Advanced Techniques for Importing CAD Drawings into Revit Projects

Miguel Valencia – Syska Hennessy Group
Albert Alderete – Syska Hennessy Group

AC6541 This class will cover advanced techniques for importing both 2D and 3D CAD drawings into Revit software projects. It will cover effective practices for "Revitizing" a CAD drawing, the steps needed to get the result you want, and the ways to develop a library of CAD details that you can use in both AutoCAD software and Revit software.

Learning Objectives

At the end of this class, you will be able to:

- Learn how to successfully import CAD drawings into Revit software.

- Learn what it takes to properly "Revitize" a CAD drawing.

- Learn how to streamline the cleaning process of CAD drawings.

- Learn how to develop a library of details that can be used in both AutoCAD software and Revit software

About the Speakers

Miguel Valencia is the CAD / BIM (Building Information Modeling) development supervisor for a large mechanical, electrical, and plumbing firm. His responsibilities include firm-wide CAD and Revit software standards development, implementation, training, and technical support. He is a Certified Revit Professional and a Leadership in Energy and Environmental Design (LEED) AP professional.
mvalencia@syska.com

Albert Alderete is the CAD / BIM (Building Information Modeling) development manager for a large mechanical, electrical, and plumbing firm. His responsibilities include firm-wide CAD and Revit software standards development, implementation, training, and technical support.
aalderete@syska.com

# Importing CAD Drawings into Revit Projects

Revit Initial Setup

Before importing CAD drawings, there are a couple settings that need to be made in Revit in order for the conversion to translate better:
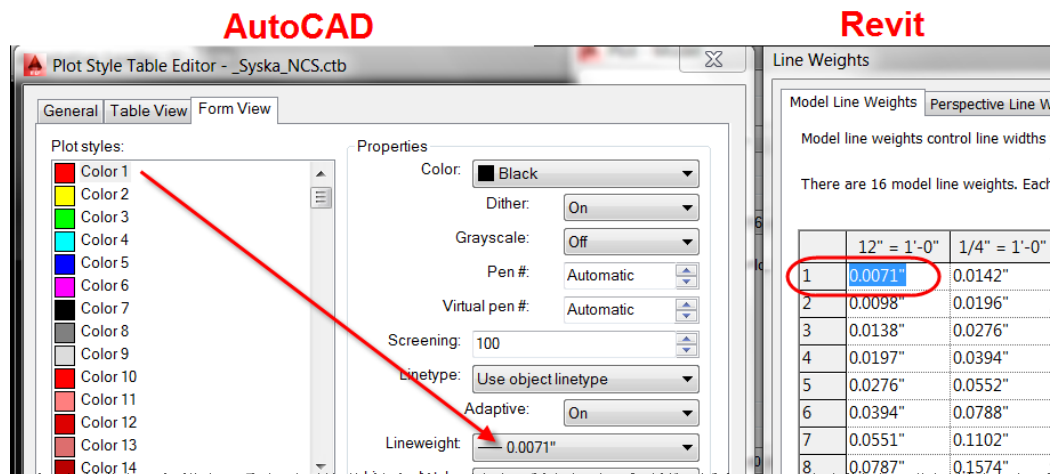
>**Revit Line Weights**
>**Importlineweights.txt**
>**Shxfontmap.txt**

Revit Line Weights

There are **16 line weight numbers** in Revit, each number controls the line weight of Model, Perspective and Annotation objects:
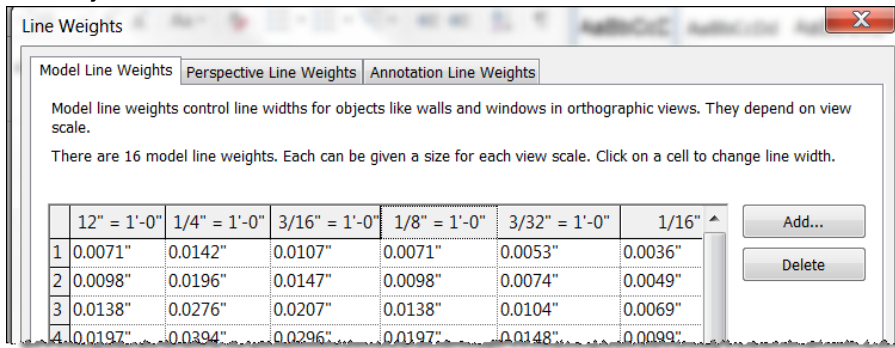
Line weights are similar to AutoCAD's Pen Colors in that each can have a different line weight assigned:
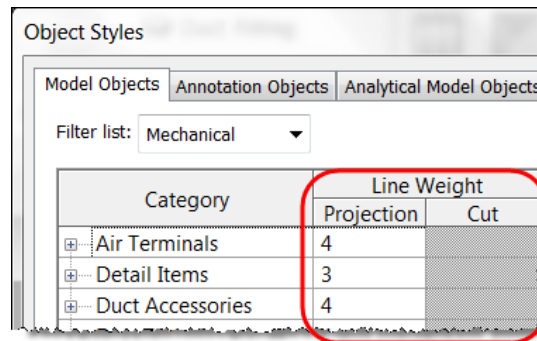
In Revit, line weights can be modified by going to Manage tab→Additional Settings→Line Weights.
The column on the left list the 16 Revit line weights, the columns on the right list the line depth at different view scales for each number. Scales can be added or deleted using the Add or Delete buttons:
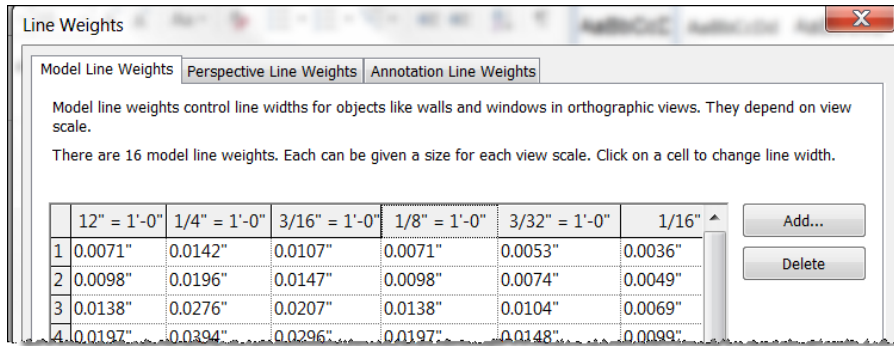

Model line weights are dependent on the view scale, whereas Perspective and Annotation line weights are not.

Objects are then given a line weight number via Object Styles:

You can use your standard AutoCAD CTB file as a guide in developing the Revit Line Weights table. The CTB file can be viewed by going to Plot→ Edit CTB→Edit Line Weights→Inches (this will convert the units from mm to inches)→ click OK:
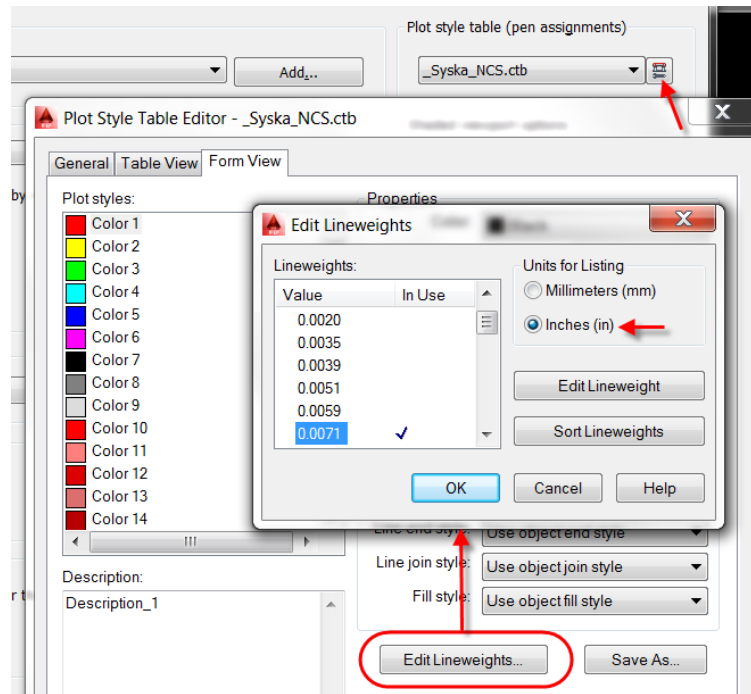
Analyze the CTB file and determine which line weights are the most commonly used. In our company, we determined that we use a total of 8 different line weights throughout our CTB file. We then created a Revit Line Weight Conversion table showing the 8 line weights as shown below:

	Line Thickness	ACAD Line Weight (mm)	Revit Line Weight Conversion (in)	Revit Pen
	1-Fine	0.18	.0071	1
	2-Thin	0.25	.0098	2
	3-Medium	0.35	.0138	3
	4-Wide	0.50	.0197	4
	5-Extra Wide	0.70	.0276	5
	6-Extra Wide x2	1.00	.0394	6
	7- Extra Wide x3	1.40	.0551	7
	8- Extra Wide x4	2.00	.0787	8

From there, we built the Revit Line Weights table by copying the numbers in the tanle to the 12"=1'-0" and 1/8"=1'-0" scales since that's what our CTB file was based on:

Revit Line Weight Conversion (in)	Revit Pen
.0071	1
.0098	2
.0138	3
.0197	4

Line Weights

Model Line Weights | Perspective Line Weights | Annotation Line Weight

Model line weights control line widths for objects like walls and windows scale.

There are 16 model line weights. Each can be given a size for each vie

	12" = 1'-0"	1/4" = 1'-0"	3/16" = 1'-0"	1/8" = 1'-0"	3/:
1	0.0071"	0.0142"	0.0107"	0.0071"	0.00
2	0.0098"	0.0196"	0.0147"	0.0098"	0.00
3	0.0138"	0.0276"	0.0207"	0.0138"	0.01
4	0.0197"	0.0394"	0.0296"	0.0197"	0.01

For the rest of the scales, we used 1/8" as our base scale and did a ratio between the other scales to find a multiplier. For example, 1/8"=0.125 and 3/32"=0.09375, then 0.09375/0.125→0.75

PEN#1
PEN#2
PEN#3
PEN#4
PEN#5
PEN#6
PEN#7
PEN#8

① 1/4
1/4" = 1'-0"

② 1/8
1/8" = 1'-0"

③ 1/16
1/16" = 1'-0"

Line Weights

Model Line Weights | Perspective Line Weights | Annotation Line Weights

Model line weights control line widths for objects like walls and windows in orthographic views. They depend on view scale.

There are 16 model line weights. Each can be given a size for each view scale. Click on a cell to change line width.

	12" = 1'-0"	1/4" = 1'-0"	3/16" = 1'-0"	1/8" = 1'-0"	3/32" = 1'-0"	1/16" = 1'-0"
1	0.0071"	0.0142"	0.0107"	0.0071"	0.0053"	0.0036"
2	0.0098"	0.0196"	0.0147"	0.0098"	0.0074"	0.0049"
3	0.0138"	0.0276"	0.0207"	0.0138"	0.0104"	0.0069"
4	0.0197"	0.0394"	0.0296"	0.0197"	0.0148"	0.0099"
5	0.0276"	0.0552"	0.0414"	0.0276"	0.0207"	0.0138"

Add...
Delete

x1.5   .75

x2   x.5

Once the line weights are adjusted, include them in your templates.

For existing projects, line weights can be transferred to other projects using Transfer Project Standard:

Massing & Site   Collaborate   View   Manage   BIM

Transfer Project Standards

Select Items To Copy

Copy from:

☑ Line Weights
☐ Load Types

Chec

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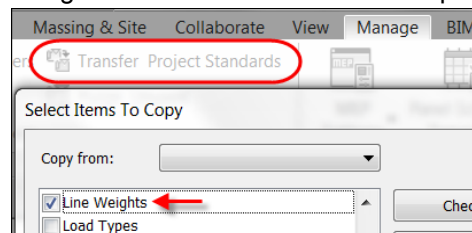
Importlineweights.txt

The Revit Line Weights table in the previous section will now be used in conjunction with the Importlineweights.txt file. When a CAD drawing gets imported into Revit, the Importlineweights.txt file maps the pen colors in the drawing to an appropriate Revit line weight. This allows the line weight in the CAD drawing to display correctly.

To create the Importlineweights text file go to the Insert tab and click on the Arrow button next to Import:
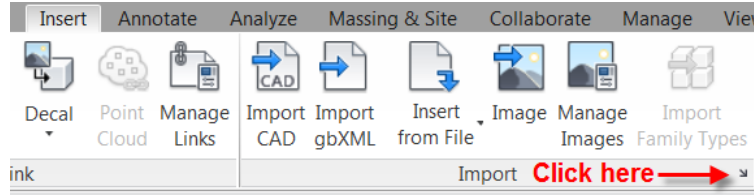
Under "DWG/DXF Color Number" there are **255 numbers**, each number represents a pen color in Autocad. Under "Line Weight", there are 16 numbers, each represent a Revit Line Weight.
Using the Revit Line Weight Conversion Table and the AutoCAD CTB file, map each Color Number with a Revit Line Weight of equal weight.

e.g. A CTB file has Pen Color #1 with a thickness of .0071", that pen color would be mapped to Revit Line Weight #1 which has a similar thickness of .0071":

Once the Color Numbers have been mapped, you can save the Importlineweights.txt file by clicking on the Save As button:
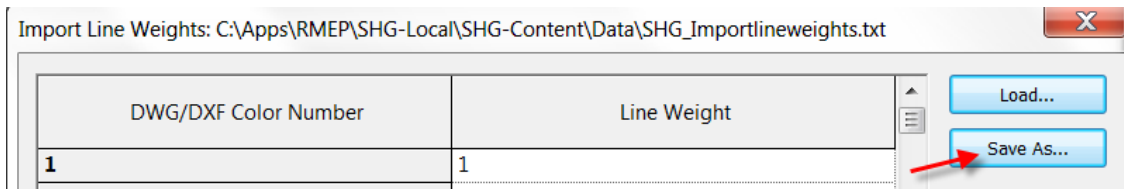
If you saved it to a network location, you can map other users to use this file by modifying the Revit.ini, more on that later.

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Shxfontmap.txt

Revit does not support Shape Fonts (SHX) used in AutoCAD, it only supports True Type Fonts (TTF). As such, when a CAD drawing is imported into Revit, the Shxfontmap.txt file maps the shape fonts used in the CAD drawing to true type fonts so they appear correctly in Revit.

Revit uses the True Type fonts installed under C:\Windows\Fonts.

The Shxfontmap.txt file can be found under: **%APPDATA%\Autodesk\Revit\<Revit name and release>**

To edit the shxfontmap.txt, open it in Notepad and edit it using the following format:

Fontname.shx <tab> TrueTypeFont.ttf

The font on the left is the SHX font, the font on the right is the TTF font that's going to replace it.

In the example below, we mapped the Romans.shx to Arial.ttf, so if we import a CAD drawing that contains Romans fonts, they will be automatically replaced with Arial fonts:
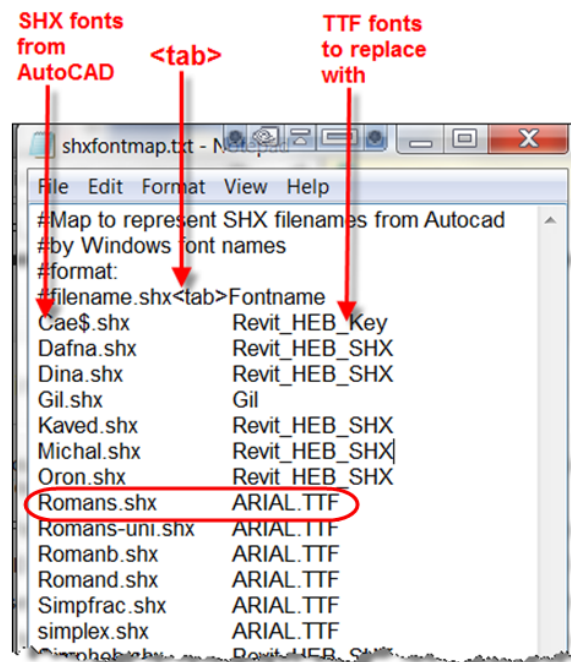
The Revit.ini does not have an option to point users to a network location of this file, so the file will have to be copied to each user's computer under: **%APPDATA%\Autodesk\Revit\<Revit name and release>**

The Revit.ini

The Revit.ini contains settings that define variables, paths, and other options inside Revit.
The Revit.ini can be found in 2 locations:

- UserDataCache folder: C:\ProgramData\Autodesk\<product and release>\UserDataCache
- User Profile folder: C:\Users\<username>\AppData\Roaming\Autodesk\Revit\<product name and release>

The UserDataCache folder contains default copies of files that are used to populate the user's profile. When Revit starts for the first time for a new user, it receives a copy of the Revit.ini from the UserDataCache folder. Thereafter, Revit uses information from the User Profile version of the Revit.ini.

The Revit.ini can be edited using Notepad.
In order to map users to the network location of the Importlineweights.txt file, the following line will need to be edited in the Revit.ini: **ImportLineweightsNameDWG**:

Revit 2013-2015:

To deploy the modified Revit.ini to all users you can either include it with your deployment image or you can copy it to each user's computer via a batch file. We went with the latter as we also needed to distribute the updated Shxfontmap.txt.

A batch file can be created by using Notepad and saving it with a .bat extension.

Inside the batch file, we executed the XCOPY command by using this format:
XCOPY <Source> <Destination>

      Source   **Destination**
XCOPY "*network_location***Revit.ini**" "%USERPROFILE%\AppData\Roaming\Autodesk\Revit\Autodesk Revit 2015\" /i /y
XCOPY "*network_location***Revit.ini**" "C:\ProgramData\Autodesk\RVT 2015\UserDataCache\" /i /y
XCOPY "*network_location***shxfontmap.txt**" "%USERPROFILE%\AppData\Roaming\Autodesk\Revit\Autodesk Revit 2015\" /i /y
XCOPY "*network_location*\ **shxfontmap.txt**" "C:\ProgramData\Autodesk\RVT 2015\UserDataCache\" /i /y

Once the batch file is saved, users can double-click on the .bat file and the files will automatically copy:
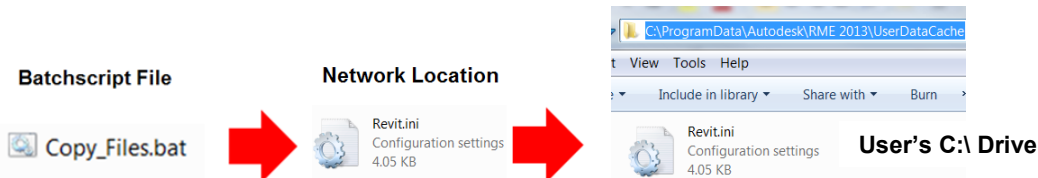
More information on the Revit.ini:
http://goo.gl/7yy2Ff

More info on the XCOPY command can be found here:
http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/xcopy.mspx?mfr=true

Revitizing CAD Drawings

Define How the Drawing Will Be Used

Will the drawing be permanent or temporary?

Permanent Drawings- are drawings that will become part of your deliverables like details, diagrams or schedules. The preferred insertion method to use is "Import".

Temporary Drawings- are drawings that will not become part of your deliverables and will be used for coordination, reference or to verify information. The insertion method typically used is "Link" which allows the cad drawing to be removed afterwards.

Define the Insertion Method to Use

It is important to understand the differences and implications between importing vs linking a drawing:

Linking a CAD file - When you link a CAD drawing, Revit maintains a "live" link to the CAD drawing. Any changes made to the drawing will reflect in the project when the link is reloaded or the model is reopened.

Implications: Note that linking many cad drawing in to a Revit model will significantly reduce performance. There is also a known bug where sometimes the graphical appearance of a linked CAD drawing won't update even when path is correct and the drawing is re-loaded. The only solution is to remove the links and reinsert them, not a feasible solution if you have many links.

Importing a CAD file - When you import a CAD drawing, there is no link between the CAD drawing and the Revit project. If the source CAD drawing changes, the changes will not reflect back in Revit.

When sending the model to a client, the cad files live inside the model so there are no missing cad links, similar to binding in AutoCAD. If the CAD drawing has been properly cleaned aka "Revitized", the drawing can be exploded and its elements will automatically convert to Revit elements, this will allow editing the drawing inside Revit.
Be careful when exploding cad files, do not explode large and complex files.

Define the Type of Drawing You're Going to Import

There are different methods that can be used when importing CAD drawings. Knowing the type of drawing that you're going to import will determine the best method to use for the job.
Some questions you can ask are:

- Will the drawing be 2D or 3D?
- Is the drawing a floor plan, a schedule, a detail or diagram?
- Will the drawing have OLE objects?
- Does the drawing contain AEC objects?
- Will it be a permanent or a temporary drawing?

The Revitizing Guideline

Revitizing - the process of cleaning a cad drawing to the point where there are no errors, graphical and non-graphical, when imported into Revit.

The following is a link to a "live" document that lives in the cloud and that is frequently being updated as software changes, developments are made and feedback is provided:

http://1drv.ms/1y3KrXE

Please submit comments, feedback and corrections to: mvalencia@syska.com

Streamlining the Revitizing Process

Scripts

A Script contains a series of AutoCAD command lines that are saved to a text file and can then be executed on CAD drawings. It is one of the oldest and easiest customizations to learn for AutoCAD. Most anything that can be typed on the command line can be copied and saved to a script.
Scripts can be modified using Notepad and are saved with a .scr extension.

More information on writing Scripts can be found here:
http://www.cad-notes.com/learn-how-to-write-command-scripts-for-autocad-and-automate-your-plotting/

ScriptPro

ScriptPro is a software that has been around for many years and it's used to process scripts on multiple drawings:
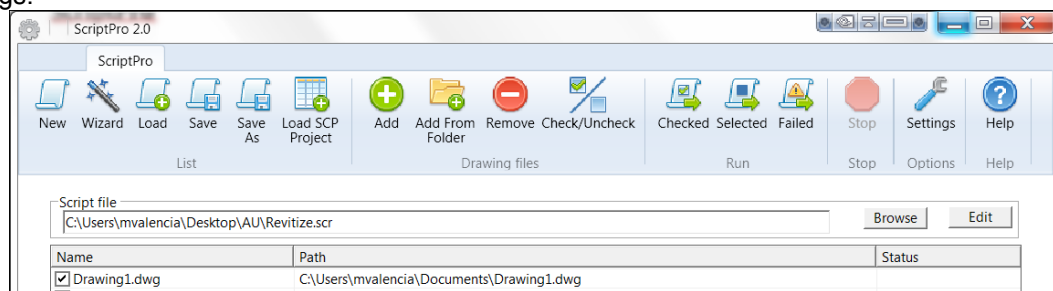
The initial setup requires to specify the location of the acad.exe file (under Settings):
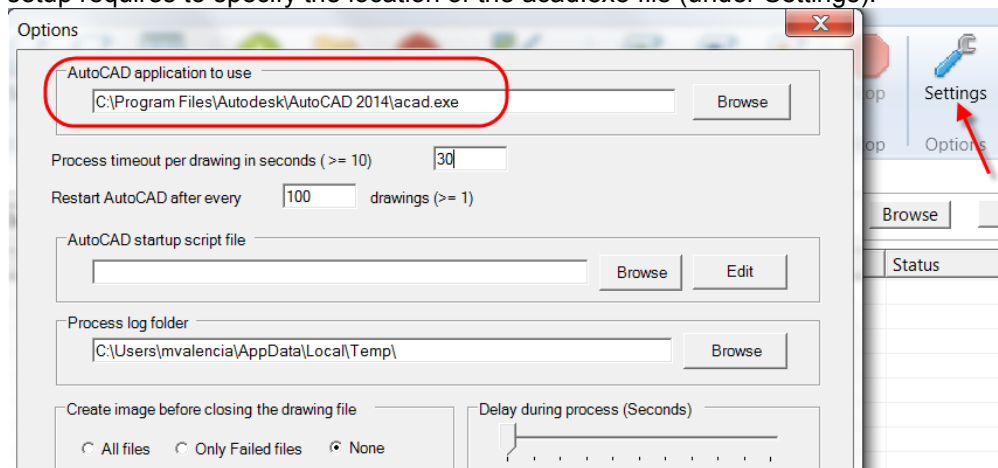
ScriptPro can be downloaded from here:
http://knowledge.autodesk.com/support/autocad/downloads/caas/downloads/content/autodesk-customization-conversion-tools.html

More information on using Script Pro:
http://adndevblog.typepad.com/autocad/2012/04/batch-purging-of-drawing-files-using-scriptpro-20.html

Scripts can be used to automate part of the Revitize process, the following script will do the following.
- Sets Proxygraphics to 1.
- Sets Ltscale and Psltscale to 1.
- Changes all Qleaders to Non-Annotative.
- Changes the Lineweight, Linetype and Color of all entities to ByLayer.
- Changes the Lineweight to Default for all layers inside the Layer Manager.
- Changes the Thickness of all entities to 0".
- Audits and Purges the drawing.
- Purges Registered Applications.
- Saves the drawing.

```
;DESCRIPTION:  Automates the Revitize Process.
;BEGIN SCRIPT
Tilemode
1
Proxygraphics          ⎫
1                      ⎬  Sets Proxygraphics, Ltscale and Psltscale to 1.
Ltscale                ⎪
1                      ⎪
Psltscale              ⎭
1
(ssget "_X" '((0 . "LEADER")))  ⎫
Change                 ⎪
Previous               ⎪
                       ⎬  Changes all Qleaders to be non-annotative.
Properties             ⎪
Annotative             ⎪
No                     ⎭

Change                 ⎫
All                    ⎪
                       ⎪
Properties             ⎪
Ltscale                ⎪
1                      ⎪
                       ⎪
Change                 ⎪
All                    ⎪
                       ⎪
Properties             ⎪
Color                  ⎪
ByLayer                ⎪
                       ⎬  Changes the linetype scale, color, linetype, and lineweight of objects to ByLayers.
Change                 ⎪
All                    ⎪
                       ⎪
Properties             ⎪
Ltype                  ⎪
ByLayer                ⎪
                       ⎪
Change                 ⎪
All                    ⎪
                       ⎪
Properties             ⎪
Lweight                ⎪
ByLayer                ⎭

Change                 ⎫
All                    ⎪
                       ⎬  Changes the thickness of objects to 0".
Properties             ⎪
Thickness              ⎪
0                      ⎭

-Layer                 ⎫
Lweight                ⎪
Default                ⎬  Changes the lineweight of layers to Default in the Layer Manager.
*                      ⎭

Audit                  ⎫
Yes                    ⎪
-Purge                 ⎪
All                    ⎪
*                      ⎪
No                     ⎬  Audit and Purges the drawing, including registered applications.
-Purge                 ⎪
R                      ⎪
*                      ⎪
No                     ⎭
Qsave
Close
;END SCRIPT
```

Developing a Library of Details for Both AutoCAD and Revit

By following the Revitizing Guideline, it is possible to create a library of CAD details that can be used in both AutoCAD and Revit. This is done by:

- Linking a Revitized CAD detail to a Drafting View inside a Revit Project file (.rvt), this will become the Revit Detail Library.
- The drafting view can then be imported into Revit projects via Insert View from File.
- Because the CAD detail is linked, any changes made to it will reflect back to the Drafting View:
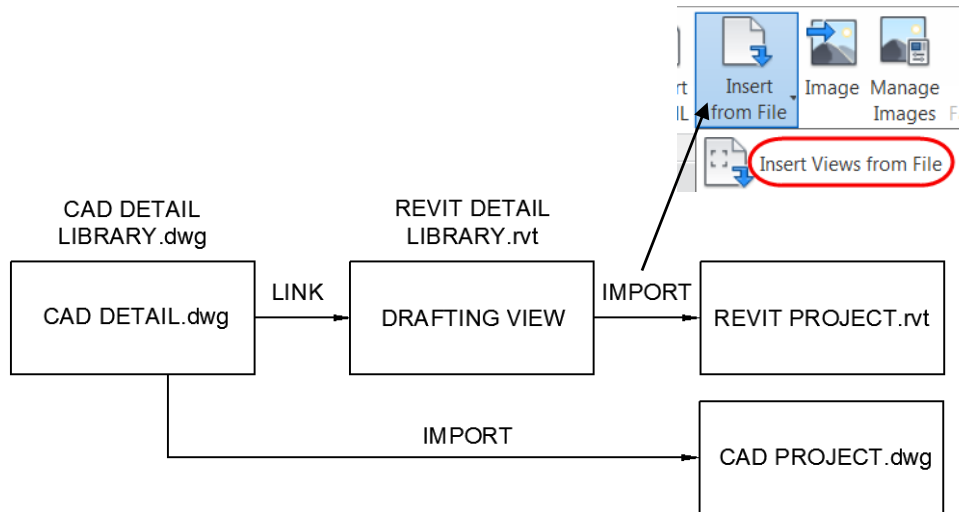
1. To create the Revit Detail Library, open a blank non-workshared enabled Revit Project file and organize the Project Browser per the way you want the details to appear when they get imported into a project:
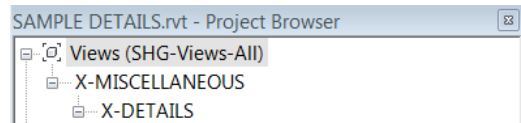
2. Create one Drafting View per CAD detail, name the drafting view to match the detail's title and set the Drafting View Scale to match the CAD Drawing Scale:
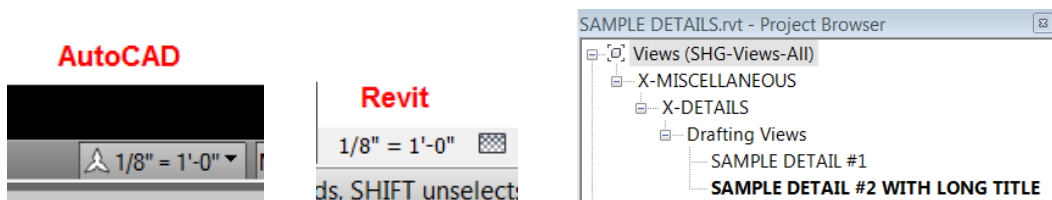
3. Link the CAD detail in its respective Drafting View and add reference planes around the parameter of the detail border. The reference planes allow for snapping when the drafting view is placed on a sheet

Add a Reference Plane where your border is.
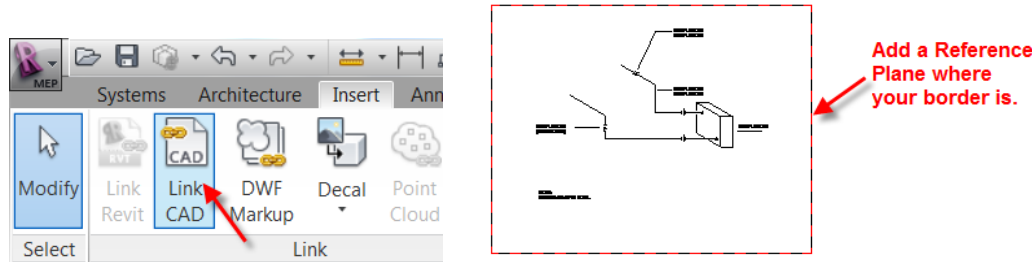
4. Layers can be deleted by selecting the CAD detail → Modify tab→Delete Layers or they can be hidden by selecting Query (this will not affect the original cad drawing):
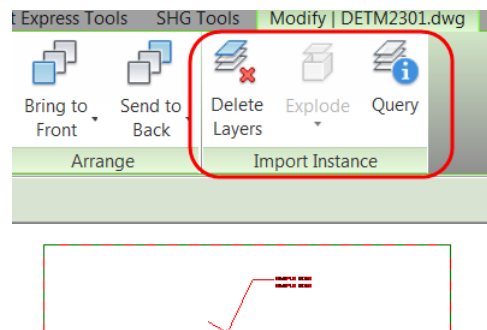
5. In the Project Browser, select the drafting view and go to its Properties. Under Identity Data, go to the "View Name" parameter and add the title of the detail. Do the same for"Title on Sheet" parameter. The "Title on Sheet" will be the title that appears on the detail when it's placed on a sheet:
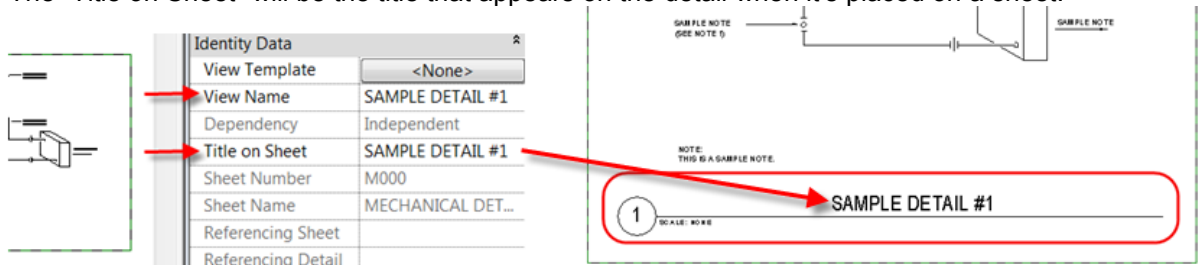
6. Longer titles can be stacked by pressing **Cnt+Enter** at a specified break point:

Press Cntl+Enter here to stack
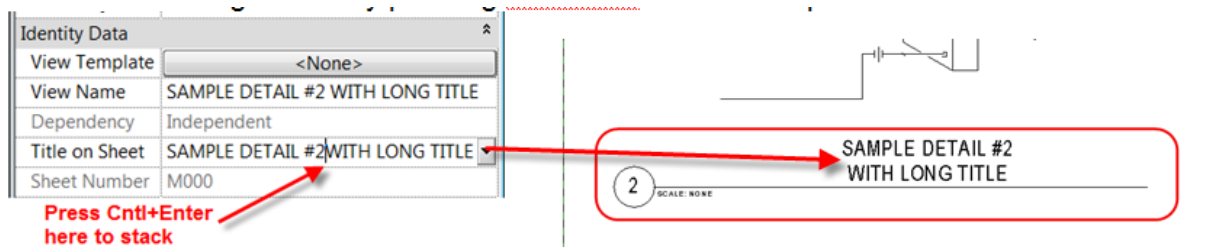
7. Save the Revit Detail file on a network location, this will allow other users to access it.

Users can then import the details into a Revit project by going to the Insert tab→Insert Views from File:
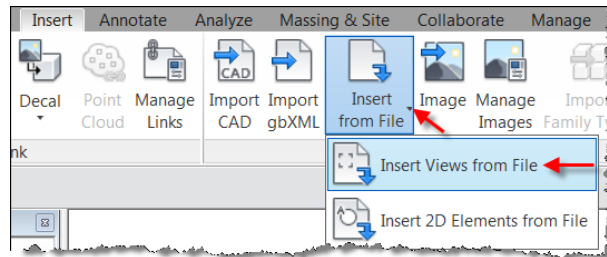
Select the Revit file that contains the desired details and click Open:
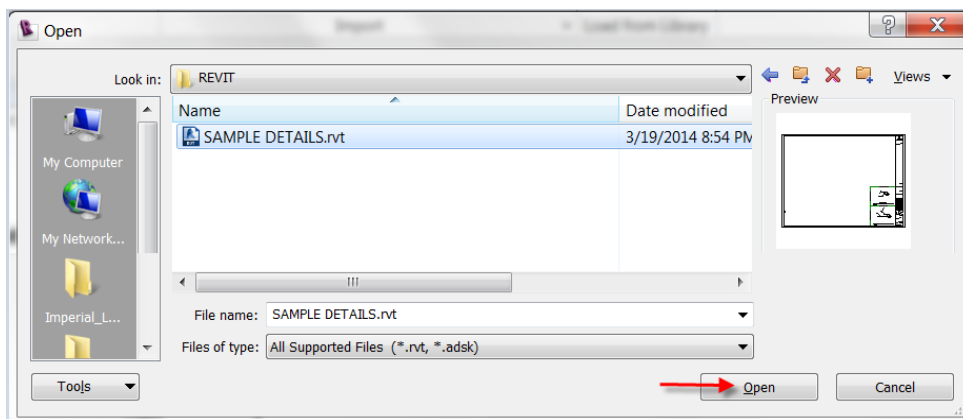
Check the details you want to import and click OK:
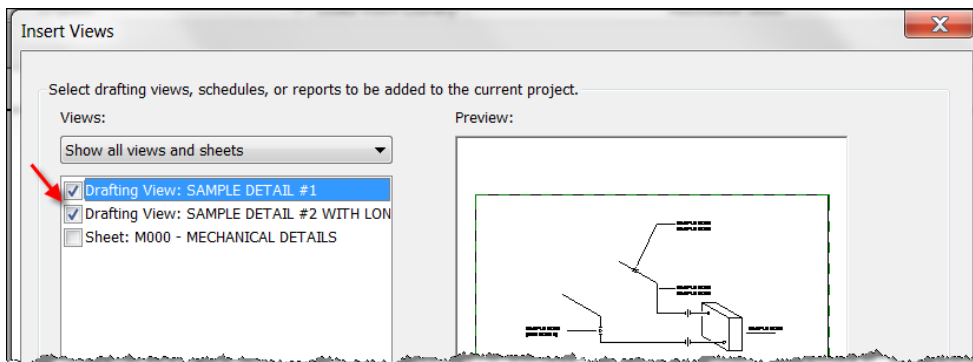
The message below will appear, this is normal. It means that the linked cad detail in the drafting view will be inserted as an import instead of maintaining the link:
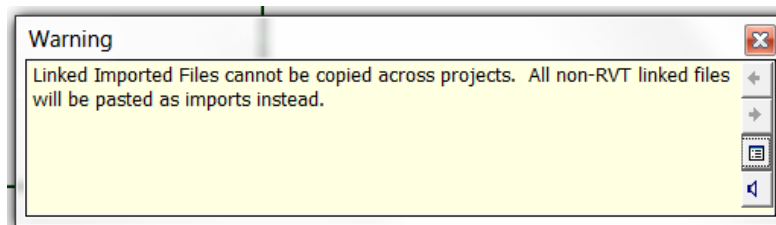
The imported details will appear in the Project Browser in the same way they were created:
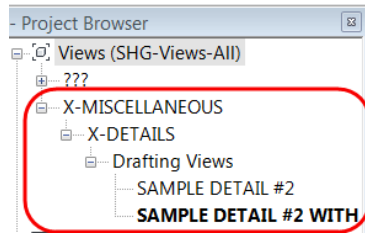
The imported details can be modified by deleting or hiding its layers, as show below, or it can exploded allowing full editing in Revit. If the detail was properly Revitized, there shouldn't be any errors when the drawing gets exploded:
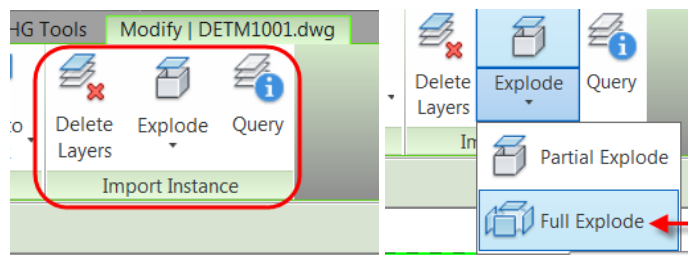
The drafting view can then dragged and dropped onto a sheet and the view title should automatically populate:
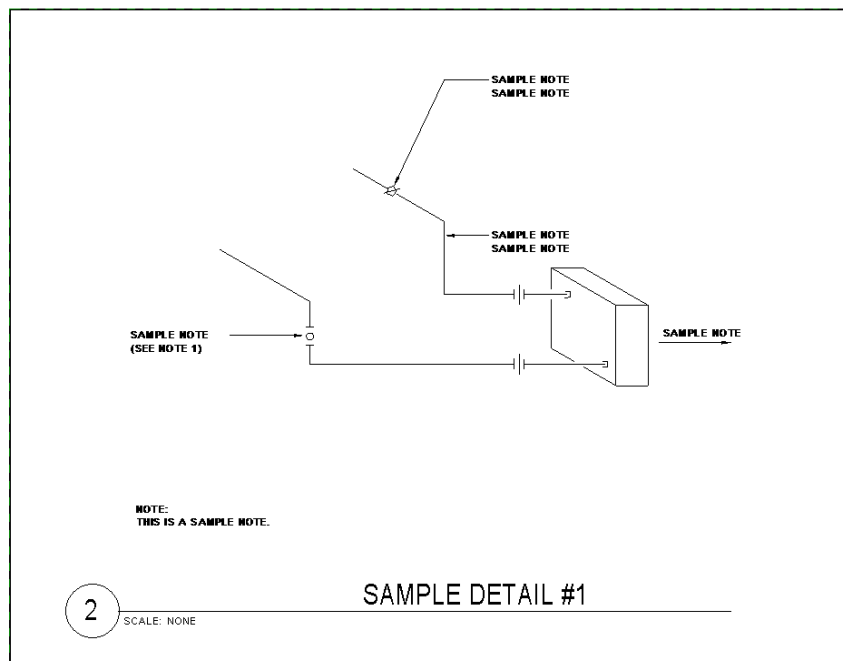
Tool Palette for Revit

The following tool is worth exploring: **Kiwicodes Family Browser Pro**
This tool allows for easy importing of the Revit details found in the drafting views, as well as schedules, groups and families:
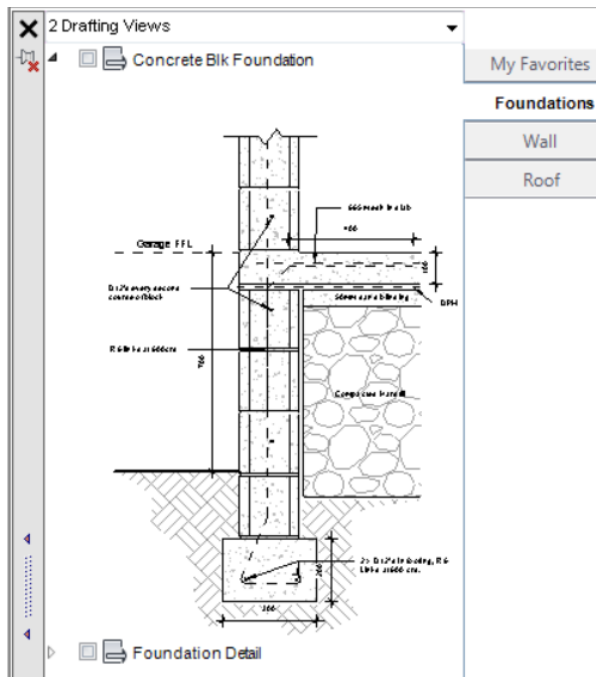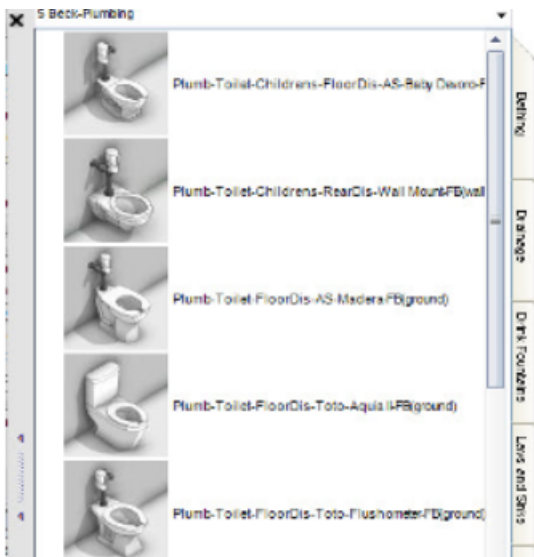
More info can be found here:

http://www.kiwicodes.com/29-family-browser.html

Importing Floor Plans into Revit Projects

2D and 3D Floor Plans

It is recommended to <u>only</u> import CAD floor plans if it's really necessary.

An object in Revit must be assigned a category in order for Revit to know how to cut it, whether in plan or section. Geometry in a drawing file imported or linked directly into a Revit project has no category assigned, and therefore will not be cut.

In the examples below, notice how the 3D CAD file is not properly cut in View Range:

3D CAD link not properly being cut by view range   **3D CAD link properly being cut by view range**

vs.
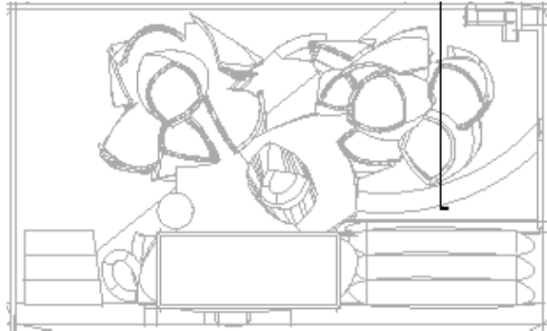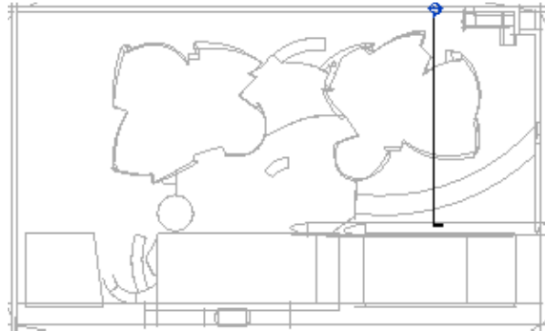
In this examples, the 3D CAD file is not properly cut in Section:

3D CAD link not properly being cut by section   **3D CAD link properly being cut by section**

vs.
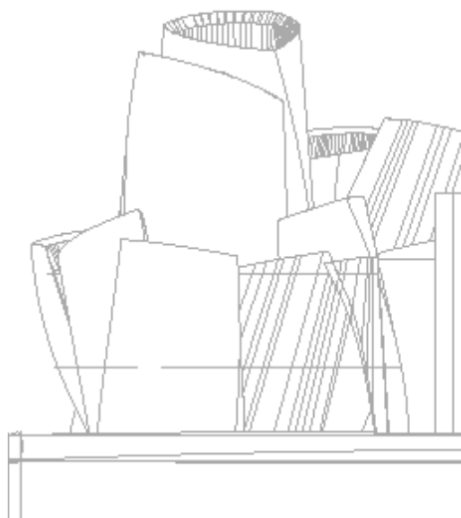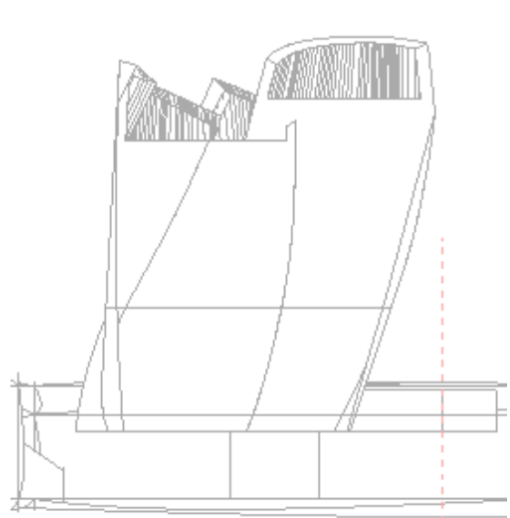
In this example, CAD elements are shown on top of Revit elements:
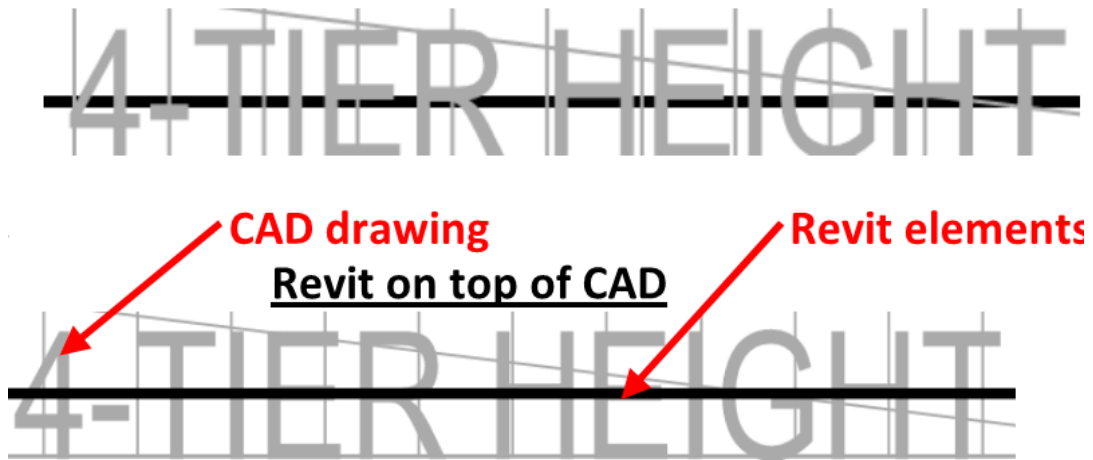
Solution:

If the CAD drawing will only be used temporarily and it's not part of your deliverable, you can link the cad drawing and detach it when not needed anymore.
If the CAD drawing will be part of your deliverable, it is recommended to:

- Import the cad drawing to a **Generic Model** family template.
- Insert that family to a blank Revit project file (.rvt).
- Link the Revit project file to the actual Revit project:
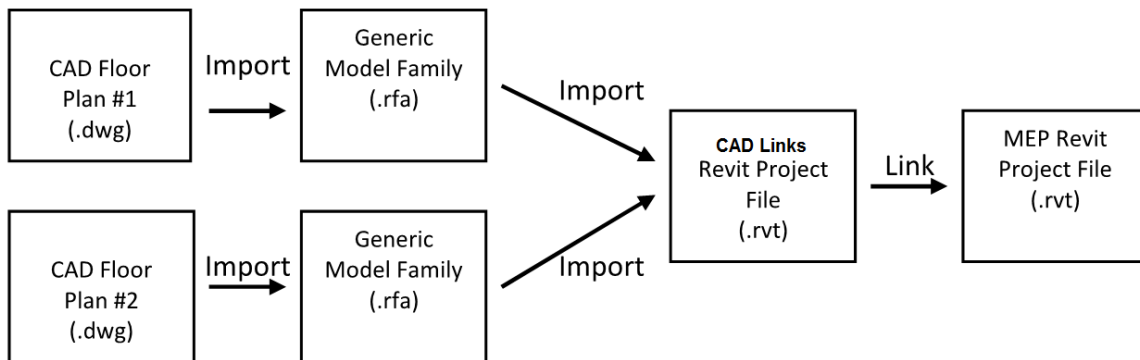
To Import the CAD file to a Generic Model family:

1. Go to the Application Menu→New→Family→Generic Model.rft:
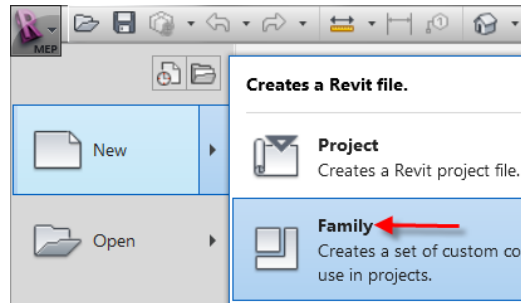
2. Go to Insert tab→Import CAD
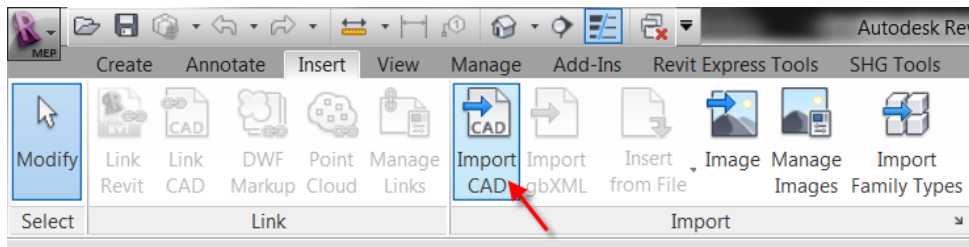
3. Set your settings as shown below:
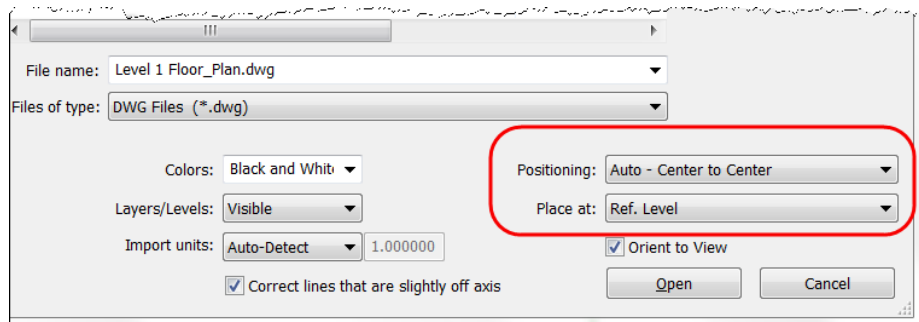
4. Load the family into a blank Revit project, position it at the correct level, orientation and origin point.
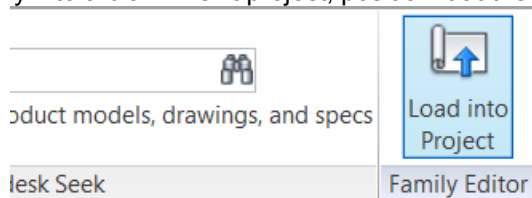
5. In order to update the CAD file, you'll need to update the family and load it back into the project.

These steps can also be used when creating 2D and 3D families from CAD files.

Useful Resources:

WAUN (World Autodesk Users Network) – An email based newsgroup with users from all around the world. Different than the typical web based groups in that you don't post your question on a forum, you send an email to the group and anyone in the group can respond with answers.

www.waun.org

AUGI (Autodesk User Group International) – Big at AU, lots of resources, can find almost anything there. Find answers, post questions, great articles.

www.augi.com

THE REVITIZING GUIDELINE

The following is a comprehensive list of things to check that will help you Revitize your CAD drawings.
This document is meant to be a "live" document that will be reviewed and updated as new enhancements are made to the softwares.

It is important to properly prepare your cad drawings before importing into Revit in order to prevent errors, reduce file size and maintain performance. ***Always make a backup of the original drawing before Revitizing.***

Users can provide comments, additions and corrections by emailing Miguel Valencia: mvalencia@syska.com

This "live" document can be found at: http://1drv.ms/1y3KrXE

DRAWING FORMAT COMPATIBILITY

AutoCAD's drawing format changes every 3 releases, not all formats are compatible with every release of Revit. If you can't link a cad drawing into you model or are constantly seeing the messages shown below, then you need to check the compatibility of the CAD drawing:

Message shows up even when **Proxygraphics** is set to **1**:
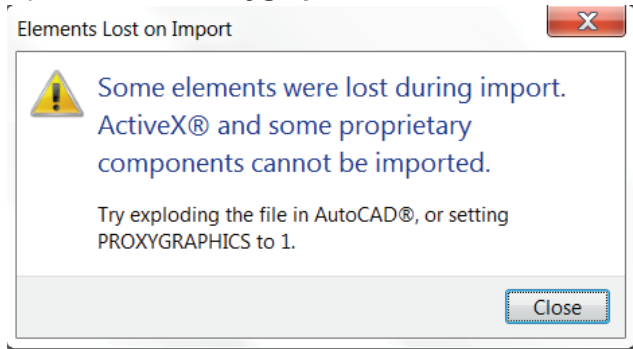
Message shows up even when elements are present in Model Space:
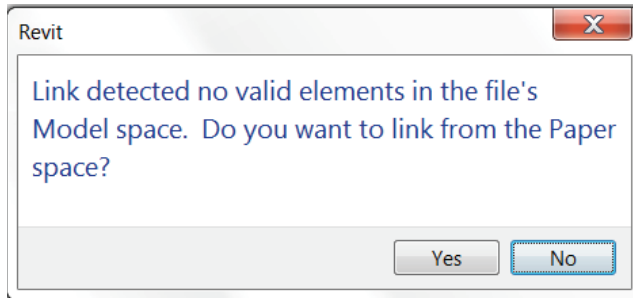
Constant crashing when opening the model:
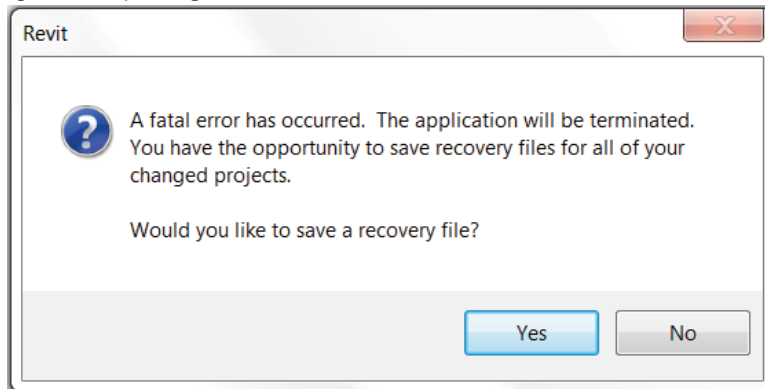
The table below shows the compatibility between the softwares:

DWG Format	AutoCAD Versions	Revit Versions Compatibility
DWG 2010	AutoCAD 2010 through 2012	Revit 2010 and Up
DWG 2013	AutoCAD 2013 through 2015	Revit 2013 and Up

SOLUTION:

If you need to link a cad drawing that is not compatible with your release of Revit (e.g. AutoCAD 2014 to Revit 2012), you'll need to downgrade the CAD drawing to an earlier version:

1. Type SAVEAS at the command line and select the appropriate DWG Format:
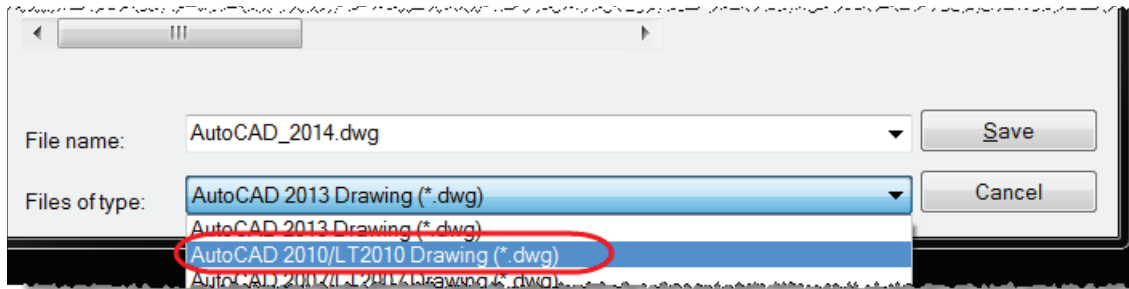
2. Or, you can go to Options and change the Save As settings to the appropriate DWG Format:
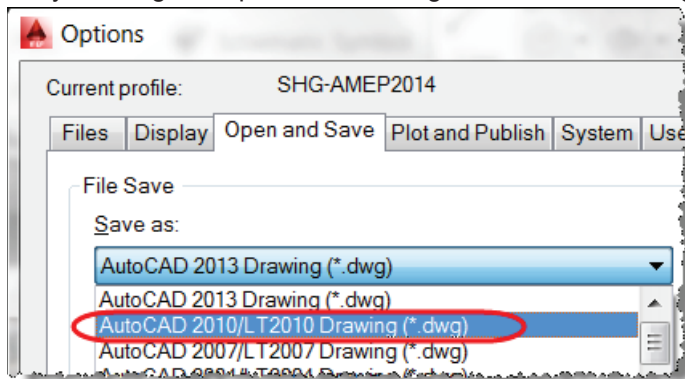
3. You can also use the DWGCONVERT command to convert multiple drawings to a different DWG Format:
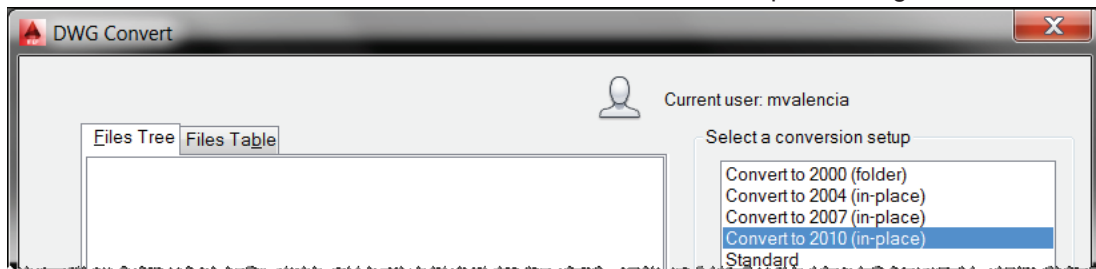
AEC OBJECTS

AEC Objects are intelligent objects that are created from other Autodesk softwares like AutoCAD MEP, AutoCAD Architecture and AutoCAD Map. Natively, AEC Objects will not display when imported into Revit:
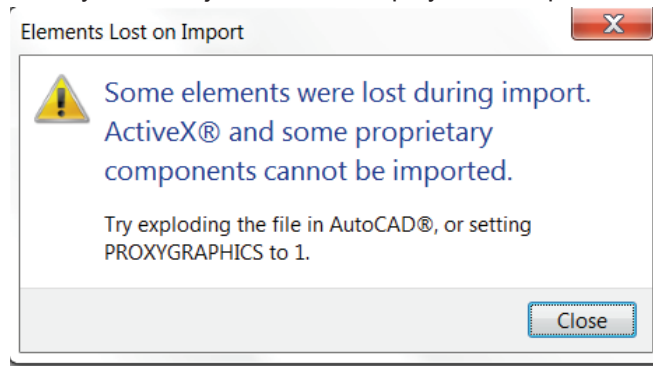
To check if a drawing contains AEC Objects, select a few elements, AEC objects can be identified by their cyan shape-handles:
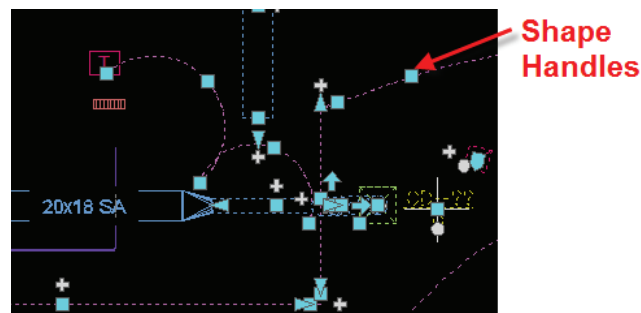
SOLUTION:

To display AEC Objects:

1. In AutoCAD, type PROXYGRAPHICS and set it to 1.
2. Save the drawing in the correct DWG Format.

If there are still AEC Objects that are not displaying correctly, you can convert them to regular AutoCAD entities via the following:

For 2D CAD drawings:

1. Type PROXYGRAPHICS and set it to 1.
2. Type AECOBJEXPLODE and set the settings as shown to the right:
3. Click OK when prompted and Save the drawing.

For 3D CAD drawings:

1. Type PROXYGRAPHICS and set it to 1.
2. Change your view to a 3D View.
3. Type CONVERTO3DSOLIDS.
4. When prompted "Select AEC objects to convert:", type ALL and hit ENTER.
5. If prompted to "Erase selected objects?", type YES, hit ENTER and SAVE the drawing.
6. If prompted "0 objects are found", there is nothing to convert, SAVE the drawing and Exit.
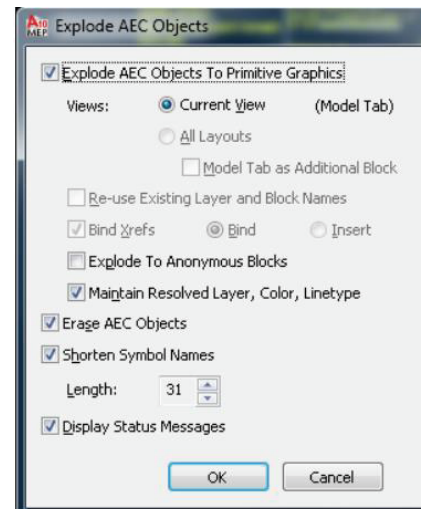
MINIMUM LENGTH REQUIREMENT

Imported CAD drawings that contains entities (lines, circles, solids, hatches, etc) smaller than **1/32"** (**0.79375mm**) in length or in circumference will show up when imported into Revit, but once the CAD drawing gets exploded, the entities will disappear, sometimes with a warning as shown below, other times without.

The minimum length requirement is built inside Revit as an accuracy for Length:

http://spiderinnet.typepad.com/blog/2014/08/revit-units-net-api-list-out-all-units-in-the-revit-default-imperial-unit-system.html

Length (UT_Length):
    Accuracy: 0.00260416666666667 ⬅
    Unit display: Feet and fractional inches (DUT_FEET_FRACTIONAL_INCHES)

0.002604' X 12" = 0.03125" ➜ **1/32" (0.79375mm)**

SOLUTION: Try to avoid drawings that are drawn 1:1 as these tend to contain really small elements. You can scale the drawing up to increase the size of the elements. The following are some of the most common messages related to this problem:

Warning message:

Autodesk Revit MEP 2013
Error - cannot be ignored   --   6 Errors, 0 Warnings
Line is too short.

<<   1 of 6   >>   Show   More Info   Expand >>
Resolve First Error:
Delete Element(s)   OK   Cancel
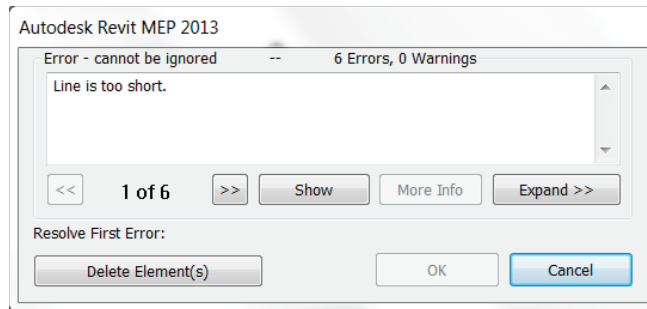
What it means: Check the length of all lines, polylines, arcs, or circles in the drawing.

Warning message:

Autodesk Revit MEP 2013
Error - cannot be ignored   --   6 Errors, 0 Warnings
Can't draw Detail Filled Region.

<<   5 of 6   >>   Show   More Info   Expand >>
Resolve First Error:
Delete Element(s)   OK   Cancel
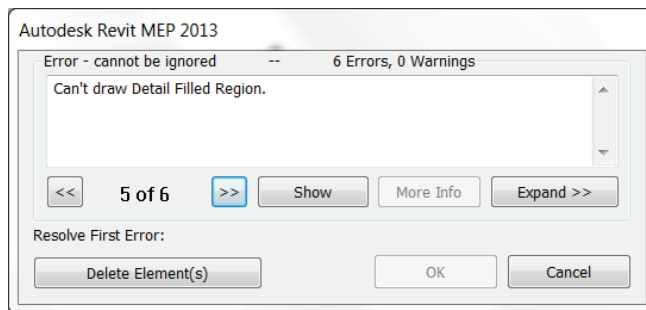
What it means: Check the area of all Filled Regions.

Warning message:

Autodesk Revit MEP 2013
Error - cannot be ignored   --   6 Errors, 0 Warnings
The constraints of the sketch defining the highlighted element cannot be satisfied.

<<   6 of 6   >>   Show   More Info   Expand >>
Resolve First Error:
Delete Element(s)   OK   Cancel
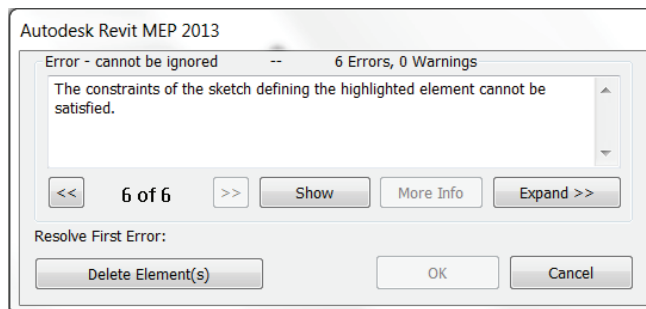
What it means: Check the length/circumference of the profile that defines the hatches.

HATCH PATTERNS

Avoid really dense Hatch Patterns as they tend to increase the file size. Revit tries to map the imported hatch patterns to fill patterns that are already defined in the model. If it cannot find a right match it will create a new pattern type, but if the hatch pattern lines are too small (per the 1/32" limitation), it will replace it with a solid fill:
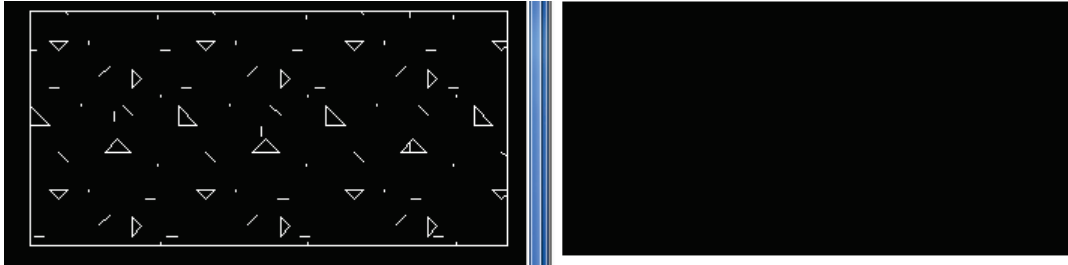
AUTOCAD   REVIT

SOLUTION:

Option 1: Scale the drawing up if true scale is not a factor.

Hatches will import better when the hatch pattern lines are larger than the 1/32" minimum requirement. Most errors occur when the drawing is drawn at a small scale, this is because the elements are smaller. If the drawing is 1:1, I typically scale the drawing up by a factor of 96. This makes the view scale 1/8"=1'-0" and allows hatches and lines to import correctly. The benefits of scaling the drawing up are the following:

- Allows lines previously smaller than 1/32" drawn at 1:1 to import correctly.
- Allows greater import compatibility for hatches and solids due to the upscaling.

Revit will automatically try to map the imported hatch patterns with predefined fill patterns in the model of similar pattern and density:

It's a good idea to predefine the fill patterns inside your template prior to importing so that Revit uses them for mapping. You can then transfer these patterns to other projects by going to Manage→Transfer Project Standards:
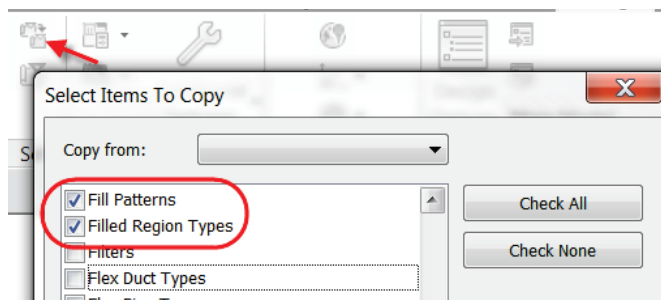
Option 2: Explode the hatch.

In AutoCAD, set **HPMAXLINES** to 1,500. HPMAXLINES sets the maximum number of hatch lines that are generated in a hatch operation, valid values are from 100 to10,000,000. Setting it to a lower number discourages users from creating really dense hatches because the hatch automatically turns into a Solid if it reaches the maximum set value. Exploding the hatch will allow Revit to import the lines that defined the hatch pattern.

SYMBOLS

Not all symbols will display properly when imported into Revit. For example, the diameter Ø symbol %%C in AutoCAD will not display properly:
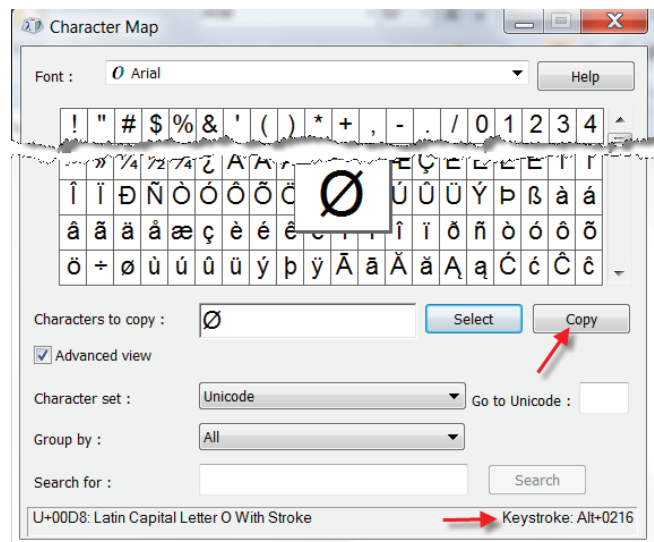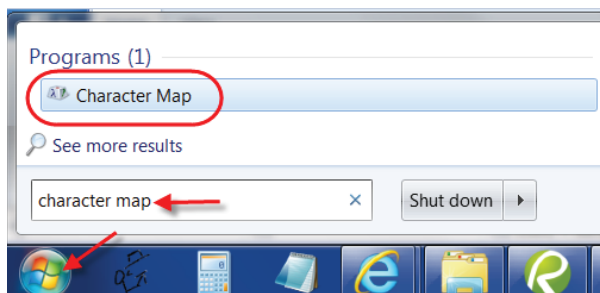

SOLUTION:

To fix, replace %%C with **Alt+0216** or **Alt+0248.** This produces a Ø symbol that Revit can read (use the number pad, not the numbers on top of the keyboard):

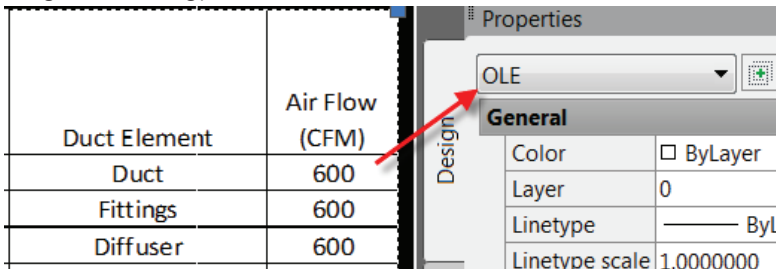To do a global replace in a drawing, use the **Find** command in AutoCAD:
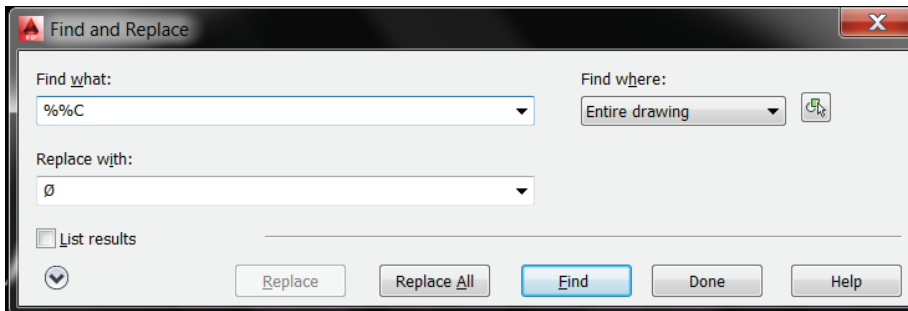
You can find more symbols by going to **Start→Character Map** and then **Copy/Paste** or use the Keystroke shortcut keys:

OLE OBJECTS

OLE (Object Linking Embedding) of Excel, PDFs and Word files in AutoCAD will not display when imported into Revit:

SOLUTION:

For **Excel**, select the cells you want to import and copy them to the clipboard:
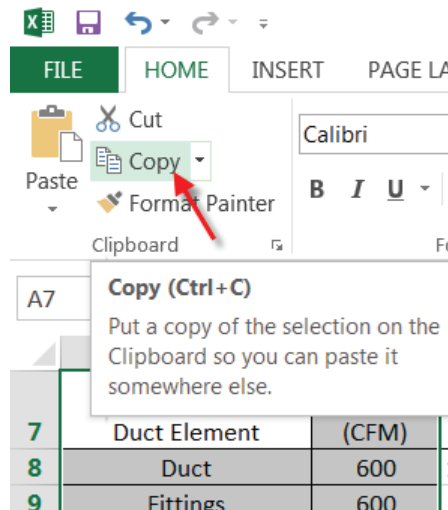
In AutoCAD, type **PASTESPEC→** Paste Link→AutoCAD Entities:
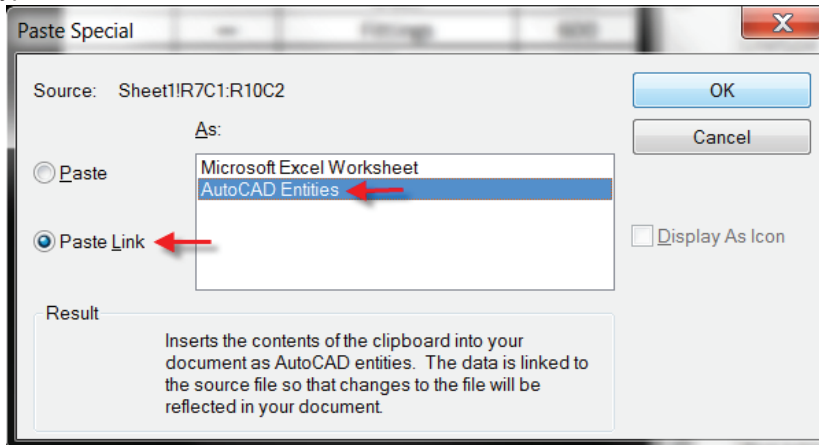
Link the CAD drawing into Revit, this will maintain a live link between Excel, AutoCAD and Revit.

For **PDF** OLEs, export the PDF as an image and import that into Revit.
For **Word** OLEs, copy to clipboard the text in the Word document and paste it to a blank piece of text inside Revit.

LAYERS, LINE TYPES AND LINE WEIGHTS

In order to display the correct line weight and line type of elements that are imported into Revit, it is recommended to set their properties to **ByLayer**:
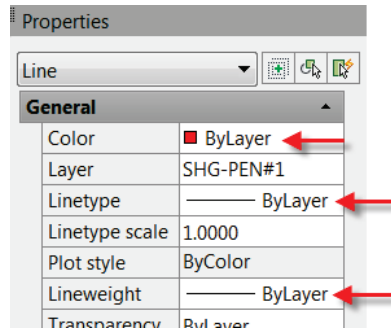
The Line Type and the Line Weight must be defined in the Layer Manager and the Line Weight must be set to **Default**:
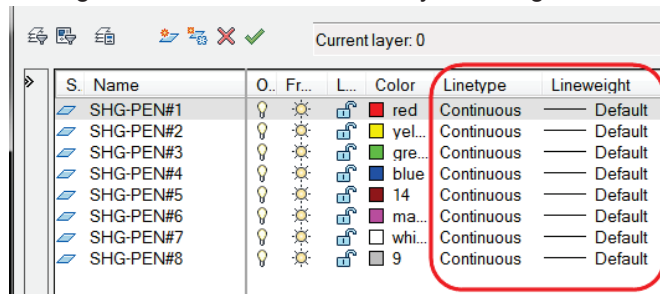
Elements that are <u>not</u> set to ByLayer will <u>still</u> display correctly:
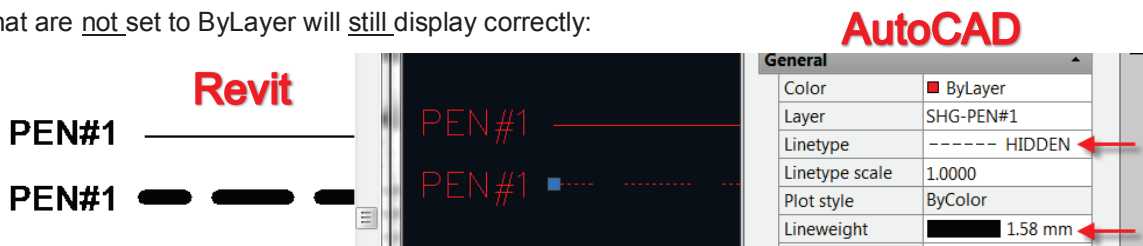
But once the CAD drawing gets Exploded, they may lose their display configuration:
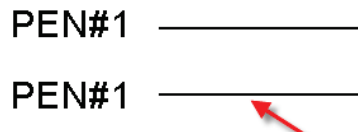
This is because when an **Imported** CAD drawing gets **Exploded**, the layers become **Line Styles** inside Revit. Revit uses the settings that were defined in the Layer Manager (ByLayer) of that Layer to define the graphical display of the new Line Style, thus overwriting the graphics of any element that was not set to ByLayer:
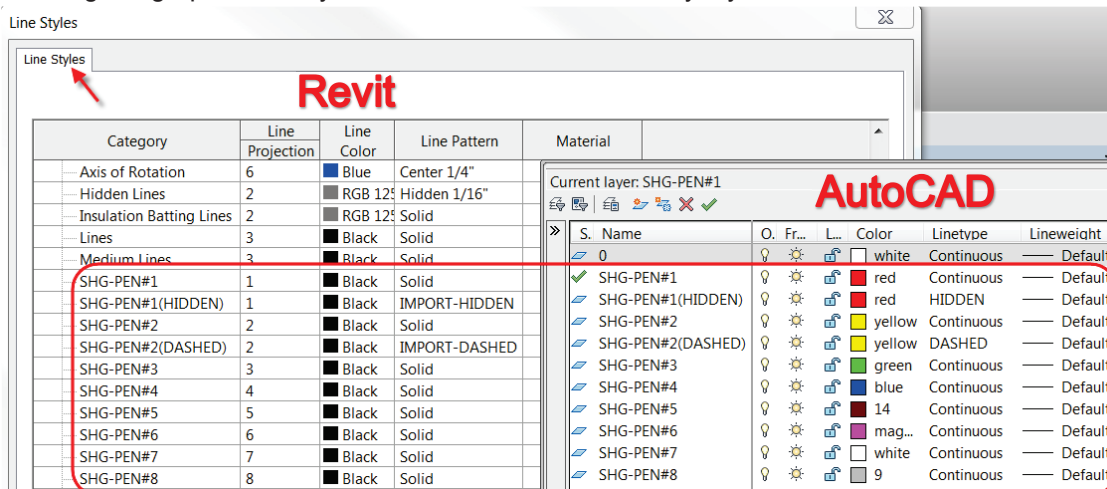
When a CAD drawing is **Linked or Imported** into Revit, the layers will show up under **Object Styles→Import Objects**:
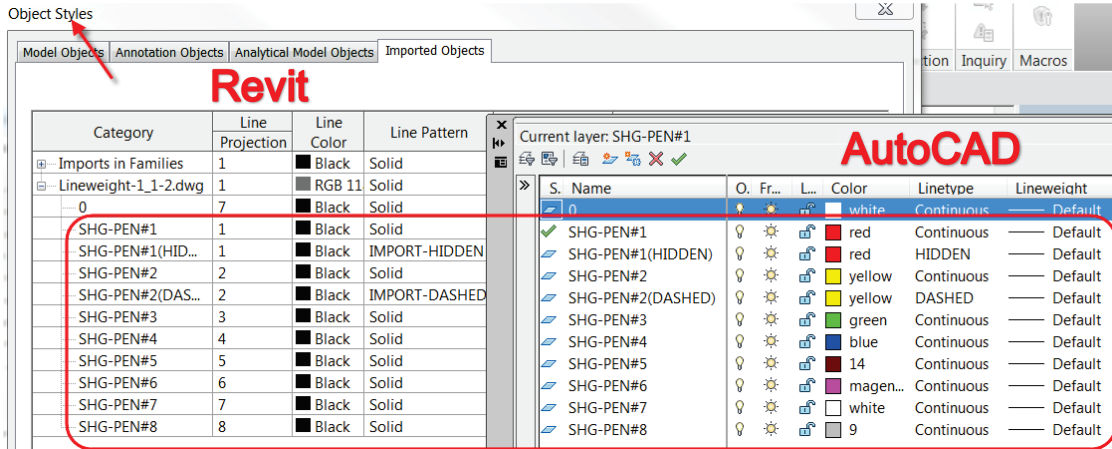
Each Layer is mapped to a Line Weights in Revit per the **Importlineweights.txt** file. The line weights can then be overwritten via Object Styles or, if the CAD drawing was exploded, via Line Styles:
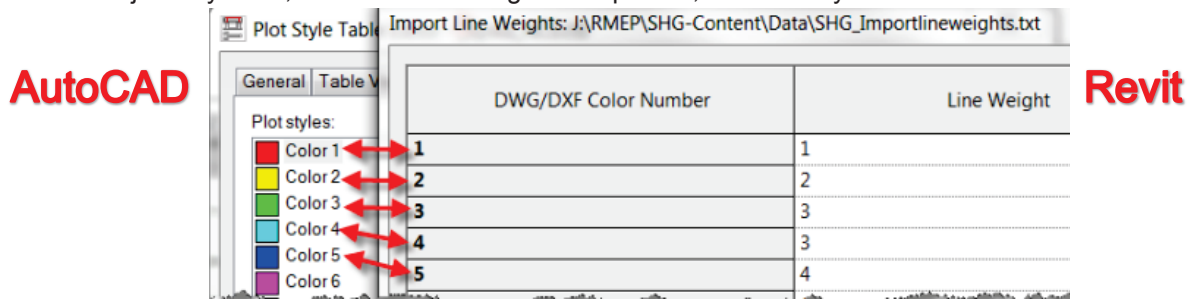

Be aware that any Line Type that is loaded in the CAD drawing, will convert into a Line Pattern once imported in Revit:
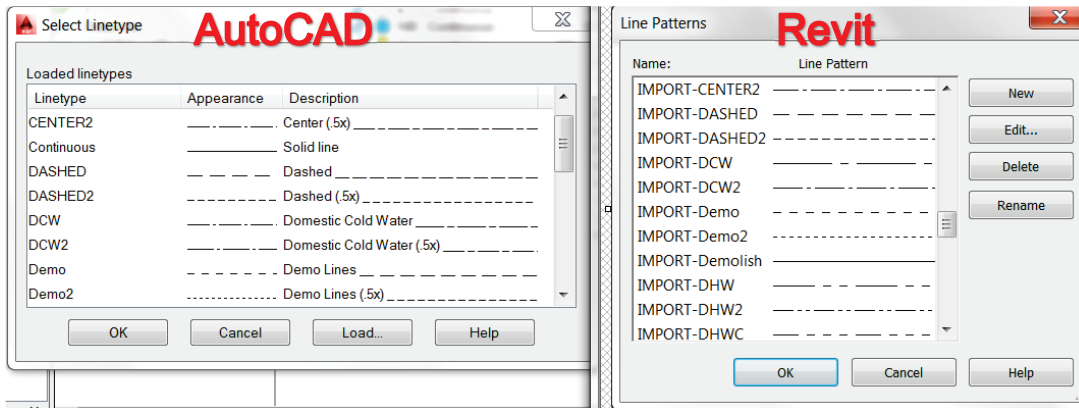
OTHER IMPORTANT NOTES:

1. It is recommended to minimize the use of Layers and Line Patterns in your CAD drawings as to not clutter the model.

2. If a Line Style already exist with the same name of the Layer being imported, the display configuration of the existing Line Style will take precedence over the one being imported.

3. In order for the Line Types to display correctly, the **LTSCALE** and **PSLTSCALE** must be set to **1,** the View Scale must match the Drawings Scale, and the Line Type Scale under properties must also be set to 1:
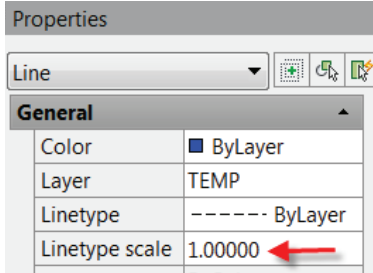
4. Since line weights are scale dependent in Revit, your **View Scale must match the Drawing Scale**. This insures that the **line weights, line types and annotative objects display** correctly:
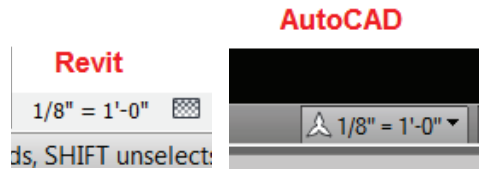

5. Elements that are Frozen or Hidden will not display when the drawing is imported, but once the drawing gets Exploded they will show up. To prevent them from importing, in the Import dialog Box, select **Visible** under Layers/Levels:
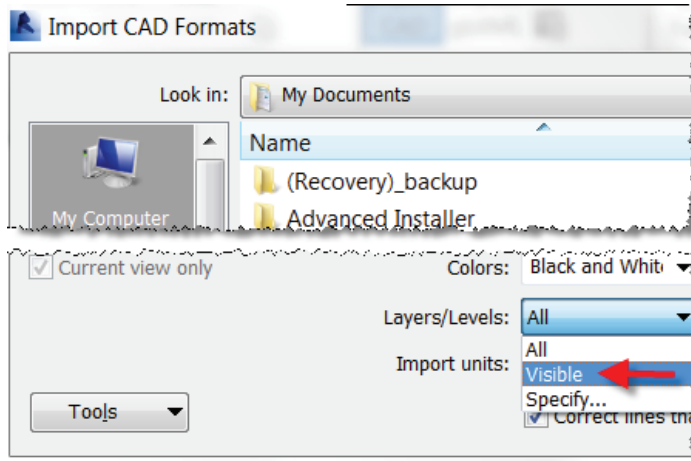
6. Drawings that are imported inside Drafting Views cannot be cropped, so it's recommended to delete any elements that are off to the side or that are frozen or hidden. Only leave the elements that you want to import.

7. If a CAD drawing that contains **Xrefs** is **Linked**, the xref will only show if the attached Type is set to **Attach**.
   If a CAD drawing is **Imported**, the xrefs will show regardless of their attached Type.
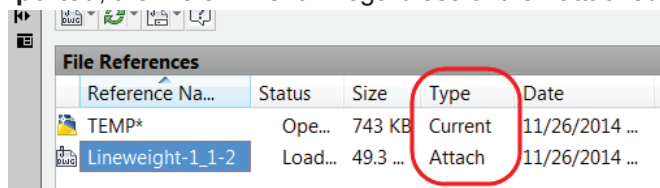
8. 2D CAD drawings such as details, diagrams, schedules, etc., should be Imported inside Drafting Views so that they don't show up in plan views. You can also use Legends, but drafting views allow you to transfer them between projects using the Insert from File→Insert Views from File:
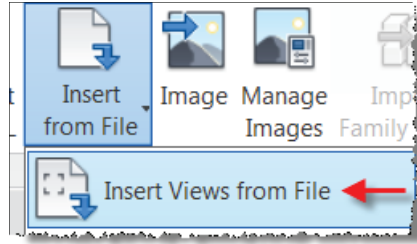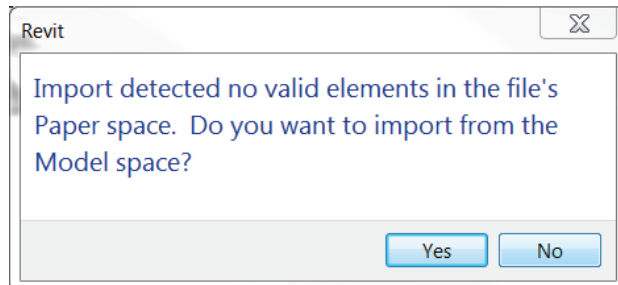

9. You <u>cannot</u> import elements from both Model Space and Paper Space at the same time.

10. **Message:**
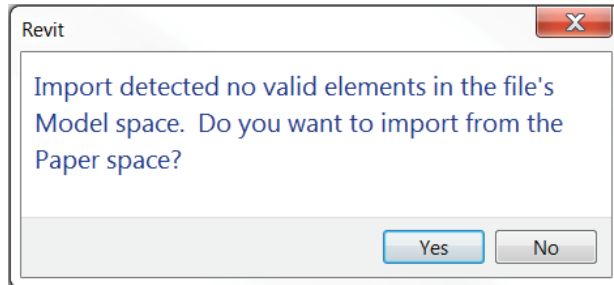
What it means: In any view that is not a Sheet View, Revit will first import the content from the CAD drawing's Model Space. If there is nothing in model space, it will prompt you if you want to import the content from the Paper Space.

11. **Message:**

What it means: If you're in a Sheet View, Revit will first import the content from the CAD drawing's Paper Space. If there is nothing in paper space, it will prompt you if you want to import the content from the Model Space.

12. If you have a lot of Mtext and you want to keep the text formatting exactly the same in both AutoCAD and Revit, you'll need to first convert the mtext font to the font used in the Revit project prior to importing. In some cases, you may need to Explode the Mtext prior to importing.

If you don't convert the font first, the Shxfontmap.txt file will do the conversion for you, but the text formatting will change due to the differences in font types.

13. The Arial Narrow font doesn't translate properly when imported into Revit:

Original AutoCAD text using Arial Narrow:
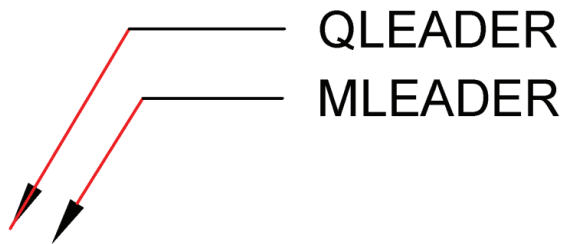
RUNOUTS SHALL BE SAME
SIZE AS COIL CONNECTIONS

Arial Narrow text imported in Revit:

RUNOUTS SHALL BE SAME
SIZE AS COIL CONNECTIONS
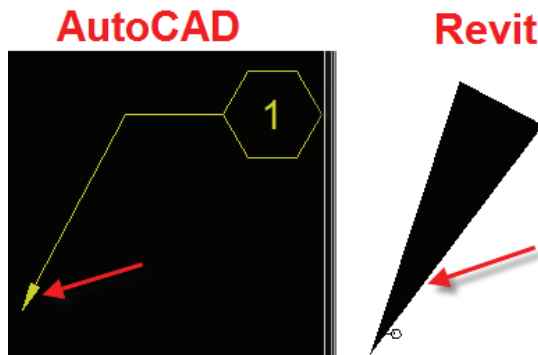
Arial Narrow text exploded in Revit automatically converts to regular Arial:
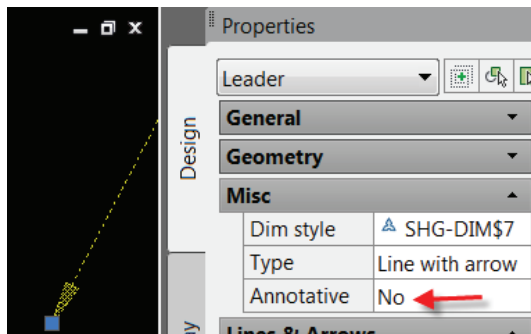
RUNOUTS SHALL BE SAME
SIZE AS COIL CONNECTIONS

14. Replace all **Qleaders** with **Mleaders**, Qleaders tend to bleed thru the arrowheads when imported:

QLEADER

MLEADER

15. In addition, when **Qleaders** are set to Annotative, they become really big when imported:
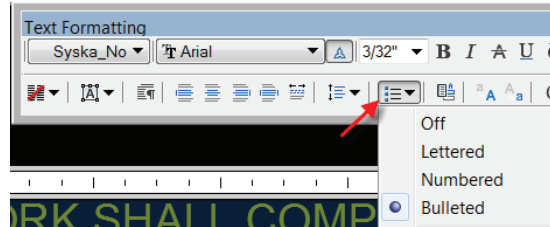
AutoCAD   Revit

To fix, replace the Qleaders with Mleaders or, change the Qleader to **non-annotative**:

THE FOLLOWING ELEMENTS WILL DISPLAY WHEN IMPORTED IN REVIT:

1. FIELDS will import as regular text.

2. Splines will import.

3. Dimensions will import, but they will become exploded once the CAD drawing gets exploded.

4. Attributes, Blocks, and Dynamic Blocks will import.

5. The following Image types will import: BMP, TIF, PNG, and JPG.

6. Bullets in Mtext will import:
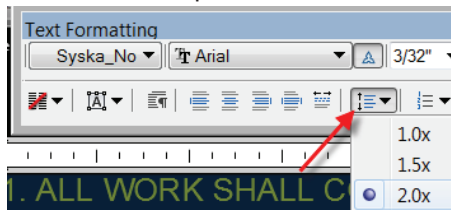

7. AutoCAD tables will import:

THIS IS A TABLE				
1	2	3	4	5
A	B	C	D	E

THE FOLLOWING ELEMENTS WILL <u>NOT</u> DISPLAY WHEN IMPORTED IN REVIT:
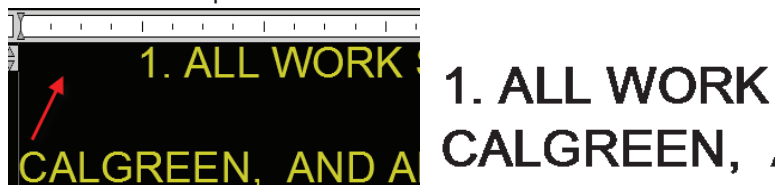
1. Line Types with **Shape Fonts** will not import:

2. Text Mask and Wipeouts will not import.

3. Invisible Attributes will not import.

4. Thickness of Polylines will not import.

5. Line Spacing in Mtext will not import:

6. Tab Spacing in Mtext will not import:

CAD DRAWING MAINTENANCE TIPS:

1. **Audit** the drawing.

2. **Purge** the drawing using vanilla (regular) AutoCAD, <u>not</u> AutoCAD MEP, AutoCAD Architecture or another vertical. It's been noted that using regular Autocad to Purge a drawing reduces the file size by up to 50% compared to the over verticals.

3. **Purge registered applications**; these applications are used to expand AutoCAD's core functionality. They are often not used, so they should be purged to keep the file size small. You can Purge them by typing the following at the command line: **–Purge➔R➔*➔No➔Enter**:

```
Command: -PURGE
Enter type of unused objects to purge
[Blocks/Dimstyles/.../Regapps/All]: R
Enter name(s) to purge : *
Verify each name to be purged? [Yes/No] : N
Deleting registered application "RAK".
Deleting registered application "ACAUTHENVIRON".
Deleting registered application "AcDbDynamicBlockTrueName".
3 registered applications deleted.
```

4. **Save** using vanilla (regular) AutoCAD.