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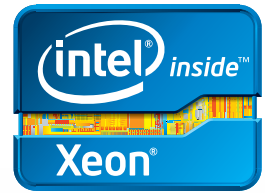
March 2013

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Editor's Note



Hello, *AUGIWorld* readers!

Ever amaze someone with your mad Autodesk skills? I've been a user of AutoCAD for 25+ years and know quite a number of speed demon moves that excel at getting the work done. For example, did you know if you need to get something out of the way graphically so that you can "see" under it, sometimes just erasing it is a great option? Erase it, do what you have to do, and then "oops" it right back.

Just about every product that Autodesk sells has potential for really getting under the software hood. So with this issue our authors hope to share a few tips and few tricks in trade for your time in reading their articles. Here is your chance to see what some of the best users in the industry cared to share with you.

But it doesn't end there. This issue features articles on other topics plus our monthly Inside Track column listing new products coming to the industry. On that note, Erik Lewis is moving on to other things and will be handing off the column to new person. Mark Kiker picked up the March issue column, but I wanted to thank Erik for his efforts over the last few years.

For the cover image this month, Dimitri Harvalias of Vancouver, BC, provided an unusually framed photo of a regional bridge under construction. I can't really explain why this image caught my eye, but it did look a little tricky, so it is well suited for this month's theme.

So what is coming next month? It all depends on what's coming from Autodesk soon...

Take care,

David Harrington

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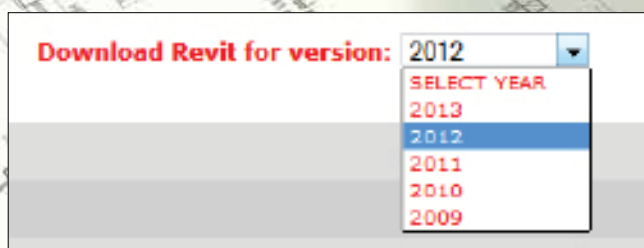
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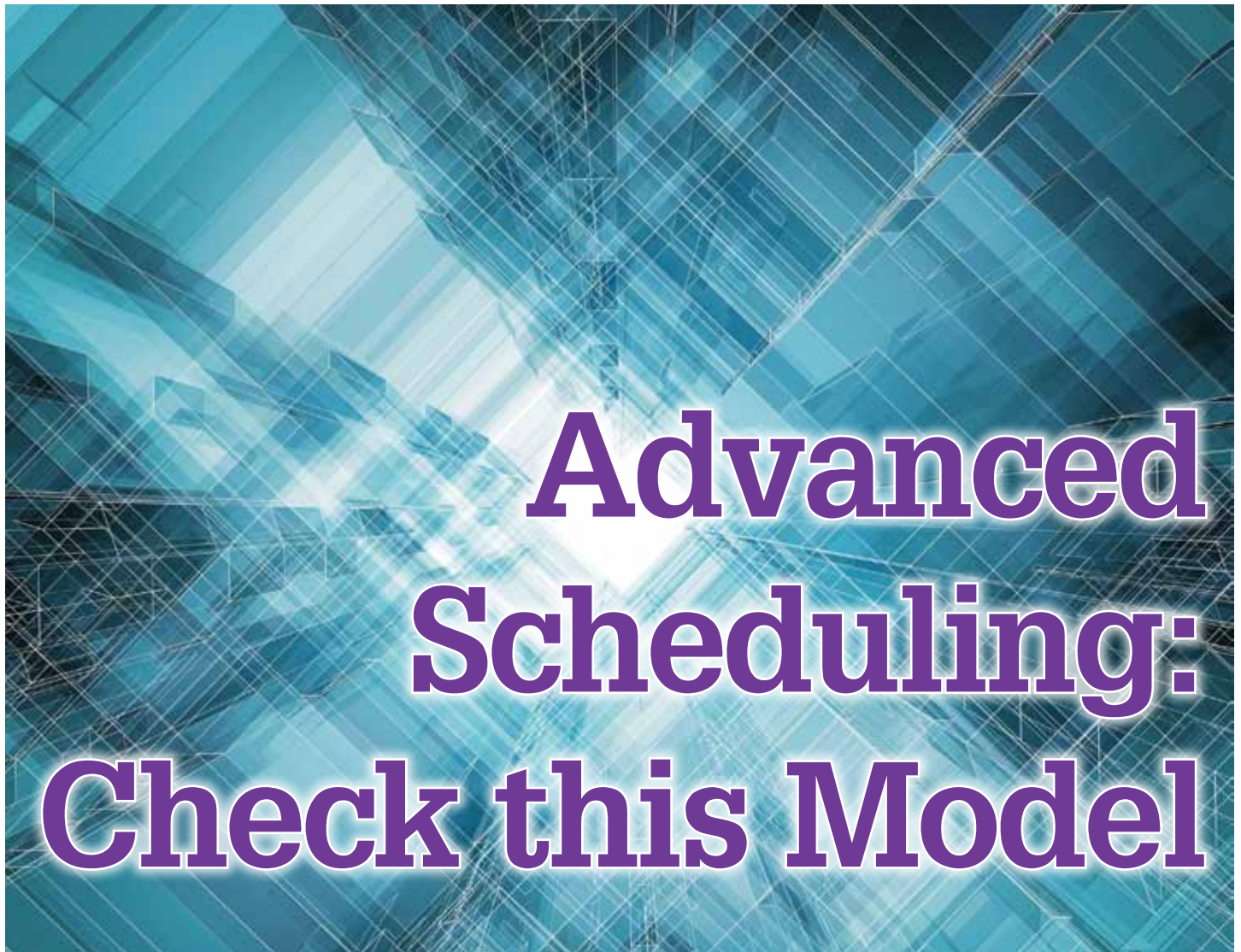
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For the past few months I've been working on the Dutch Revit Standards. Currently the boring framework is all done (which, by the way, led to the IFC articles published in *AUGIWorld*), so now it's time to get on with the good stuff: schedules! Oh, and some Adaptive Components, too.

ENDLESS CAPABILITIES

Something I haven't found in any of the templates, standards, libraries, or any other resource I've seen in the last few years is Rule-Based Model Checking. And I don't mean "why doesn't my foundation show up in a schedule?" kind of Model Checking. I mean the real deal. Does my design meet the Building Code standards for the amount of toilets? Does my bedroom have the legally required width and area? Is the egress width of this fire door big enough compared to the size of the fire compartment(s) adjacent to it? Those are all questions Autodesk® Revit® can answer, if you know how to leverage schedules.

FRAMEWORK

Okay, even with cool stuff like schedules there is some back-end dullness you need to get through. Basically you need to set up some rules to which you can test the design. That's why Revit has Key Schedules.

S:\99\01_KS_BB_building uses			
Primary use of a building	IS residential	m2/person	Min m2 occupied area
cell function	<input type="checkbox"/>	0.05	0
cell function, area for visitors	<input type="checkbox"/>	0.125	0
commercial function	<input type="checkbox"/>	0	0
educational function	<input type="checkbox"/>	0.125	0
gathering function	<input type="checkbox"/>	0.125	0
gathering function, with the purpose of viewing sportmatches	<input type="checkbox"/>	0.3	0
healthcare function	<input type="checkbox"/>	0.05	0
healthcare function, with bedding	<input type="checkbox"/>	0.125	0
industrial function	<input type="checkbox"/>	0	0
industrial function, not occupied by people	<input type="checkbox"/>	0	0
lodging function	<input type="checkbox"/>	0.05	0
lodging function, in a lodging building	<input type="checkbox"/>	0.05	0
office	<input type="checkbox"/>	0.05	0
other functional	<input type="checkbox"/>	0	0
residential function	<input checked="" type="checkbox"/>	0	18
residential function, in mobile home	<input checked="" type="checkbox"/>	0	18
residential function, in residential building	<input checked="" type="checkbox"/>	0	18
sports function	<input type="checkbox"/>	0	0
structure, not being a building	<input type="checkbox"/>	0	0

Figure 1: Key schedule to identify the primary use of (part of) a building.

The first thing I did was analyze the Dutch building codes. It has a very simple setup for all regulations (from fire safety to the height of a stair thread).

1. All regulations are performance based, which means there's a minimum/maximum set. This is great, because you can use those to validate your design.
2. All regulations are differentiated to the primary use of a building (part), such as Residential, Office, Medical, and so on.
3. Further differentiation depends on the primary use of a room: is it a bathroom, toilet, closet, or meant for people to reside in, and the number of people a room is intended for.

So the next thing I did was set up Key Schedules defining all possible uses of a building (see Figure 1). However, this left me with a problem: you can create only one Key Schedule for a certain Category. But the Dutch building codes are based on two distinct features: the overall usage of a building and the use of a single room. A large portion of the regulation is based upon combining those two. At first I just added more Key Names such as Office Building, toilet, Office Building, hallway, Office Building, elevator shaft, and so on. Given the fact that we have 19 or so building usages, each containing 17 different room types, that soon became a giant mess. So I decided that for the DRS I was going to cut the Key Schedule in pieces.

This proved to be a little hard, since you can't do that—until I found this little trick over at AUGI.

1. Create your basic Key Schedule and place it on a sheet.
2. Select it, hit Ctrl+C to copy to clipboard.
3. Close all views containing the Key Schedule.
4. Go to another sheet and hit Ctrl+V to paste. You now have a copy of your Key Schedule which you can use to setup a new Schedule Key (see Figure 2).

Primary use of a Room	IS residing	IS toilet	IS cooker	IS wash	IS joint
bicycle storage					
boiler					
circulation space					
circulation space, joint					
elevator machine					
elevator shaft					
gauger					
residing	✓				
residing, joint	✓				
residing, joint, with cooker	✓		✓		✓
residing, with cooker	✓		✓		
restroom		✓			
storage for household waste					
technical					
unspecified					
washroom				✓	
washroom with toilet		✓		✓	

Figure 2: Second Schedule Key for rooms: use of a single room.

There is a caveat, though. These are two separate Schedule Keys, with different GUIDs. So even if you name them alike, you're still going to have two Schedule Keys in your Room Properties. If you have a Schedule Key with lots and lots of Key Values assigned to it, you're just going to have to make do.

STEP ONE: DOES YOUR DESIGN MATCH YOUR PROGRAM?

So for us, it's customary to start with a Design Program: what's the building for, what rooms do you need, and for how many occupants?

In the DRS this is covered by a schedule with a bunch of non-placed rooms (see Figure 3). This schedule contains parameters for the desired area of a room, the allowed deviation in percents, and the number of people who are going to use it. When creating rooms in your model, instead of just clicking away in Plan View, look at the Options Bar, select the desired Room from the dropdown menu, and place it where it needs to be.

Level	Number	Name	Area	Primary Use	Room Function	Program Area	Max Deviation	Occupancy
Not Placed	3	Gauger	Not Placed	gathering function	gauger	1.00	10%	0
Not Placed	6	Living Roc	Not Placed	residential function	residing	30.00	10%	5
Not Placed	7	Closet	Not Placed	residential function	unspecified	10.00	10%	4
Not Placed	8	Bathroom	Not Placed	residential function	washroom	15.00	10%	0
Not Placed	9	Toilet	Not Placed	residential function	restroom	3.00	10%	0
						0.00		9
peil = 0	1	Washroom	4.31	gathering function	washroom	150.00	10%	2
peil = 0	2	Kitchen	23.00	gathering function	residing, with cooker	25.00	10%	0
peil = 0	4	Music	36.26	gathering function	residing	40.00	10%	20
peil = 0	5	Closet	4.44	gathering function	unspecified	10.00	10%	0
						68.01		22
						68.01		31

Figure 3: Building program schedule.

Placing these rooms fills up a second schedule (which doesn't show Not Placed Rooms by filtering for Areas > 0) that does one thing.

CHECK THE ACTUAL AREA AGAINST THE DESIRED AREA

This is a Yes/No Calculated Value, named CALC_meets program, with a formula that is actually quite straightforward:

$$\text{and}(\text{Area} < (\text{Program Area} + (\text{Program Area} * \text{toegestane afwijking PvE})), \text{Area} > (\text{Program Area} - (\text{Program Area} * \text{toegestane afwijking PvE})))$$

What this does is check whether that Actual Area is within the desired range. To add a text field telling you it's OK or NOT OK, simply add another calculated value that says:

$$\text{if}(\text{CALC_meets program}, \text{"OK"}, \text{"NOT OK"})$$

M(00)01 Controle oppenlaken P+E						
Number	Name	Area	Program Area	Max Deviation	CALC meets program	Area meets Program
1	Washroom	4.31	150.00	10%	No	NOT OK
2	Kitchen	23.00	25.00	10%	Yes	OK
4	Music	36.26	40.00	10%	Yes	OK
5	Closet	4.44	10.00	10%	No	NOT OK
		68.01	225.00			
		68.01	225.00			



Figure 4: Checking program area against actual area.

CHECK THE OCCUPANCY AGAINST THE BUILDING CODE

The second schedule checks the desired occupancy (number of people per room) against building code regulations. Figure 5 shows the regulations of a minimum number of people per square meter of residing room space. For gathering functions, this is 0.125 person (or 8m² per person).

To check this, we need a few things.

1. Is the room a room meant for people to reside in? This is covered in the second Key Schedule, where yes/no parameters are added to specify the kind of room (see Figure 2).
2. Room schedule with the following fields (except some “standard” properties such as name and number):

- **IS_residing** = defines which rooms are residing to base further calculations upon.

- **Program_nr of people** = number of people defined in the Design Program schedule.

- **BC_ppl per m2** = reads Key Schedule 1 for the number of people per m² based on the Building Function.

- **BC_nr of people** = Calculated Value that has the following formula: $IF(IS_residential, roundup((Area / 1 m^2) * BC_ppl \text{ per } m2), 0)$ This function determines whether the Building Code even applies, and if it does, which number of people a room should be designed to handle.

- **Program meets BC** = Calculated value which checks whether the parameter Program_nr of people is not smaller then the parameter BC_nr of people, using the following formula: $if(not(Program_nr \text{ of people} < BC_nr \text{ of people}), "OK", "NOT OK")$

M(00)1 2 aantal personen per ruimte									
Number	Name	Building function	Room Function	Area	IS_residing	Program_nr of people	BC_ppl per m2	BC_nr of people	Program meets BC
1	Washroom	gathering function	washroom	4.31	No	2	0.125	0	OK
2	Kitchen	gathering function	residing, with cooker	23.00	Yes	0	0.125	3	NOT OK
4	Music	gathering function	residing	36.26	Yes	20	0.125	5	OK
5	Closet	gathering function	unspecified	4.44	No	0	0.125	0	OK
				68.01		22		8	

Figure 5: Checking occupancy against building code.

STEP 2: DOING WHAT CAN'T BE DONE

Another big deal in the Dutch building code is the size of certain rooms. A residential unit needs at least 18m² of residing rooms, each being at least 1.8m wide and 5m² in floor area. A toilet has to have a floor area of at least 0.9x1.2m, and so on.

Now I know this can be checked manually. And it can probably be checked by tapping into the API, too. But it's not supposed to be doable in native Revit. Or is it?

Let's just see about that...

To start with: it's good to know that there are several Revit Family Categories that are aware of the room or space in which they are placed. Air Terminals, Furniture (Systems), Specialty Equipment, and Plumbing Fixtures are some of them. Another thing to know about is a special kind of families: Adaptive Components. These families have the ability to flex upon placement in a project and can be used in several Family Categories, one of which is Furniture Systems.

Combining those two together you can create a family that can flex upon placement, adjust to changes in room sizes, and knows which room it's placed in (and most importantly this can be scheduled, too!).

A "SIMPLE" FAMILY

I created a simple Adaptive Component quadrangle which can be placed as a rectangle, square, diamond-shaped form, and so on. Using a few shared reporting parameters that read the length of all sides and the length between the two parallel sides and some IF / AND functions, it's possible to report the smallest width and length of this shape in a schedule using Calculated Values.

Then, you need another shared reporting parameter measuring the length of a diagonal (creating two triangles) and some basic math to calculate the area for any quadrangle shape with non-intersecting sides (which is cool since rooms usually don't have intersecting walls)—see Figure 6.

Now that we have the family reporting all the necessary stuff for size and area, it's time to create some rules. For this article, let's focus on one possible approach: A residential unit needs at least 18m² of rooms for people to reside in, all being at least 1.8m wide and 5m² in floor area.

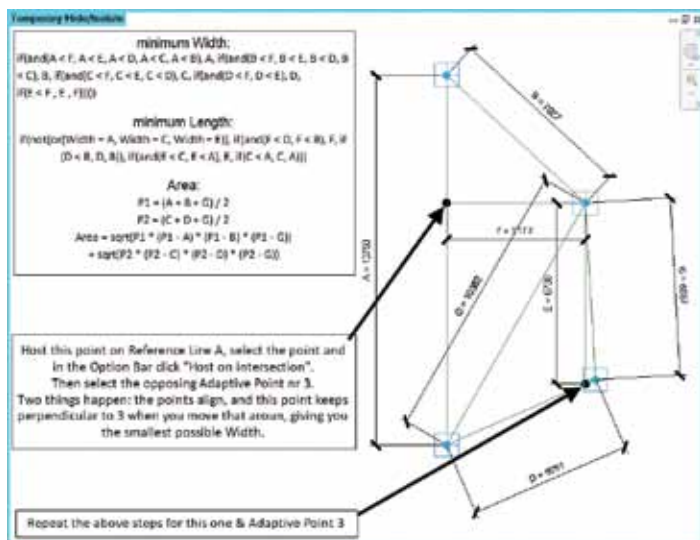


Figure 6: Finding smallest width and length and calculate area.

WHY DID WE WANT TO DO THIS AGAIN?

Can't I just do this with a room schedule? Well, you can come a long way (Figure 7); however, you cannot check for room width using just a room schedule. In this particular example, this means the difference between getting a permit or just having to redo the entire layout.

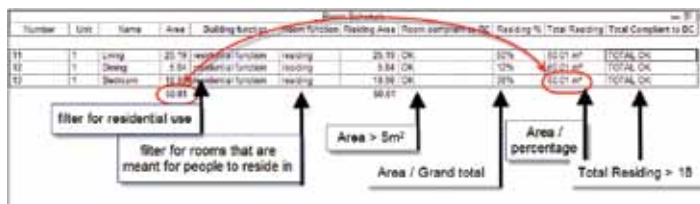


Figure 7: Using a room schedule to check for building code compliance.

CHECKING WIDTH

1. Place the family in the project, in all the rooms you want to check.
2. Create a Furniture Systems schedule with the following fields:
 - Room: Name
 - Room: IS_residential
 - Shared Parameters A, B, C, D, E, F and G from the Furniture Systems Families (you can hide those later on)
 - Calculated Values Width (Length) and Area (Area), using the formulas in Figure 6.

- Maybe add some calculated values to show whether or not this unit complies to the Building Code (see Figure 8).

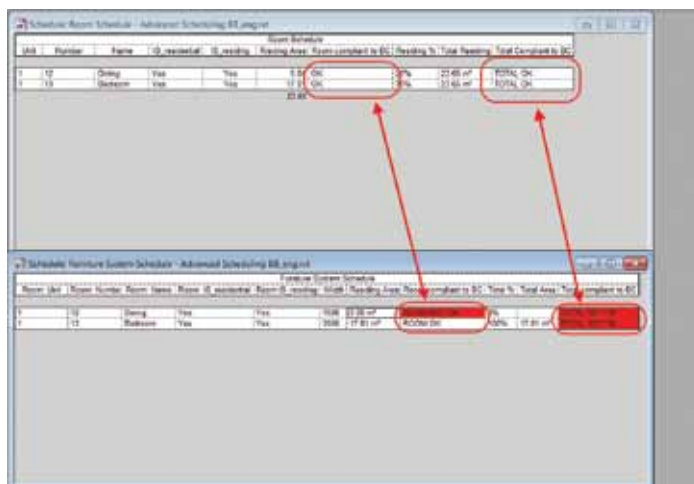


Figure 8: Same check, but now compared to using the Furniture Systems Family.

CONCLUSION

A few short examples in this article show the power of using schedules and helper families that have “special” capabilities.

If you want more examples, find the Dutch Revit Standards on the www.revittg.nl website. This resource has a lot of different model checks incorporated, is completely documented and open for anyone to download and use.

Oh, it is in Dutch, of course. I Google Translated it for this article, so you'd probably get past that, too!



Martijn de Riet is a self-employed BIM Consultant from the Netherlands, working with Revit since version 5.1. Martijn has a bachelor degree in Building Science. After his study he started his own engineering firm working for contractors, architects and private clients. Starting 2007 his company transformed into a full-time BIM consultancy service. At the moment, Martijn's clients vary from mid-sized architectural firms to the largest Dutch general contractor and MEP engineering firms, with a focus on specific corporate solutions, design, and implementations of Revit and BIM workflows. Martijn is a member of the Dutch Revit User Group and currently working on creating a Master Template and library. He provides lectures for companies, technical universities, seminars and such on a regular basis.

Tools & Timesavers

COMMAND LINE

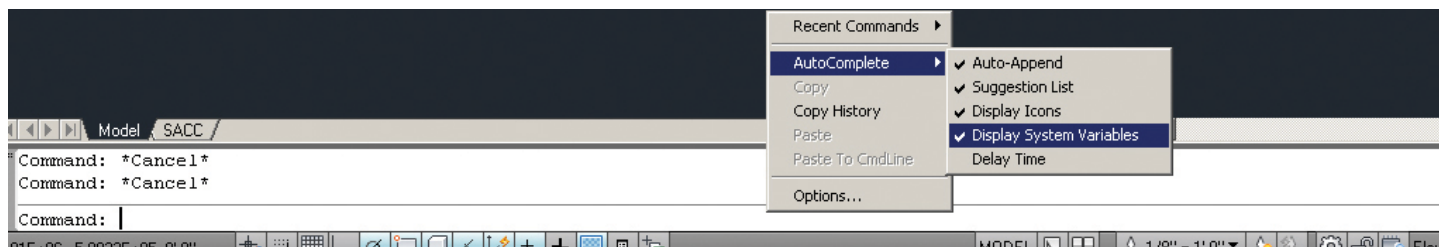


The command line has a few new enhancements, including giving the user more control over transparency and color. If you float the undocked command line above the AutoCAD® Architecture drawing window, you will notice that the semi-transparent prompt history doesn't affect the

drawing area. If you select the new customize tool on the command line, you can control the number of lines of prompt history (which displays up to 50 lines) as well as AutoComplete, Transparency, and Options (see Figure 1). If you wish, you can make the command line almost completely transparent so that it will display only when you hover over it. The color of the command line can be changed from the Colors tool, which is found on the Display tab, Options dialog box.



Figure 1: Command line



2: AutoComplete customization

EXPRESS TOOLS

In AutoCAD Architecture 2013, Express Tools are now “real” commands. The NCOPY Express Tools is a core command now. You can now copy nested objects from Xrefs, DGN underlays, and blocks with no need to explode or bind. The Delete Duplicates tool (OVERKILL command) can be used to clean up your drawing and remove any duplicate geometry. OVERKILL settings can be controlled in the dialog box. You can specify which object properties you wish to ignore as well as whether or not to optimize polyline segments or combine co-linear objects. The tolerance value in the dialog box controls the precision by which the command will operate.

ADD SELECTED

If you need to draw an object with the same type and properties of an existing object, you can use the Add Selected tool. This tool differs from the COPY command by duplicating only the general properties of an object. For example, creating an object based on a selected circle adopts the general properties of the circle such as its color and layer, but prompts you for the new circle’s center point and radius. For another example, you can select a polyline, then right-click and click Add Selected. Now AutoCAD Architecture is ready to create another polyline with the same properties. How quick is that!

AUTOCOMPLETE

AutoComplete is the ultimate timesaver for those who like to key in commands. As commands are keyed in, AutoCAD Architecture will automatically complete the entries. If you pause while entering the command, a list of all possible commands and system variables will display, allowing for easy selection. By entering the command AUTOCOMPLETE, you can customize which of the following features are turned on.

- ♦ **Append** – Controls whether commands and system variables are automatically completed as you type.
- ♦ **List** – Controls whether a list of valid commands and system variables is displayed as you type.
- ♦ **Icon** – Controls whether the corresponding icon for a command is displayed in the list. The same icon is used for all system variables.
- ♦ **System variables** – Controls whether system variables are also included with the Append and List features.
- ♦ **Delay** – Sets a time delay in seconds before the Append and List features take effect.
- ♦ **On** – Enables the operation of the AUTOCOMPLETE features that are currently turned on.
- ♦ **Off** – Suppresses the operation of AUTOCOMPLETE features without changing their settings.

At this point, you will notice that the history is now displayed with a gray background color, which can be modified in Options. To obtain the above list of options, you can also right-click on the command line and the AutoComplete list is present (see Figure 2).

AUTODESK CONTENT EXPLORER

Autodesk Content Explorer allows for quick searches of all types of content. This includes blocks, layers, attributes, and styles, among others. The Content Explorer is located on the Plug-ins tab of the ribbon (see Figure 3). It can search through thousands of files instantly, including the Autodesk Seek web service. This allows you to easily add online content from a variety of manufacturers. You can open the source file from Content Explorer or drag content into your current drawing.

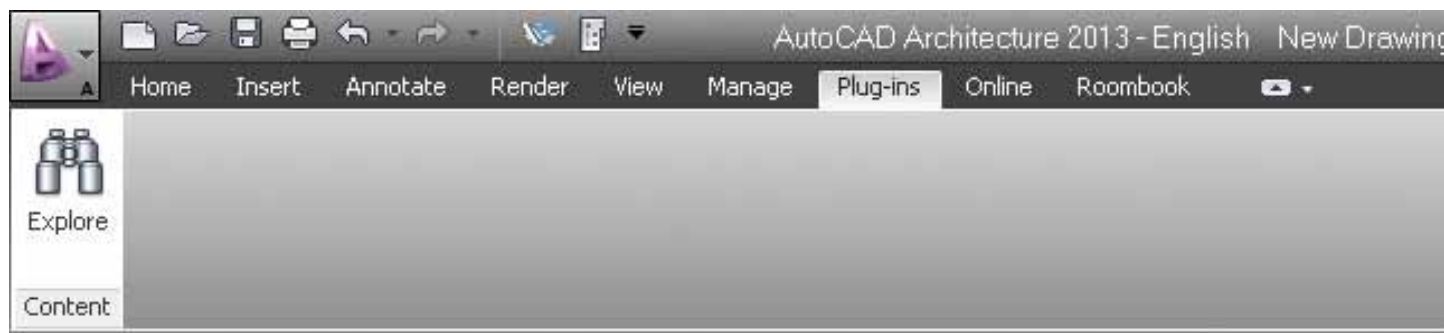


Figure 3: Autodesk Content Explorer

AutoCAD Architecture 2013

One important note is that the Add Network Content option has now changed. It is now a drop-down list named Add Content Provider. In the list, you will see that the option for Autodesk Content Service replaces the previous Add Network Content button. AutoCAD Architecture 2013 includes basic indexing support for any file that can be opened, attached, and imported using AutoCAD Architecture.

MULTIFUNCTIONAL GRIPS

In AutoCAD Architecture 2013, multifunctional grips have been added to many objects. Polylines, for example, have extra grips to make editing much easier. Secondary grips are located at the midpoint of each segment. Using the secondary grips to move a segment is much easier than editing each vertex.

Multifunctional grips can also be found in dimensions and multi-leaders, lines, arc 3D faces, and many more. When you use multifunctional grips with dynamic input turned on, you can edit the object via relevant dimensional values. When you hover the cursor over a quadrant grip with dynamic input enabled, the distances from the center to the quadrants are displayed along the major and minor axes. If you click on the grip, you can edit the values.

ASSOCIATIVE ARRAY

The ARRAY command creates a new array object that is associative by default. An associative array treats the entire array as a single array object, similar to a block. Unlike a block, however, you can still manipulate the individual objects. This makes editing the properties of an array much easier. Editing can be done using multifunctional grips, which is quick and easy. You can edit individual items within the array by using the Ctrl key. If you find that you have made errors in your edit, the Reset tool returns the items to their default size and position and you can begin again. You can use the new Replace Item tool to replace selected instances with other objects.

There are three types of associative arrays: rectangular, polar, and path option. Rectangular arrays are automatically displayed in a 3-row by 4-column grid. Polar arrays are displayed in a full circular pattern of 6. Associative arrays can be 2D or 3D. 3D associative arrays are very powerful in AutoCAD Architecture. You can indicate the number of items needed in the Z direction and specify the distance between levels. It is important to note that the distance of 0 between levels would create each row at the same elevation. The visual preview provided by AutoCAD Architecture makes it easy to get your array right the first time around.

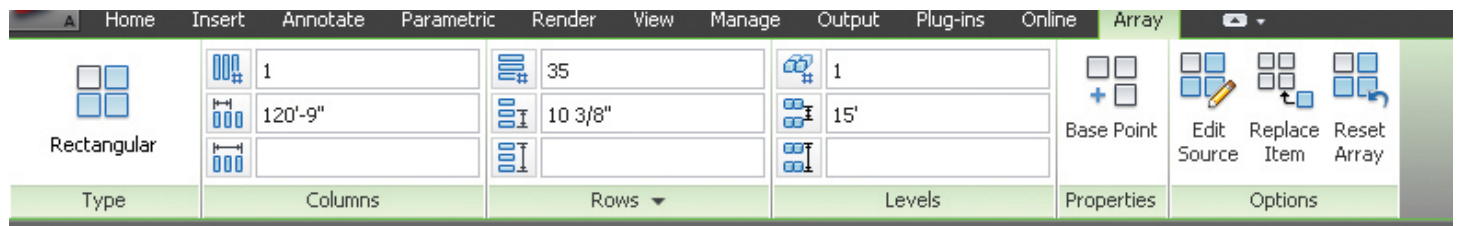


Figure 4: Array toolbar

3D UCS

In AutoCAD Architecture 2013, the UCS icon can be directly manipulated using multifunctional grips. You can now easily move and align the origin with objects, including solids and curved surfaces. Begin by selecting the UCS icon. As you hover over the grips, various menus appear. If you right-click on the UCS icon, additional controls appear. In the UCS command, the UCS icon displays a dynamic preview. UCS icon selectability can be controlled in the UCS dialog box, which is found on the Coordinates panel, View ribbon tab in the 3D Modeling workspace.

RENOVATION

The Renovation tool in AutoCAD Architecture 2013 is intended to make completion of renovation projects easier for the user. You can easily identify objects and associate them with different phases of a renovation project. In one drawing, you can show existing, demolished, and new construction! This allows you to avoid errors that are typically caused by editing multiple drawings.

When you begin Renovation mode, the existing category is assigned to existing objects. If objects are deleted, they are assigned to the demo category. For example, moving a door will create both a new door as well as a demo door along with the corresponding wall openings.

In the display configuration for Renovation, objects are displayed according to their display representation. Within this display configuration, Existing, New object, and Demolished categories are specified. They can be viewed in plan, elevation, and section displays.

The first time Renovation mode is activated, a specific Renovation display configuration is created. To do this, click the Manage tab of the ribbon, Style & Display panel, Renovation Mode. This brings up a dialog box that allows you to give a name to the new display configuration. You can select the Options button to change settings using the Display, Layers, and Styles, Blocks and Materials tabs. Click OK and you are now working in Renovation mode.

POINT CLOUDS

Point clouds created from 3D scanning devices can be attached and displayed. Point clouds are great for streamlining time-consuming restoration and renovation projects. They are attached similar to other reference files through the External Reference Manager and support up to two billion points.

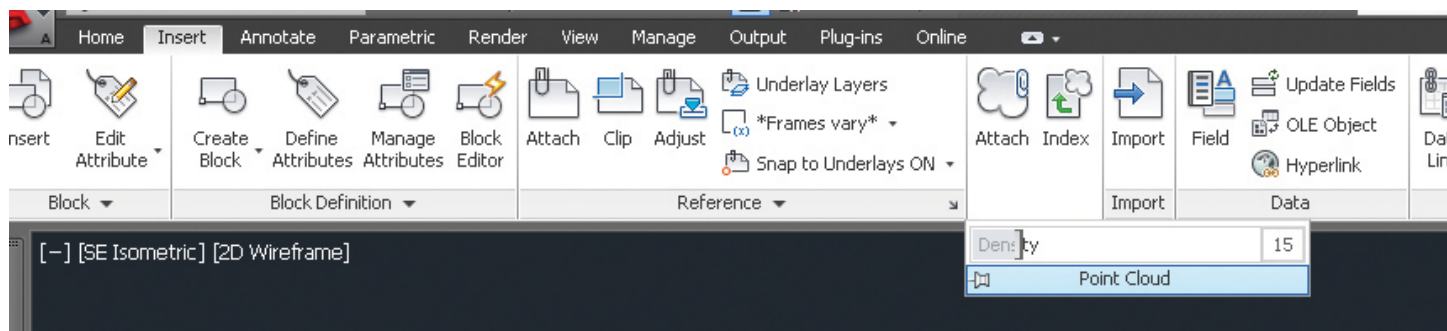


Figure 5: Point Cloud Density

The Attach Point Cloud dialog box now provides you with a preview and more detailed information than before. You can quickly visualize and snap to the surface of your scanned objects directly within your modeling workspace. It is a good idea to lock down the point clouds so the points don't move.

AutoCAD Architecture 2013 has an improved indexing algorithm. This allows for optimized viewing when changing zoom levels and keeps you from waiting as long for the drawing to refresh. The point density can be adjusted using the Density slider bar for better performance (see Figure 5). A new bounding box will appear when you select a point cloud, which makes it easier to visualize its position in 3D space. There is now a new Point Cloud ribbon tab that appears with all the necessary Point Cloud tools when one is selected. If intensity data is included, you can now use the analysis tools to view point intensity with different color schemes. In addition, you can now clip a point cloud, which can be very useful.

Indexing now provides a noticeably faster and smoother workflow. The new Create Point Cloud File dialog box allows you to select multiple files that you can batch index and also merge into a single file. Point Cloud indexing has been significantly improved, especially when working with raw scan files.

CUSTOM GRIDS

Creating Custom Grids allows you to define several aspects that were not previously user defined. With this tool, you can define different numbers of grid lines for each side of the grid. This means you can create column grids where one or more column lines are not required to be across the entire building as a single object.

While labeling the grid, you may use primary and secondary numbering. This allows you to add grid lines with a secondary numbering sequence during the grid creation. You can also add them later, if you desire. This feature reduces the need for you to convert linework and also eliminates having to tag each of your column lines individually.

Several properties can be controlled with the Custom Grid tool. Some of these properties are:

- Number of grid lines
- Inner grid radius
- Prefixes for grid labels
- Grid label numbering/lettering scheme
- Clockwise and counter-clockwise grid direction
- Orthogonal or radial grid shape

With the Custom Grid tool, there are many more possibilities for time saving. What a great productivity tool!

CONCLUSION

There are many tips and tricks for AutoCAD Architecture and this article provides just a few. Begin by practicing with these and explore to see what all they can do beyond what I have written. Then explore the many others that are out there. The greatest way to learn is to delve into the software and play around. Remember, there is always the Escape button! Now, on your mark, get set, explore!!






Melinda Heavrin is a CAD Coordinator & Facility Planner for Norton Healthcare in Louisville, Kentucky. She has been using AutoCAD Architecture since release 2000. Melinda can be reached for comments and questions at melinda.heavrin@nortonhealthcare.org



Revit Content That Works

 Too often Autodesk® Revit® content is viewed as not much more than a 3D CAD block. Much time is wasted scavenging the Internet in hopes of finding a family that never quite suits its intended purpose. It doesn't have to be this way. By investing a little time and thought there will never be a need to download again. Custom Revit content can be developed that meets specific design criteria, reduces repetitive tasks, and fully leverages Revit's automated tagging and scheduling features.

Let's use a standard floor poke-thru as an example. What is the advantage to building a custom family in-house versus using one that has been obtained from a third-party site? Downloaded versions likely are nothing more than the housing of the poke-thru. This is adequate for reserving real estate early in the design process. It does nothing to address the additional views in which it may appear, or scheduling.

The thing with an item such as a poke-thru is that it is an assembly of various components, possibly from multiple manufacturers, that

need to be specified. These items that aren't being accounted for are equally important. Quite often there can be several different configurations of the same model poke-thru in a job. Capturing this information correctly is critical.

For a new Revit user, the approach would most likely be to place the device on the floor plan and tag it as usual, then import an existing 2D detail into the Revit model and edit it manually. This approach not only creates extra work, it also ignores the scheduling and tagging features at which Revit excels. Editing tags manually always leaves an open window to error that Revit can eliminate. By creating a family of nested sub-components, all the information is placed directly into the model with the family and then extracted into different views as needed—just as Revit is intended to work. Doing this creates a truly integrated workflow.

In the standard 1/8" plan view there are three poke-thrus (see Figure 1)—all of the same make and model. Graphically they are all represented as a double circle.

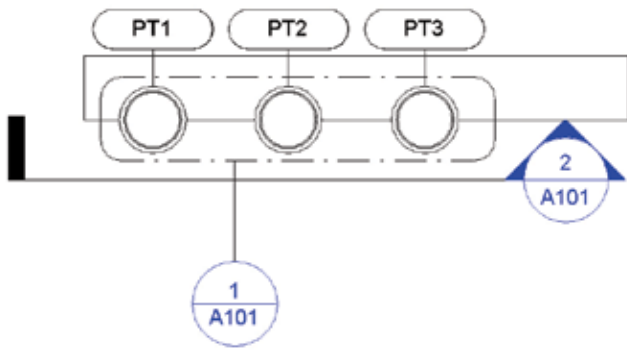


Figure 1

From cutting a section view, it's pretty apparent on the outside that they are all the same (see Figure 2). The only difference is that the one on the left (PT1) is rotated 180 degrees. However, the Revit tags are reading them as unique objects (PT1, PT2, and PT3) in plan and section views.

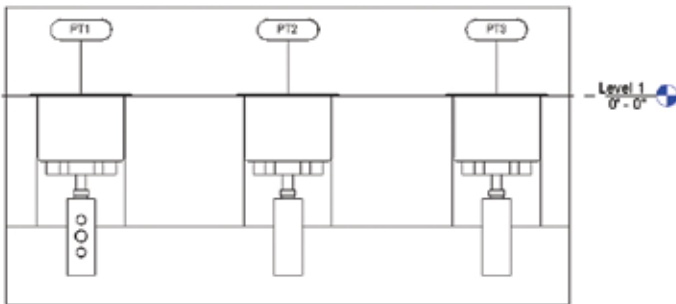


Figure 2

Making a detail view to be placed on the details sheet will show what qualifies them to be tagged differently. This is done by creating a callout and dropping the view range several inches below the surface to see inside.

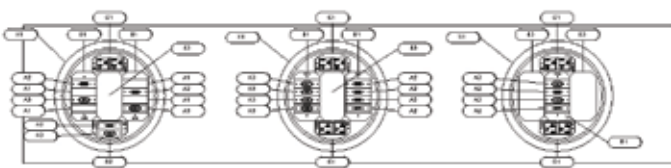


Figure 3

The detail view in Figure 3 shows that all three devices contain HDMI, VGA, and duplex inserts, in three distinct configurations. All of these pieces need to be accounted for and appear in a schedule or BOM. For the demo here, there is a very limited scope on the devices and types of inserts being used, so it isn't too hard to figure out specifics.

Dealing with a live project where there can be a wide variety of inserts used, possibly in different models of poke-thrus and in larger numbers, it can be difficult to keep track of. By using this nested component family, Revit is now keeping track of everything (see Figure 4).

Type Mark	Family and Type	Description	Model	Description	Count
PT1	...PokeThru_Rotated			POKE THRU ASSEMBLY 1	1
PT2	...PokeThru_Rotated			POKE THRU ASSEMBLY 2	1
PT3	...PokeThru_Rotated			POKE THRU ASSEMBLY 3	1
A1	C.CastPokeThru_Base BLANK PLATE - 200X4	012	100	BLANK PLATE	4
A2	C.CastPokeThru_Base_HSS	012	101	HSS	6
A3	C.CastPokeThru_VISA_VISA	012	102	VISA	6
A4	C.CastPokeThru_VISA_VISA_ADAPTER_MOUNTING_PLATE - 200X4	012	200	MOUNTING PLATE	1
B1	C.CastPokeThru_VISA_VISA_ADAPTER_MOUNTING_PLATE - 200X4	012	201	VISA MOUNTING PLATE	1
B2	C.CastPokeThru_VISA_VISA_ADAPTER_MOUNTING_PLATE - 200X4	012	202	BLANKING PLATE	6
C1	C.CastPokeThru_VISA_VISA_ADAPTER_MOUNTING_PLATE - 200X4	012	300	27 AMP DUPLEX RECEPTACLE	6
C2	C.CastPokeThru_VISA_VISA_ADAPTER_MOUNTING_PLATE - 200X4	012	301	POKE THRU HOUSING	1

Figure 4

Placing one instance of each unique poke-thru family in the model is all that is needed to cut consistent, integrated plan, section, detail, and schedule views. Nothing is ever drawn, saving time. The only manual editing needed is for populating the initial parameter information (Type Mark, Description) for the family. This can be done easily in the schedule. It is just as easy to make edits in the schedules as it is in a spreadsheet. The need to draw an elevation, draw a detail, insert a spreadsheet/schedule, or manually edit the tags has now been eliminated. Any edits made in one view will automatically update in the other corresponding views.

So how can families that make our lives easier and recoup the investment on Revit be designed?

Diagram: Before modeling anything, lay out a basic assembly diagram (Figure 5, PT1). This will help with thinking through how the pieces will fit together in the finished family, and how to build the individual components. While the individual poke-thru pieces are simple, it took some trial and error to determine the correct sequence. Most items likely won't require quite this level of coordination to construct.



Figure 5

Name: How the individual components and finished family are named is very important. When the family is inserted into the project it will show up in the Project Browser under the Families menu. All of the nested sub-components will also show up there as objects that could inadvertently be inserted into the model individually. The naming scheme should identify these items in a way that will tell the user they are part of a greater assembly, and not to be placed on their own in the model.

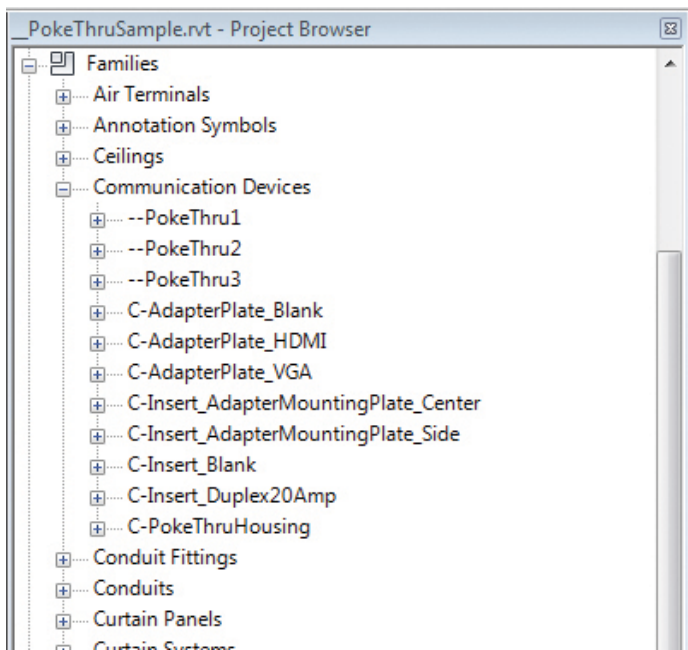


Figure 6

For the demonstration, a “C” at the beginning of a name is used to identify a sub-component (see Figure 6). Notice that the poke-thru housing is considered a sub-component. Find a variation on this theme that is compatible with the established naming convention.

Model: There are always multiple ways one can extrude and create Revit content. The individual components need to be created based on how they will be assembled in the finished family. Give some thought to what direction the extrusions will be created (bottom up, left to right, and so on) and determine the correct origin point for easy insertion.

The duplex receptacle in the sample was created from one side out so it will line up correctly to the pieces next to it. Had it been built with the insertion point dead center, positioning it correctly would be difficult. To ensure that the sub-components can be placed quickly and accurately, reference lines are built in as snap points. Be sure all components are face-based families as the face they will be hosting to is each other. All component families should be set to the same Family Category. If this isn't done, items won't schedule properly and it will not be possible to automatically swap out components.

Detail: One of the most difficult discussions pertaining to Revit content is how much detail to model. There is no one right answer. Different stakeholders require different sets of information from the same items in order to complete their work. The philosophy applied here is that an object should be modeled to a level of detail that allows it to be identified visually by a non-technical person (the person writing the check).

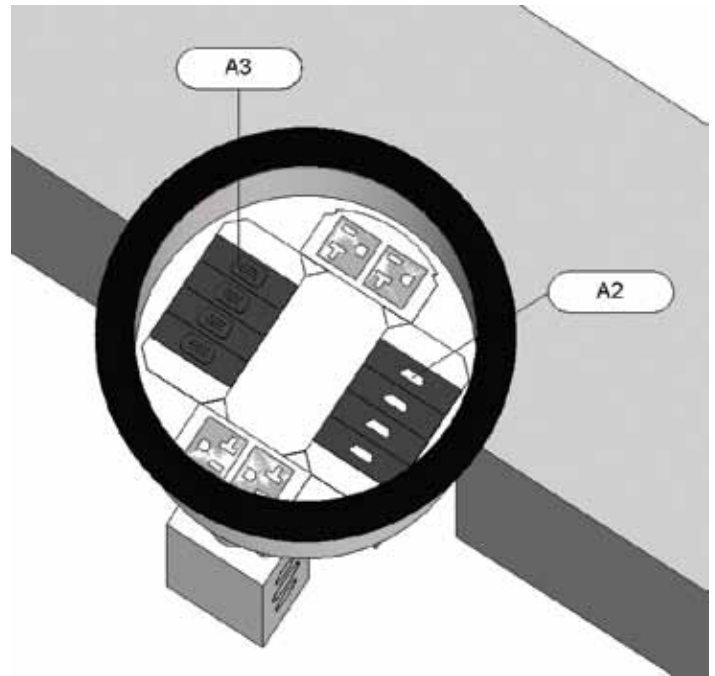


Figure 7

In the case of the poke-thru, the client should be able to view a model of the exciting new space, and when they see the device on the floor say, “That’s the thing where I plug in my laptop to do a presentation. I understand.” (Figure 7) Accomplishing this took only a few basic extrusions and revolves. There were three critical dimensions to capture per manufacturers spec—the overall diameter, the core diameter, and the overall depth. Even with that covered, it is still basic in appearance.

To capture the view placed on the detail sheets requires a different approach. Those HDMI and VGA inserts may be tiny, but they do have a lot of detail. All that detail could be modeled. It would take a considerable amount of time and likely lead to a crashed model. Instead, a very basic model of the insert is created.



Figure 8

An iso view (Figure 8) shows that the HDMI insert consists of two basic extrusions and one void extrusion. Revit will hardly even notice it's there. To present a heightened level of detail, create and insert a 2D detail component. Detail components only show up in the view in which they are placed (see Figure 9). For all the inserts, they have been put into the plan view. Notice that it doesn't show up in the iso view even though it is part of the family.

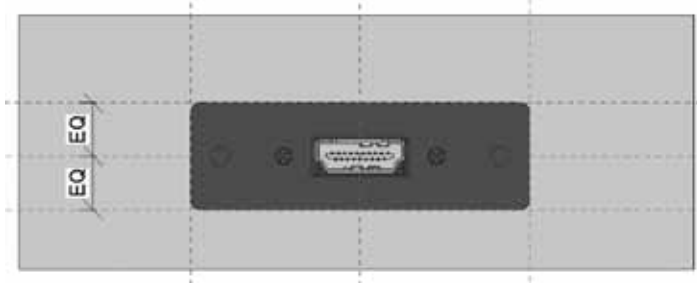


Figure 9

Because detail components are only lines, the memory they take is nominal. As an added bonus they served as a template here for creating the extrusions, which saved a few minutes.

Schedule and Parameter: The sample schedule is pretty basic. It shows the various components in the model, the nomenclature used to identify each component, overall count totals, manufacturer, and model number. This may be all that is required. By tagging items in a different manner and adjusting the scheduling filters, a schedule could be created that tells us what exact items are in each poke-thru family, or each poke-thru by space.

This could be very useful on a large project where there are many unique configurations to be located and assembled. If it doesn't exist already, a shared parameter can be created for any piece of information that needs to be scheduled or tracked. Don't think of this just in terms of what is placed on the issued sheets. It is very useful to have "work" schedules in a project that can monitor what is going on in the model, or provide a reality check. All schedules can be made part of a project template so at the beginning of a new job they are already in place. All that is required is to look at them.

Miscellaneous: Other features that could be added to this family might be a void extrusion to cut the core. Do this first, before inserting any sub-components into the new family. It doesn't appear to work on linked models, though. When the family is completely assembled, add conduit connectors. If this is being used in the same model in which electrical is working, add a connector to the duplex so it can be circuited. If desired a lid can be added and given a yes/no parameter to control visibility. Beyond that the sky is the limit. What does the job require? (Figure 10)



Figure 10

Like all other design software, Revit is nothing more than a blank slate. Its custom content editor opens a new world of design possibilities and the flexibility to create. Making use of these features is key to getting the maximum return from the software. By learning to work with Revit, Revit will work for you.



Andrew Baranowski has the best of both worlds. Working at ESD, the largest MEP consultancy in Chicago, he is heavily focused on developing Revit processes and creating custom content for the low-voltage department, while anchored with the AV team as a CTS. Since 2009 he has championed Revit's benefits, and worked through its frustrations to find the greatest ROI for the team. As a member of the NIBS-BSA he serves on the Product Development sub-committee for V3.0 of the US National BIM Standard. In a former life he spent seven years in the Chicago Carpenters Union as a Journeyman Cabinetmaker, designed plastic components for a global manufacturer of office supplies, and received a Bachelors degree in Arts Management from Columbia College Chicago. Contact him at abaranski@esdglobal.com

Tips from the Dork Side



Working in Facilities Engineering means that I am consuming much more information with AutoCAD® than I am creating. So, I would like to walk you through some selection and navigation methods I am fond of, and there is even a little homework assignment for you at the end of the article.

JUST FOR REFERENCE

Do you need to re-path xrefs for a large number of drawings? A quick and easy way to accomplish this is by using the Reference Manager application. Go to your Windows Start menu, click Pro-

grams, then Autodesk, then AutoCAD, and you'll find the Reference Manager application. Click the Add Drawings button, and the program will show you the data for each selected drawing. Once you select the necessary attachments, you'll be able to edit a path or perform a Find and Replace on them.

COME ON, BABY, LET'S DVIEW TWIST

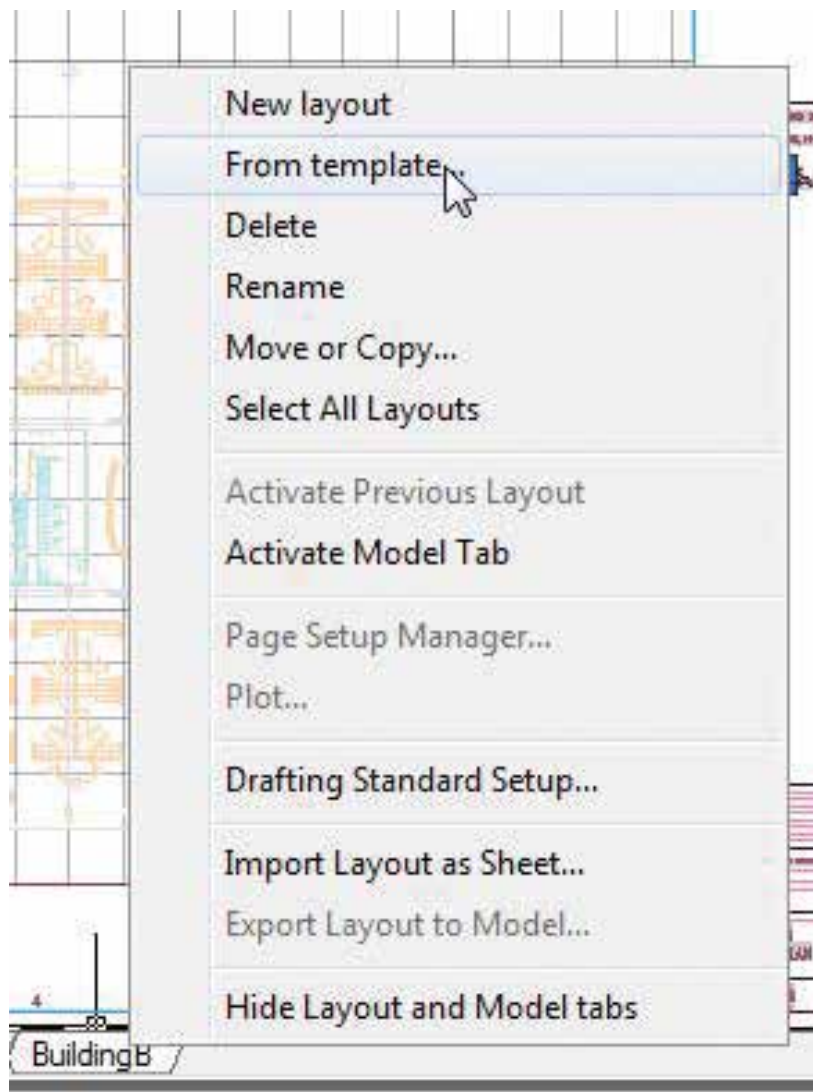
Buildings are never built perfectly in line with magnetic north, or with each other. My campus's plan is accurate in direction, but that means when I want to print out a floor plan for just one of the buildings, they will not appear straight on the plot. I set up layouts for each of the buildings, so that I can print them 'straight.'

```
Enter option
[CAmera/TARget/Distance/POints/PAn/Zoom/TWist/CLip/Hide/Off/Undo]: tw
Specify view twist angle <6.88>:
```

Pull up a layout tab and click into the viewport, zooming into your preferred area. Type DVIEW and select an object. You will be prompted to select from different available options. Type TW for the twist option, then rotate the view for best fit, without having moved the modelspace entities at all.

LAY IT ALL OUT

After I set up these layouts for each building on that floor, I want to import the layouts into the drawing for another level. Open up your next drawing and just right-click on a Layout tab and select From Template..., change the Files of Type selection to .dwg, and select the drawing in which you just set up your layouts. You will be able to select one or more of the layouts available in the drawing you are using as your template.



You can also import layouts into other drawings by using Design Center, although this will not bring along their Page Setups. Go to the Output tab of the ribbon and click the Page Setup Manager to import from there, if needed.

SELECTION SELECTION

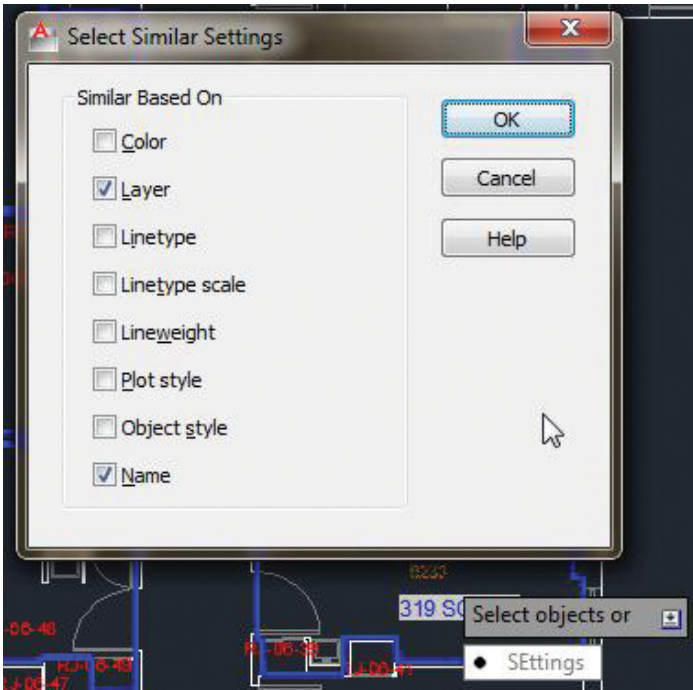
There are a few different ways to go about selecting entities to examine or modify, depending on your specific needs at the time. If you were to select every single entity in a drawing, when you bring up the Properties palette you would notice that some properties are not available for editing. That is because different entity types do not all have the same properties. You have to filter out dissimilar entities so you can access the controls you need. The following paragraphs contain four different ways to create selection sets. Select your favorite!



One of the easier ways to get a group of objects together for mass editing is through the Isolate command, available on the Layers panel of the Home tab. You select an object or objects on the layers you want to see, and this command will hide the remainder of the layers for you. You can also start and reverse the command by typing in LAYISO and LAYUNISO.

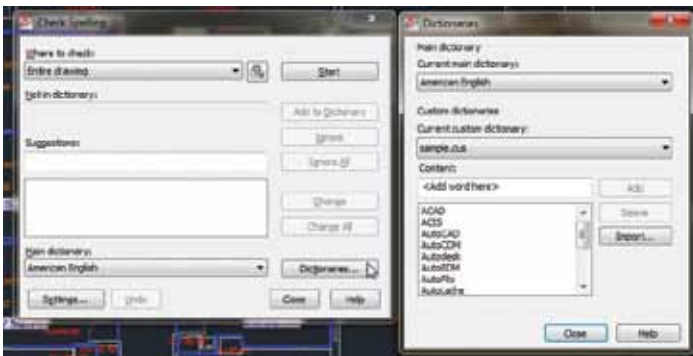
A more precise method for selecting objects is Quick Select. You can find this command on your right-click menu, on the top of the Properties palette, or by typing QSELECT. In the command's dialog box, you see that you've got a couple more options to get more specific in your object selection. You can control what portion of your drawing the selection will draw from, which types of entities are included in your selection set, which properties the desired objects have, and what values you want to include or exclude. Say I want to grab all Polyline entities whose layer color is <> not equal to BYLAYER. I might not want to grab all entities in the drawing and set them all to bylayer because I might have some annotation in the drawing that needs to remain a distinct color for some temporary reason. Or, perhaps I want to grab all Text on layer A-Rm-Num that is less than 9" tall. I can quickly and easily do that here.

If you use the Filter command, bringing up the Object Selection Filters dialog, you see how precise you can be in selecting objects, and you can even save the filter criteria for future use.



Another, more recent addition is the Select Similar command. It has been available in vertical products for many years, and I was thrilled when it was finally added to vanilla AutoCAD. *If you're using release 2010 or earlier, you can find LISP routines which will provide this functionality. There is code available in the AUGI Forums and on my Mistress of the Dorkness blog, along with instructions on adding it to your right-click menu.* I like the way it works—as part of your shortcut menu—because you don't have to interrupt your workflow by using a dialog box or moving out of the drawing area to click a button. Type SELECTSIMILAR then SE to access the Select Similar Settings dialog box and dictate by which criteria you prefer to gather your selection.

SPEEL CHOCKER

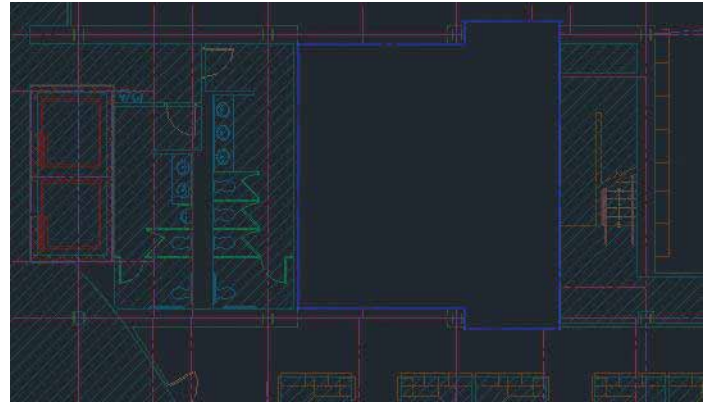


We all need spell checking at times, let's face it. Pull up the SPELL command by clicking Check Spelling on the Text panel of the Annotate tab. The default dictionary might be fine for most uses, but you can also make your clients happy by clicking the Dictionaries... button and adding custom words. I'm serious here, take a couple of seconds to input a company (or building or occupant) name correctly in your dictionary (e.g., Shoenberg) so you can check consistency and ensure that your client does not get irritated by seeing

your drawing set with numerous incorrect variations. While spelling has little to do with the quality and value of the design that gets built in the field, it does display professionalism and attention to detail.

SNIP SNIP

Working in a large hospital, our projects are a pretty small part of each massive floor plate, so we use the XCLIP command quite a bit to omit irrelevant extents of a plan. Did you know that since release 2008, you can invert the clip selection, cutting a hole in your existing plan that you can fill in with new data?



Selecting the xref will bring up the contextual External Reference ribbon tab. Select Create Clipping Boundary, select Invert clip (or type I), then select a polyline boundary or drag a rectangle around the needed area.

PREVENT DOCKING

To move a tool palette out of your way without having it dock on the edge of your screen, simply hold down the Control key while you're moving it and it will remain floating.

FLIGHT OF THE KEYBOARD NAVIGATOR

If you are old-school like me, you might always keep one hand on the keyboard. I habitually keep a few programs and many drawings open and like to navigate using typed commands:

- Use Alt + Tab to toggle between open files and programs
- Use Ctrl + Tab to toggle between different open AutoCAD files
- Use Ctrl + PgUp & PgDn to toggle between layouts / modelspace – Page Down to move right, Page Up to move left
- Use Ctrl + R to cycle through viewports

VERY VALUABLE VARIABLES

I wish it were a fictional account, but true story, I once saw someone asking a question on a (non-CAD) website about how to bring back their missing File Open/Select File dialog. The reply

was “That stupid thing happens all the time; you have to reinstall AutoCAD.” Imagine my look of horror. I couldn’t post “Just type FILEDIA!” fast enough.

AutoCAD allows so many things to be controlled by System Variables, and it is hard to learn or recall more than a handful of them. I encourage you to poke around the help files and see what some of them do. And, if you’re experiencing weird behavior, just post your question in the AUGI Forums, where you’ll get much better advice from experienced peers about the cause and solution than the poor guy mentioned above.

HAVE YOU TRIED...?

Now for your homework assignment. Here are some system variables you can look up and experiment with:

HPGAPTOL	PUBLISHCOLLATE
IMAGEFRAME	UCSFOLLOW
MAXSORT	VISRETAIN
MTJIGSTRING	XREFTYPE
PEDITACCEPT	

And if you have not used any of the commands in the below list, give them a try:

AECTOACAD	PASTESPEC
APPLOAD	RECOVERALL
ARRAY	RENAME
DIMSPACE	SETBYLAYER
FLATSHOT	SSM
LAYERSTATE	TABLE
LAYMRG	XLIST
MLEADER	

I hope I have shown you something you hadn’t seen yet. If you have some favorite commands and methods of your own, please stop by the AutoCAD Tips and Tricks forum to share.



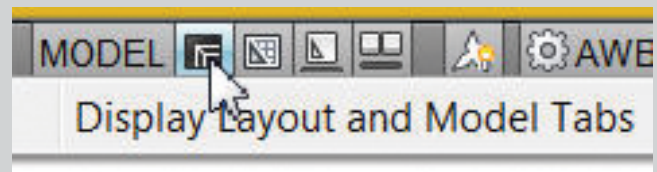
Melanie Perry is a Facilities-Management Coordinator and Technical Editor in St. Louis, Mo. She is the AUGI Salary Survey Manager since 2004 and is currently serving as an Officer on the Board of Directors. Melanie can be reached at mistressofthedorkness@gmail.com or found on Twitter as @MistresDorkness

And Here’s How... To Get Your Layout Tabs Back

Your day can come to a screeching halt if you open a drawing that you know has several layout tabs ... and they’re not there. This usually happens about 4:20 when you’re in a hurry to plot the project and then skeddadle.

SOLUTION

On the Status bar, right after Model/Paper, if the layout tabs are ‘missing’ you’ll see a very dark icon. Some call it the Black Hole; I call it Darth Vader. Either way, it’s only there if the layout tabs are not displayed. Right-click on it, then click the only option available, *Display Layout and Model Tabs*.



INSIGHTS

- Why would you want to turn them off? Consider this: If you were sitting with a customer with your laptop and wanted to eliminate the clutter and get the ‘cleanest’ AutoCAD screen you could, right-click on a Layout tab, then click *Hide Layout and Model tabs*. Use *Ctrl + 9* to eliminate the Command line (that’s a toggle), then *Ctrl + 0* to eliminate the ribbon (that’s a toggle, too). From the drop-down menu at the end of the Quick Access Toolbar you can *Hide Menu Bar*, and voila! You have one lean drawing window ... and the Zoom Extents are really big! Save this condition as a Workspace; mine’s called Nada.
- You can also access the visibility of the Model and Layout tabs from *Options > Display tab > Layout Elements: Display Layout and Model Tabs* checkbox.



Michael E. Beall (B. Arch.) is an Autodesk Authorized Author and the owner of CAD Trainer Guy, LLC. He has been presenting onsite CAD training around the planet for more than 30 years. Contact him at michael.beall@cadtrainerguy.com or give him a call at 502.500.2267.

123D CREATURE



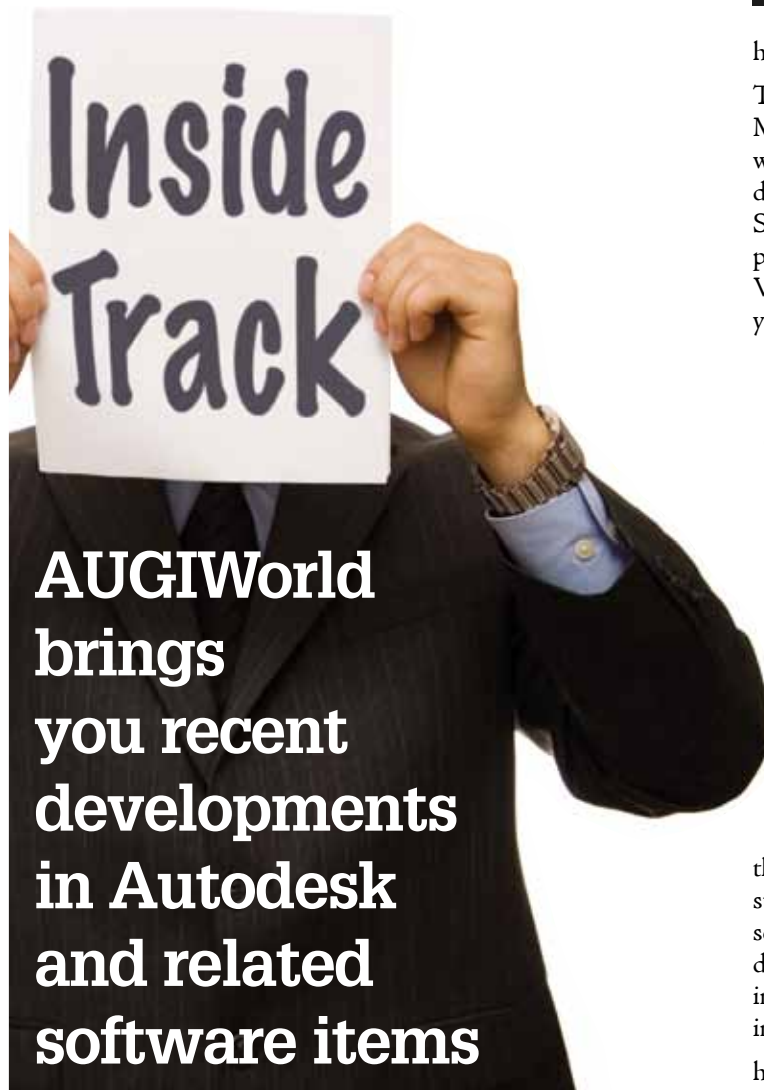
<http://goo.gl/seisZ>

Create 3D characters like a pro with Autodesk® 123D Creature. Design your creature, then sculpt detailed features and paint on skin, fur, feathers, or whatever you imagine. Export your finished creature as an image or 3D model, or have it 3D printed into a real sculpture!



<http://goo.gl/yIWBR>

Axis Communications launched a strong addition to its toolbox for security system designers with the introduction of Axis Camera Families, a collection of 3D surveillance camera models to be used with Autodesk® Revit® software.



**AUGIWorld
brings
you recent
developments
in Autodesk
and related
software items**

Based on direct feedback from the Axis Architecture & Engineering (A&E) community, Axis Camera Families includes detailed metadata required for Building Information Modeling (BIM) such as power requirements and mounting accessories. The camera models created for use in Autodesk Revit 3D CAD building layouts will allow security system designers to interactively visualize camera coverage, select the proper Axis cameras for surveillance needs, and optimize the system layout.



NVIDIA Quadro professional graphics provide leading performance that also lets you easily use the other applications in the AutoCAD® Design Suite—such as Autodesk® 3ds Max®—with complete confidence. This is something integrated just can't handle.

<http://goo.gl/kLUqB>

3DS MAX



<http://www.hdrlightstudio.com>

The new HDR Light Studio 4 Live connection for Autodesk® 3ds Max® with Chaos Group V-Ray allows artists to light their scenes with real-time feedback using V-Ray RT as the ActiveShade renderer and HDR Light Studio's innovative interactive HDR canvas. Sophisticated lighting environments can be created in moments to perfectly light and reflect in your shot. It's a new approach to light V-Ray scenes, seeing the lighting interact with your materials in your final shot.



Vuzix Corporation is now shipping the next generation of its award-winning digital see-through Augmented Reality eyewear, the Wrap 1200AR. This new gen product retains the familiar sunglass style look, now with a wider field of view, adjustable eye separation and other enhanced features not previously available in digital see-through AR eyewear. As a bonus, the Wrap 1200AR includes a free copy of maxReality, an AR content authoring plug-in for Autodesk® 3ds Max®.

<http://goo.gl/CNaUj>

Professional CAD/CAM Workstations



Award Winning Performance, USA Built

@Xi[®] Computer has been building the most performing AutoCAD[®] Workstations for over 20 years. The new Intel[®]Core™ i7 & XEON[®] based, MTower™ & PowerGo™ are no exception. As NVIDIA[®] TPP, we are offering Maximus™ Certified Workstations combining HPC and Visualization power in a single Desktop. Proudly Custom Built in the USA, sided by a superior domestic technical support, Xi Computers are designed to excel and reliably deliver, even in the most demanding computational environments.



MTower PCIe

PowerGo

Mtower 2P64X

- Intel[®] Core™ i5/i7 3570/3770K
- Intel Z77 C.S. USB & PCIe 3.0
- 8GB-DDR3-1866MHz to 32GB
- NVIDIA[®]Quadro[®] 600 1GB Dual
- 120GB SATA6Gb Corsair[®] SSD
- 23.6" 1920x1080 Samsung[®] LED
- Xi[®]MTower Silent Liquid Cooled
- MS Windows[®] 7 Pro[®] -Linux[®]

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- 8GB DDR3 1600MHz to 32GB
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- MS Windows[®] 7 Professional[®]

- Intel Xeon[®]Processor, E5 Series
- 10/20MB L3Cache,C602 Chipset
- 16GB DDR3-1600 ECC to128G
- NVIDIA[®]Quadro[®] K2000 2GB
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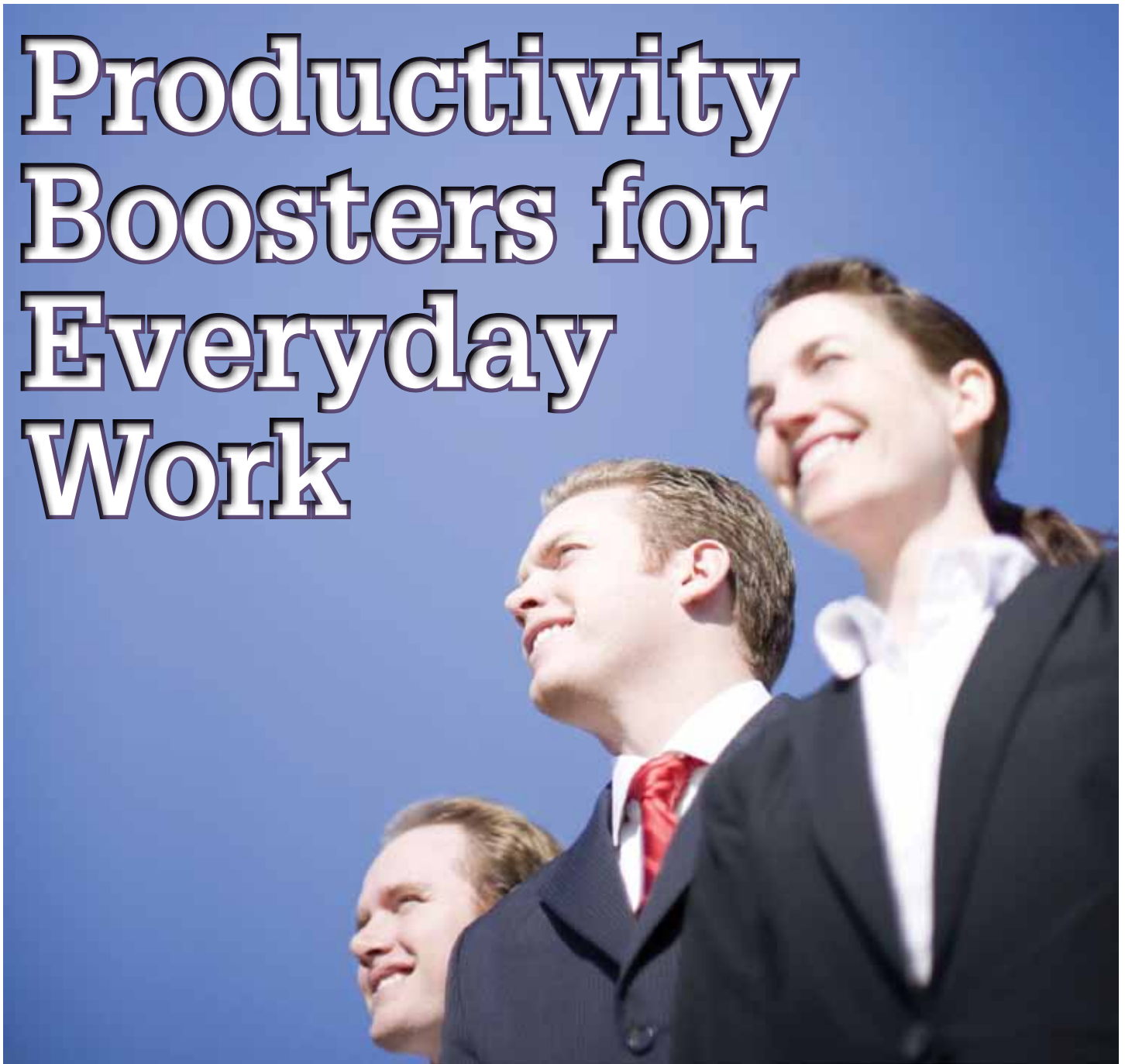
NVIDIA[®] Tesla™ K20/Quadro Desktop HPC NVIDIA[®] MAXIMUS™ TECHNOLOGY Certified NVIDIA[®] GEFORCE™ TITAN Kepler 2 for HPC

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Productivity Boosters for Everyday Work



Tips and tricks are among the most valuable things to know and are always fun to pass along to others. This article includes a variety of tips and tricks that would be a great addition to any Autodesk® Revit® Structure user's daily process.

BRACE FRAME

One useful tip for anyone modeling in steel is to make a slight adjustment to the "L" angles. The out-of-the-box families are set to be modeled from the centroid of the member, which might be

acceptable for some situations but can be problematic for others such as when modeling brace frames. Fortunately, the centroid is simply a parameter that can be changed; these parameter values are named X and Y.

To make this modification, duplicate the size that is needed change the X value to 0. This will model the angle from the edge instead of the centroid. Note that this would not work if the angle had been rotated. I suggest changing both the X and Y values to 0 so it is understood that the pick point is the corner, and neither of the centroid values.

Also make sure to model brace frames the correct direction. Assuming “X” bracing, then the correct direction is modeling from bottom of column up to beam on both sides. This method will model the braces back to back (see Figure 1). Conversely, modeling the braces from bottom of column to beam, then from beam to bottom of column results in the braces facing the same direction (see Figure 2). This is true for “C” channels as well.

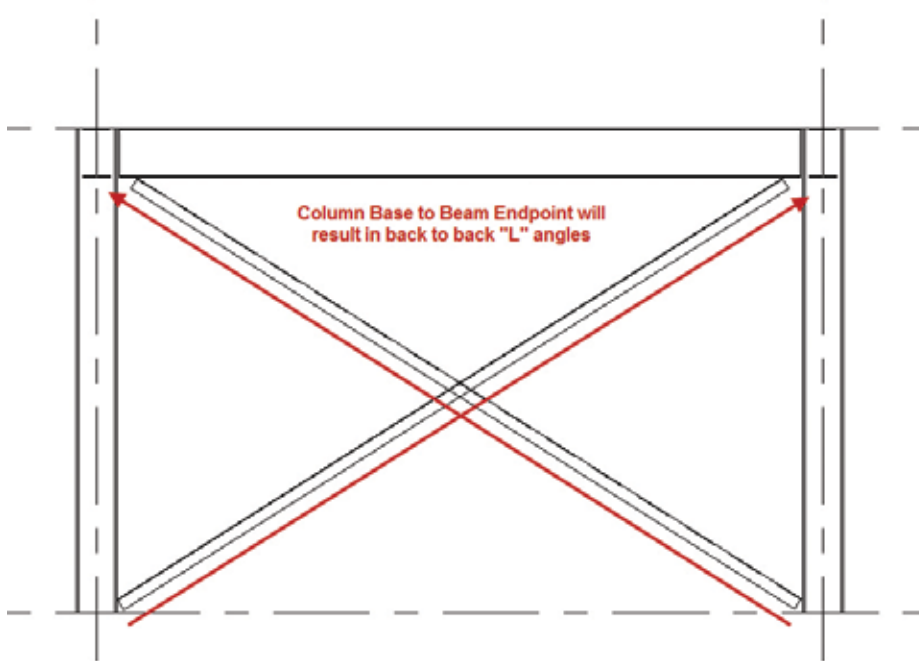


Figure 1

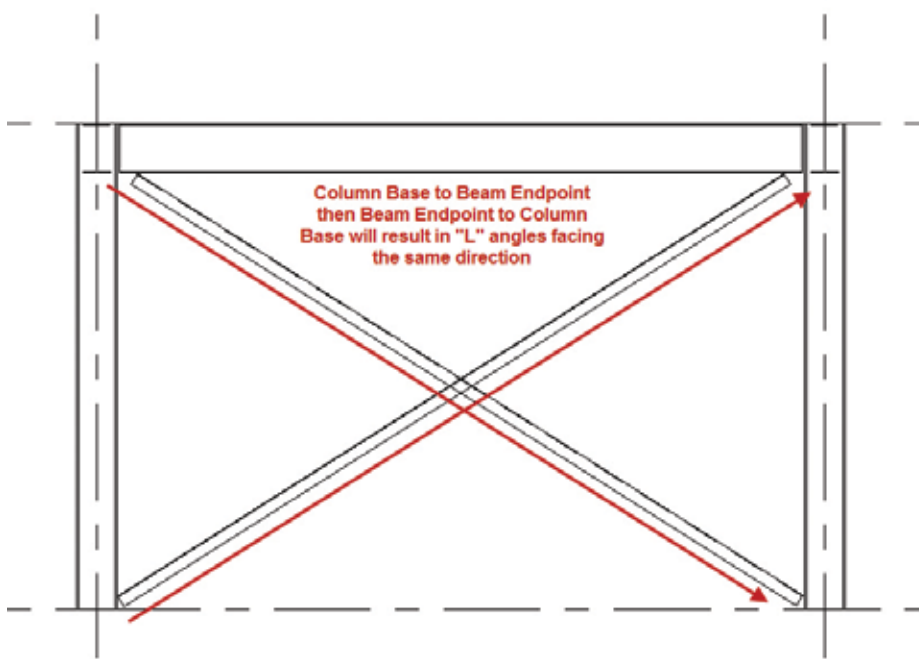


Figure 2

TEMPORARY DIMENSIONS

Frequent Revit users use temporary dimensions, and even this simple tool has a few tips. To activate a temporary dimension, simply select an element on the screen. Sometimes temporary dimensions don't immediately display—this can happen if the elements selected are being monitored, locked, and so on. If this is the case, look for the activate dimensions button in the options bar. Once the temporary dimensions are available, the middle grip on the witness line (called the move witness line grip) can be selected and dragged to another object.

Another option is to simply click the witness line, which will cause it to cycle from one face of an element to the center or to the other face. This works for some elements, but not all (i.e., walls). Input can also be entered once the temporary dimensions are activated; however, not everyone knows that formulas can also be input. For example, if an angle is activated and the rise and run are known but not the angle, then entering “=atan(rise/run)” or “=atan(4/12)” will calculate the angle and adjust the graphics accordingly. Another temporary dimensions tip is to start dragging one end of an element then start typing in a number. This will automatically activate the temporary dimensions and the entered value will be applied.

DIMENSIONS

One quick dimension tip is a simple way to dimension all grid lines along an axis. Draw a wall outside of the building, making sure it crosses over all of the grid lines that need to be dimensioned. Now use an aligned dimension, and in the options bar change the Pick: value from Individual References to Entire Wall. Click the options button and check Intersecting Walls. Then select the wall and place the dimensions. Now delete the wall and the dimension will remain.

If there is a need to remove only a portion of a dimension string while keeping the string continuous, then right-click on the middle grip on the witness line and select Delete Witness Line (see Figure 3). If the need arises to break the string apart, then Tab to select the individual string shape handle and delete that portion of the string as normal.

Revit Structure 2013

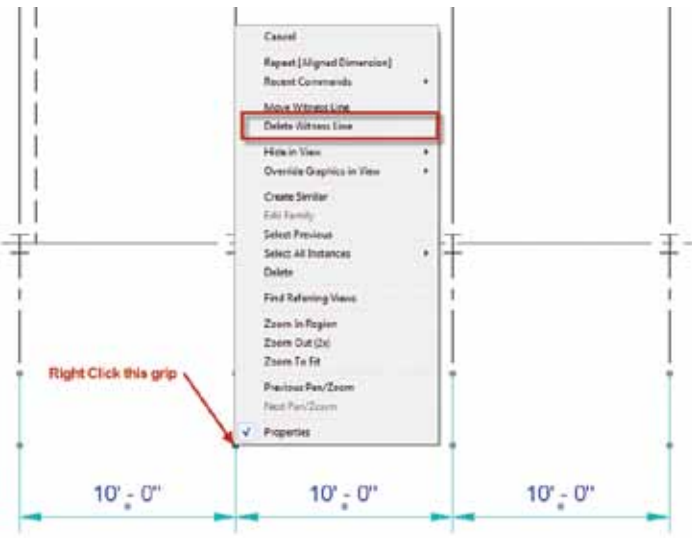


Figure 3

Ever had a dimension and been unclear as to what was actually dimensioned? If so, there isn't any need to start clicking elements on the screen to see if the dimension turns blue. Instead, right-click on the padlock, regardless of whether or not it is locked, and select "Show Related" (see Figure 4). This will bring up a dialog box that will have options to cycle through the two objects that are being dimensioned by that dimension segment (see Figure 5).



Figure 4

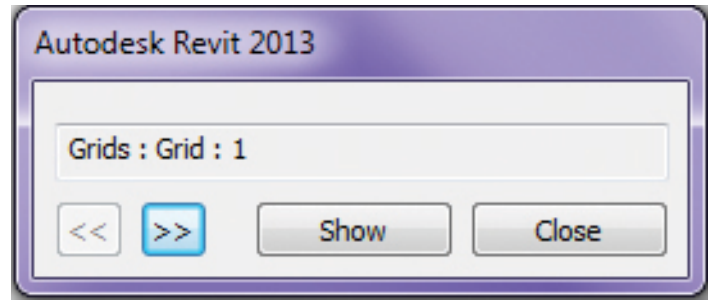


Figure 5

When a dimension text value is moved from its origin, there is a tool to move it back to the original position. Select the dimension string, right-click, and select Reset Dimension Text Position (see Figure 6).

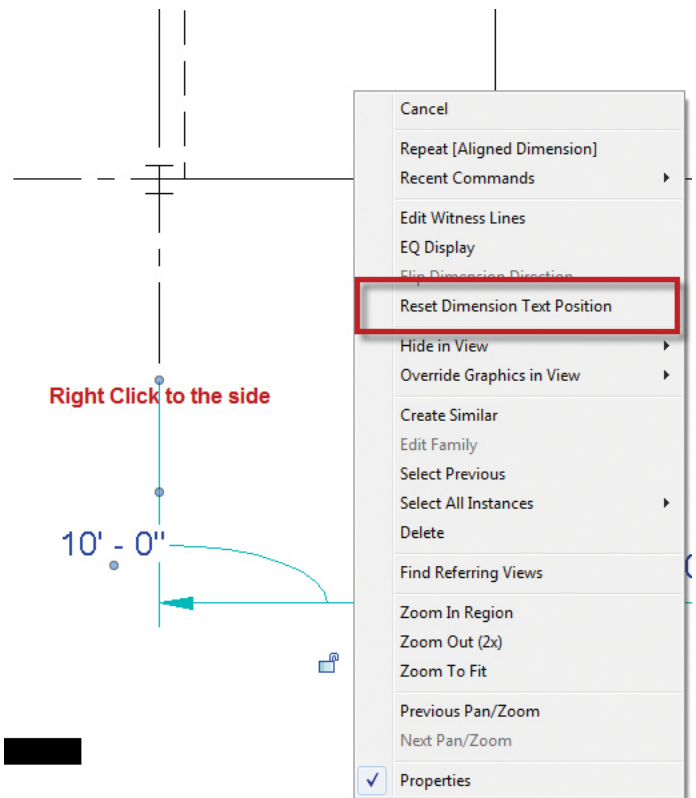


Figure 6

A classic dimension tip is how to use dimensions to move/alter the element being dimensioned. If a dimension is applied to an element, then selecting the element will activate the dimension and the dimension value can be changed. Furthermore, if the dimension type is set to fractional inches or millimeters, then those values can be used for input instead of having to input feet or meters (i.e., type "6" instead of "0' - 6", "0.5" or "100" instead of 100mm, "0.1").

BEAMS

Novice Revit Structure users may find it frustrating when the height of a column moves or changes and the beams that were associated to the top of the column didn't change elevation with the column. This condition was changed a few releases ago, but it still seems to be a rarely utilized property.

If a beam is modeled to a column, two properties are applied: Start Attachment Type and/or End Attachment Type. These values, when set properly, allow the beam to move up or down with the column. By default, the values are set to End Elevation, which doesn't associate the beam to the column. For the beam to be associated, this value should be changed to "Distance." Once distance is selected, then two additional properties appear: Attachment Distance and End of Referenced Column. The distance value can be used to adjust the end of the beam such that it isn't aligned with the end of the column. Unfortunately, this value will always move the beam away from the ends toward the center of the column and not outside the ends. End of Referenced Column can either be set to the top or bottom of the column so the beam moves accordingly (see Figure 7).

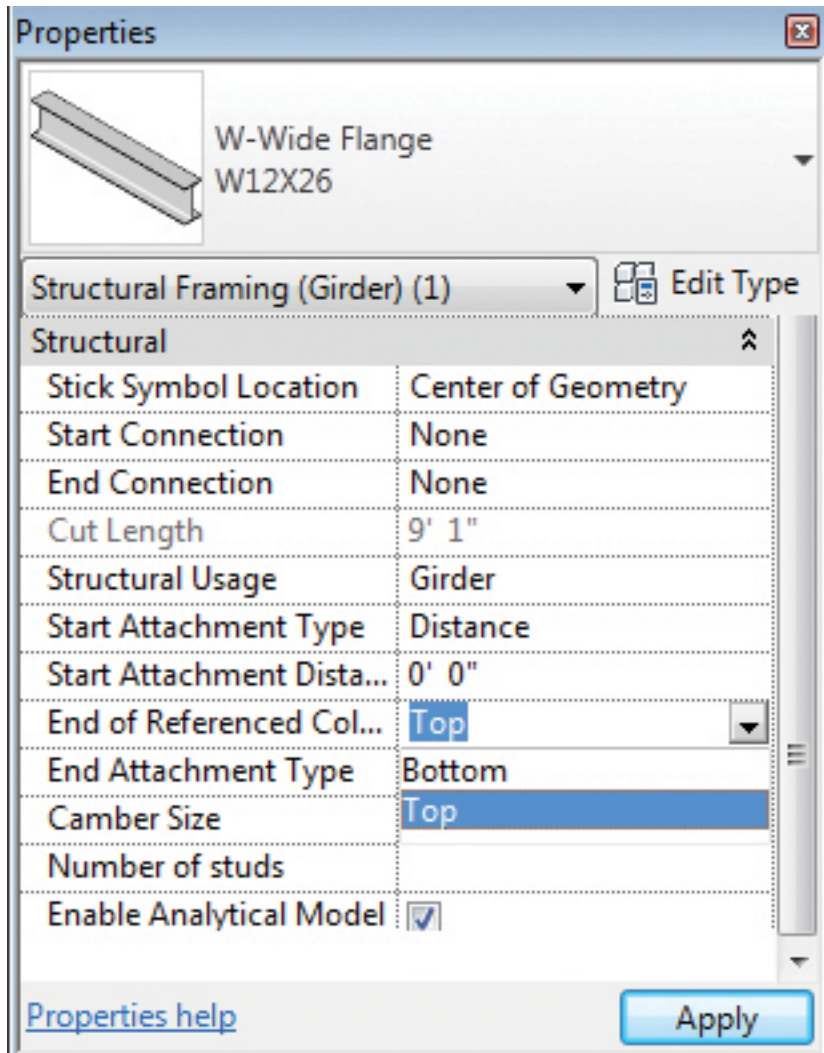


Figure 7

When coping beams, especially steel beams, there are many complaints that the cope doesn't include an automatic radius. However, if a custom beam is created such that the flanges have a slight radius to them, this shape will be used for the cope and coping will include a radius (see Figure 8).

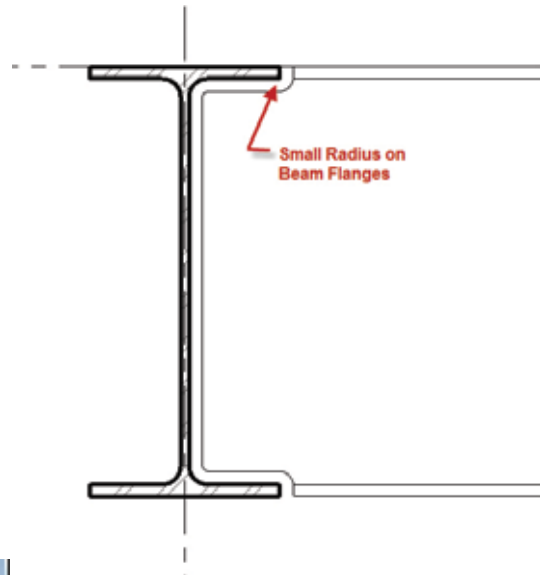


Figure 8

When modeling beams on a sloped work plane, a new beam instance property becomes available. A new value of orientation is displayed. There are two options for this property: Normal, which has the member perpendicular to the work plane, and Horizontal, which changes the member to be plumb.

With beam members there has always been the ability to show start or end connection symbols. In the early releases, connection symbols were limited to Moment Frame and Cantilever Moment. These symbols could have any graphics desired, but they were the only two options. In the last few releases this feature was opened up, so many connection types and custom symbols can be created. Several firms have used this feature, but since it has been opened up, the applications can go beyond the FE classic option. Firms could use this feature for all types of building construction. For example, it could be used in wood construction to show the different types of hangers and/or fasteners in plan graphics. Customizing this feature is a multistep process, but once added to a template, the options will be available for the entire team to use (see Figure 9).

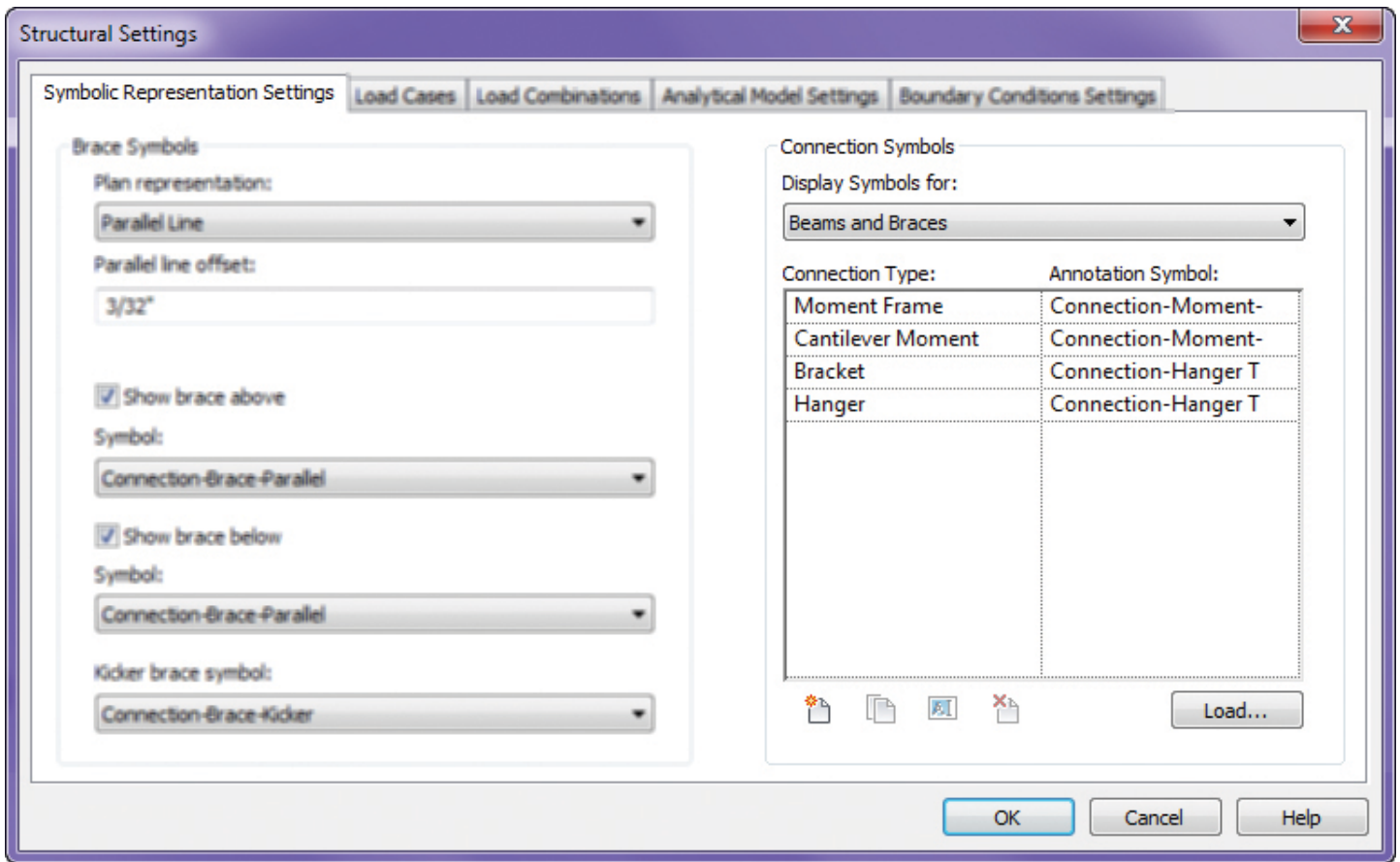


Figure 10

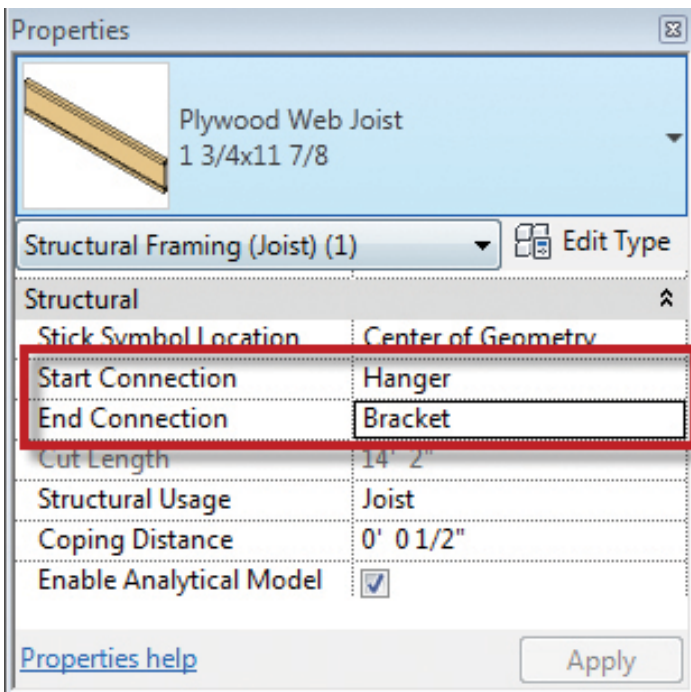


Figure 9

- The first step is to create the connections symbols. There isn't a template specifically designed for this, so start with a generic annotation family. Then, using the Family Category and Parameter button, change the family type to Connection Symbol. The intersection of Reference Planes is the

insertion point, which is the end of the beam. The symbol should be drawn to the right of the insertion point. There is also an option for "Automatic Cutback for Beams and Braces." This option allows the symbol to add an additional cutback to the beam's symbolic line in the project. If the intent is to have the symbol added directly to the beam line, this should be unchecked.

- Once the symbol is created, load the family into the project or project template. In Structural Settings, go to the Symbolic Representation Settings tab and add a new Connection Symbol for Beams and Braces. Once the new Connection Type is created, choose the appropriate symbol (see Figure10).
- Now when a beam is created, the new options will be available for connections within the beam instance properties.

All of the above is also applicable to structural columns connections.

MISCELLANEOUS

If the properties dialog is moved to the second monitor, this also moves the Type Selector. To keep the Type Selector closer to the ribbon and to the view window, add it to the quick access toolbar by right-clicking in the Type Selector and select "Add to Quick Access Toolbar" or "Add to Ribbon Modify Tab" (see Figure11).

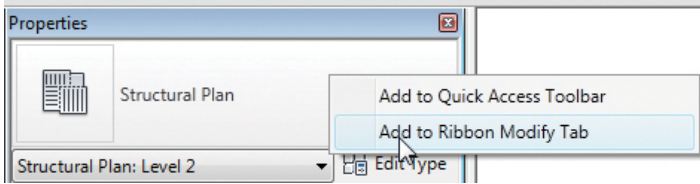


Figure 11

When modeling a CMU or brick, it is possible to course it automatically. Change the snap setting to accomplish this. This may seem obscure, but the snaps dialog can be used for more than just controlling the running object snaps. It also controls the snap distances while modeling. It is best not to add additional values to the snaps. Instead, change the 6" or 150m value to 8" or 200mm so the dimensions snap while modeling.

A great tool to remember is the "Hover + Tab + Click" (HTC) utility. Most people know that when selecting elements a user can hover over an area and hit the Tab key, which will cycle through different elements, grips, and so on. In addition, the HTC feature will also select elements that are associated at their ends. The HTC feature is useful in many cases, but especially when modeling wall foundations as well as slab edges. The HTC feature will allow a few clicks to add slab edges all the way around the slab instead of manually picking each individual edge.

These tips will not only improve your productivity on a daily basis, but also will make your day more enjoyable as you pass them on to fellow coworkers.



Brian Mackey, self-proclaimed "The Revit Geek," has spent more than 25 years in the AEC industry, about 10 of which have been focused on Revit and BIM. After nearly a decade of working with Architects and Engineers to advance BIM in their companies, Brian started his BIM consulting company in 2011 to focus on custom high-level training and mentoring. Brian has clients all over the US and Canada that generally tolerate his sarcastic nature in exchange for his wide breadth of BIM knowledge. Brian showcases his love of talking about Revit, or maybe just his love of talking, in a monthly light-hearted, occasionally irreverent, free Q&A webcast, Revit Radio. Brian is a regular speaker at many conferences, including the inaugural RTC North America, where he was voted top speaker. Brian and his wife, who met at Autodesk University, just welcomed a baby into their family.



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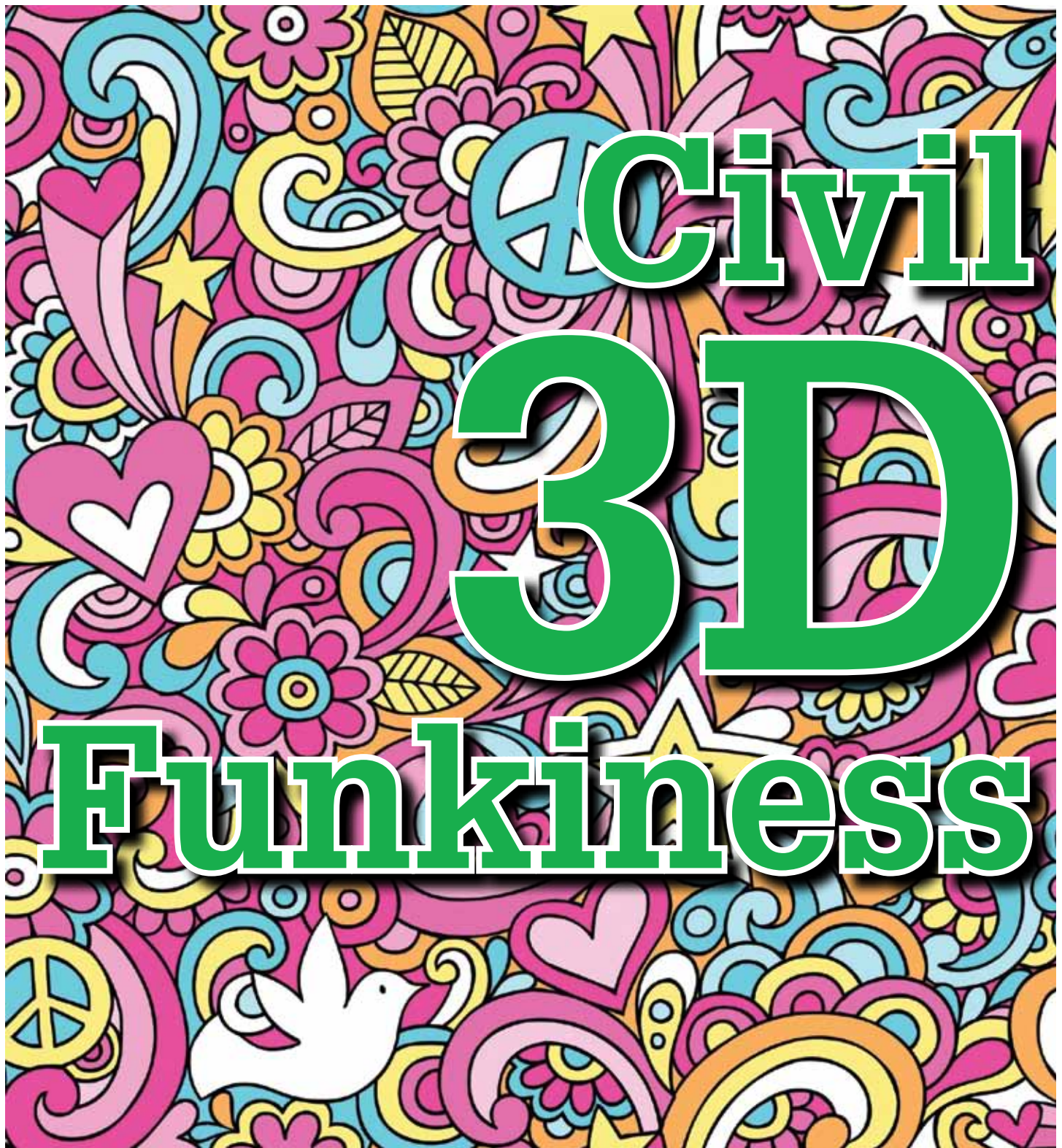
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With any advanced program, there are numerous options available to you. Many of the commands may have been developed for a specific set of customers so may not be widely known. Due to this, there are many commands that are not covered in an AutoCAD® Civil 3D® course. This article will cover some of my top tips and tricks.

ALIGNMENTS

There's a dirty little secret you don't hear when Autodesk demos the product. The secret is that design profiles do not dynamically update with alignment changes. Sure, sampled surfaces change, but design profiles do not. It's nice of Autodesk to solve the dynamic problem of the easy profile to create, but ignore the important profile type. There are some workarounds for this program limitation.

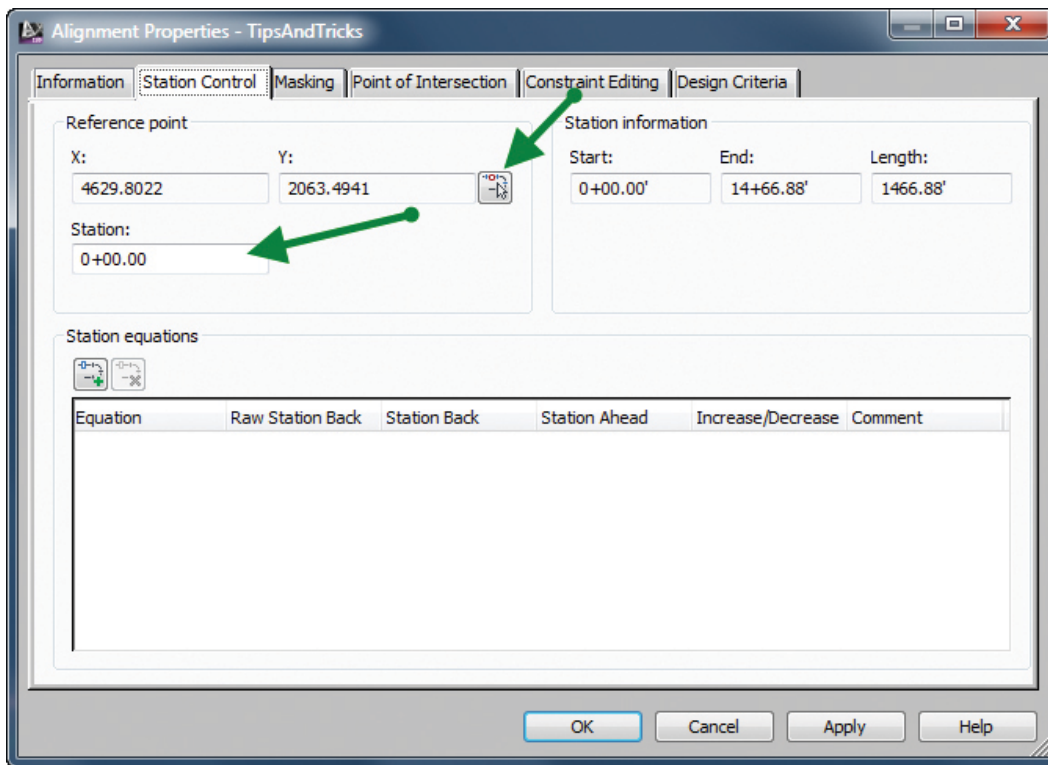


Figure 1

One option I've been using for quite a while is to set the Reference Point for an alignment at a point that makes the least amount of work for me to update a profile after the alignment change. For instance, if I'm working around station 0+25 on a 1,000 foot alignment, I'll change the reference point to be just after the area I'm changing (0+30). This way I'll only have to adjust the profile from the start of the alignment to the reference point 0+30; rather than 0+25 to 10+00. It saves quite a bit of time making changes.

PIPE NETWORKS

I've found pipe networks extremely frustrating to work with. As such, this tip isn't going to be coming from out-of-the-box Civil 3D. It's a trick I created several years ago when I had to change the pipe sizes of a whole pipe run. Civil 3D only allows for one pipe to be swapped at a time. Did I really want to spend an hour or two swapping parts when I could create a tool that did the same thing in the same amount of time? I chose to create the tool and make it free for everyone who wanted to download it. The tool (for Civil 3D 2011) and source code is available on my blog. Feel free to download the source code and upgrade it to the version of the product you are using.

If you don't want to mess with the source code, the same swap tool capability may be found in the SincPac by QuuxSoftware and other third-party applications. If you find yourself doing repetitive

things with pipe networks, you may want to explore tools available to make the process work better for you.

CORRIDORS

For corridors you should be using Subassembly Composer to create subassemblies that meet your requirements. When I use Subassembly Composer I'll often use it to make labeling cross sections easier. Often I'll want to have one link label style for a full width lane and a different label style for a smaller width when a full dimension look wouldn't look correct. In Figure 2 I'm labeling the Pave Link to show the width of the item of work. For the 2', the dimension looks horrible. To remedy this shortcoming I'll have to check before I create this link to see if I

want assign the Pave link code or the Pave-Short link code. Then when I create the link I'll use the appropriate link code. In Civil 3D I'll then have the code set style set up to use both link codes with the appropriate code set style. This saves me countless hours of having to go through and make sure the correct code set style is assigned. When doing this check manually I end up missing some, so this helps reduce my error rate in my plans.

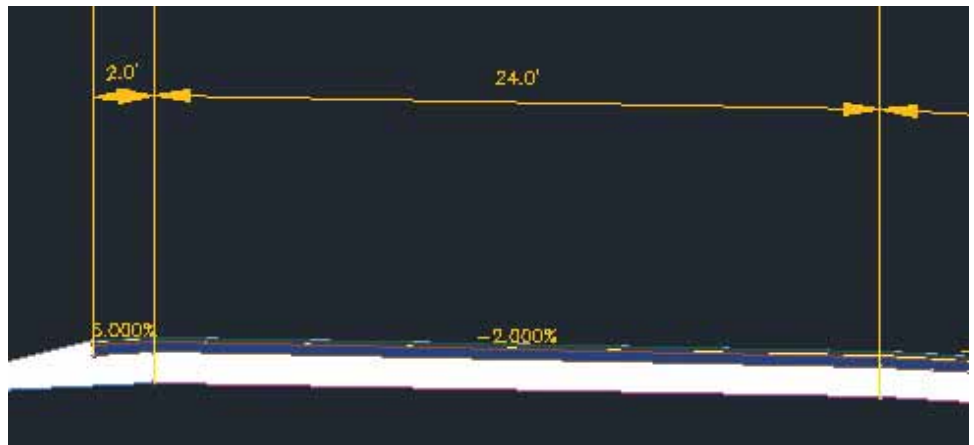


Figure 2

Maybe you don't want to use Subassembly Composer. You can use expressions to achieve the same look. Unfortunately, all this does is ensure job security since they get so complicated most users won't be able to go in and modify them for simple changes. Even when I do create them and come back, it takes me a little while to get my bearings in terms of what the components are in the labels style. One way I use to find label components is to temporarily change the color of the component. This way it becomes obvious where the label component is.

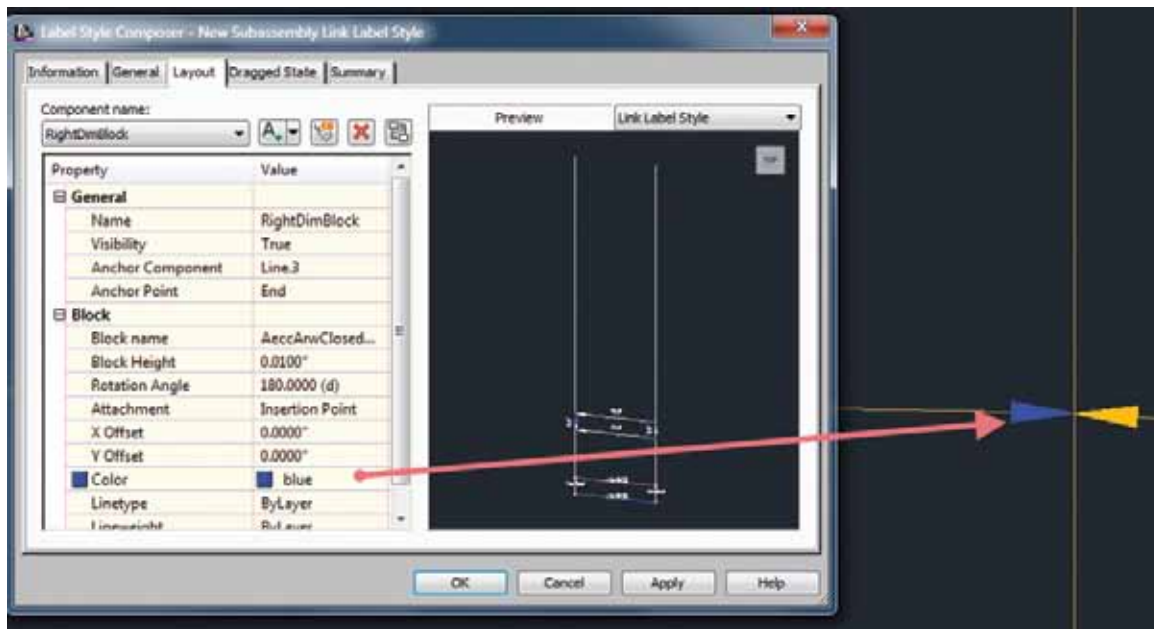


Figure 3

Right below the convert polyline commands is the Edit Polyline Elevations. This command comes in handy if you get contour information in the form of 2D polylines without Z elevations. This makes it so you can type the elevations at the command line. This tool is useful only if you have a small group of polylines to which to assign elevations. After 20 or so polylines, you start to think there has to be a better way. Good thing there is an alternative.

3D POLYLINES AND POLYLINES

The next tip is probably covered in a Civil 3D training class, although the next commands are buried inside a ribbon. This hiding makes it difficult to remember the commands exist. The commands are the Convert 2D to 3D Polylines and the 3D to 2D Polylines. The commands make it easy to convert polylines back and forth between 3D and 2D. I usually use this command to extract polylines and convert them to 2D polylines. The lines are then used in xrefs to provide a performance boost in printing out drawings so I don't have to xref the corridor drawing into all of the sheets.

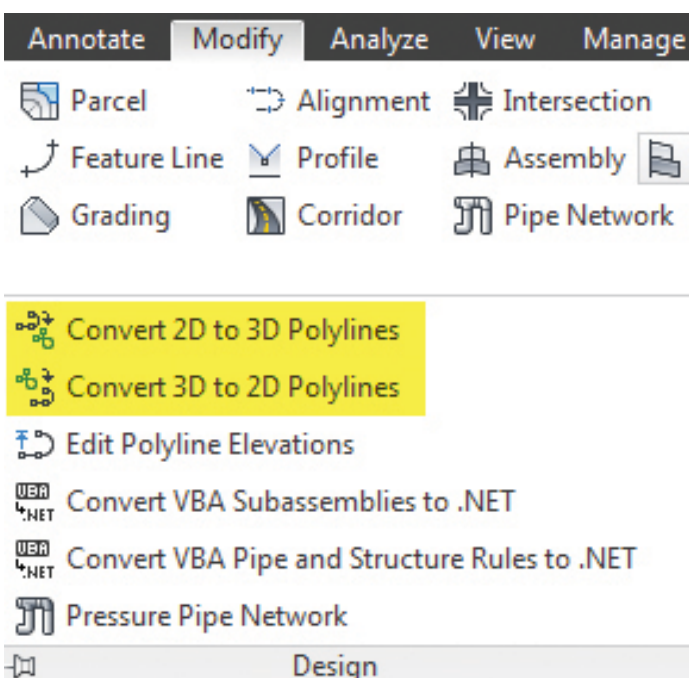


Figure 4

COUNTRY KITS

If you live in the UK or Ireland, you are lucky to get some great tools created by Autodesk. One of the tools is called 2D to 3D Contour Conversion command. The command is available through the UKIE Country Kit, available as a download from the Autodesk site. The Country Kit commands are placed in the Toolbox, but can be copied from the kit and placed in the Toolbox as its own tool outside of the Country Kit.

While you are at the Country Kit site, take some time to peruse what's available in the other Country Kits. There are some commands that are might fit into your workflow. I find the UKIE Country Kit the most useful because it's in a familiar language and you can tell someone has spent a lot of time understanding the Country's needs and developing the tools to fill some of the gaps in Civil 3D.

These are just a few of the tips and tricks I use. If you want others, there are some classes at past Autodesk University sessions given by Peter Funk of Autodesk that cover additional obscure tips and tricks for AutoCAD Civil 3D.



Christopher Fugitt has spent his years in the real world collecting certifications and letters behind his name. Currently he works for his company, Civil Reminders, performing civil engineering and programming for a diverse list of customers. In addition, he contributes to the Sincpac, a third-party add-on to AutoCAD Civil 3D by Quux Software.



What's in a Report?

Coordination meetings are fun and exciting, and sometimes a little tedious, but they are meaningless if notes are not taken and distributed. Autodesk® Navisworks® allows you to create a number of different reports to capture and distribute important meeting minutes for the entire team.

WHICH CLASHES TO INCLUDE

Multiple articles have been written in this magazine reviewing various best practices of the Clash Detective. These practices really reveal their power when it comes to reporting.

Open the Report tab in the Clash Detective. This tab enumerates all the different options to customize your report. Start on the right pane of the window. The Include Clashes pane allows

you to define which clashes you will include in your report. The drop-down options include Group Headers, Individual Clashes, and Everything.

The Group Headers option will include only Clash Group information and information on clashes not associated with a group. If you follow a practice in which your group clashes in groups, the group header information will only report on the group level or the folder. This information is very general and does not typically contain enough information to review the constructability issue identified.

The next option is Individual Clashes. This selection will include every individual clash whether or not it is in a group. This option is very specific, but it does not distinguish clashes that are in a group against clashes that are out of a group.

Navisworks Manage 2013

Everything includes both Group Header information and Individual Clash information. Clashes in a group will be grouped together in the report. Individual clashes will be listed separately in the report.

I suggest using the Everything option if you group information together to help you better find the constructability issue you are seeking.

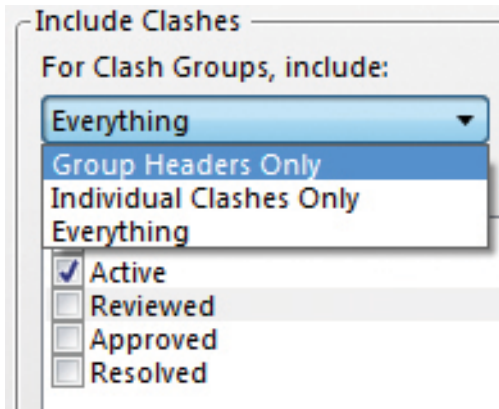


Figure 1: Including Clashes

WHAT'S IN A STATUS?

Following multiple best practices already presented in previous articles, Status in the Clash Detective matters. Every company should establish what each status means. The Active, Approved, and Reviewed status can be defined by internal workflows. The Resolved status is well established by Navisworks to mean that the two intersecting points of geometry no longer conflict with one another. The New status is also established by Navisworks to mean that the Clash was found for the first time. The reason New and Resolved should not be used to define a specific meaning in a company is because Navisworks automatically assigns these statuses and will overwrite any clash that meets Navisworks definition of these fields with the corresponding status. What this means is that if you mark a clash as resolved that is not actually resolved (meaning that the two points of geometry are still intersecting), Navisworks will change the clash back to Active.

Good practice suggests that rather than fight Navisworks with Resolved and New status, you should use the remaining three codes to your advantage. I suggest you have Active mean that the clash representing the constructability issue is still outstanding. Any duplicate clashes should be marked as reviewed. Any outstanding clashes that have been agreed to be worked out by some means in the field are marked as Approved. By following a strict structure with codes you can easily generate meaningful reports to the whole team.

Regardless of your code structure, you can still customize which status codes you wish to include in your report. If you follow the strategy I mentioned above, you would want to include New and

Active clashes only. You can customize which status you wish to include by checking the box next to the status in the Include Clashes panel on the Clash Detective Report tab. You should never include resolved clashes unless you wish to generate a report displaying a problem that once existed but no longer exists.

BUILDING CONTENT

Your ability to select specific information to include in your report is customizable, thanks to the Content pane. This pane allows you to select from multiple options to include the information you are looking to report on.

- Summary gives information on how the clash test was run. It gives the totals for the clash test, the tolerance used, and the type of test that was run.
- Clash Point reports the XYZ coordinate of the clash point.
- Date Found reports on the original date the clash was found.
- Assigned to reports any assignments associated with a clash.
- Date Approved reports the date when a status was changed to approved.
- Approved by reports the name of the user that changed the status to approved.
- Layer Name reports the name of the layer the object was on.
- Item Path reports the selection hierarchy of both objects.
- Item ID reports a unique ID given to the objects.
- Status reports the status of the clash.
- Distance reports the severity of the clash in terms of distance.
- Description reports the type of clash used (Hard, Clearance, etc).
- Comments report any comments or tags associated with the clash.
- Quick properties reports all quick properties defined in the project for both items.
- Image creates an image of the viewpoint associated with the clash.
- Simulation Dates reports the time a clash happened if time-based clashing is used.
- Simulation Event reports the activity that is associated with geometry in conflict.
- Clash Group reports group information associated with a clash.
- Grid Location reports a grid location of the clash.

As you may have guessed, not all of this content is useful in all situations. For example, if you have a project that uses only Autodesk® Revit®, the Layer information would always be blank. I suggest using Summary, Clash Point, Date Found, Comments, Image, and Grid Location. If you assign your clashes using the Assign tool in the Clash Detective, you should also include that option.

If you have very defined quick properties, that would be a good option to include. Play with the different content options until you have the information you desire.

Do not be the guy who selects all the boxes and creates a very complicated report that has too much information to review. Only use the information you need in order to further coordination efforts.

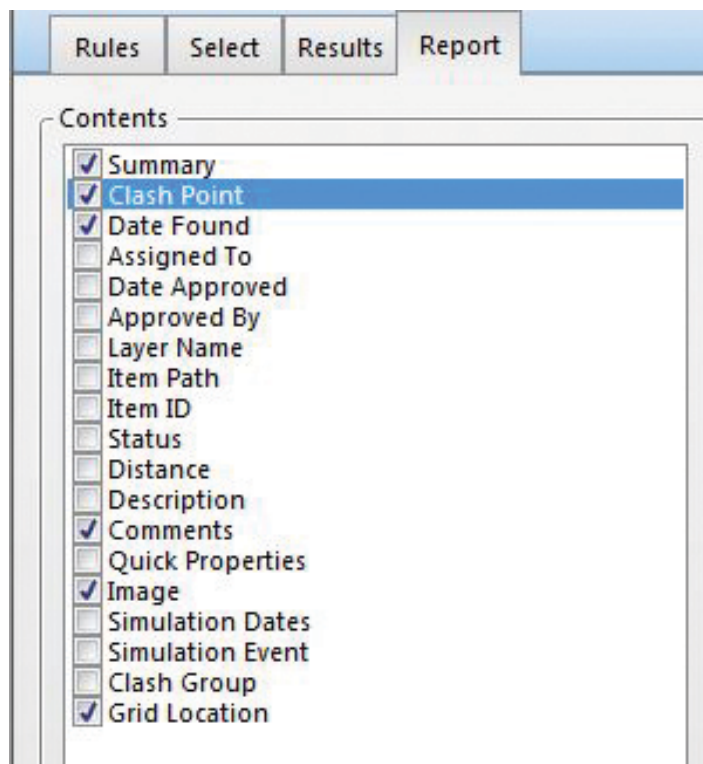


Figure 2: Report contents

HOW TO OUTPUT THE INFORMATION

The last pane is the Output Settings. This exciting pane allows you to customize which Clash Test(s) you wish to export and the format in which you wish to display the results.

The Report Type drop-down has the following options: Current Test, All Tests Combined, and All Tests Separate. Current test will only export the results of the clash test that is selected in the Clash Tests panel. The All Tests Combined option will create one large report that contains the results of all clash tests grouped by clash test. All Tests Separate will create a separate report for each clash test.

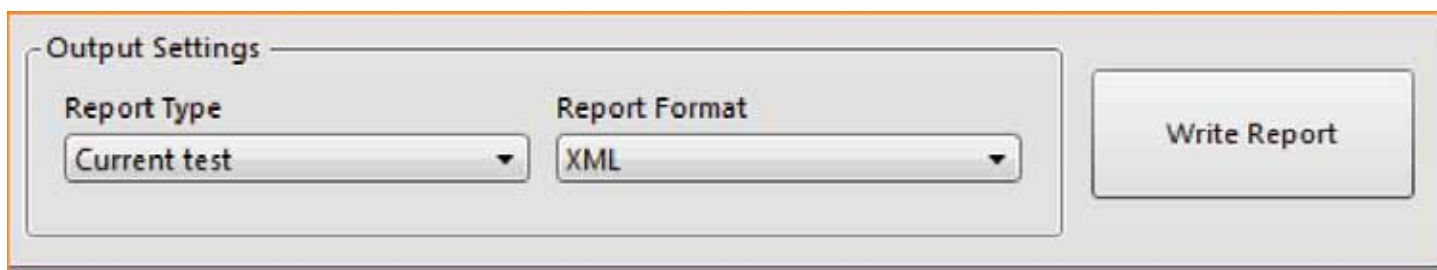


Figure 3: Output Settings

I recommend All Tests Combined as I am not a fan of having to deal with multiple files and I want all the results from all of my clash tests. Earlier we selected which clashes to include based on their status and we selected the contents of those clashes we wanted to report on. Because of this, our report is already distilled so separating it out into multiple small reports does not make sense.

CHOOSING THE RIGHT FORMAT

The last step to finish your report masterpiece is to select a report format. Navisworks allows you to report your results in xml, html, html tabular, text, and viewpoints.

xml is an export option as it allows you the most flexibility to display your results in other programs. If one of your content options was Image, Navisworks will export a folder that has all the images that the xml file references.

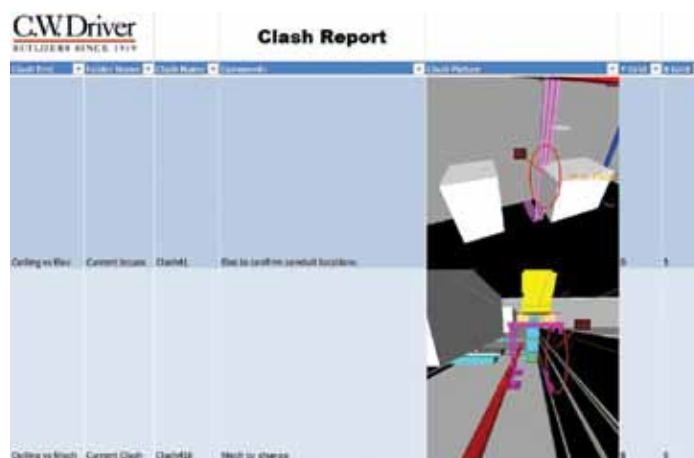


Figure 4: Custom report from xml

The next report type is html. This report will include all the contents in an html document. Like the xml file, images will be created in a separate folder associated with the html file. This report can be viewed in any web browser.

Navisworks Manage 2013

Ceiling vs All		Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status
		0.00ft	8	0	1	2	0	5	Hard	Old





Image	Clash Name	Grid Location	Date Found	Clash Point	Comments	Item 1
	Clash526	G-11.7 : FIRST FLOOR	2012/10/31	06:34.55;x:6427.46, y:6996.81, z:62.90	#2 - msmith - 2012/11/13 22:53.25 Duct to raise 6" clears ceiling, invisible model wall shown on paper	
	Clash1	F-1 : SECOND FLOOR - ADDITION	2012/10/31	06:34.55;x:6434.30, y:7236.26, z:74.89	#4 - msmith - 2012/11/13 23:07.56 Piping to be raised	
	Clash485	F-8 : FIRST FLOOR	2012/10/31	06:34.55;x:6437.61, y:7085.99, z:64.08	#5 - msmith - 2012/11/13 23:15.55 In column cap, to be re-routed	
	Clash486	C-2 : (E) THIRD FLOOR	2012/10/31	06:34.55;x:6515.49, y:7218.07, z:80.36	#6 - msmith - 2012/11/13 23:23.33 Updated set shows detail of mechanical in space	

Figure 5: html report

The html tabular report creates an html file that has an xls transform that allows this report to be viewed in a web browser or in Microsoft Excel. The xls file can be customized, allowing you to change the look and feel of your report. Text will not generate any images and will create a text file containing all the information prescribed in the Contents pane.

Viewpoints will create a viewpoint for each clash. A folder is created for each clash test with subfolders for each clash group.

If you do not want to create a custom report, I suggest using the html tabular report and creating viewpoint.

Best practices suggest that you should always create an nwd with every one of your reports. Because your entire team might not have a copy of Navisworks, it is suggested that you create clash viewpoints so they will be able to view the clash in context in Navisworks Freedom.

VIEWPOINT REPORTING

Another way to create reports is to create a Viewpoint Report. If you do not enjoy using the Clash Detective and its amazing tools, you are probably creating viewpoints to capture constructability issues. If this is your workflow you can still create a report to distribute to your team. On the Output tab of the ribbon in the Export Data panel you can create a viewpoint report.

CONCLUSION

Narrowing your results by selecting which status to include, which clashes to include, what contents to include, and what type of report enables you to efficiently create a report that is informative and professional.

Best practices track all the way through the Clash Detective workflow. If you created good markups in your clashes to define real constructability issues and associated a proper status code, reporting on real information is a snap. It is even better if you follow the practice of documenting with comments or tags in the Clash Detective. The more information you associate with your clashes, the better your reporting will become.

If you didn't take the time to create clash views and neglected to comment on any clashes, your reports will not contain useful or pertinent information. Many subscribe to creating viewpoint in key areas of the building and distributing those images. Although there is benefit to be gained with this reporting style, there is no way to track and persist that information throughout the life of a construction project. It has been my experience that this process is not sustainable and ends in long, inefficient coordination efforts.

Thorough reporting, on the other hand, expedites coordination efforts and increases communication, allowing for a sustainable efficient method of coordinating all the trades in a project.



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A Collection of **Hot** Tips



For even the most seasoned users of CAD software, tips and tricks are always in demand. It's what piques our interest in using design software—knowing that you can always learn something new or a different approach to a common problem.

In this article we will take a look at several tips I have found over the years as well as a new one in the 2013 release that not a lot of users know about.

ARE YOU IN THE LOOP?

This tip brings one of those “aha” moments when you see it for the first time. It doesn't mean what you were doing before was wrong, it just means perhaps your method wasn't as efficient as what I am about to show you.

A common modeling question is: “What is the best way to center a hole on a face of a model?” Make a constrained sketch? Link model parameters to a linear placement? Well, if it always has to stay put in the middle then let's use a Work Point instead.

With this method, we are going to place a Work Feature on the face that will always stay in the center of the face regardless of geometry change on the face itself or the rest of the model.

To place the Work Point using just the Work Point command and not the menu flyout, start the command as usual from the ribbon or use the period key for the shortcut. Right click and choose Loop Select to enable that type of selection.



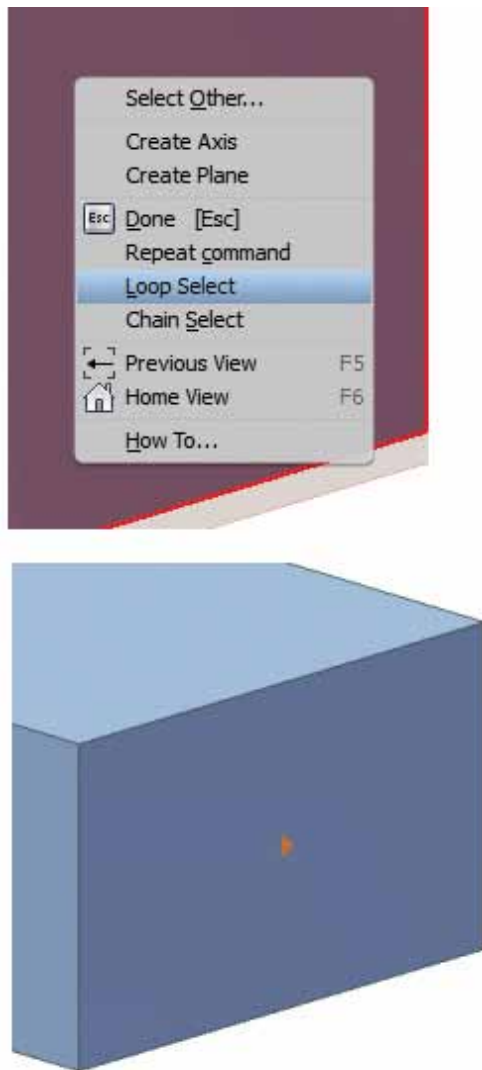


Figure 1

Once you select the desired perimeter loop, the command will place a Work Point on the face that will always stay at the center even if the original parent reference geometry changes.

From there, start the Hole command and choose the On Point placement method. Select the Work Point and then choose a direction reference for the Hole. This can be an edge, or as I have used it here, one of the origin axes (Figure 2).

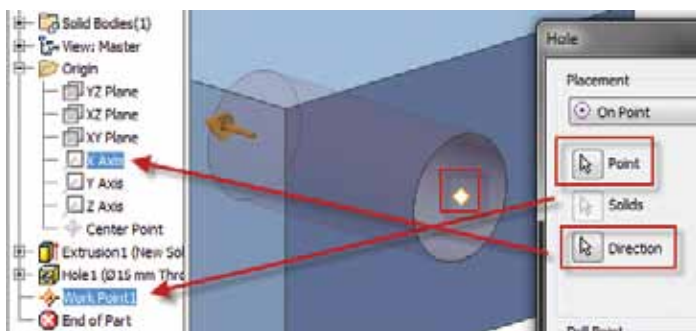


Figure 2

A SCALING EFFECT

Usually when I start sketching a new part file I take a semi-unintelligent approach and just throw together the rough shape of the geometry first before I put any dimensions on it. With the advent of the Dynamic Input and Dimensioning, I really should be doing dimensions and geometry at the same time, but old habits are hard to break. I originally learned to build a simple geometric reference and then control the sizing with dimensions placed afterwards.

When I did this in the past, if I wasn't careful about how much magnitude I gave a certain sketch object, my model would end up being blown out of proportion by my first dimensional change to the model.

But now I get to be extra lazy thanks to an enhancement in Autodesk Inventor® 2013. Now I can sketch something and even if my overall scaling is way off, when I put my first dimension in, it will automatically scale the entire sketch based on that first dimension. Notice in Figure 3 how it changes the entire geometry based on the change made from the .125 to the .5 dimension value.

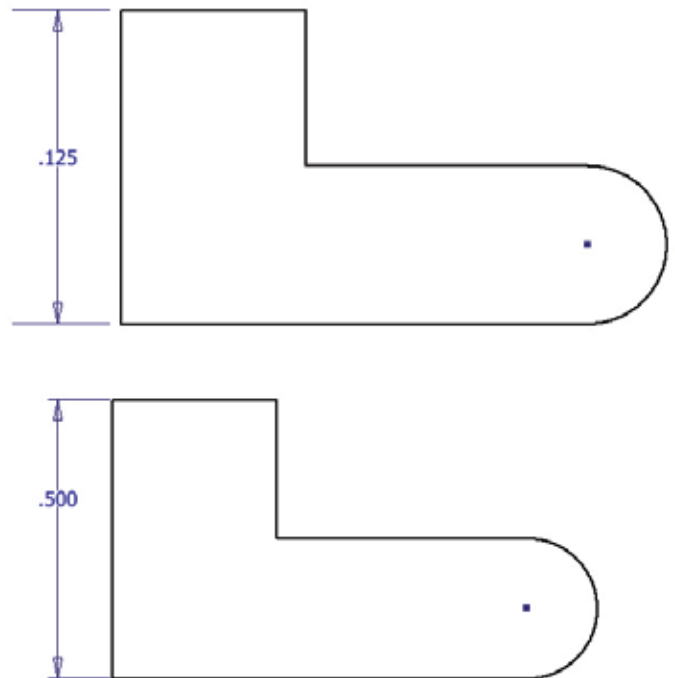


Figure 3

One thing to remember is that you cannot have more than one dimension on the sketch for this to work. If you have two dimensions placed, simply delete one of them and then this trick will work with a change to the remaining dimension.

A LINK TO THE DETAIL

There are not a lot of settings that need to be set in an Assembly template for Inventor. Let's face it—most of the focus goes to the

Drawings or Part template settings, but Assemblies? What is there to have in Assemblies for a template? Well that all depends on how you accomplish your work and how big your designs get.



Figure 4

If you design large equipment, AEC content, or have to supply customers with simplified models you probably have already heard of Level of Detail Representations in Inventor.

Level of Detail or LOD is commonly used to suppress components that are not needed during a particular time in modeling, hence making the opening and work inside an assembly file a little less frustrating. Think about it—is it easier to open a file with 2,000 parts or 200? If you have a 64-bit, high-RAM CAD station, you probably don't care either way, but if you are working with a five-year-old box that management refused to upgrade, you definitely have an opinion on the matter.

Inventor ships with system-defined LODs called Master, All Components Suppressed, All Parts Suppressed, and All Content Center Suppressed.

Master: Everything is loaded (unsuppressed); no exceptions.

All Components Suppressed: Suppresses all children of the assembly, which results in a fast load of only the assembly file. Sub-assemblies are fully suppressed so that their browser structure is not visible. All Components Suppressed is the lowest-weight loading of an assembly.

All Parts Suppressed: Suppresses all parts at all levels of the assembly hierarchy. Sub-assemblies are loaded. You can investigate the assembly structure, constraints, and other attributes without loading part files.

All Content Center Suppressed: Suppresses all components designated as content, and does not load their occurrences in memory. For example, consider the hundreds of fasteners in a design. If the Content Center files are stored in a remote location, reduced network traffic may also result.

As soon as you try to suppress a component outside this scope and try to save, you will get a message stating that a new level of detail will need to be created to accommodate the suppression. This is because the Master cannot be saved with a component suppressed. And you inevitably start creating LevelofDetail1 for the parts that are suppressed. But what if you already had a LOD in the Assembly? How about default LODs in our Assembly templates?

Template LODs accomplish two goals for us. One, it creates a defined LOD for me to categorize the work I don't want loading, and two, because this LOD is in all my assembly files, I can use a command to link them all together. You may not have known about the latter option before. If you have a LOD in a lower assembly—let's use "Customer Requested" as an example—when you activate "Customer Requested" at the top level of the assembly it does not automatically link that to the "Customer Requested" in the sub-assemblies (Figure 5, left image). What Inventor does do though, is if it is a system defined LOD (Master, All Content Center, etc) it will link those together (Figure 5, right image).

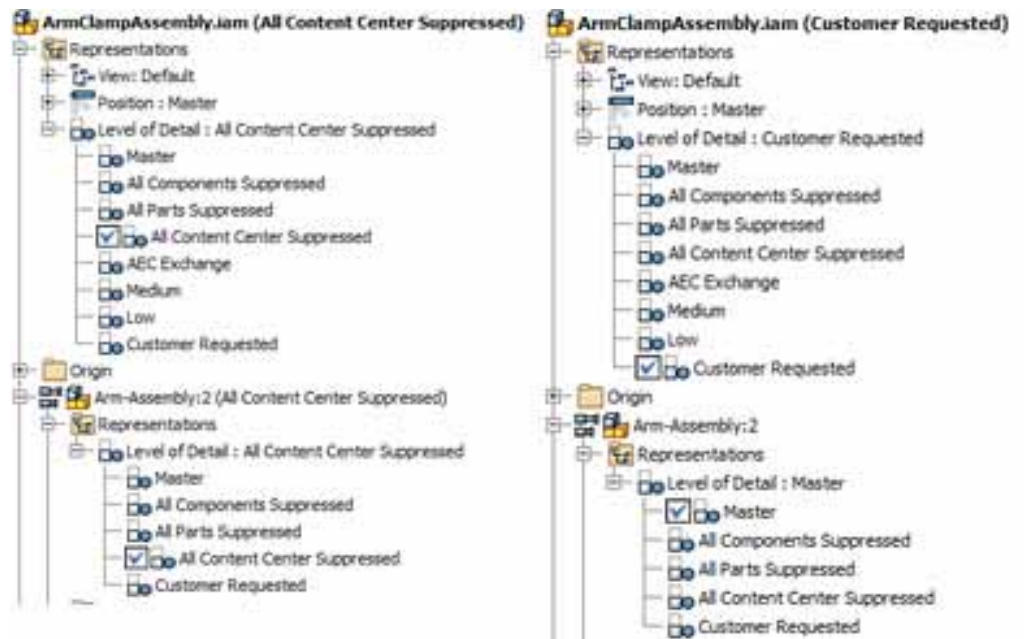


Figure 5

So how does the linking take place? Well if you don't know the next tool I will show you, then the process has to be done manually throughout your assembly structure and that could be quite tedious and time consuming for different LODs. Instead, use a tool that was introduced in Inventor 2010 call Link Levels of Detail. This little gem is located on the Assembly Tab > Productivity Tools Panel.

Inventor 2013

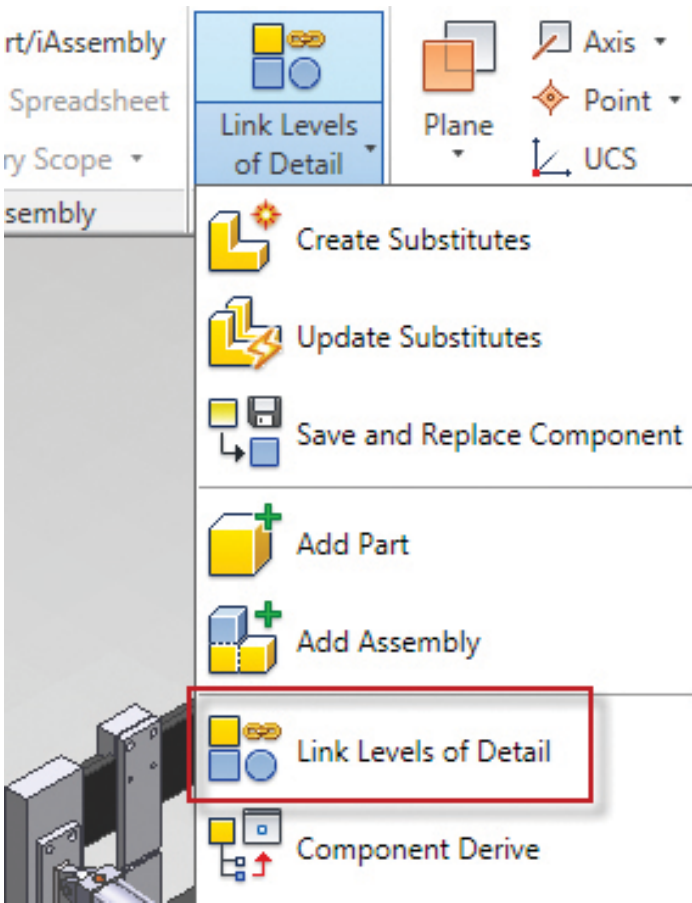


Figure 6

This command will look at the top level of the assembly and then automatically link the LODs that have the exact same name. That is why it was important for me to add them to assembly templates. Simply select the LOD to link, hit OK, and the software does the work for you. This can help you take your design to a more manageable size a lot faster and more efficiently.

BLANK SLATE TEMPLATES

Another tip that not a lot of users know about is the creation of a blank slate template. This will basically start up a new drawing with no Drawing Resources or Styles loaded into the document. This is the perfect way to start a new Company Standard for any and all styles as well as new Drawing Resources such as Title Blocks and Sheet Formats. It keeps the Inventor default styles manageable by not loading them all and gives you the power to start renaming them correctly from the beginning.

To start a clean slate template, hold down CTRL+SHIFT and at the same time select a new drawing from the pull-down in your Quick Access Toolbar.

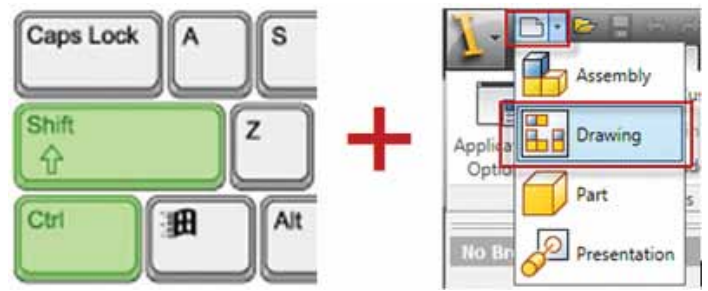


Figure 7

The Styles and Drawing Resources will be blank, allowing you to start from scratch on your new Standard or Title Block.

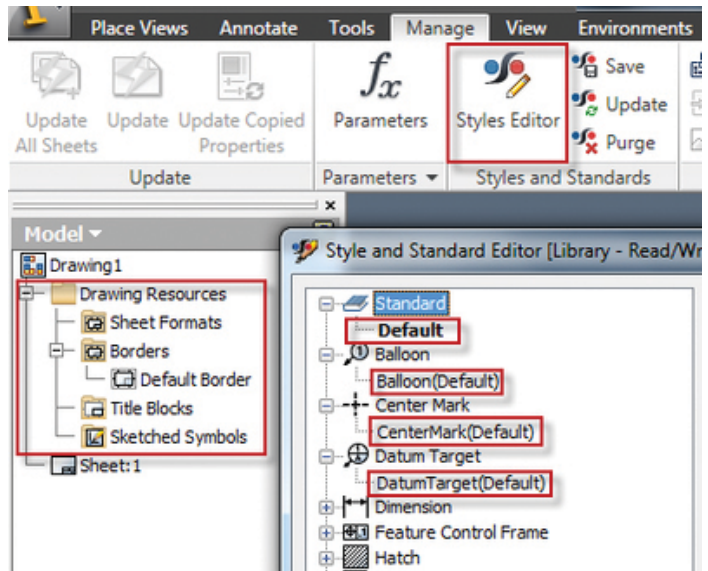


Figure 8

CHECK MODEL COMPLEXITY

I received an odd request from a user about how to check the number of faces and edges a model contained. I was actually taken back by this request and had to ask, "Why do you care? What is that going to tell you?"

His response was something I should have seen coming. He was trying to import a file into Autodesk® 3ds Max® and wanted to know how much of a load the faces are going to put on the machine. The answer is a versatile tool called Check Design. While it was used heavily to maintain sanity before passing off models to AEC consumers, it now has an added purpose with the Autodesk Suite bundling.

We can access this command on the BIM Exchange Environment. Start the tool and examine your results.



Figure 9

Holy faceted faces, Batman! There are a lot of faces and occurrences in that design (Figure 11). Now let's imagine we used LODs properly and prepared for this eventuality during the development of this design.

Consider LOD or Substitute model in the place of this example; a reduction to a single component and a reduction from 74k faces to 13.5k faces. My AEC and Visualization consumers are going to love this version compared to the larger one. Oh, and I almost forgot, for my AEC folks I can add Omni class table information, connectors, and metadata to the file so our lives are a little more accurate than before. Remember this trick next time you are asked for an export for a 3ds Max user or AEC consumer.



Figure 10

DETAIL ATTACHMENT

I'm sure this has happened to you at one point or another when documenting with Autodesk Inventor. You start placing Base and Projected views and then maybe a Section,

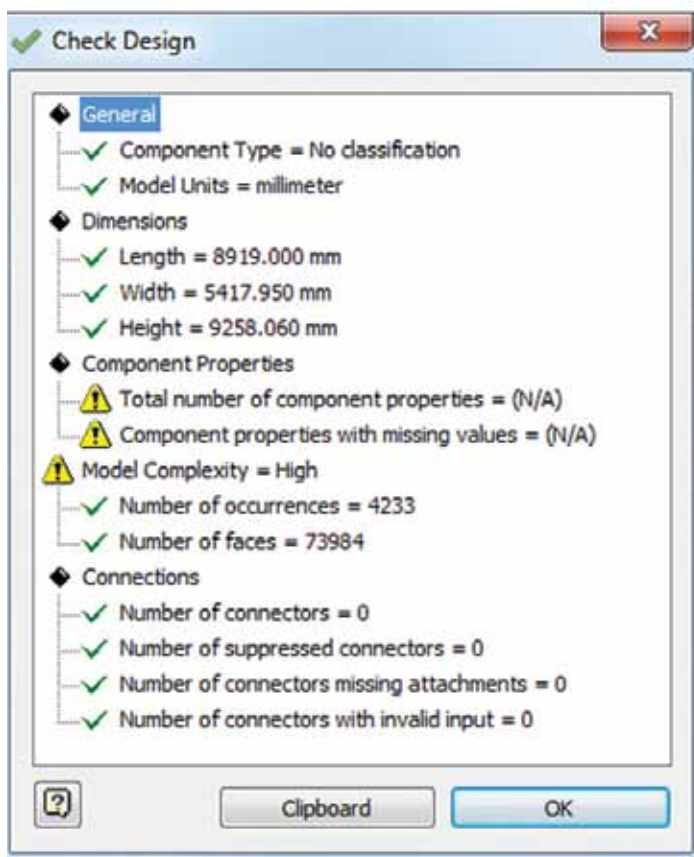


Figure 11

the occasional Auxiliary View, and then your Detail views. Design changes happen, documents update, somewhere its 5:00 PM and someone is enjoying a nice, refreshing after-work beverage, but not you. You have to fix those detail views that didn't move with your geometry when the design updated and changed. So how do we get out of work sooner and with fewer headaches next time? By attaching our detail views.

When you place a detail view in the drawing manager, after the initial placement you can move it around in case you didn't like its initial placement on your view.

This flexibility is also the reason why when a design updates, the detail may or may not move with the update. This can cause incorrect dimensions (shown in Figure 12) as well as those pink orphaned dimensions we hate to see.

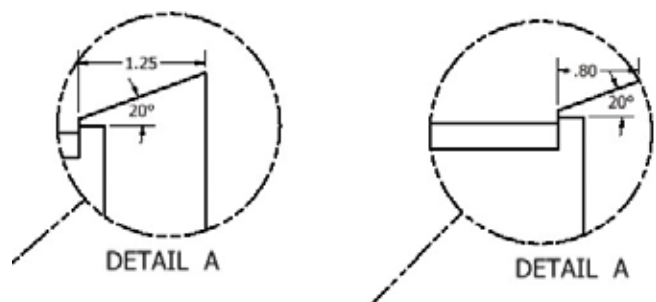


Figure 12

Inventor 2013

So next time you place your detail view, take an extra step and attach it to some geometry. This will essentially anchor it to a point so when it updates in the model the corresponding detail attached to it will also move in conjunction with it. Simply right-click on the center green dot of your detail boundary on your view and select Attach.

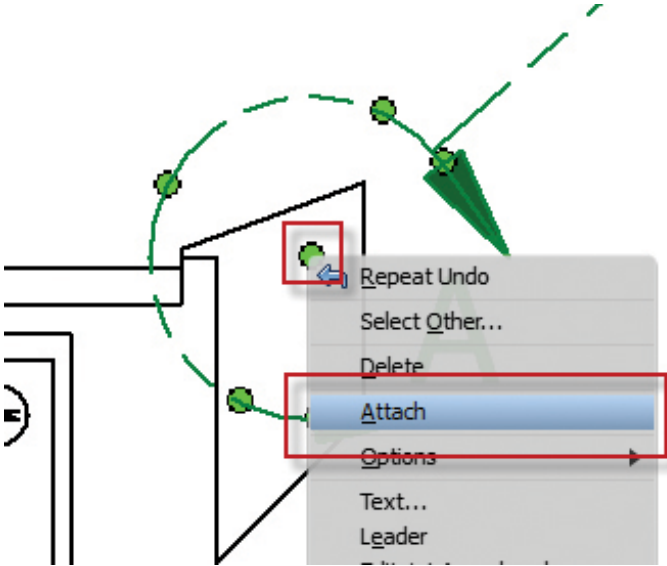


Figure 13

A VIEW FROM THE TOP

The Inventor view cube holds many secrets. In fact, I could probably do an entire article on just that little guy. However, we'll focus here on just the ability to change the top and front orientations of the cube and what that does for your models and drawings.

By right clicking on any flat face of the cube you have the ability to change it to be the new orientation for top or front view.

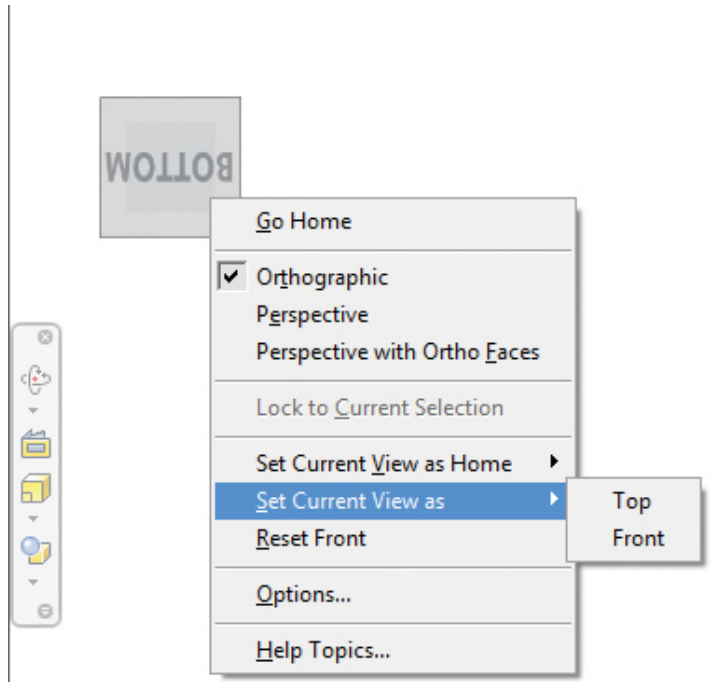


Figure 14

Doing this will change a couple things. First it will change how your model shows reflections when you turn them on in the modeling environment. The selection of the top view is most important for this change.

Second, a change to the front grants the ability to have a predefined "From Model" understanding of what you want your front view to be when placing views into the drawing environment. *Just make sure the settings in your Style Library accept the view from the model instead of using the XY plane.* The latter would be common if you have reused your styles over the last five years instead of starting new ones.

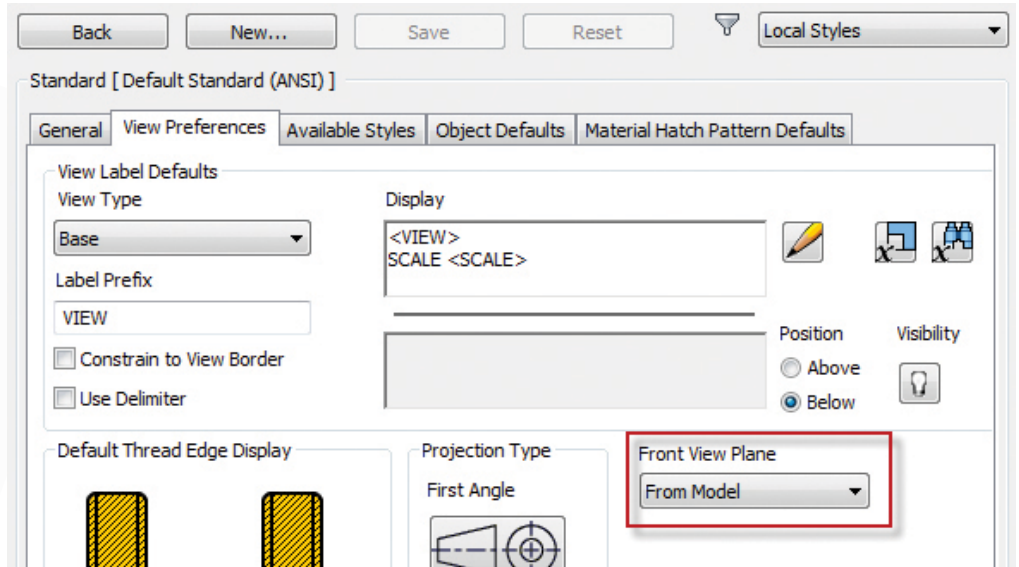


Figure 15

TEXT BALLOONS

This tip is one that I didn't really know was "a thing" until I was asked for it. In my past experiences I have never had a need for this type of documentation object, but who am I to judge?

We all know that most companies use ANSI as a guideline and have their own way of documenting and annotating their designs so when I was asked about this I immediately went to the "out-of-the-box" tool that should perform this type of annotating. I went to Sketched Symbol, but I ran into problems since the geometry created in the symbol would always require a similar quantity of text and never quite worked out to my satisfaction.

The solution is balloon overrides. You are able to attach it to geometry the same way you would a sketched symbol, but the software defines the bubble size for you instead of pre-defining it with a sketched symbol. Simply right-click on the balloon after placement and select Edit Balloon.

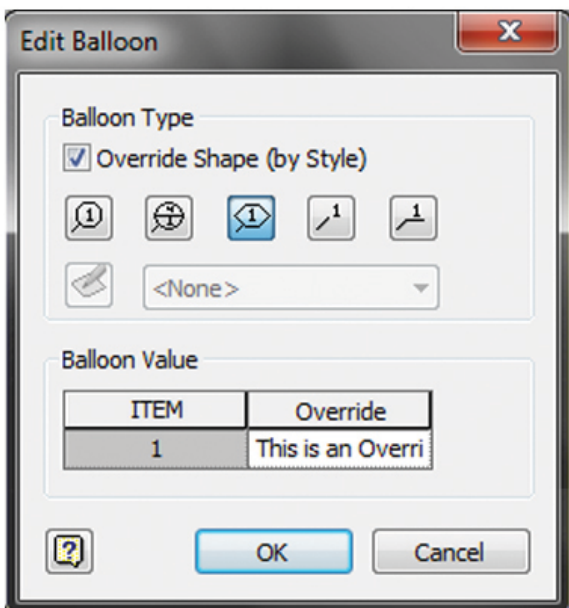
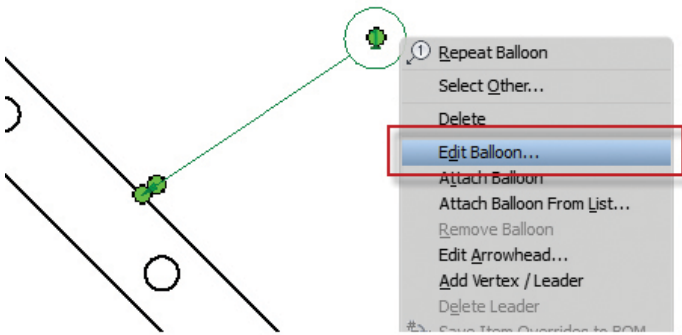


Figure 16

Next, choose a shape override if need be, and then start typing in the override area the information you need to put in the bubble. This will be single-line, no-carriage-return text—anything else should probably be put in a notes section on the drawing anyway.

What about an individual part? Surely this wouldn't work on a single part without a BOM or Parts List to speak of. Young grasshopper, pull up a CAD mouse and pay attention. You can absolutely do this. Simply start the balloon command and select your part. It will prompt you to create a simple BOM for just this part.

There you have it, a geometry enclosed leader with a perfect fit for your text.

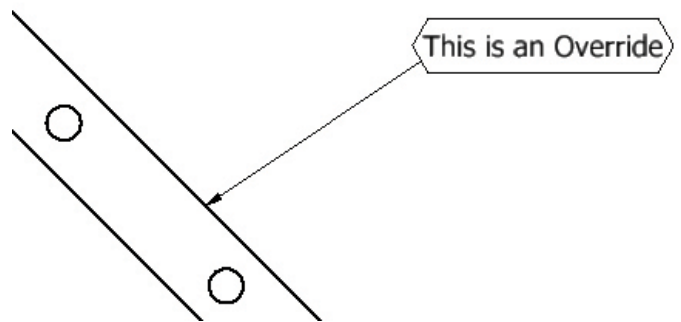


Figure 17

I hope you have enjoyed a few of these hot tips and tricks. Now share some of your own with your co-workers and on the AUGI forums!



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