.
Normal	Clicking on a normal button calls up a submenu or requests input
Active Layer	Affects only the active layer, not the inactive ones
Toggle ON	Affects just the active menu functions (the button is depressed)
Toggle OFF	Affects just the inactive menu functions (the button is raised)
Background	Drawing window color
Tooltips	Background color of tooltip

4. Decide what fonts you want to change, click on the appropriate Font button, and select font, style, and size from the Font dialog box:

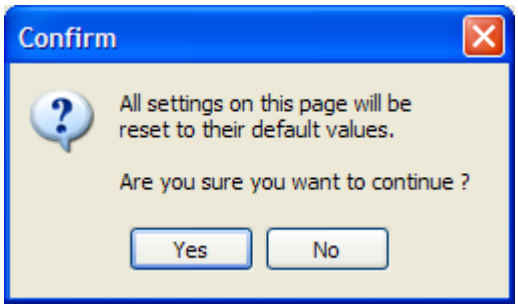
Display	Affects text that appears in the left-hand menu and in the message, error, and coordinate toolbars

Drawing Window	Affects text you add to the file displayed in your Drawing Window

5. Use the slider bars to set how long tooltips should appear.

Display Delay	Affects how fast a tooltip appears from the moment your cursor hovers on a function
Hide Delay	Affects how quickly the tooltip disappears

6. Click on OK to make your changes take effect. If you click on Defaults, DataCAD ignores your changes and asks you to confirm your decision before it restores the original interface settings.



This warning appears if you click on Defaults to restore DataCAD's original interface settings

Pull-down Menu Hints and Shortcuts

We've added hints to the MNU file. Hints appear at the message line when you highlight a pull-down menu item.

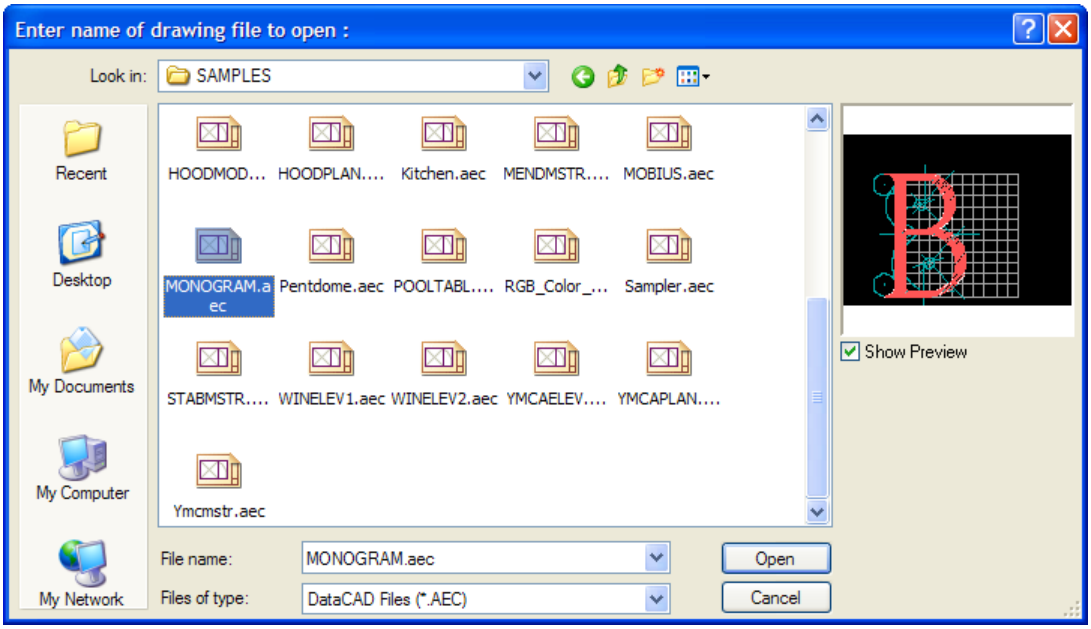
Now, you can create keyboard shortcuts for any of the 250+ pull-down menu selections by editing the DCADWIN.MNU file. The format of the menu file is Label|Shortcut|Hint. Any shortcut you add to the MNU file will supersede any existing DataCAD shortcut if they are the same. The following key sequences are supported.

```
322.    (F1-F12)
323.    Example: Open|F5|Open Existing File
324.
325.    ([CTRL] + (0-9), (A-Z), (F1-F12))
326.    Example: Open|CTRL+5|Open Existing File
327.    Example: Open|CTRL+E|Open Existing File
328.    Example: Open|CTRL+F5|Open Existing File
329.
330.    ([CTRL] + [SHIFT] + (0-9), (A-Z), (F1-F12))
331.    Example: Open|CTRL+SHIFT+5|Open Existing File
332.    Example: Open|CTRL+SHIFT+E|Open Existing File
333.    Example: Open|CTRL+SHIFT+F5|Open Existing File
334.
335.    ([CTRL] + [ALT] + (0-9), (A-Z), (F1-F12))
336.    Example: Open|CTRL+ALT+5|Open Existing File
337.    Example: Open|CTRL+ALT+E|Open Existing File
338.    Example: Open|CTRL+ALT+F5|Open Existing File
339.
340.    ([SHIFT] + (0-9), (A-Z), (F1-F12))
341.    Example: Open|SHIFT+5|Open Existing File
342.    Example: Open|SHIFT+E|Open Existing File
```

```
343.     Example: Open|SHIFT+F5|Open Existing File
344.
345.     ([ALT] + (0-9), (A-Z), (F1-F12))
346.     Example: Open|ALT+5|Open Existing File
347.     Example: Open|ALT+E|Open Existing File
348.     Example: Open|ALT+F5|Open Existing File
349.
350.     ([ALT] + [SHIFT] + (0-9), (A-Z), (F1-F12))
351.     Example: Open|ALT+SHIFT+5|Open Existing File
352.     Example: Open|ALT+SHIFT+E|Open Existing File
353.     Example: Open|ALT+SHIFT+F5|Open Existing File
354.
355.     ([CTRL] + [ALT] + [SHIFT] + (0-9), (A-Z), (F1-F12))
356.     Example: Open|CTRL+ALT+SHIFT+5|Open Existing File
357.     Example: Open|CTRL+ALT+SHIFT+E|Open Existing File
358.     Example: Open|CTRL+ALT+SHIFT+F5|Open Existing File
```

Preview Window

The preview window used in File I/O dialogs has been improved to display bitmap previews more reliably and with better quality. If you don't want to see a preview of an existing drawing, simply click in the Show Preview box to remove the checkmark.



Compatibility Enhancements

Double-precision Database

DataCAD 11 uses double-precision floating point math to calculate and store values in the drawing database. Prior versions of DataCAD had an effective accuracy of ~7 decimal places. DataCAD 11 has an effective accuracy of ~14 decimal places. That means DataCAD 11 is now as accurate as AutoCAD® and you can work on much larger projects without running into rounding issues, especially when importing large drawings.

DCAL Macros

Existing DCAL macros should be compatible with DataCAD 11. Due to DCAL's limitations, existing macros still use single-precision math. The primary benefit is that macros do not have to be re-compiled by the original author to work with this version of DataCAD.

Program Directory and File Maintenance Improvements

Although not very glamorous, directory and file maintenance changes have a big impact on DataCAD's compatibility with other programs and with your productivity.

The program directory holds the .INI file, allowing you to run an older version of DataCAD on the same computer. Expanded names will help you navigate quickly to the directory you want to use.

Import and export enhancements affect many of the image file formats. The drawing file size reduction will give you more room for new projects and will make file sharing easier.

The expanded file formats for backup and recovery will help retain your sanity and your hair when you exit DataCAD incorrectly.

Undocumented INI Settings

359. [General] 360. USER_NAME=John Doe 361. USER_COMPANY=John Doe Architects, Inc. 362. USER_SERIAL=DCXIW00000	Identifies the user, company, and serial number for the current DataCAD version.
363. [General] 364. CAVWALL=FALSE	If TRUE, inserting doors and windows into cavity (4-line) walls trims the outer jamb lines to the cavity lines.
365. [General] 366. CoplanarCheck=FALSE	If TRUE, this forces the vertices on 3D polygons with more than three sides to be coplanar, based on the first three non-collinear vertices.
367. [General] 368. ShowWinCursor=FALSE	If TRUE, it would activate the Windows system cross-hair cursor along with the DataCAD cursor. This is useful for screen capture programs that record the movement of the Windows system cursor.

369. [General] 370. OldHelp=FALSE	If TRUE, accessing help from the pull-down menu or with [Ctrl]+[F1] opens the old DCADWIN.HLP instead of the new DataCAD11_Manual.PDF.
371. [General] 372. MinusKeyTogglesOvershoot=TRUE	If FALSE, the minus key will invoke direct distance input.
373. [General] 374. CommaKeyErasesLastEntity=TRUE	If FALSE, the comma key will invoke direct distance input.
375. [General] 376. PeriodKeyRestoresLastEntity=TRUE	If FALSE, the period key will invoke direct distance input.
377. [General] 378. CapsLock=FALSE	If TRUE, the AllCaps toggle operates like CapsLock instead of forcing all uppercase letters.
379. [General] 380. FixFont=FALSE	If TRUE, corrects fonts with zero width character definitions.
381. [General] 382. HYPERVIEW=ALT	If ALT, access hyperlinked views using [Alt]+Left-click. If ALT+SHIFT, access hyperlinked views using [Alt]+[Shift]+Left-click.
383. [General] SymbolCacheSize=2	Sets the size (in megabytes) to allocate for caching symbols displayed in the symbol browser. Only whole numbers may be used.

384. [General] 385. PurgeDrawingsOnExit=1	Enables or disables the automatic purging of unused drawing data upon exiting and saving a drawing.
386. [General] 387. Aspect Ratio=1	The default value of 1 assumes a screen aspect ratio of 4:3 (i.e., 640X480, 800X600, 1024X768, and 1600X12000). To adjust your DataCAD Drawing Window, measure the width and height of a square displayed on your screen. Divide the width (X) by the height (Y) and enter this value for the aspect ratio.
388. [General] 389. NoGridLnSelect=TRUE	If FALSE, DataCAD will not automatically disable grid snapping during selection and Window In.
390. [Paths] INSTALL_DIR=c:\Program Files\DataCAD\ PATH_SWAP=Temporary Files\ PATH_SUPPORT=Support Files\ PATH_DEFAULTS=Support Files\ PATH_ICON=Support Files\Toolbars\ PATH_BMP=Support Files\Toolbars\ PATH_MSG=Support Files\ PATH_HELP=Help\ PATH_RECOVERY=Recover_Archive\ PATH_PENTABLE=Support Files\ PATH_O2C_TEX_IMPORT=Textures\o2c_Import\	Program paths that are not accessible via Program Preferences.
391. [XREFs] 392. Auto Convert=TRUE	If TRUE, DC5 XREFs are automatically converted to AEC files.
393. [PaletteFile] 394. DoCustomColors=TRUE	If TRUE, DataCAD will save the 16 custom colors that can be defined using the Windows Color Picker via the Pen Table dialog.

395. [o2cViewer] 396. SmoothDistance=0	Distance between adjacent polygons to be considered for smoothing.
397. [o2cViewer] 398. SmoothAngle=30	Angle between adjacent polygons to be considered for smoothing.
399. [o2cViewer] 400. MergeTextures=FALSE	If TRUE, DataCAD will merge o2c bitmap textures when two or more materials use the same texture.
401. [Printer] 402. FitToAdjustment=0	Percentage (positive or negative whole number) to add or subtract from DataCAD's automatic FitTo calculation.
403. [Printer] 404. NewFitTo=TRUE	If TRUE, DataCAD uses a more accurate method to determine the available print area which may be incompatible with some drivers. If FALSE, DataCAD uses the original method to determine the available print area.
405. [Alias] 406. PopupWidth=300	Width of command line alias popup window in pixels.
407. [Alias] 408. PopupLines=4	Number of lines displayed in command line alias window.
409. [MenuBtn] 410. BTN_SPACING=2 411. BTN_WIDTH=0	Set the number of pixels between menu buttons vertically; alternatively, set the number of pixels to add or subtract from the width of menu buttons.

412. [StatusArea] 413. DropDownWidth=0	Width in pixels to add or subtract from Status Panel.
414. [SymbolBrowser] 415. DockWidth=	Width of Symbol Browser in pixels when docked.
416. [SymbolBrowser] 417. ConvSM3ToDSF=FALSE	Automatically convert SM3 files to DSF files while browsing.
418. [SymbolBrowser] 419. ConvSM3ToO2C=FALSE	Automatically convert SM3 files to O2C files while browsing.
420. [SymbolBrowser] 421. ConvDSFToO2C=FALSE	Automatically convert DSF files to O2C files while browsing.
422. [Mask] 423. UseGlobalMask=TRUE	Use Mask instead of Selection Sets when editing (TRUE) or Selection Sets instead of Mask when editing (FALSE).
424. [Undo] 425. Disabled=FALSE	If TRUE, undo/redo system is disabled.
426. [TemplateWindow] 427. WIDTH=	Value in pixels to set the width of the template window.
428. [File Dialog] 429. Extension=PNG	Bitmap format for drawing preview. Valid formats are PNG, BMP, JPG, TIF, TGA, and PCX.
430. [Recent File List] 431. Max=4	The number of recently opened files to display. The maximum is 10.
432. [Recent Folder List] 433. Max=4	The number of recently opened folders to display. The maximum is 10.

434. [Clipboard] 435. CopyBitmap=TRUE	If TRUE, entities copied to the Windows clipboard will maintain a corresponding bitmap representation for pasting into bitmap applications.
436. [Debug] 437. ShowUndoHistory=FALSE	If TRUE, menu option for undo history is displayed.
438. [Debug] 439. LabelFileEditor=FALSE	If TRUE, menu option for label file editor is displayed.

Double-Click DataCAD File Launch

Now, you can double-click on DataCAD drawing files in Windows Explorer to open them while DataCAD is already running.

Network Awareness

DataCAD can query other instances of DataCAD running on a network to determine whether or not a file is "in-use." Every time you open a drawing, DataCAD records the date, time, username, and workstation name in a corresponding user (.U$R) file. If you try to open a drawing file that is "in-use," DataCAD will only allow you to open a copy of the file.



AEC File Extension

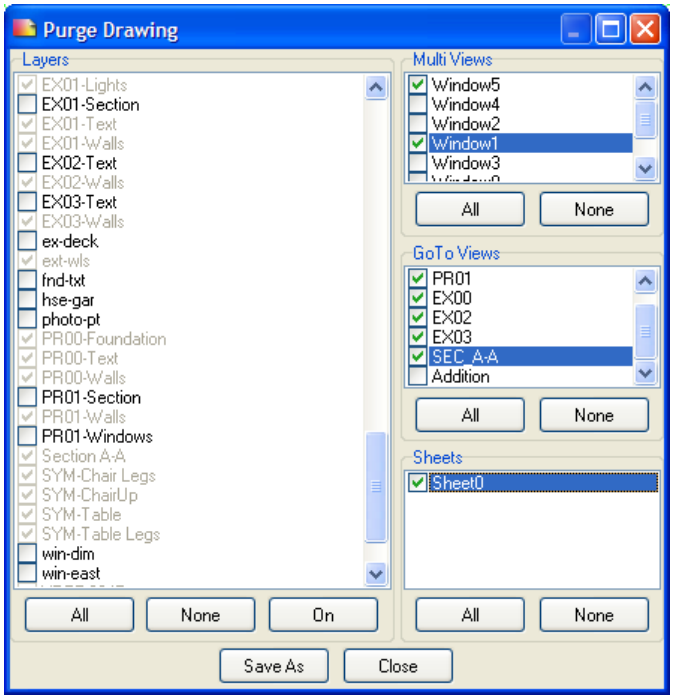
DataCAD 11 drawings have an AEC file extension. When you open a DC3 or DC5 file in DataCAD 11 for the first time, it is automatically converted to an AEC file. This conversion process takes a few moments longer than usual. In the process, the drawing file is cleaned up and purged of unused entities and the database is converted from single-precision to double-precision.

File Purge

DataCAD files are automatically purged of any unused data each time you exit and save your drawing. In addition, a Purge dialog replaces the Layer Utility macro, allowing you to create new drawings based on a sub-set of an existing drawing.

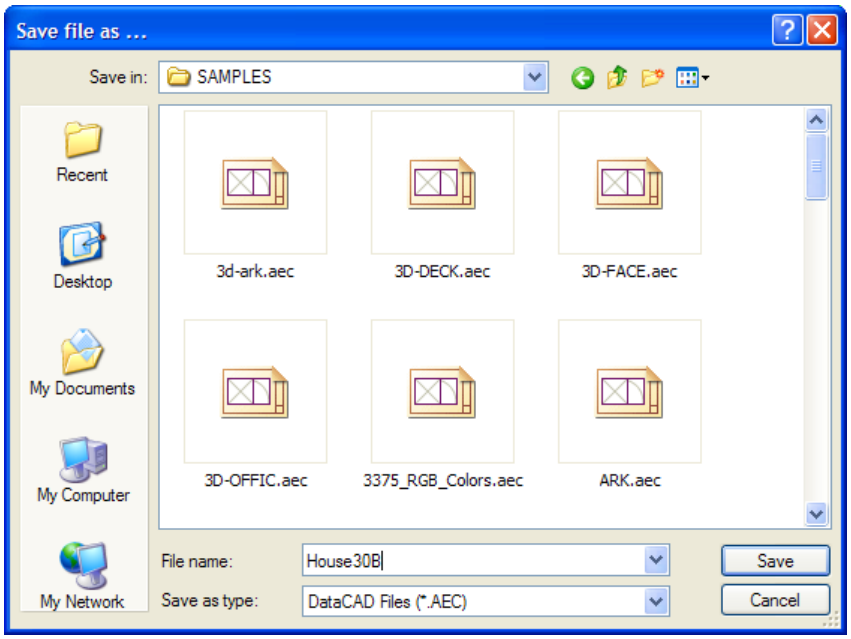
➔ To eliminate layers, multiviews, go-to-views, and/or sheets from your file:

1. Select Purge from the File pull-down menu. The Purge Drawing dialog box appears.



The Purge Drawing dialog box

2. Decide what you want to keep from this file by placing a checkmark in the appropriate boxes. This lets you use the checked portions of the current drawing as the basis for a different one.
3. Click Save As when you are finished making your selections. The Save file as . . . dialog box appears.



Name the new file

4. Supply a name for the new file and click on Save or press [Enter]. The Purge Drawing dialog box reappears. If you want to create more files, repeat steps 2 through 4 again.
5. Click on Close in the Purge Drawing dialog box when you are finished creating new files based on the current drawing.

Compressed Drawing Files

DataCAD 11 drawings are stored in a compressed format. Though the drawing swap file is nearly double in size (due to the double-precision database), AEC files are roughly 1/5 the size of the DC5 files you created in previous versions.

Due to database changes, other DataCAD file extensions have changed. Most of DataCAD's file types are now registered with the operating system during installation. DataCAD includes some unique file type icons to distinguish them from other programs' files. The following list describes the DataCAD 11 file extensions. Items marked with an asterisk are new.


AEC* DataCAD Drawing File

ANG DataCAD Angle File


ARB* DataCAD Auto-recover Backup File


ARF* DataCAD Auto-recover File


CHR DataCAD Font File

CST* DataCAD Context Toolbar Configuration File


DBK* DataCAD Drawing Backup File

DCA DataCAD Command Alias File


DCX DataCAD Add-On Macro File

DEC DataCAD Decimal File

DIMSTYLE DataCAD Dimension Style File

DIS DataCAD Distance File


DLF* DataCAD Layer File

DMF DataCAD Material File

DOR DataCAD Door Style File

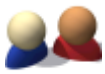

DPF DataCAD Pen Table File


DRF* DataCAD Drawing Recovery File


DSF* DataCAD Symbol File

DTB* DataCAD Toolbar File

EDB	Estimator Link Database File
FRM	DataCAD Symbol Report Form File
GUI*	DataCAD Graphical User Interface File
LBL	DataCAD Menu Label File
LIN	DataCAD Line Type Definition File
LIT	DataCAD Shader Light Source File
MCR	DataCAD Keyboard Macro File
MNU	DataCAD Pull-Down Menu File
MSG	DataCAD Message File
O2C	Object To See File
PAT	DataCAD Hatch Pattern File
RGB	DataCAD Color Palette File
SCH	DataCAD Report Schedule File
SCL	DataCAD Scale File
SHP	DataCAD Font Definition File
STL	DataCAD Text Style File
STR	DataCAD Stair Style File
$WP	DataCAD Drawing Swap File
SYM	DataCAD Symbol File
TAG*	DataCAD Drawing Tag File
TBL	DataCAD DXF/DWG Color Map File
TPL	DataCAD Template File
U$R*	DataCAD User File
WIN	DataCAD Window Style File



DataCAD User File
\datacad\drawings\my_drawing.U$R

The user file is a temporary file that stores the last date, time, username, and workstation name of the operator who last opened the drawing successfully. DataCAD uses this data to provide you with helpful information and appropriate options when you try to open a file that is marked "in-use." Under normal conditions, the user file is only present when a drawing file is open. However, if you exit a drawing abnormally (e.g., in the case of a program error), the user file remains and DataCAD queries it to determine an appropriate course of action the next time you attempt to open the file.



DataCAD Drawing Backup File
\datacad\drawings\my_drawing_(backup).DBK

Backup drawings (with a DBK extension) are created each time a drawing is saved. The DBK extension distinguishes DataCAD's backup files from other programs' generic BAK extension.

DataCAD Drawing Session Backup (10 Maximum)
\datacad\drawings\my_drawing_(session-01).AEC

You can configure DataCAD to automatically save up to 10 incrementally-named backup drawings. Drawing session backups are only created when you exit and save your drawing.



DataCAD Drawing Swap File
\datacad\temporary files\my_drawing.$WP

The drawing swap file is a temporary copy that is created when you open your drawing. This is the file DataCAD modifies when you edit your drawing.



DataCAD Auto-recover File
\datacad\drawings\my_drawing.ARF

The auto-recover file is a copy of your drawing that DataCAD creates at regular time intervals that you set. Auto-recover files are also created when you execute forced file saves.



DataCAD Auto-recover Backup File
\datacad\drawings\my_drawing.ARB

The auto-recover backup file is a copy of the auto-recover file. This file is automatically created the second and subsequent times you perform an auto-recover file save.



DataCAD Drawing Recovery File
\datacad\recover archive\my_drawing_(recovered-01).DRF

Drawing recovery files are incrementally-named copies of the drawing file that are created automatically when you opt to restore an auto-recover (ARF) file. This file quarantines copies of recovered files that our technical support staff may use when all attempts to restore the original drawing fail.

File Open DXF/DWG

You can open DXF and DWG files directly from the File Open dialog. You are no longer limited to importing them into existing files. You can also highlight multiple files for batch conversions.

Insert Bitmap

The number of supported image files includes .BMP, .JPG, .GIF, .TIF, .TGA, .PNG, .PCX, .EPS, and .PCD files.

Save Image As...

Shaded images and the drawing window can be saved to .BMP, .JPG, .GIF, .TIF, .TGA, .PNG, .PCX, .EPS, or .PCD format.

STL (Stereolithography)

You can export DataCAD models to STL format for use with rapid prototyping machines such as the 3D printers developed by ZCorp (www.zcorp.com). Our educational distributor, Tech Ed Concepts, developed a course for DataCAD (http://www.tecedu.com/news_chipless.htm). You can also use the Insert menu to import STL files directly into DataCAD 11.

3DS (3D Studio)

DataCAD's Insert menu gives you a direct link for importing .3DS files.

DWF (Autodesk WHIP!)

You can export DataCAD drawings directly to .DWF format for viewing with Autodesk Express Viewer.

Backup and Recover Process

We revamped DataCAD's backup and recover process to be more reliable and less confusing. Whenever you exit a drawing abnormally, DataCAD will automatically try to recover the most recent version of your file without prompting you with unnecessary warnings and options.

The following story about Joe User summarizes the file creation, backup, and recover process.

File Open, Backup, and Recover Process

01. Joe User creates a new drawing. A corresponding swap file is created in the temp folder along with a corresponding user file in the drawing folder.

```
\drawings\My_Drawing.U$R  (User File)

\temporary files\My_Drawing.$WP  (Swap File)
```

02. Joe User continues to work in the new file for 15 minutes when DataCAD saves an auto-recover file in the drawing folder.

```
\drawings\My_Drawing.U$R  (User File)
\drawings\My_Drawing.ARF  (Auto-recover File)

\temporary files\My_Drawing.$WP  (Swap File)
```

03. Joe User continues to work in the new file for another 15 minutes when DataCAD saves an auto-recover file for the second time. The current auto-recover file is renamed to serve as a backup and a new auto-recover file is created.

```
\drawings\My_Drawing.U$R  (User File)
\drawings\My_Drawing.ARF  (Auto-recover File)
\drawings\My_Drawing.ARB  (Auto-recover File Backup)

\temporary files\My_Drawing.$WP  (Swap File)
```

04. A few minutes later, Joe User presses [SHIFT] + [F] to save his drawing for the first time. At this point, DataCAD creates a drawing file, copies the ARF to an ARB, saves a new ARF, and resets the auto-recover timer to zero.

```
\drawings\My_Drawing.AEC  (Drawing File)
\drawings\My_Drawing.U$R  (User File)
\drawings\My_Drawing.ARF  (Auto-recover File)
\drawings\My_Drawing.ARB  (Auto-recover File Backup)

\temporary files\My_Drawing.$WP  (Swap File)
```

05. About ten minutes later, Joe User completes an extraordinary modeling feat and decides to do a forced file save just to be safe. DataCAD copies the AEC file to a backup file for the first time and updates the auto-recover files as previously described.

```
\drawings\My_Drawing.AEC  (Drawing File)
\drawings\My_Drawing.DBK  (DataCAD Backup File)
\drawings\My_Drawing.U$R  (User File)
\drawings\My_Drawing.ARF  (Auto-recover File)
\drawings\My_Drawing.ARB  (Auto-recover File Backup)

\temporary files\My_Drawing.$WP  (Swap File)
```

06. Another auto-recover save occurs and the auto-recover files are updated. However, the drawing and its corresponding backup are not updated.

\drawings\My_Drawing.AEC (Drawing File)
\drawings\My_Drawing.DBK (DataCAD Backup File)
\drawings\My_Drawing.U$R (User File)
\drawings\My_Drawing.ARF (Auto-recover File)
\drawings\My_Drawing.ARB (Auto-recover File Backup)

\temporary files\My_Drawing.$WP (Swap File)

07. Then Joe user performs a forced file save. The drawing and its corresponding backup are updated, the auto-recover files are updated, and the auto-recover timer is reset to zero.

\drawings\My_Drawing.AEC
\drawings\My_Drawing.DBK
\drawings\My_Drawing.U$R
\drawings\My_Drawing.ARF
\drawings\My_Drawing.ARB

\temporary files\My_Drawing.$WP

Exit/Save and Crash/Recover Scenarios

Exit and Save

A. Joe user exits and saves the changes to his drawing. DataCAD updates the drawing and its corresponding backup; then, it deletes the swap and auto-recover files.

\drawings\My_Drawing.AEC
\drawings\My_Drawing.DBK

Crash and Recover (Same User)

B. The power goes out on Joe User. When his computer is back up and running, he tries to re-open the file he was using previously. DataCAD checks the user file and determines Joe was the previous user. Then DataCAD checks for the presence of an ARF, determines that one is present, and notices it is newer than the AEC file.

DataCAD informs Joe he exited the drawing abnormally and gives him the option to proceed and automatically recover the most recent version. Joe user accepts (his only choice) and DataCAD copies the AEC file to a "Recover_Archive" folder.

The ARF file is copied to a new AEC file, the ARB file remains, the semaphore file is updated, and the recovered drawing is opened.

\drawings\My_Drawing.AEC
\drawings\My_Drawing.DBK
\drawings\My_Drawing.U$R
\drawings\My_Drawing.ARB

\temporary files\My_Drawing.$WP

\Recover_Archive\My_Drawing_(Recovered-01).DRF

Note: Each time My_Drawing is recovered, a new DRF file is created sequentially (i.e., My_Drawing_(Recovered-01).DRF, My_Drawing_(Recovered-02).DRF, My_Drawing_(Recovered-03).DRF).

Crash and Recover (Different User)

C. The power goes out on Joe User. He goes home for the day without trying to re-open the file. In the meantime, Jill tries to open the file that Joe just crashed out of.

DataCAD checks the user file and determines Joe was the previous user. A message pops up telling Jill that Joe was the last person to open the file and that DataCAD will perform a check to see if Joe is still in the file.

Jill selects OK, then DataCAD tries to interrogate Joe's computer to see if he has the file open. There is no response (Joe is not running DataCAD at the moment), so DataCAD then checks for the presence of an ARF and determines one is present and that it is newer than the AEC file.

DataCAD informs Jill that the file was exited abnormally and her only option is to proceed and automatically recover the latest version. Jill accepts and DataCAD copies the AEC file to a "Recover_Archive" folder.

The ARF file is copied to a new AEC file, the ARB file remains, the semaphore file is updated, and the recovered drawing is opened.

```
\drawings\My_Drawing.AEC
\drawings\My_Drawing.DBK
\drawings\My_Drawing.U$R
\drawings\My_Drawing.ARB

\temporary files\My_Drawing.$WP

\Recover_Archive\My_Drawing_(Recovered-01).DRF
```

Drawing Session Backups

The Drawing Session Backups feature allows you to incrementally save up to 10 drawing sessions. When enabled (off by default), DataCAD creates sequential session backups only when you exit and save your drawing. Forced drawing file saves you perform during the session will not update drawing session backups. Drawing session backups use the following naming convention.

```
\drawings\My_Drawing_Sessions\My_Drawing_(Session-01).AEC  (Oldest)
\drawings\My_Drawing_Sessions\My_Drawing_(Session-02).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-03).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-04).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-05).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-06).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-07).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-08).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-09).AEC
\drawings\My_Drawing_Sessions\My_Drawing_(Session-10).AEC  (Newest)
```

An additional option (found in Program Preferences) allows you to specify a parent folder for all session backups. The default path is \datacad\sessions\. The contents of the parent folder might look like this:

```
\sessions\My_Drawing_Sessions\
My_Drawing_(Session-01).AEC
My_Drawing_(Session-02).AEC
My_Drawing_(Session-03).AEC

\sessions\My_Other_Drawing_Sessions\
My_Other_Drawing_(Session-01).AEC
My_Other_Drawing_(Session-02).AEC
My_Other_Drawing_(Session-03).AEC

\sessions\My_Favorite_Drawing_Sessions\
```

My_Favorite_Drawing_(Session-01).AEC
My_Favorite_Drawing_(Session-02).AEC