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The Official Publication of Autodesk User Group International

July 2013

Managing Products, Processes, and Fish (People)



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- Revit's Fantastic Filters
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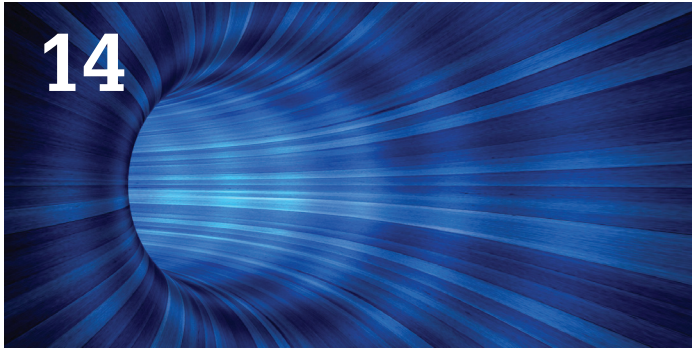
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contents

product focus



- 6 AutoCAD MAP 2014:**
Highs and Lows of Moving DWG into a Database
- 10 Revit Structure 2013:** Fantastic Filters
- 14 Vault and Simulation 2014:**
Simulation, Vault, and You
- 18 Revit Architecture 2013:**
BIM, on a Smaller Scale
- 22 AutoCAD Civil 3D:** Managing Your Civil Design Software Environment



columns

- 4 Editor's Note**
- 43 Inside Track**
- 46 Special Feature:**
AUGI Forums: String Theory



- 28 AutoCAD Architecture 2013:**
On Display, in ACA
- 32 AutoCAD:**
Get a Grip on AutoCAD
- 36 Revit MEP 2013:**
Revit Adaptive Components for MEP
- 40 Navisworks Manage 2013:**
Navistools—Tools for BIM
- 44 AutoCAD MEP 2013:**
The BIM Manager's Balancing Act



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Editor's Note



Hello, *AUGIWorld* Reader!

You ready for another great issue? You are? That's great since we have one for you! Our theme this month is management, a very diverse subject matter for sure. But our contributing authors have taken a good stab at this topic. So hold onto your keyboard, here we goooooo.....

But first, a quick word about a wonderful, but totally anti-technological, cover image. Our intrepid yet prolific cover photog Daniel took this shot in Cuba last year. Although I'm sure the fish were just doing what fish do, I would imagine that in many offices some people just follow along without any real idea why (one fish follows the fish in front—just because). So, there's the connection...fish are people, too!

Okay, with that segue out of the way, let's move on to the articles!

We begin with Gordon Lockett, and his ups and downs when using AutoCAD Map 2014. Next we have Greg Hale disclosing some of the fantastic filters found in Revit Structure 2014. And then John Evans brings a new subject to us, Vault and Simulation 2014. John breaks down this new product combination, showing what it can bring to you and your work on a daily basis.

Moving on to BIM, but on a smaller scale, Martijn de Riet breaks down how BIM and the process is often misunderstood by smaller companies adopting the use of Revit Architecture 2013. We follow that with an article by Bryan Tanner, who describes how to manage AutoCAD Civil 3D 2013 and its design software environment.

Bringing a new focus on displays, Melinda Heavrin goes on a shopping spree using display controls in AutoCAD Architecture 2013. Staying on the CAD road, Walt Sparling grabs hold of AutoCAD grips and shakes out some great tips! And then Michael Beall puts in his two cents as he explains how to change the insertion point of a block.

Branching out into the Revit world again, comrades Mark Green and Alan Jackson set the scene for when an adaptive component could and should be used in Revit MEP 2013. And then John Foster gets handy in Navisworks Manage 2013 with a neat set of Navistools!

Nearing the end of this packed issue, our man on the street, Lee Ambrosius, exposes CADPOWER, CADLEARNING, and MAGICAD in this month's Inside Track column. I guess the theme is programs with "CAD" in the title! Following that is Bill Campbell and his BIM balancing act when using AutoCAD MEP 2013.

Finally, in what may become a new recurring column, our own Melanie Perry gets all scientific in "String Theory" where she brings to *AUGIWorld* direct quotes from the AUGI Forums! Why should only readers on the forums get all the glory? There is some great stuff there, so take a read!

And with that, dear reader, I am ready to leave you to your nirvana....Autodesk products. Enjoy!

Take care,

David Harrington

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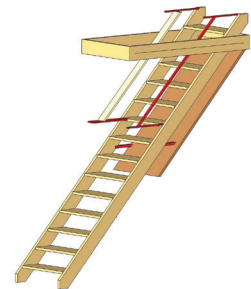
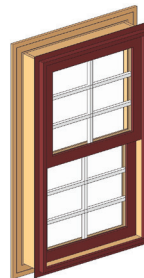
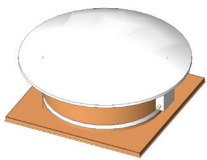
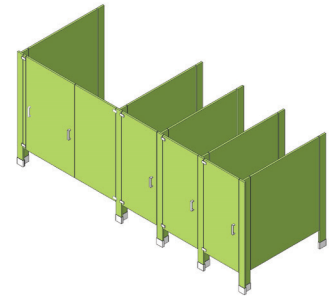
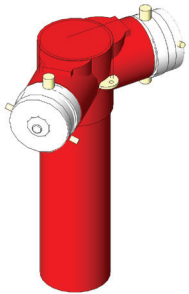
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Highs and Lows

Of Moving DWG Into a Database

Let's face it, the DWG is a wild beast with a complex and messy file format. It contains everything from polylines to xrefs to dynamic blocks to splines.

Using the DWG to map features within a municipality can be as easy as herding cats. Taming your DWG begins with simply keep-

ing good naming conventions for your blocks and layer names. CAD managers really need to be taskmasters to keep everyone consistent while creating DWGs.

How often do you attend a meeting and someone opens a DWG to demonstrate how something is built, and a colleague points out that the DWG is not the latest version?

DATABASE TO THE RESCUE

Storing your DWG in a database is not a new concept. As far back as 2001, Autodesk released Autodesk® Map 5 with Polygon and Advanced Oracle Extension service pack. This extension enabled you to push your entire DWG, including blocks, layers, and any attributes such as Object Data into an Oracle database. It was as simple as clicking two buttons called Read and Write (see Figure 1).

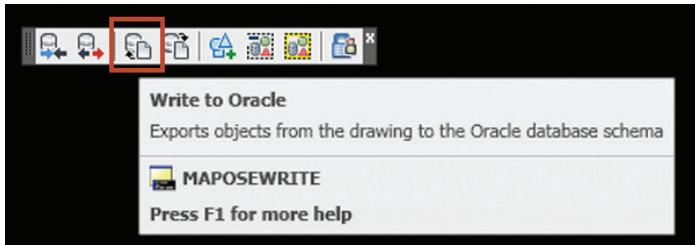


Figure 1: MAPOSEWRITE button

In fact, if you received a new DWG containing all the water mains, hydrants, and valves for a new subdivision, you could simply click Write, and everything—even block scale and rotation—would quickly go into Oracle in the correct format.

Unfortunately this only works with 32-bit versions of AutoCAD® Map 3D 2014 and Oracle rather than the newer 64-bit versions.

MORE DATABASES FOR YOUR DWG

In 2004, Autodesk released Autodesk Map 2005 with Feature Data Objects (FDO). This started the trend of connecting to many different GeoSpatial data types including:

- Autodesk SDF
- Shapefile
- ArcSDE
- MapInfo
- ODBC
- Oracle
- SQL Server
- SQLite
- PostgreSQL
- MySQL
- WMS/WFS

Some amazing tools to style and theme the data were now available. You could now color-code your water mains rapidly by age or size using the style tools. Performance increased exponentially. Even classic GIS analysis such as spatial overlays were now possible.

FDO truly marked the shift from DWG-centric data to spatial-centric data. However, it was no longer easy to push blocks and attributes into a table. In order to push data into the database, the user would have to know the data structure inside and out. You would have to know which AutoCAD® properties went into which column in the table. For example, your block rotation might have to be mapped to the block_rot column.

You can select each AutoCAD feature and add it to the table one feature at a time, but the FDO way ignores all the AutoCAD properties such as text value or Object Data (see Figure 2). To load the new subdivision you will have to pick on each new item individually or export all the layers to a temporary file such as SDF first, and then use batch tools called Bulk Copy to load it into the database. Not so pretty, is it?

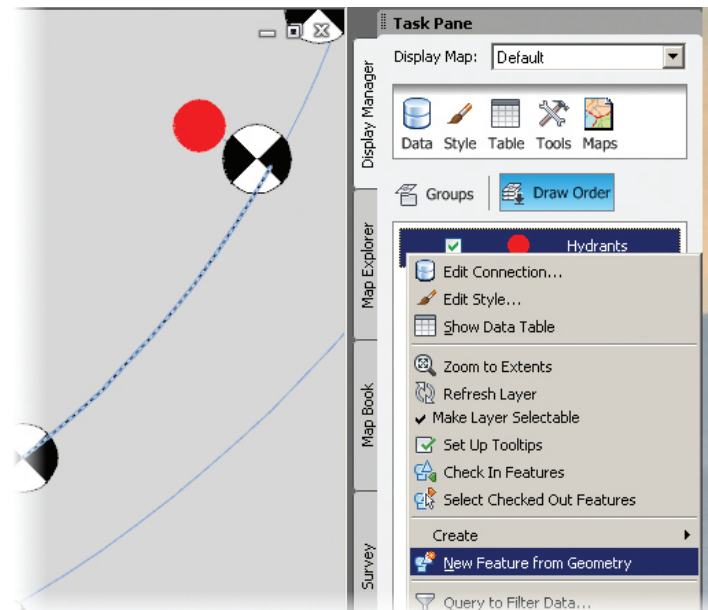


Figure 2: New FDO hydrant from AutoCAD geometry

If you no longer want to deal with DWG, maintaining the database is quite easy with FDO. In fact, it is a very powerful spatial engine and integrates with Autodesk Infrastructure Map Server and Autodesk InfraWorks (Infrastructure Modeler) seamlessly.

WHOLE HOG DATABASES

The evolution of moving to databases really matured when Autodesk released Topobase in 2006, the Oracle-based tool for storing your DWG in Oracle.

Topobase, completely integrated into AutoCAD Map 3D and now called Industry Models for Utilities, provides a lot more tools than FDO alone. Not only does it now support SQL Server, SQLite, and Oracle, but it also can do some advanced drawing such as prompting the user for rotation when inserting a block symbol directly to the database. Versions of the data are stored within the database and referred to as “Jobs.” Network analysis is also “out of the box” in the industry models if the data supports it.

AutoCAD MAP 2013

Another advantage of going with the Industry Models is that you don't need to reinvent the wheel. There are whole data models for Electric & Gas, Land Development, Roads & Highways, Water & WasteWater, and any custom model you wish to create (see Figure 3).

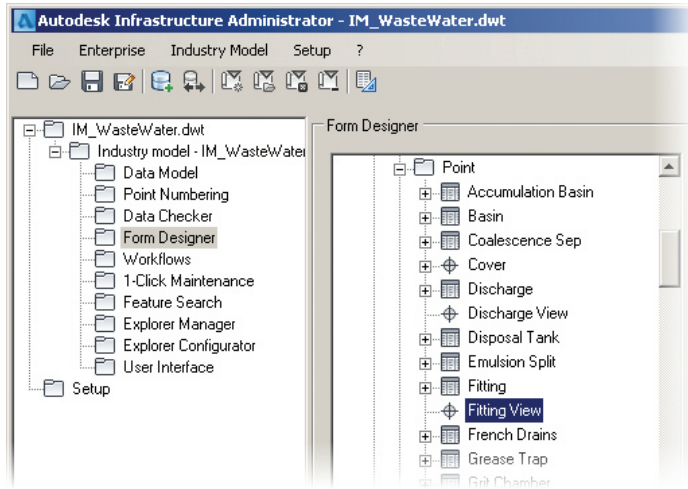


Figure 3: Autodesk Infrastructure Administrator WasteWater Model

Returning to our example of a new DWG containing all the water mains, hydrants, and valves for a new subdivision, just as with the FDO, the Industry Models still would require adding one feature at a time. Alternatively, like FDO, there is a batch mode called Convert to Industry Model that allows you to match each feature in an SDF or SHP to an associated feature in the Industry Model (see Figure 4).

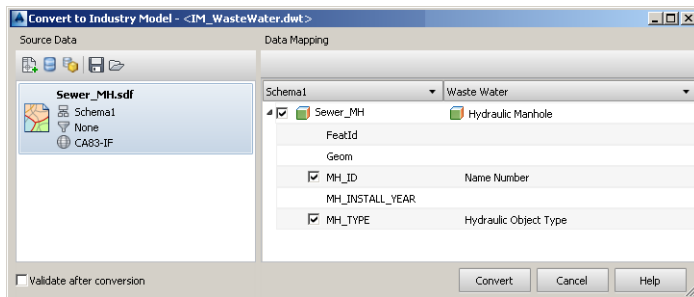


Figure 4: Convert to Industry Model (SDF to Oracle)

Either way, you will require an intimate knowledge of the data model to bulk load data into the database with either FDO or the Industry Models; the current DWG properties or exported SDF/SHP columns will have to match up to what is in the database. It's not as seamless as Read/Write.

DATABASE LOADING THE NON-AUTODESK WAY

So you are probably thinking, "Why can't I have the Read and Write buttons like the Oracle Spatial Extension?" Those of us using AutoCAD Map since the stone ages have been asking that same question.

Until FDO or the Industry Models have these user-friendly read/write tools, we can look outside the Autodesk universe to see how to move our DWG into the database automatically. A great product from Safe Software is FME Desktop (<http://www.safe.com/fme/fme-technology/fme-desktop/>). FME (Feature Manipulation Engine) converts, transforms, and modifies data in almost any spatial industry format. In fact, there are few formats it does not read or write. It's amazing. From a DWG perspective, it can read the properties from a DWG and push it into the database with simple batch files or on-demand buttons.

Properties such as block attributes and text rotation, object data and linetypes can all be captured and put in the database table of your choice. I frequently use this to batch As-Builts into SQL Server on an hourly basis so everyone has the latest version.

Again, this process is not for the faint of heart. You not only have to have a good understanding of your database, but also a keen knowledge of how FME works. This is a tool for the geospatial professional who also wears a database administrator's hat.

FUTURE

Hopefully this is a "call to arms" for the Autodesk community to come up with an easier way to load whole or partial DWGs into a database with a simple click of a button.

Until then, we can keep using the FDO and Industry Model one-feature-at-a-time techniques, which are great if all your data is edited "in-house." For those who receive DWG updates from an outside source, it might be worth your while to research the FME Desktop product or at least learn about the Bulk Copy or Convert to Industry Model tools.

Either way, unless you are still using 32-bit AutoCAD Map 3D and only want to use Oracle, the magic of Read/Write is out of reach.



Gordon Lockett is principal of Arrow Geomatics Inc., a GIS consulting, training, and development company. Oracle Spatial and SQL Server Spatial are part of Gordon's specialties, especially when they are combined with Autodesk and Open Source products. Much of his focus entails building web-based sites using Autodesk Infrastructure Map Server and MapGuide OpenSource.

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Fantastic Filters

 As you've progressed through your Autodesk® Revit® implementation into your office workflow, just how far have you utilized Revit within your daily design and document process? Typically, the first step is to match the graphic standards of the documents you had previously created using some other CAD platform such as AutoCAD®. Further steps might include such things as integrat-

ing trade coordination, quantity takeoffs, and analysis. Many companies only make it to the first step—without realizing the true benefits of Revit and BIM. One great way to learn how to leverage the underlying data in Revit is to utilize graphic filters. This little-known and easy-to-use feature will help expose some of the many paybacks of investing in a BIM workflow. It can also serve as a tool for quality control and project management that provides graphical and intuitive feedback.

WHAT ARE FILTERS AND WHY DO WE NEED THEM?

As mentioned previously, graphics are typically the first hurdle in a Revit implementation and are very important to initial success. There are a number of ways to adjust the appearance of objects in Revit; Object Styles, Visibility Graphics, Phasing, View Depth, Worksets, Linked Files, View Templates, Linework, and so on. Revit objects belong to Categories instead of Layers, and Categories have appearance settings that are applied to all objects in a category. Category appearance settings control object characteristics of line color, line weight, and line pattern and can apply to an entire project or to individual views. At a global project level these are controlled by Object Styles. At a view level, they are controlled by Visibility Graphic Overrides.

For structural engineers, the graphics tend to be relatively simple for such things as floor plans, elevations, and details with the majority of these being fully controlled by Object Styles and Visibility Graphics Overrides. But there are some instances where that's not enough. For example, there is no sub-category of walls for bearing versus non-bearing walls, or concrete columns versus steel columns. So how do we control the graphic representation of an object by its parameters instead of just its category? This is where filters come in. Filters allow us to quickly and effectively select and modify the appearance of objects from within the same category.



Figure 1: Filter of concrete and steel columns

While filters have not been widely used in the Structural Engineering field, they are quite common for MEP Engineers. That's because filters are an absolute necessity in order to graphically differentiate systems, such as Supply and Return, in order to coordinate them.

THE ANATOMY OF A FILTER

Filters can be found on the View tab or by going into the Visibility Graphics of most views. The filter dialog is made up of three main sections: Filters, Categories, and Filter Rules.

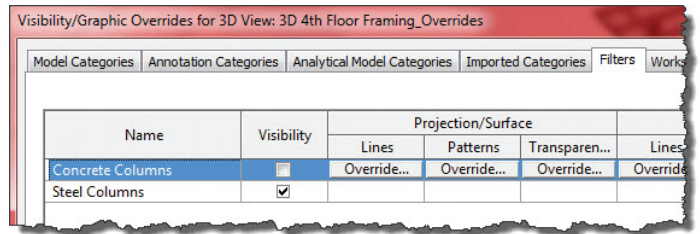


Figure 2: Visibility Graphics Overrides

Filters – refers to each of the named filters within the project. This is similar to other dialogs where these named rule sets can be created, duplicated, renamed, and removed. A standard naming convention should be used that is descriptive, yet brief, to help the user easily identify the rules applied to the filter.

Categories – refers to the available Revit categories in which to apply the named filter. Like schedules, this will dictate the parameters you will have available to apply rules.

Filter Rules – defines the logical statement that will determine to which objects the filter will apply. Each set of rules consist of three elements: a parameter to filter by, an operator (equals, less than, does not contain, etc.), and the value to look for in the specified parameter. Up to three logical statements can be used per filter using the “And” statement.

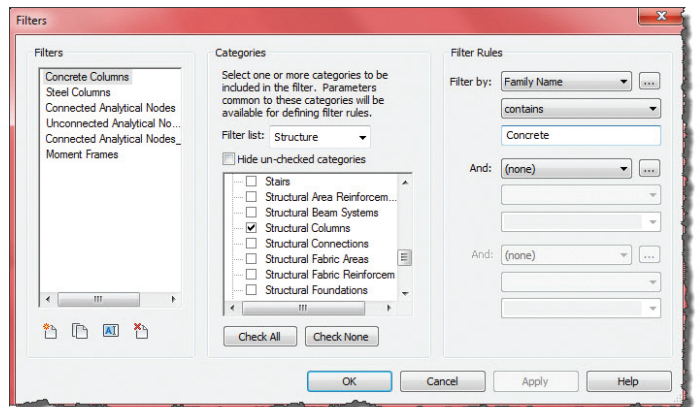


Figure 3: Concrete column filter

APPLYING A FILTER

Once you have the filter defined, you may apply it to a view. To do this, go into the Visibility Graphics and select the Filters tab. You will then select the “Add” button and continue to select the named filters that you would like to add to your view. Once they are added to the view you will continue to define the overrides you would like to apply to the filter. Graphics that can be controlled are Visibility, Projection/Cut Lines and Patterns, and Transparency. Ultimately, this allows you to control your graphics by categorical parameters instead of just object categories.

Revit Structure 2013

INNOVATE

Now that you've learned how to create a filter and apply it to a view, get imaginative and start applying them in ways that enhance your design workflow. The opportunities are limitless. Following are some ideas of ways that filters can assist.

Filters for Documentation

There are always cases where you need to highlight specific kinds of elements, or conversely, greytone them or even hide them. Revit Categories don't provide great flexibility, and overriding individual elements can be time consuming and cause problems down the road. Use Filters to dig into the Revit parameters of the categories and override the graphics of the targeted elements.

- + Bearing wall and shear wall pattern overrides
- + Visibility of steel versus concrete columns
- + Category (bracing & trusses)
- + Material surface shading
- + Existing grids & levels
- + View tags (section/elevation/callout) visibility
- + Linetypes by object parameter
- + Phasing or sequencing by custom parameter
- + Concrete pour sequence
- + Transparent floor by parameter
- + Owner furnished, contractor installed
- + Owner finished, owner installed

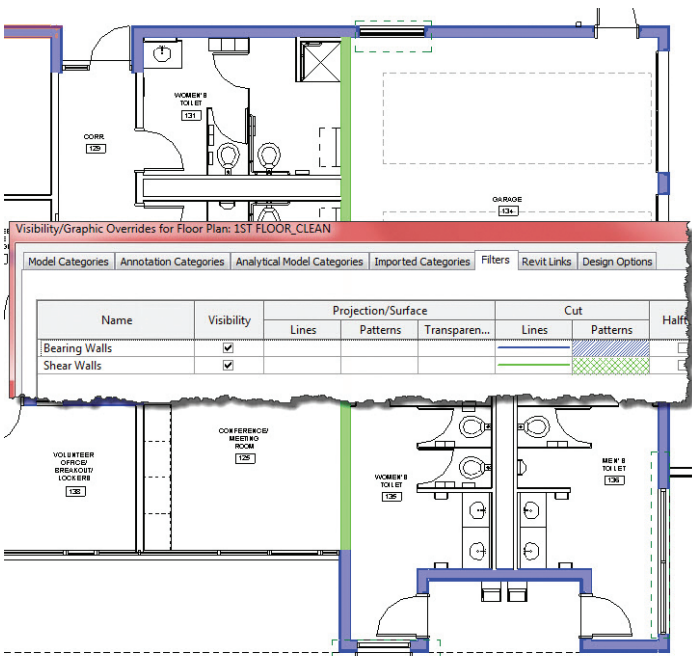


Figure 4: Bearing wall and shear wall filter

Filters for Management, Review, and Coordination

Have you ever wondered if there was another way to quality control your design and documents without using paper and a highlighter? Now there is. Set up a new Revit view of your floor plan or 3D view. Then create a filter to test your design and use graphics to highlight the correct, or offending, items. For instance, highlight moment frames in green in a 3D view so that you may graphically check that you have applied end connections correctly (see Figure 5). Or add a custom parameter to structural elements showing whether design calculations have been checked for individual elements or sections. Then set up a QC view that shows checked items in green and unchecked items in red. This can be a great way to show the project reviewer or project manager which items have been reviewed.

- + Moment frames/braced frames
- + Trade coordination
- + Engineering review check
- + Design review dates
- + Fire ratings (color by rating)
- + Color by associated level (3D)
- + Color structural embeds by location
- + Beam sizes by color
- + Foundation sizes by color
- + Host references
- + "Appears in Schedule" custom parameter

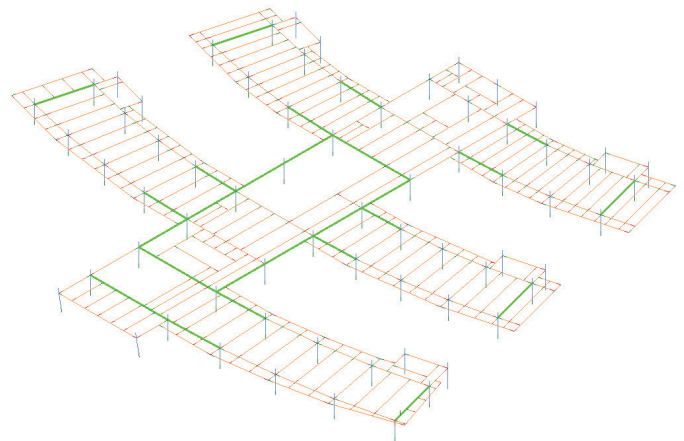


Figure 5: Moment frame filter

Filters for Analysis

Have you ever tried transferring your Revit Structure project to structural analysis tools and received several errors or warnings regarding the connectivity of nodes? Now you can graphically check the connections of nodes in your model before exporting. Revit 2014 comes preloaded with a couple new filters in its structural template for node connectivity. Also utilize these filtered

views to check your structural loading and look for things such as high moment or shear values that might require some extra attention in design.

- Analytical adjustments
- Special design calcs or considerations
- Connected analytical nodes

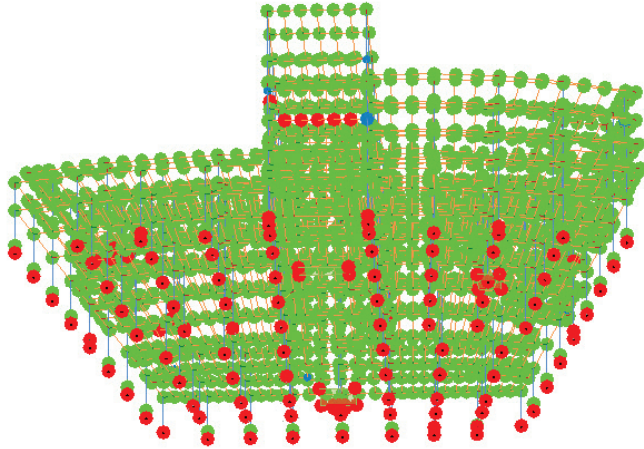


Figure 6: Analytical node filter

VIEW TEMPLATES

Utilize view templates to apply these filters to many other views and standardize in your company template. Because filters cannot be copied and pasted, this is the surest way to easily apply graphics settings to multiple views. View templates and filters can also be transferred between projects by using the Transfer Project Standards command.

GET YOUR PRIORITIES STRAIGHT

There are times when a particular object might be selected by multiple filters at once. Fortunately, Revit has a system in place to manage this. The filters have priorities so that the filter listed as the highest priority will control its visibility. If each filter is controlling different graphic settings, then both filters may be applied with the higher ranking filter taking priority. The one exception to filter priority is the “Visibility” setting. If any of the filters has this setting unchecked, then the object will not be visible, regardless of priority.

Also look out for other conflicts with graphic overrides. Filters rank high on the list, as shown in Figure 7, but overrides that rank higher are individual element overrides and the Linework tool. You should use this list as a guide for the best ways to approach your graphics changes. Start at the bottom and work your way to the top with the Linework tool being your absolute last resort.

CONCLUSION

Many of us in this industry are graphical people who can understand illustrations better than numbers. Using graphic filters allows us to test our design and present it in a way that is easily understandable and can provide us with visual clues to designs that can be difficult to interpret on paper or by numbers. Try digging into the filters tool to see what kind of creative uses you can find. I would be interested to hear some of them.

PRIORITY OF VISIBILITY OVERRIDES IN REVIT
(Listed from highest to lowest priority)

1. Line Work Tool
2. Override graphics in view by element
3. View Filters
4. View Range – Beyond line style for objects in Secondary Range
5. Phasing
6. Silhouettes (Graphic Display Options)
7. Visibility Graphics Overrides – Transparency
8. Visibility Graphics Overrides – Override host layers (Cut Line Styles)
9. Visibility Graphics Overrides – (Projection and Cut Lines)
10. Object Styles

Figure 7: Visibility overrides priorities



Greg Hale has worked in the AEC industry for the last 15 years. He’s spent the prior 6 years as BIM Manager for an AE firm, 6 years as a structural engineer, and 3 years in construction. Greg recently took the position as CTO at Edge Global Technology Solutions. Specializing in Autodesk Revit, Navisworks, mobile technology and 3D HD Laser Scanning, he provides training, implementation strategies, product optimization, and best practice solutions to a wide variety of clients. His main focus has always been on utilizing technology as a catalyst to advance the AEC industry and break down barriers formed by traditional methods. Greg is a well-rounded educator in technology solutions and has spoken at many professional events nationwide. In addition, Greg is a co-founder of the RocCity Revit User Group and has been a member of multiple NCS and NBIMS task teams. Contact him at: ghale@edge-gts.com



Simulation, Vault, and You

Autodesk® Vault support for simulation and analysis has been touchy for some time, and by and large I think most companies performing simulation tend to avoid it. Some products were not or are not supported as well as others.

I want to take a quick glance at some of the things I've encountered with Vault, and what it can do for you. I'll also discuss some workflow issues and possibilities that may help get you around a few glitches.

Topics Outline

- Vault Basic?
- General Vault Support and Dependencies
- Simulation CFD
- Simulation Mechanical
- Vault Manual Check-out Issues
- Inventor 2014 to Simulation Export and Vault Thoughts

VAULT BASIC?

I'll be writing from the perspective of Vault Basic 2014 for two primary reasons.

- To give everyone a baseline perspective of what can be expected between Autodesk simulation platforms and the version of Vault that ships with Product Design Suite 2014.
- I have not upgraded my Vault 2013 Professional license (still licking my wounds from a bad archive and recovery).

Vault Basic gives everyone the opportunity to catalog the progress of any design or study. Anything can be archived in Vault, which Scott Moyses and I discussed at Autodesk University 2012; it's simply a matter of careful planning when Vault does not support that particular software.

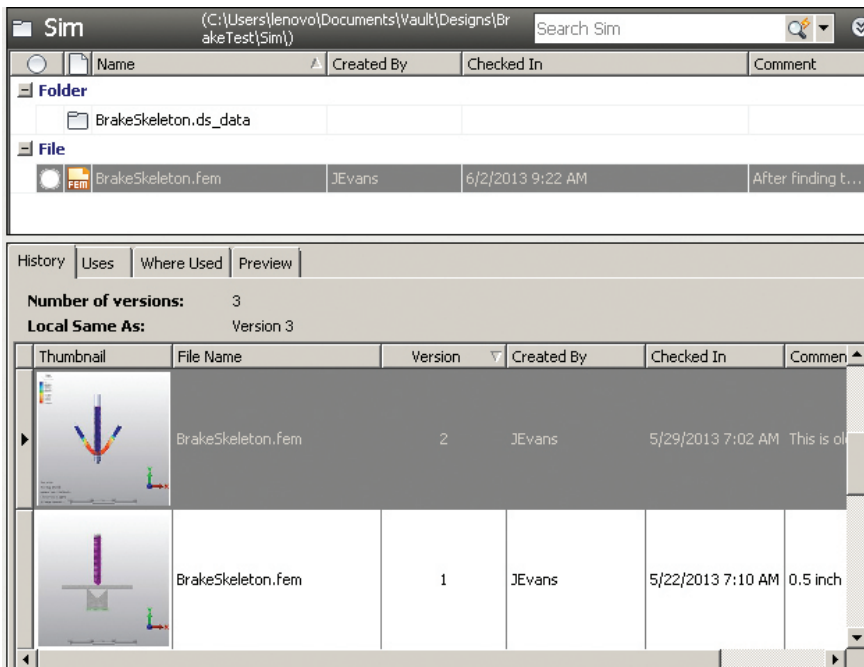


Figure 1: Versions of an ongoing analysis study in Vault Basic 2014

GENERAL VAULT SUPPORT AND DEPENDENCIES

When you hear that Vault supports your software, you might expect the whole nine yards of capabilities; however, that may not be the case. For many 2014 software titles from Autodesk, Vault support will include at the minimum a ribbon tab that includes basic check-in and check-out procedures. These tools also load the extensions that interact with Vault and help catalog the dependencies and mapping associated with each of the various files in a particular check-in process.

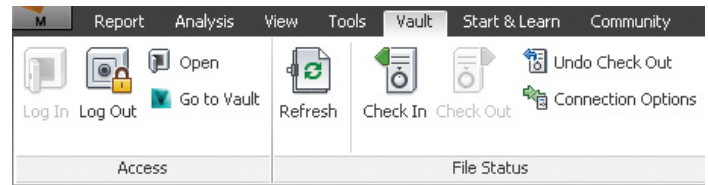


Figure 2: The Vault ribbon tab in Simulation Mechanical 2014

What this means is that without this particular integration, you are likely to be up a creek with a very unintelligent drag-and-drop paddle. Fortunately, 2014 rolled around with basic Vault support for all Autodesk simulation platforms.

SIMULATION CFD

Vault support in Simulation CFD, while lovely, does not include dependency support. The company used the very same solution Scott and I worked out, creating an appropriate archive from the really cool tools in CFD, and then manually overwriting the previously checked out version in Vault.

The 2014 support simply furnishes the Vault ribbon interface to automate the process, which I am thankful for just the same.

A note about CFD Archives in Vault:

Initially I tried checking the entire CFD structure into Vault Professional. Without Vault dependency support, this turned out to be a nightmare. Moreover, file quantities and the sheer size of the file structure was overwhelming for a Vault check-in. The CFD archive in itself is a blessing and makes the Vault process much cleaner. The downside is not being able to review your log files from version to version. We, however, wanted to perform the review

and change process in PLM 360, so it was no loss for us.

SIMULATION MECHANICAL

Vault Basic offers Simulation Mechanical users the following basic capabilities:

- Archival and catalog support
- File dependency tracking
- Version tracking
- Vault ribbon tab integration in Simulation

As you can see in Figure 3, Vault does a fine job of tracking not only the file dependencies in Simulation Mechanical, but also their appropriate version relationships.

Vault and Simulation 2014

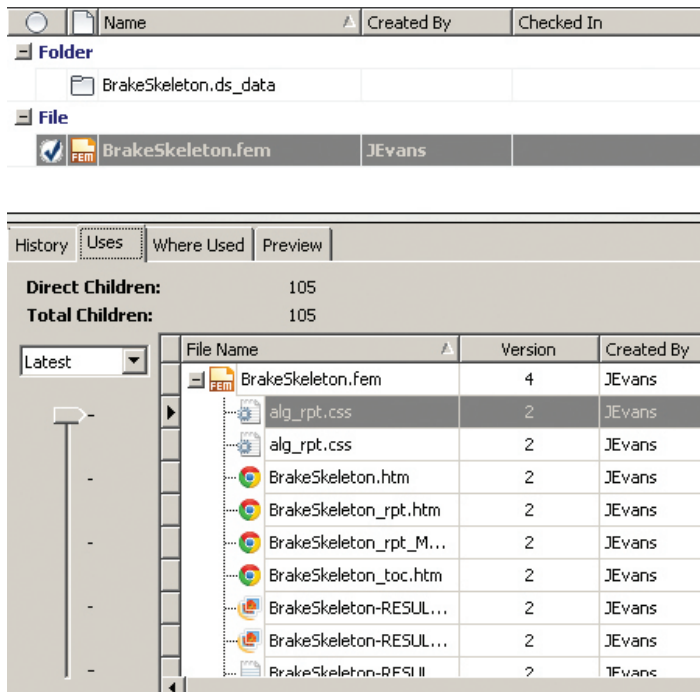


Figure 3: Vault cataloging the Simulation Mechanical .FEM file relationships

Vault saved my bacon this past week with this analysis, where I had inadvertently modified my scenario to end up with very problematic results. Attempts to revert the modifications failed miserably and took far too much time. Finally, a check-out of the older version overwrote the problem with the previous, stable solution. From there I was able to re-steer the study.

File property mapping characteristics are unsupported. Mapping has to do with file types and Vault's understanding of what information the file can pass to the database and vice-versa. Simulation Mechanical is not on the list of compatible file types.

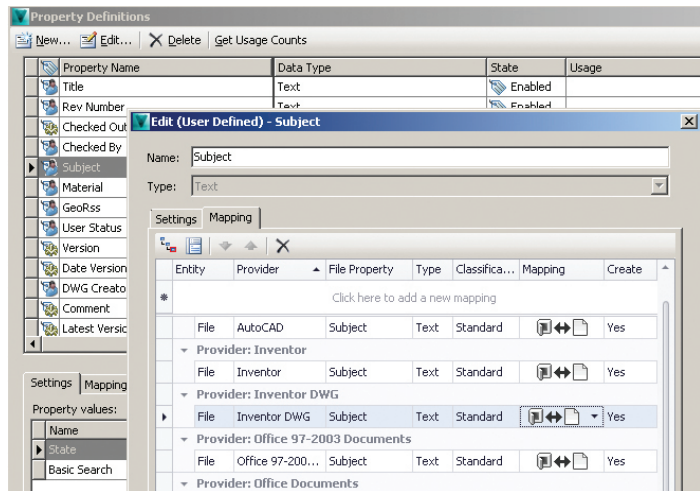


Figure 4: File property mapping options in Vault Basic 2014

VAULT MANUAL CHECK-OUT ISSUES

As much as I like the Vault support for Mechanical (and CFD), the sudden fall-off of supported capabilities in Vault are difficult to deal with on occasion. One occurs when directly opening or checking-out Mechanical's file from the Vault 2014 client.

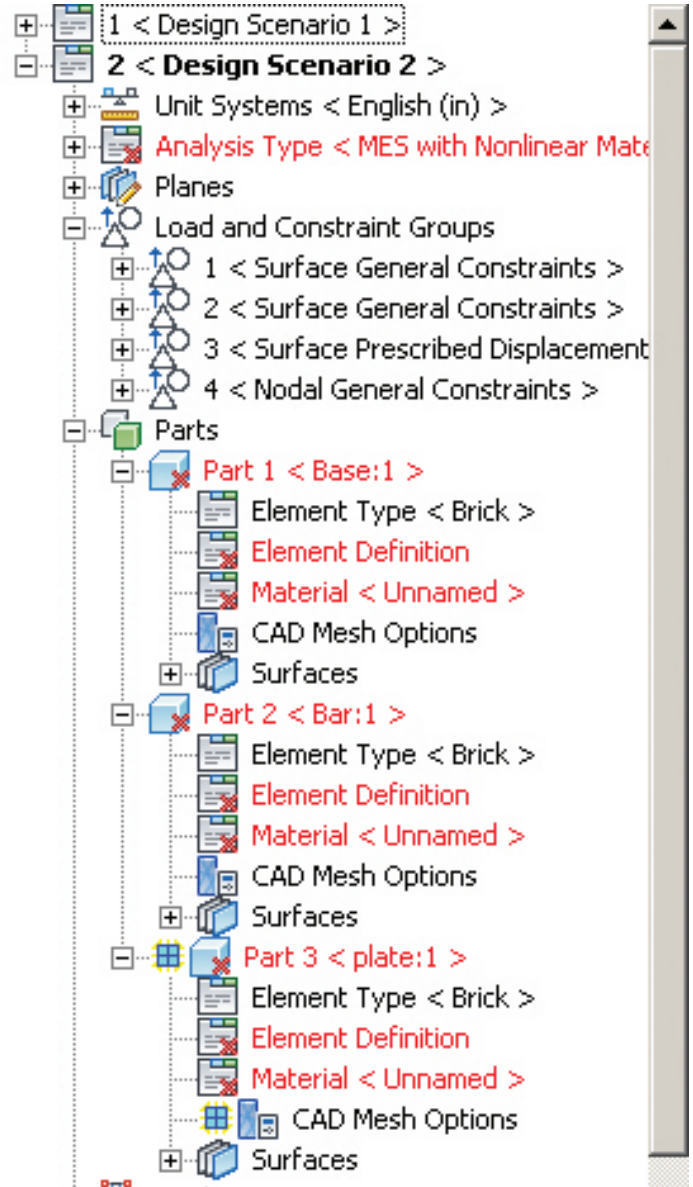


Figure 5: Simulation Mechanical 2014 fails after an improper Vault check-out

If only part of the required files are checked-out, say, the Mechanical's FEM file but not its related folder structure, Vault will not check-out the remaining files when needed. The same goes for opening the file directly from the Vault 2014 client. Vault will copy all the appropriate files to the working folder, and Simulation Mechanical will open them just fine; however, the analysis setup will geek-out and Simulation will not tell you exactly what is wrong.

If this happens, close the file, undo the check-out in the Vault client, and then check-out both the .FEM file as well as the related folder structure, overwriting everything in their paths.

INVENTOR 2014 TO SIMULATION EXPORT AND VAULT

There is one headache that has plagued me and many other Inventor users who enjoy the Simulation export functionality. When the model is exported to Simulation Mechanical, the resulting analysis file structure is saved in the Inventor project structure. My analyses tend to take on a life of their own, and having all that data stored in the Inventor project root is undesirable.

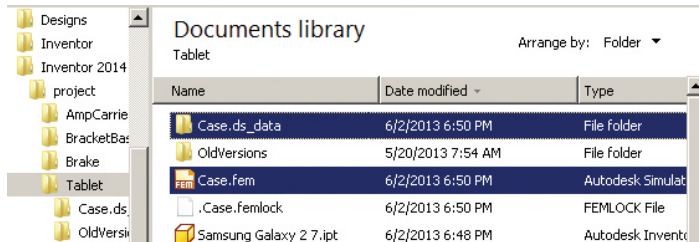


Figure 6: Inventor project file structure resulting from Inventor - Simulation Export

One way we typically deal with this is to perform the Vault check-in from Mechanical once the set-up process is completed. Then check-out the data, which will put the structure in the appropriate Vault Working folder from there on. An option to remove the files from Inventor is available during the process, which if left unchecked will leave you to deal with the files later.

Another consideration at that point is updating the components once the analysis process is underway. Modifying the Inventor model and resubmitting it through the Simulation export process will cause Mechanical to replace the model in the associated analysis study, provided that the Simulation Mechanical file structure is still where Inventor put it. When the Mechanical files are no longer present, a new analysis file will be built. When this is important, users have two options.

- Leave the Simulation Mechanical file structure in its original Inventor project location, checking-in all the data including the Inventor data as well. (You can eventually restructure the data when the model is no longer expected to be modified.)
- Copy and overwrite the older Simulation Mechanical files within the Inventor project, after checking the newer files out of the Vault.
- Neither option is perfect. I like to leave the data structured together in Vault, but move the Simulation Mechanical data to the 'SIM' folder, and the CFD related data to the 'CFD' folder in the Vault structure.

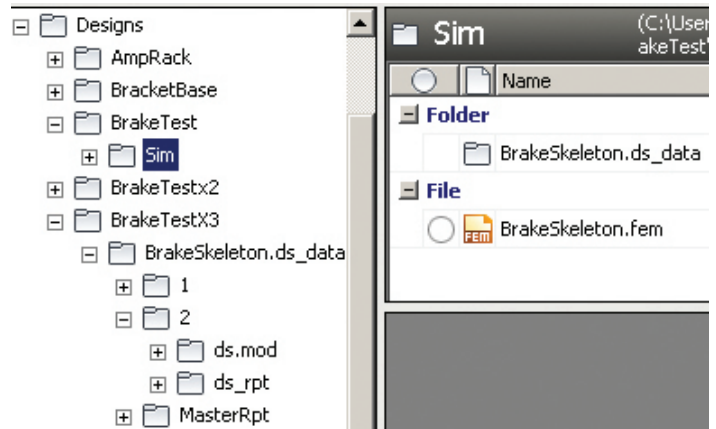


Figure 7: Organizing the Simulation Mechanical data in the Vault client

In this way, all my data from Inventor, Inventor Simulation, Simulation Mechanical, and CFD are collected in a clean, single project under control of Vault. The downside is that Inventor can no longer modify the model in Mechanical.

THOUGHTS

While Vault support with all the file data interaction is not present for the Simulation products, the basic necessities such as check-in, version, and dependency processes are there. Furthermore, Vault Professional still offers change order and revision control for any file that is cataloged. One of my favorite Vault Professional features is the ability to associate the file types with categories and automate various organization and behavioral characteristics. These allowed Vault to change how my reports are cataloged as soon as the files were checked-in.


Being able to catalog and control my results data, as well as the ability to recall previous versions of my studies in a pinch, is a life saver and the main reason I highly recommend finding the best method of incorporating Vault in your analysis process.



John Evans is an Autodesk Certified Inventor Professional living in the Florida Panhandle, where he provides technical troubleshooting at Gustin, Cothorn, and Tucker, Inc. His career through the Aerospace Design, manufacturing, and maintenance spans 24 years and includes a tour in the USAF. John now works as a design consultant and author from his company John Evans Design and manages the blog "Design and Motion", where he combines his passions: Autodesk Inventor, simulation, and motion control. He is a regular attendee of Autodesk University and has recently joined Tekni Consulting as a contributing author for the Creative Inventor training series. He can be reached at john@johnnevansdesign.net



On a Smaller Scale

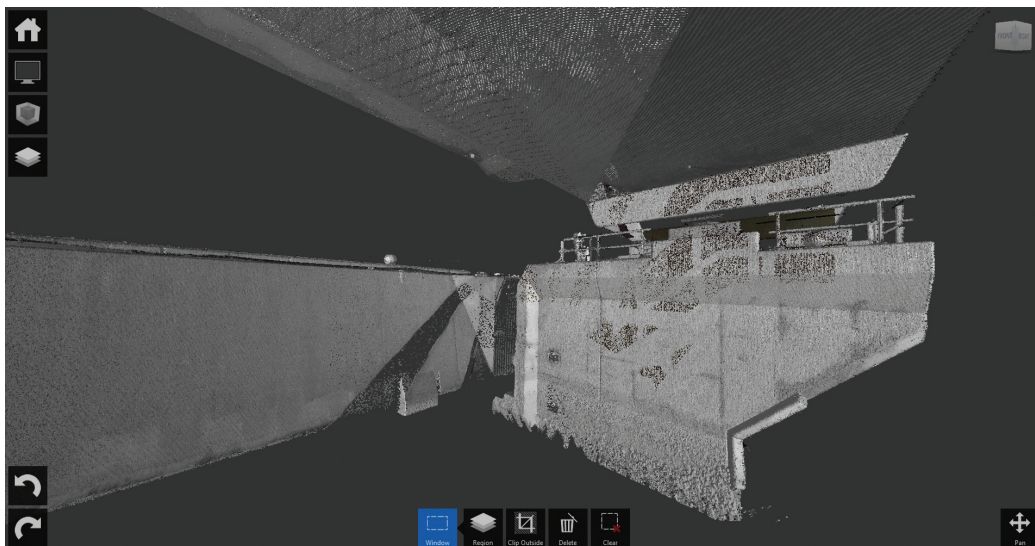

When I was first approached to write on the topic of BIM implementation in large firms versus smaller ones, I thought, “What’s there to write about?” However, after giving it some consideration I realized that there are some major differences between the BIM workflow in large and small firms. The subject grew on me, so to speak. This is not a roadmap—we have those in the form of BIM Execution Plans, BIM Protocols, and such. This is my view on the pitfalls that you encounter when trying to implement BIM, or any disruptive technology or work process, in “small” companies.

I would like to stress that this can also be a very enlightening article for those of you working in large firms, especially if you find yourself getting extremely frustrated whenever you deal with small firms. So keep reading, even if it does not immediately seem to affect you directly...I am sure it will!

DEFINING “SMALL”

What is small? Well, obviously, there are the numbers and in some cases it is that simple. Regarding the numbers, I would consider mine a small firm, since it is just me. (*A firm any smaller would be non-existent!*) That said, small is project-dependent and not simply about the number of staff. A firm of one can be small or large; small is fundamentally about the size and complexity of projects. To demonstrate this I offer up two examples:

1. I have a client and friend who is self-employed, just like me. However, he works on Big projects (and the capital B is there for a reason). I mean, he works on huge, multi-billion dollar projects! He is an extremely specialized expert who, employed for his particular field of knowledge, operates both with and within large and complex project teams. I do not consider his firm small in any way, even though it is as numerically small as my firm is. His is an example of a big firm.



“Small” firm GeelinkBosch laser-scanned the Eastern Scheldt storm surge barrier

- I also know of a company that is one of the large architectural firms, in Dutch proportions. The company specializes in consumer-based housing projects and each project they do is a single, unique residence designed by an architect and then taken to construction by an all-around engineer. They have 50 to 60 people in design development; however, due to the scale and nature of their projects, the firm acts as if it is as small as my firm.

When it comes to implementing BIM, size is not about how many people there are in a firm; size is about the complexity and magnitude of any single project done.

WHAT'S SPECIAL ABOUT SMALL FIRMS?

What are the differences in the approach to BIM among large and small firms? Good question, and the answer is, “not much.” However, there may be a few pitfalls, which have more to do with expectations and prejudices than any of the usual things one might assume when pondering firm size and implementation needs.

Just as in big firms, implementing BIM in small firms mostly means getting people to adapt to a new work process, train them to work with new tools, and define new project strategies. So far, so good, one might say.

The differences (or pitfalls) lie within the following aspects of the implementation:

- The Numbers
- The I.T.
- The Budget
- The Commitment

PITFALL 1: BIM IS NOT ABOUT NUMBERS | BIM IS A PROCESS

Let’s start with some of my “red flags.” If you ever want to trigger a good “discussion” with me, use one of the following statements: “If you don’t collaborate in project teams, you’re not doing BIM.” or “Small projects aren’t suitable for BIM.”

In my not-so-humble opinion, those two often heard statements are complete and utter BS (with the capitals intact). BIM is not, I repeat,

NOT, defined by the number of people on your project team, nor is the size of your project’s budget or square footage a determining factor for ‘doing BIM.’ BIM is about a work process. BIM is a coordinated, effective, wholistic process for AECO project realization.

In a similar manner, collaboration is about disciplines, not people. If your architect, building engineer, structural engineer, fire safety expert, MEP engineer, and everyone else on project are one and the same, then cool! That saves you from bouncing extraordinary numbers of emails, memos, and reports back and forth, but does not affect the BIM-ness of the project. As long as she or he is working in an integrated Building Model (or models), there is no difference with a project team where individual people play these roles individually or one individual plays all roles together.

BIM can be suitable from the smallest of projects.

Trust me; I have done it countless times, and why not? Small projects do not need coordination or revisions... There are never any ducts going through structural members on small projects either, right? Of course not...

One of the most challenging tasks I face when starting conversations about implementing BIM in a small firm is getting the prospective implementer to understand that BIM brings benefits (read as: added value) for any team, on any project, of any size! No matter how big or small, complex or simple, BIM is a process and not a bunch of numbers.

PITFALL 2: I.T. | BIM IS NOT ABOUT I.T.

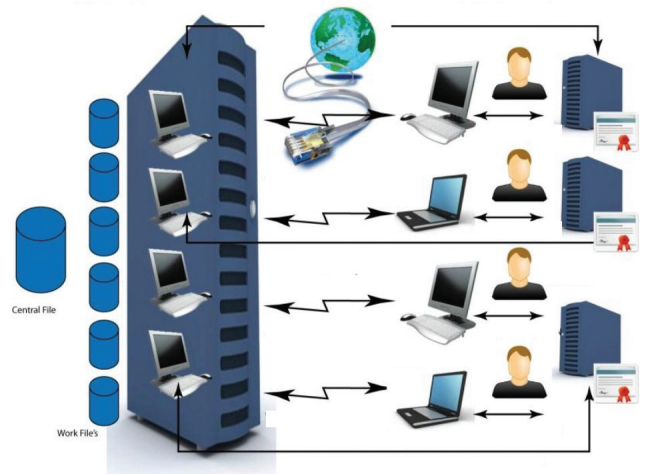
Let’s face it: we love our gadgets, both software and hardware. If there is a new toy out there, we can hardly wait to get one and play with it. So we all get excited if there’s a chance to implement an integrated set of BIM tools such as Vasari, Revit, Navisworks, Vault, Citrix servers for model access through your iPad, point cloud laser scanning, smart QR Codes on site, and so on...and on...and on. However, that is not a necessity for BIM.



Tiny, yet profitable, BIM

When implementing BIM in small firms there is a golden rule: Do not get carried away. Small firms probably have no I.T. Manager. Usually it's the person that once, a few years ago, thought to give a jammed workstation a cold reboot, which cleared the 'problem.' Same with the CAD Manager—something somebody does on the side, when there is nothing more important to do, just because they know how to get a .ctb file modified in AutoCAD®.

BIM can be straightforward and very simple. Install your software and be done with the "Tools" part, *at least for now*. There is no absolute need for all the fancy I.T. stuff. Sure, it comes in handy sometimes—it might even help you to leverage BIM more effectively and get more value out of your investments, but for small firms the primary objective is staying down to earth. One of my clients quite eloquently put this in perspective when I got carried away. They said, "You're already on Mars while we just want to go to the moon."



Probably a bit over the top for small firms

One way of finding the right balance is to talk to your clients about their wishes. What do they want? What do they need? What would be their ultimate goal in 5 or 10 years from now? Then apply the Pareto Principle. http://en.wikipedia.org/wiki/Pareto_principle. Get to 80 percent of the targets with 20 percent of the effort and you are on your way. Forget the rest for now, the other 20 percent will come once they are on board and have their own work processes in order.

PITFALL 3: BUDGET

The world is not fair. Implementing BIM is (debatably) more difficult for small firms than for larger firms. It can be thought there are two reasons for that:

3a) License Coverage

In large firms, not all team players may be working as an architect or engineer with the design software. Even when they are working projects and using the BIM software, if your design staff is of a certain size you can be assured that not all of them will be in the office doing design work at the same time.

Therefore, while a small firm needs a single license for every employee, in large firms these licenses are often shared, which means that when we calculate the direct software costs per employee, those numbers drop when the firm gets bigger.

3b) Phasing

In large firms BIM can be implemented in phases, which means direct costs (software and hardware) and indirect costs (training and lost productivity) can be spread out over a longer period of time. Moreover, there is always a part of the large company working at full speed, which means a lower impact on the company as a whole.

This is not the case for small firms. If there is just one designer, your entire team is gone when he or she is taking a course in the new BIM software. When that single designer is struggling, the revenues of the entire firm are affected.

This requires serious attention. I usually “solve” this by training the staff on-project. This way, they (sort of) stay productive. For “basic” training, I rely on them to self-study using YouTube, Autodesk® video instruction, and so on. Fortunately, I find people working in smaller firms are *usually* very flexible and proactive, so this works rather well.

3c) Standardization

Small firms struggle with creating their own workflow from scratch. You bought the software, invested in training, and now you also need to spend serious time and budget on getting it to work? Create a library, BIM execution plans, modeling agreements and definitions, and so on.

Small firms benefit from standardization. They have neither the manpower nor the budget to have somebody work on a company standard and template for a month. They want to buy something, put in their corporate identity (you know, have the section marker look like the boss wants it to look) and get cranking.

PITFALL 4: COMMITMENT

Usually in small companies there is an extremely high level of commitment. The decision to “go BIM” is applied firm wide (which is easy if your firm employs just a few people). Commitment is not as easy to achieve in larger firms, where a management decision is the defining adoption factor. In small firms, management usually IS the work floor, and vice versa.

While larger firms can deal with one or two (or ten) people not seeing the benefit or willing to go the extra mile, this is deadly for small firms. Let’s say you are a party of five. Having one person not on board means 20 percent of the people in your firm do not agree with its current heading. Twenty percent is a lot to have “going rogue,” especially because small firms do not have the ability to transfer the rest and push them against the wall. The team simply is too small.

For BIM—and specifically BIM implementation and adoption—to work in small firms you will need 100 percent commitment, nothing less. Large firms will ultimately need this same commitment, but can handle it in smaller phases of implementation and adoption.

IN CONCLUSION

As stated in the beginning; implementing BIM in a small firm is similar to adopting in a mid-sized or large firm. There are a few pitfalls, but if you are aware of them, manage them, or manage to avoid them altogether, you will be just fine!



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.

Managing Your Civil Design Software Environment

What has the AutoCAD® Civil 3D® environment become? We've grown from the "basic" installation of Civil 3D to entire suites of software supporting, supplementing, and expanding the range of capabilities accompanying Civil 3D. Add to that the complexity of people—upper management, which may or may not have an understanding of the software's capabilities, a user base at varying levels of experience and technical knowledge, and an ever-growing need to stay billable during a time when budgets and overhead are tight. What's a person to do in this sea of resellers, suites, training options, and budget cuts?

Let's explore some opportunities to get significant gains in productivity, while reducing demands on time and improving the overall level of expectations surrounding the software we use day in and day out.

LICENSE MANAGEMENT

There are several reasons why I can't ethically suggest specific software packages, suites, or Value- Added Resellers (VARs). However, I can offer some perspective on evaluating your software uses and needs, purchasing timeline, as well as the organization and maintenance of software licensing.

First off is your choice of VAR. It's as simple as this: if you aren't happy with the information and service you are receiving, look elsewhere. One VAR may not suit all firms' needs. Some of those reasons include cost, responsiveness, and level of expertise for support services, as well as training options, software advisement, down to the pleasantries of individuals you have grown to enjoy working with. There are dozens of options available from international, regional, and web-based VARs. Autodesk has also attempted to better address which VARs may be a bet-

ter fit for firms by creating Partner Tiers (Platinum, Gold, Silver, etc.) and Partner Specializations (advanced customer solutions, consulting, training, etc.). To find a VAR in your area, visit <http://autode.sk/weY77m>.

You should also be regularly looking into what software licenses are being used, how many, how often, and if you have more licenses than what suits your firm's needs. Don't underestimate the need to evaluate if you have too few licenses as well. Nothing brings production to a halt faster than attempting to load your software of choice and no licenses being available. This also raises the question of what array of network or standalone licenses you should maintain. Whatever you do, don't ignore this potentially expensive step of managing AutoCAD Civil 3D. The Autodesk Network License Manager is your *de facto* tool for managing licenses, but tools such as SAMreport, FlexNet Manager, and JTB FlexReport make understanding usage patterns and demand load a snap.

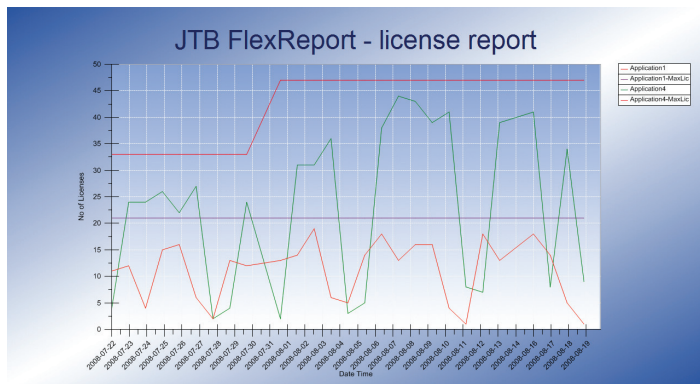


Figure 1: Example FlexReport—license report (courtesy jtbworld.com)

When you should purchase can make nearly as big a difference as *what* you purchase for the cost of your software. Given the myriad software purchase combinations and impossible-to-predict changes in pricing, there is no magic answer for deciding the best time to purchase engineering software. However, anyone experienced with the process should be aware by now that there are regular promotions and discounts available at different times of the release cycle. Simply put, be on the lookout via Autodesk's and VARs' social media accounts or sign up for email alerts to keep in the loop for potential cost savings. A good place to start is @Autodesk on Twitter, but there are numerous resources.

INSTALLATION MANAGEMENT

AutoCAD Civil 3D 2013

Creating a deployment can be a time-consuming process, but it is much more effective than distributing that time and those tasks to dozens or hundreds of workstations with the possibility of inconsistent settings. You can find more information on installation and maintenance of software here: <http://autode.sk/Zs3gal>

PEOPLE MANAGEMENT

People management is, without a doubt, the most difficult aspect of managing engineering software. There are numerous articles, posts, and even entire websites devoted to the concept of managing people. However, I'm more interested in what it takes to manage aspirations, abilities, and continual use of Civil 3D and Infrastructure Design Suite.

Before beginning any software initiative, you must have buy-in from upper management. This will include setting expectations for the time and effort required to successfully implement the software, a plan for who is to manage templates, what projects are appropriate for which software, and when certain individuals will be responsible for learning and using the software. This is a 10,000 ft. view of the essentials, but the essentials aren't to be taken lightly. Too many firms adopt Civil 3D and the surrounding software without a realistic plan in place. That plan may or may not include the assistance of VAR training, educational books, conferences or seminars, and on-going, in-house training. As a matter of fact, one of the most important things you can do is continue regular, in-house training.

That said, continuing training should include the use and instruction on your firm's customized templates and defined workflows. Leaving processes too vague or non-specific as to how "you do things" will create numerous opportunities for inconsistent drawings, rework, and overwork on projects. Many projects have and will be "over modeled" due to a lack of oversight, causing over-complexity of drawings, larger files, delays in processing, and a reduction in potential profit on projects.

Utilize opportunities such as lunch-and-learns, morning meetings, or monthly internal user group seminars to assign different team members an opportunity to learn and present on topics applicable to active projects. This will ensure all staff is taking part in both sides of the learning process and reduces the possibility of burnout on your part. Use the following link to get more information on Autodesk software training options: <http://autode.sk/MNixHg>

Whatever you decide, remember to evaluate your choices every six months to a year to ensure everyone stays on track. "Everyone" includes upper management, training, and production users. If there is a gap in expertise, understanding, or support of the process as a whole, consider methods to engage those individuals.

DRAWING MANAGEMENT

We've finally progressed to the point of managing Civil 3D and Infrastructure Design Suite that involves production. The previous topics are all necessary in the engineering software environment, but do little for billing against projects. Let's explore some tools and techniques to maximize the productivity of projects.

Foremost are your company or client standards. Although the thought of standards in Civil 3D pairs directly with a template, the process begins at a baser level. You can't overlook text and dimension styles, layers, fonts, LISP routines, or plotter configurations. AutoCAD and Civil 3D allow for support paths to be local to each workstation or from a server location. These are defined from the "File" tab of the OPTIONS dialog, shown in Figure 3.

Unless you are constantly mobile, working on production outside the office, or have less than a handful of users, do you and all users in your office a favor and set up support files within a designated location on the server. This will allow for consistent configurations and make it easier to maintain standards, especially if you save a custom user profile from the settings in the OPTIONS dialog. Also, if your firm has preferred System Variable settings, those can also be saved from the SYSVDLG dialog and imported to each workstation.

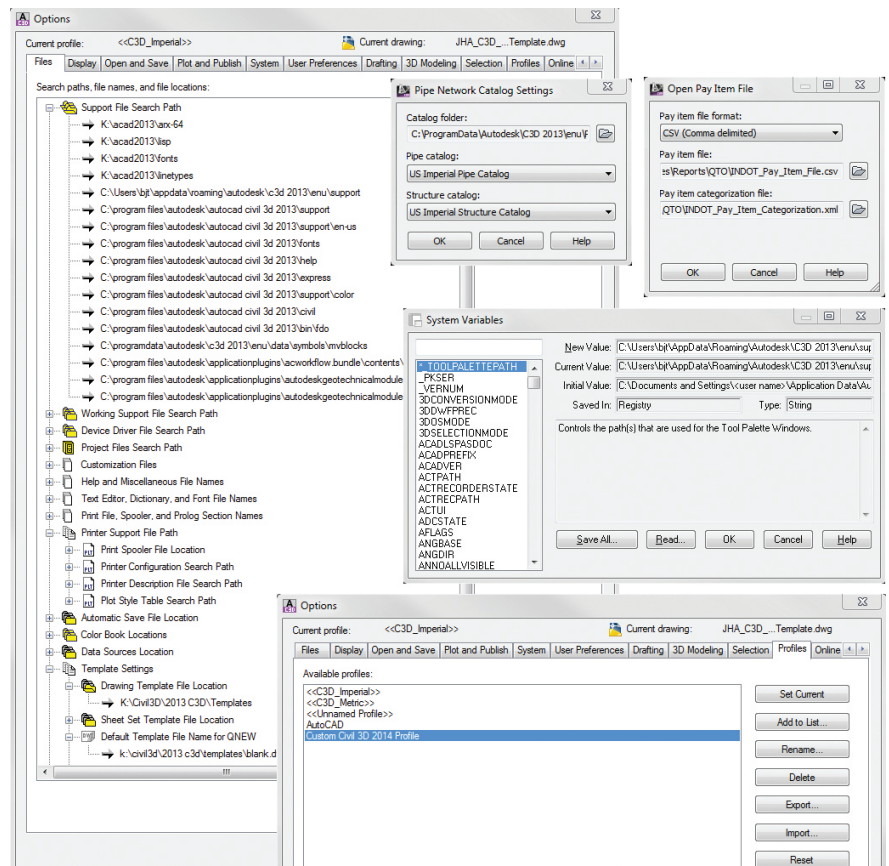


Figure 3: Options support paths, profiles, pipe network catalog, quantity, and system variable example configurations

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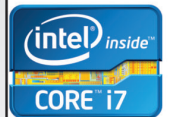
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Next, consider your company or client template. Beyond just the .DWT template file, you must think about settings configured locally or on the network for Pipe Network Catalogs, Quantity Takeoff Pay Items, and Reports. These dialogs are represented in Figure 3.

Creating and maintaining a template is a never-ending process that will require additional styles created over time and to be imported into the template file for future use, as well as regular communication with all users regarding changes to or different methods used for styles during the design process. You never know what inventive uses could be overlooked or what problematic settings can sneak back into templates. Don't disregard the questions and concerns of your users and educate them on the importance of starting from a clean and updated version of your templates for each new drawing.

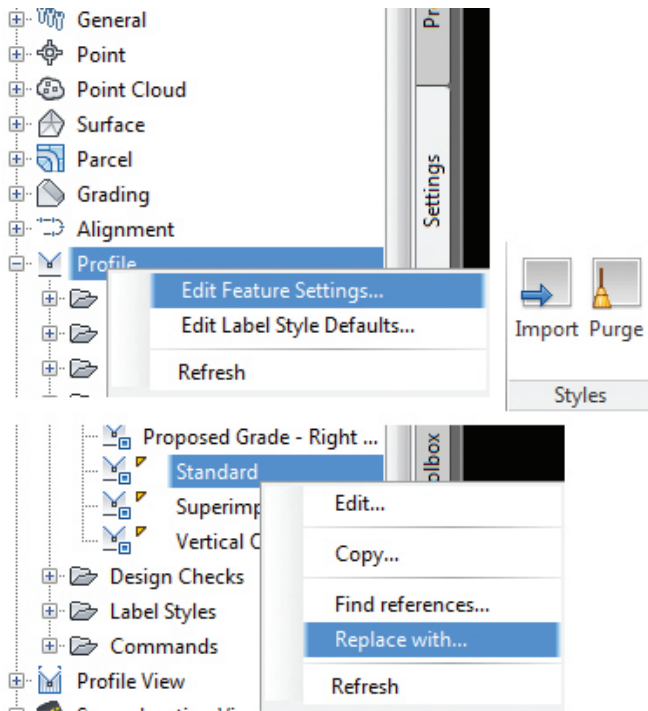


Figure 4: Edit Feature Settings and Edit Label Style Defaults are quick ways to apply styles and settings, while the Import, Purge, and Replace with tools are methods to cleanup and refine template styles

In Figure 4, you'll see some of the options available to make maintaining a template easier. Right-clicking an element from the Settings tab of the Civil 3D Toolspace and choosing "Edit Feature Settings..." or "Edit Label Style Defaults..." will allow you to apply mass changes to object layers, units, text styles, and many other properties. This will save considerable time and allow minor changes involving just the unique elements of each style. The "Import" and "Purge" style commands from the Manage ribbon make transferring and cleaning up styles from files en masse possible. Also, for the purposes of refining a template to remove any unnecessary styles, the "Replace with..." and "Find references..." options from the right-click menu allow for granular control of those hard-to-remove styles.

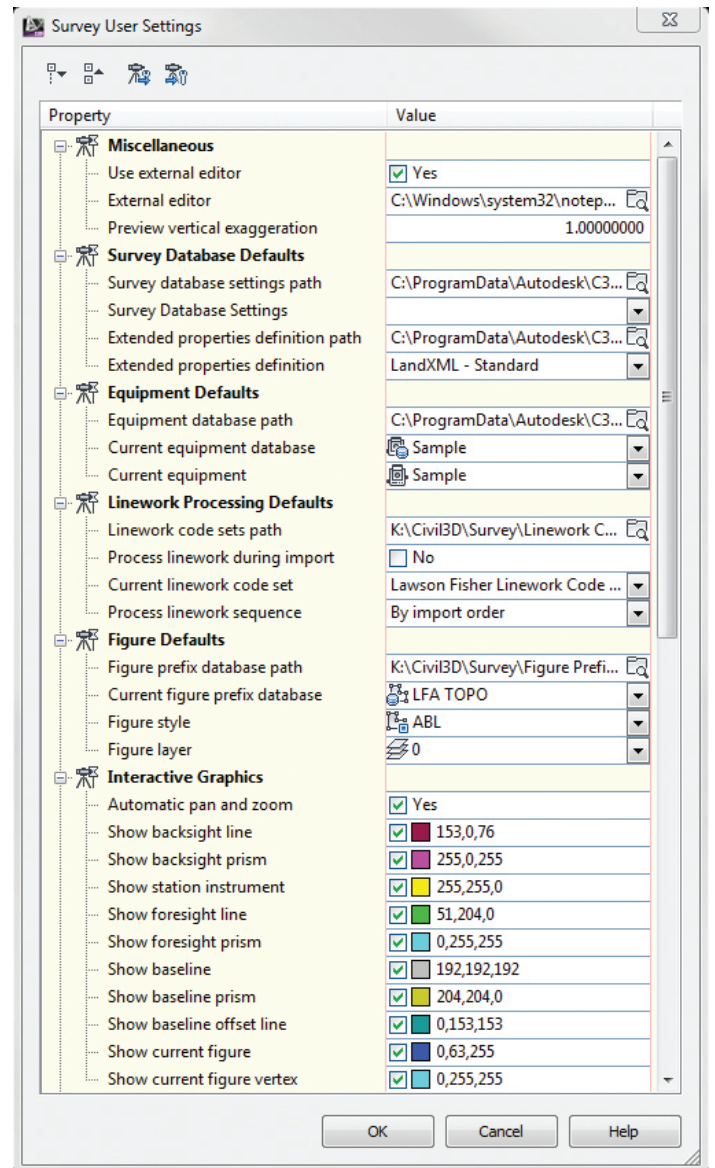


Figure 5: Don't forget the elusive Survey User Settings dialog before importing a database or network

Figure 5 represents the Survey User Settings dialog, which is an often forgotten area of Civil 3D setups. This is partially due to residing on the Survey tab of the Toolspace as opposed to the Settings tab. It is important to ensure that settings such as Figure Prefix Databases, Equipment Databases, Linework Code Sets (as well as Coordinate Zone and Units from the Survey Database Settings) are defined before importing any survey events into Civil 3D. Again, these resources can be located on a server to share office-wide to maintain standards.

Special Note: One tendency of some network administrators and CAD Managers is to "lock" or write-protect resource folders and files shared on a network. However, in certain cases such as Figure Prefix Databases, for example, this can inhibit or completely prevent the use of these files by Civil 3D. Be sure to research what network resources can or should be freely editable.

Wrapping up, there are many tools and methods to manage the madness that Civil 3D and Infrastructure Design Suite can become. Although this article focused on Civil 3D, many of the topics can be utilized for AutoCAD, Map 3D, Utility Design, and many other programs. Even extensions or supplementary applications, such as Autodesk Storm and Sanitary Analysis, have the ability to create templates and standard definition files for consistent use of the software. Keep in mind, too, that not all effort must be done at once. Development and maintenance over time will keep you sane and ensure you're applying new concepts learned from support and production throughout project lifecycles.



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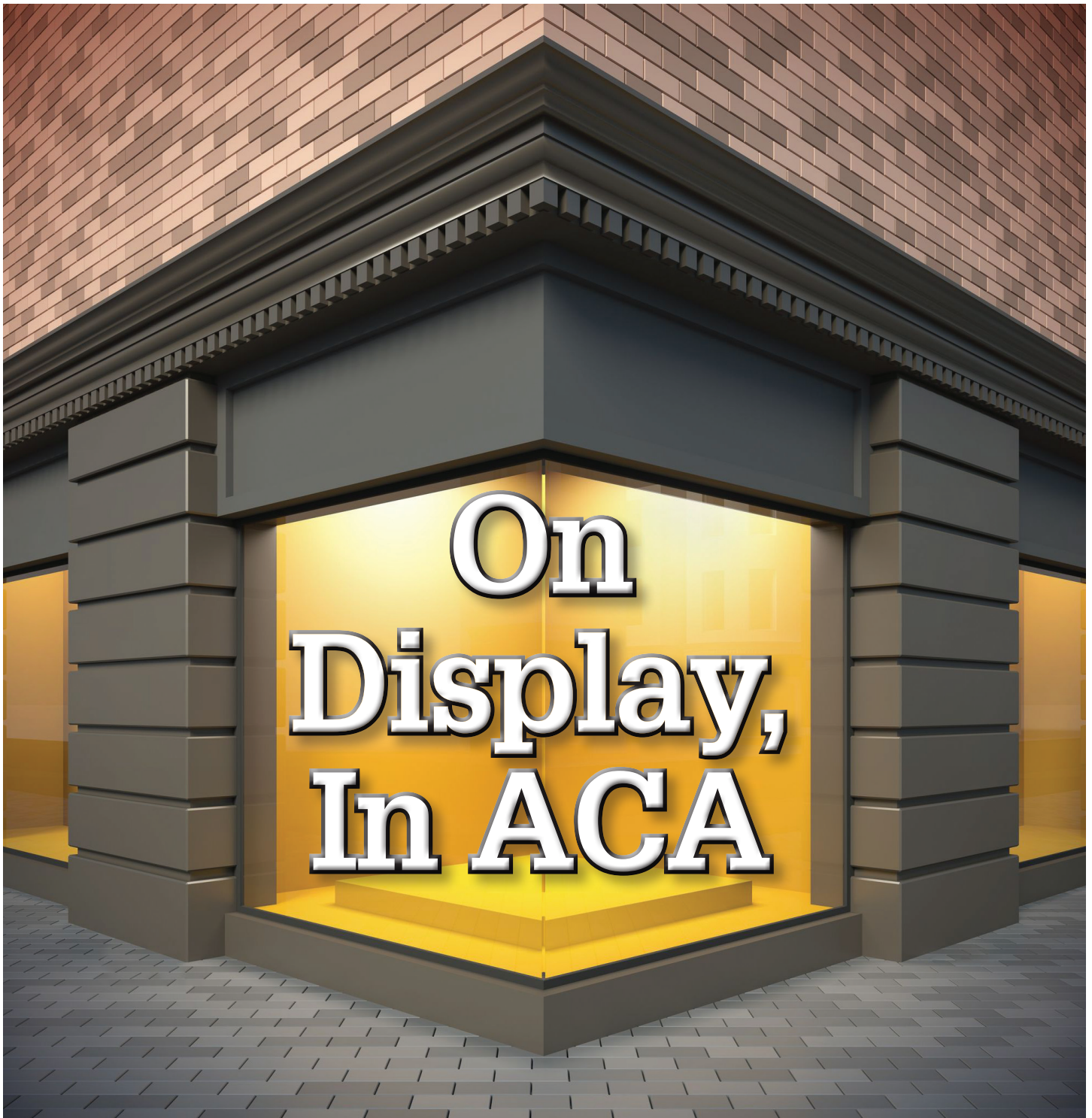
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The display system in AutoCAD® Architecture is specifically designed so you only have to draw an architectural object once. The appearance of that object will then change automatically to meet the display requirements of different types of drawings, view directions, or levels of detail. The view-dependent display of objects in AutoCAD Architecture is made possible by a hierarchical system of display settings that specify display properties (visibility, layer, color, linetype, etc.) for individual display components of all the different types of architectural objects under all the different viewing scenarios.

If you are a CAD manager, you will want to fully understand the display system structure and the display manager so you can modify and organize default settings as necessary to implement your own display standards. But any user can quickly change the appearance of an object in a particular view by modifying values on the Display tab of the Properties palette.

To change the display using this tab, click Select Components, select an object display component, and then select or enter a new value for the display property you want to change (such as color or

lineweight). The results are immediately visible in the drawing area for the current display representation and can be applied to other display representations that use the same component.

The display system has three major elements.

- Display representation – controls how an individual object is displayed.
- Display set – a group of display representations of objects.
- Display configuration – a collection of display sets assigned to particular view directions.

These three elements are hierarchical: each display configuration contains a number of display sets and each display set contains a number of display representations. To use a display configuration, you assign it to a viewport. The objects in the viewport then use the display properties specified in the display configuration.

You use different display configurations for different tasks, such as sketching and plotting. You also use different display configurations for different types of drawings such as floor plans, 3D models, and elevations. AutoCAD Architecture includes templates with predefined display configurations applied to viewports. These configurations are created for typical architectural tasks and drawing types. You can use the configurations and viewports supplied by the templates or you can modify the display system settings to suit your office standards. If you want to create your own display configurations, you can start a drawing from scratch or from a template that does not contain predefined display configurations.

DISPLAY MANAGER

The Display Manager is a centralized location for the display system information for your drawing in AutoCAD Architecture. The Display Manager is used to create and modify display configurations, display sets, and display representations. The Display Manager window can be resized as needed to view display information. To open the Display manager, click on the Manage tab of the ribbon, Style & Display panel, and select Display Manager.

On the left pane of the Display Manager is a hierarchical tree view that organizes the display information for your drawings. You can add, rename, purge, send, and copy display system components in this area. As you select items in the left pane, you will notice that the right pane is updated (see Figure 1).

The right pane of the Display Manager contains information about your selection in the left pane. In this area, you can view display sets and mapped view directions that are associated with each display configuration. You can also view the display representations of objects and preview how an object is displayed.

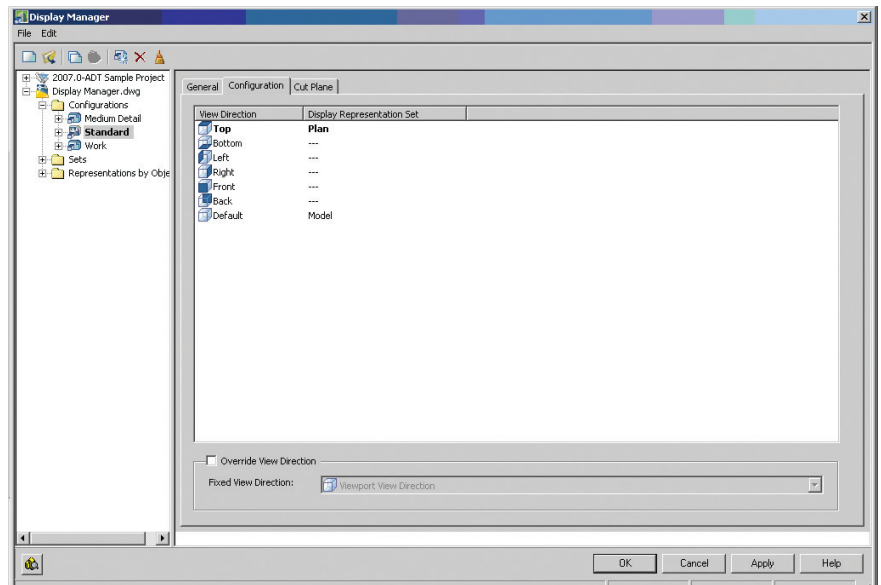


Figure 1: Display Manager

DISPLAY SETS

Let's take a more in-depth look at display sets. Display sets are collections of object display representations. A display set determines which objects are visible and how these objects are displayed in different views. A display set contains display representations that are appropriate for specific tasks and/or drawing types. For example, the Reflected display set contains display representations for objects that are usually included in a reflected ceiling plan (see Figure 2).

It is possible for a display set to contain more than one display representation for an object. For example, a display set designated for plotting a floor plan might include the Plan and Threshold Plan display representations for doors. In this example, Plan display representation contains components for the door panel, frame, stop, and swing; whereas the Threshold Plan display representation contains components for the inner and outer thresholds of the door.

If a display set does not contain display representations for a particular object, the object is not displayed when that display set is used. For example, a reflected ceiling plan's display set does not need representations for railings, which usually are not shown in these drawings.

A display set is not dependent on view direction, although it usually is designed with a specific view in mind. Similarly, a Plan display set might contain Plan display representations for a number of objects intended for two-dimensional (2D) top views. A three-dimensional (3D) model display set might contain the Model display representation for a number of objects. The display representations included in a display set depend on what representations are available for each object and whether objects need to be drawn differently from different view directions.

AutoCAD Architecture 2013

Drawings based on templates provided with AutoCAD Architecture contain display sets for many purposes. All drawings, including those that are not created from templates, contain the following default display sets: Elevation, Model, Model High Detail, Model Low Detail, Plan, Plan High Detail, Plan Low Detail, and Reflected. These display sets contain display representations for each object based on the most common design situations.

To create a Display Set, begin by clicking on the Format menu, select Display manager, and expand Sets. If you want to create a display set with default properties, right-click Sets and click New (see Figure 3). If you want to create a display set from an already existing display set, right click the display set you want to copy and click New. Enter the name for the new display set and hit Enter. Specify the display representations to use in this display set and click OK.

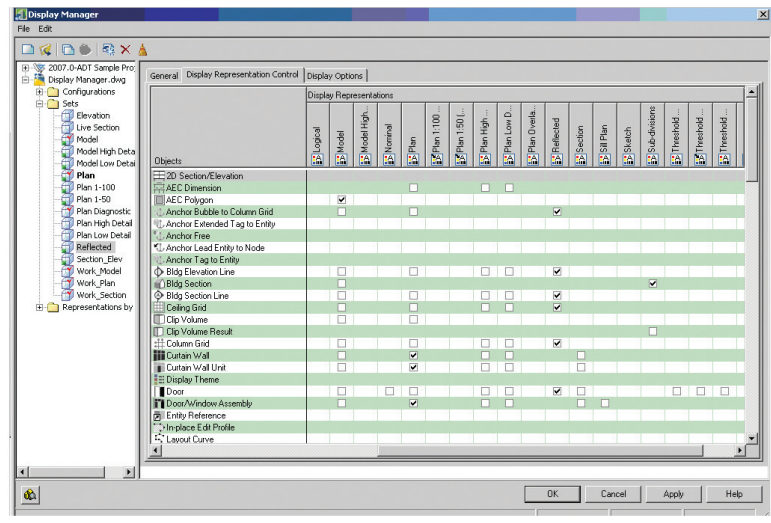


Figure 2: Reflected display set

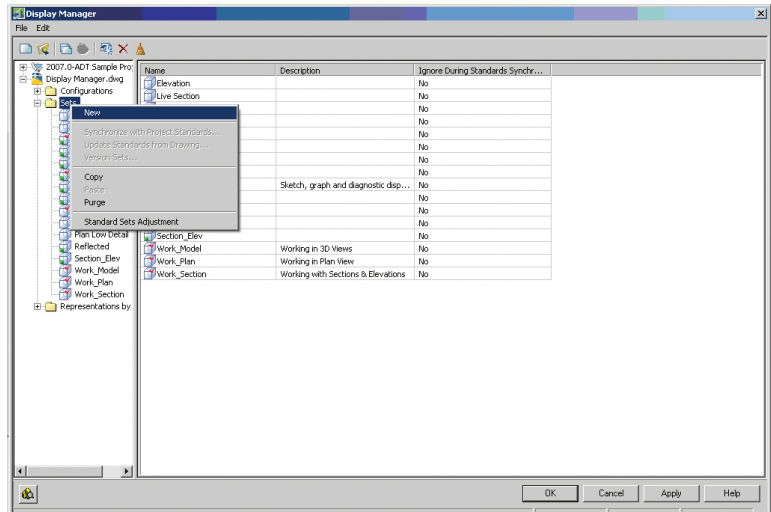


Figure 3: Creating a display set

DISPLAY REPRESENTATIONS

Display representations define how the components which make up an object are drawn. Many AEC objects are made up of in-

dividual components. Each component of an object has both physical and graphical properties that help to determine the display representation of that object. The physical properties of an object control height, width, location, and shape of the object in the drawing. The graphical properties control visibility, color, layer, and linetype.

The physical properties of an object are typically decided when you create it. For example, you specify the size of a door and its location in a wall. The graphical properties of an object are controlled in its display representation. Multiple display representations can be defined for the same object.

All AEC objects have predefined display representations. Most objects have Plan, Model, and Reflected display representations, because these are the most common design situations. Other objects have only a General representation because the display of these objects does not change in different views.

A single object can be drawn in several ways, depending on the needs of each drawing type. For example, the Plan display representation draws the door panel, stop, frame, and swing components (see Figure 4). The Nominal display representation draws the door panel, frame, and swing components. Even though both representations draw the door panel, each draws it differently. The Plan representation draws a door panel as a rectangle, while the Nominal representation draws it as a single line.

The display representations available for an object and the names of those representations are based on the ways you might need to view the object. Display representations can include different components of an object or additional display options.

To create a Display Representation for an object, begin by clicking on the Format menu, select Display Manager, and expand Representations by Object. Select the object for which to create the new display representation. In the right pane of the Display Manager, right-click the display representation to duplicate and click Duplicate (see Figure 5). Enter a new name for this display representation and hit Enter. The new display representation will have the display properties of the representation you just duplicated. Please note that the display representation created in the right pane will not be listed in the Representations by Object directory in the left pane until you close and reopen the Display Manager. Double-click the new display representation to edit its properties and then assign the display representation to the display sets in which they will be used. When finished, click OK. You can also click Apply instead of OK to save the changes and continue working in the Display Manager.

To edit a Display Representation, begin by clicking on the Format menu, select Display Manager, and expand Representations by Object. Next, expand the object that contains the display representation you want to edit and select the display representation to edit (see Figure 6). The display properties you can edit will depend

on the object and the display representation you select. Select the Layer/Color/Linetype tab in order to change the AutoCAD properties, including the visibility of the object components and whether their display is controlled by the material assignment. If applicable, select tabs such as Hatching or Other to change object-specific display properties. When you finish editing display properties, click OK.

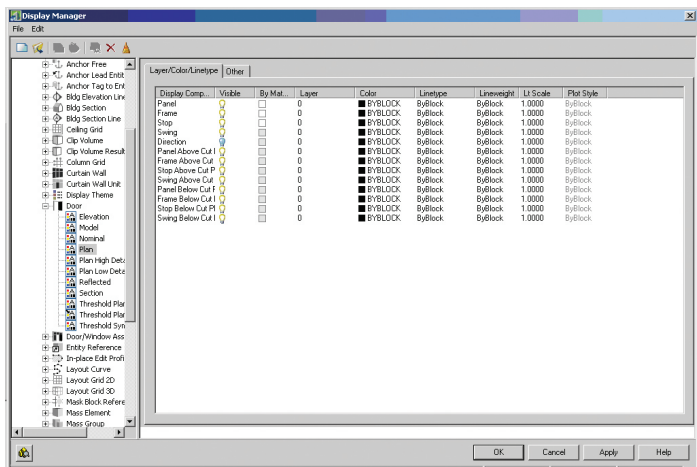


Figure 4: Plan display representation

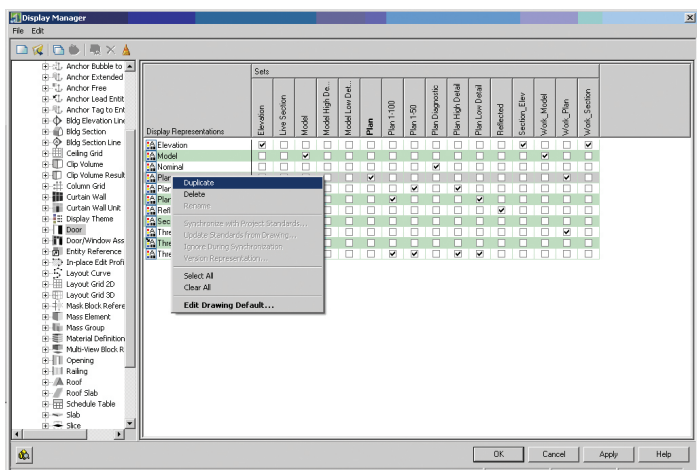


Figure 5: Creating a display representation

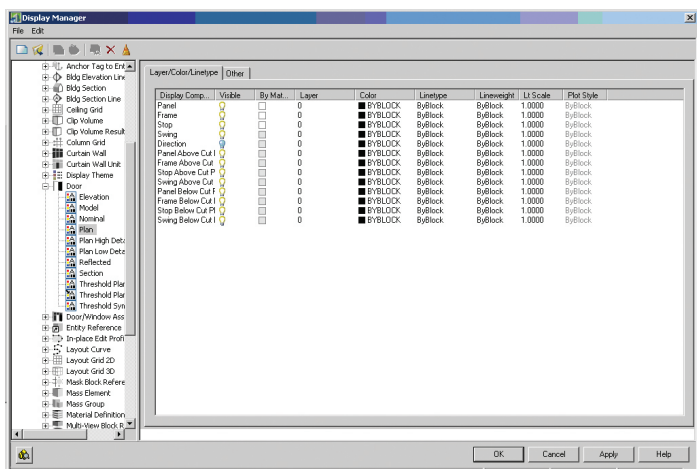


Figure 6: Editing a display representation

DISPLAY CONFIGURATIONS

A display configuration is created for a specific design task or drawing type. To use a display configuration, you need to assign it to a viewport. Drawings based on templates provided with AutoCAD Architecture contain layout tabs with viewports to which appropriate display configurations are assigned. You can use the configuration assigned to a viewport, assign a different one, or customize the configuration.

You can identify the display set assigned to each view direction using the Display Manager. In the Display Manager, the active viewport in the drawing is assigned the Medium Detail display configuration. In the left pane, the display sets used are listed below the configuration name. An icon next to each display set indicates the view direction to which the display set is applied. The Configuration tab in the right pane shows the view direction to which each display set is mapped.

The display configuration, the current viewport, and the object interact in the following manner to determine what is shown in a viewport.

- The active viewport has a current view direction and a current display configuration.
- The display configuration has one or more display sets and uses the display set that is assigned to the current view direction.
- The display set has associated display representations and it selects the representation associated with the object that needs to be shown.
- The object is shown in the active viewport using the appropriate display representation and display properties.

The display configurations in a drawing depend on the template used to create the drawing. A drawing that is not created from a template contains the Standard display configuration, which includes the Plan and Model display sets.



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

Get a Grip on



We all need to get a grip at some point and in AutoCAD® it's a great way of being more efficient. By using grips, you can actually perform many functions without picking or typing any commands (except the space bar or CTRL key).

In any production environment, good designers and CADD techs are constantly thinking ahead. They know their next step or command before finishing their current command. If you don't know where you're going or what you're doing next, you're losing time and productivity.

Grips are a great way to increase your productivity by allowing you to manipulate objects within AutoCAD by keeping your movement going, without actually having to pick or type a command.

I do not recall what version of AutoCAD introduced grips, but I know when they first came out, they confused and irritated a lot of CADD folks—it just seemed like more clutter on the screen. Now many years later, some surprisingly still feel the same. Those of us who use grips probably don't even think twice about their presence—we just use them. In AutoCAD 2011, multi-function grips were added and these were further enhanced in AutoCAD 2013.

Where I work, a lot of people don't use grips and some even turn them off. I had to create a button macro on our master menu to turn on the grips and enable "pickfirst" when I'm helping someone, because I can't stand to work without them—it's not efficient.

So what can you do with grips?

- Copy objects
- Stretch objects
- Move objects
- Scale objects
- Rotate objects
- Mirror objects

The only input you need to do is select an object's grip and use the space bar to toggle through the options or use the CTRL key to copy it. The results will vary depending on the object selected—i.e., when selecting blocks and text with a grip, the default result is to move the object.

Experienced users, especially those using AutoCAD since the DOS days when command shortcuts ruled, utilize the keyboard extensively while they work and can get accustomed to this added methodology easily (one hand on the keyboard one on the mouse).

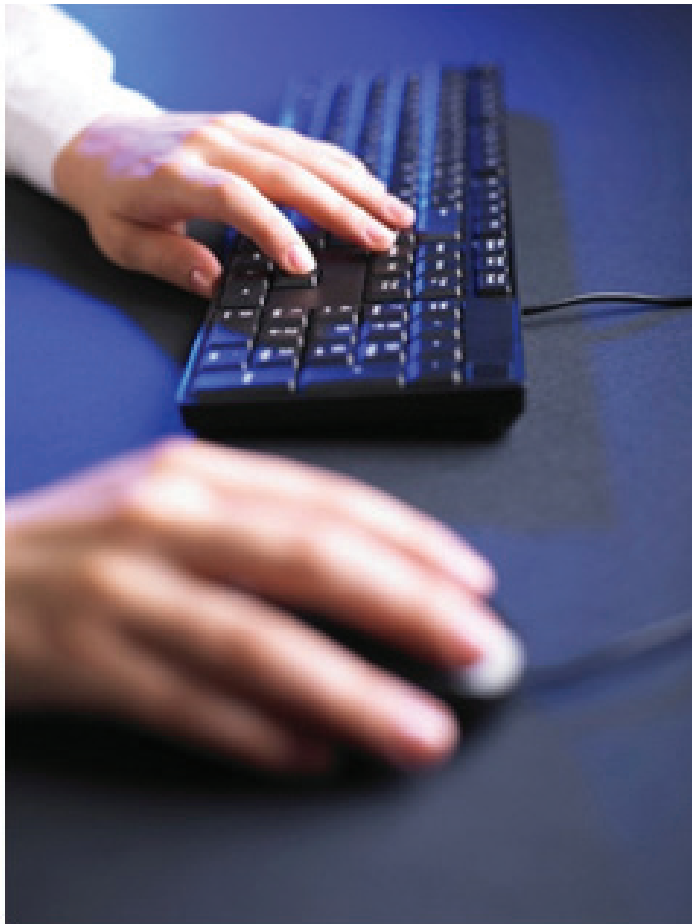


Image courtesy of adamr / FreeDigitalPhotos.net



Below are the options available when manipulating a grip selected object.

Select your object, select a grip, then tap space bar (or CTRL key) as described below and move your mouse to complete the command.

Stretch = Default—move mouse to stretch object from selected grip. (Note: many objects such as blocks and text or selecting center grips on circles and lines will actually move the object with this selection. Selecting other grip points will stretch it.)

Move = 1 space bar tap, moves object from selected grip point to new mouse selected location.

Rotate = 2 space bar taps, rotates object around selected grip.

Scale = 3 space bar taps, scales object with base point being the selected grip.

Mirror = 4 space bar taps, mirrors object around selected grip.

Copy = CTRL Key, object is copied to each point you select with the mouse.

Figure 1 illustrates some common entities with their grips shown.

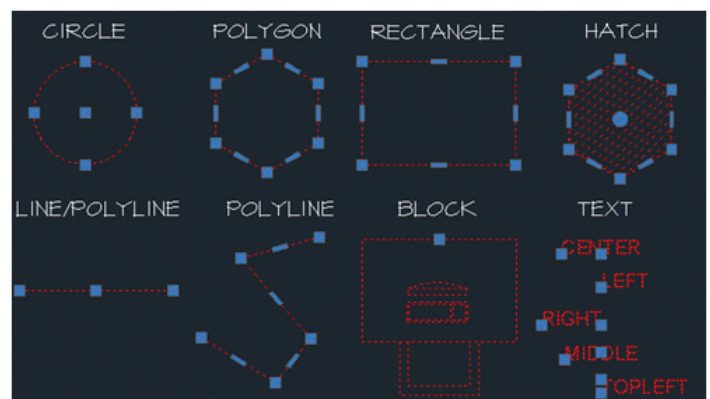


Figure 1

Note that in the above graphic, the BLOCK has one grip and is great for moving or copying or rotating around the insertion point. If your block looks like the mess in Figure 2, you have "Show grips within blocks enabled" (GRIPBLOCK = 1). This will really clog up your screen and I recommend you turn off this option.

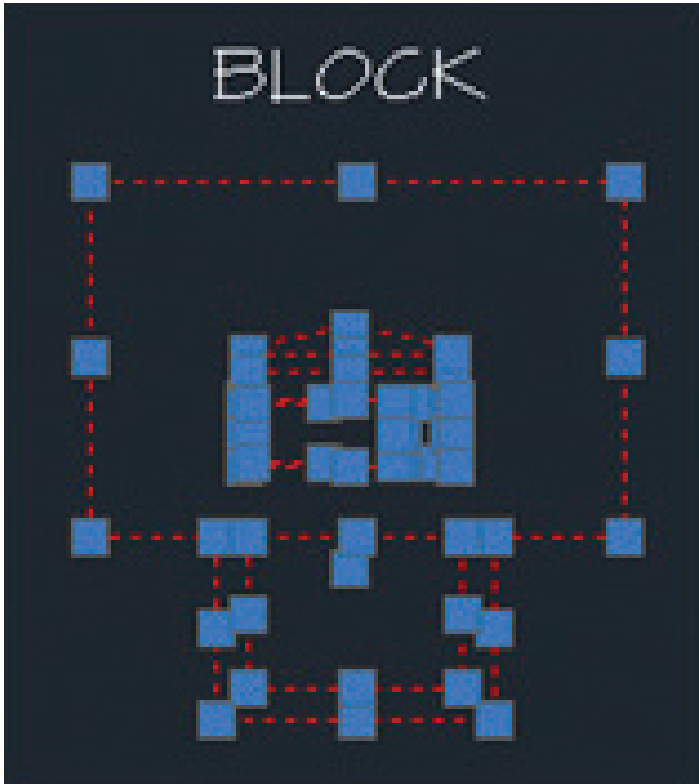


Figure 2

There are a few settings to implement and understand when using grips. As with most AutoCAD settings, you can control grips through various methods, including the options dialog and system variables. If you work with someone who refuses to use them, but you share common standards or systems, you can use a button macro to reset them for your use. See Figure 3 for the dialog options and below for the SETVARS to use in macros and scripts along with a sample set of macros.

A simple grips macro to turn them on or off:

On: `^C^CGRIPS;2;GRIPMULTIFUNCTIONAL;3;PICKFIRST;1;`

Off: `^C^CGRIPS;0;`

Below is the detail for each of the system variables used in the macros (suggested setting in parentheses):

GRIPS: (2)

- 0 = Hides grips
- 1 = Displays grips
- 2 = Displays additional midpoint grips on polyline segments

GRIPMULTIFUNCTIONAL: (3)

- 0 = Multifunctional grip options are not available
- 1 = Multifunctional grip options can be accessed by pressing Ctrl to change grip behavior (Ctrl-cycling)
- 2 = Multifunctional grip options can be accessed via the grip menu displayed when you hover over a grip
- 3 = Multifunctional grip options can be accessed with both Ctrl-cycling and the grip menu

PICKFIRST: (1)

- 0 = Off. You can select objects only after you start a command.
- 1 = On. You can also select objects before you start a command.

The PICKFIRST setvar allows you to do noun, verb selection (pick the object first) instead of verb, noun selection (pick the command first). This just means you can select an object before you choose the command. Think about Microsoft Word or Outlook: you don't pick the Delete key and then select your text or email. I use this functionality whether I am using grips or not—it's just more flexible. And don't worry—the old way still works, so you can do whichever is most applicable for the task at hand.

GRIPBLOCK: (0) (not used in the macros)

- 0 = Assigns a grip only to the insertion point of the block.
- 1 = Assigns grips to objects within the block.

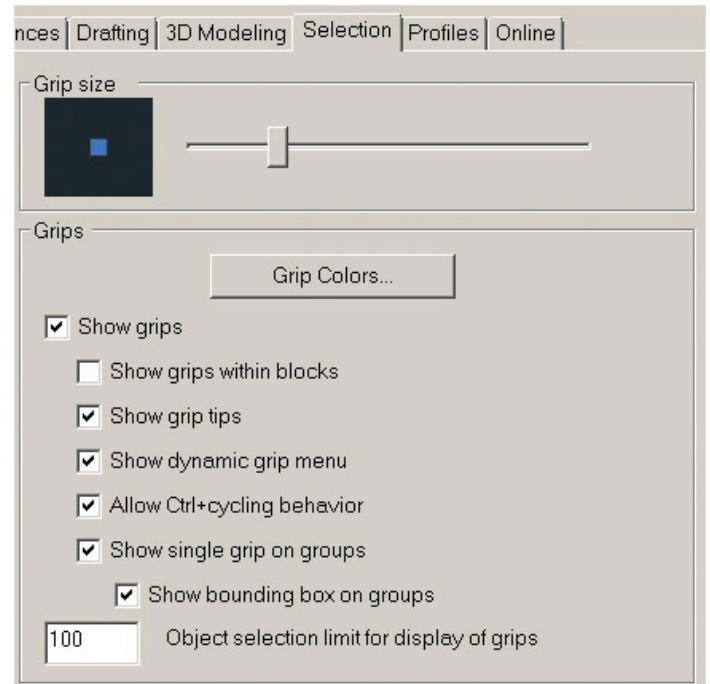


Figure 3

To get to the dialog box shown in Figure 3, type "options" at the command prompt and select the "Selection" tab. In Figure 3, you

see that “Show grips within blocks” is unchecked (see Figure 2 for why). You can also control your grip colors and size here. If you wanted to script these items, you would need to add the GRIP-SIZE, GRIPCOLOR, GRIPHOVER, GRIPHOT, and GRIP-CONTOUR setvars to your macro or script.

Grip Tips/Notes

Use grips to fix non-associated hatches.

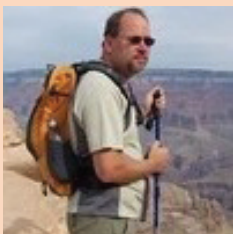
When you select more than one grip on an object to stretch it, the shape of the object is kept intact between the selected grips. (To select more than one grip, press and hold the Shift key, and then select the grips.)

Grips on text, block references, midpoints of lines, centers of circles, and point objects move the object rather than stretching it.

If you select a quadrant grip to stretch a circle or ellipse and then specify a distance at the Command prompt for the new radius—rather than moving the grip—this distance is measured from the center of the circle, NOT the selected grip!

For those already using the “pickfirst” variable who have a ton of shortcut keys and are practicing with one hand on the keyboard and one on the mouse, you may already be getting much of the speed available with grips for typical modify commands (copy/move/rotate), but the multi-function grips add a lot more possibilities. If you think you are quicker using the mouse alone, you are wrong. We all work a little differently, and AutoCAD allows us to work in ways that fit each of our styles best (palettes/toolbars/ribbons, and so on), but if you’re not using the keyboard, you are not optimizing your efficiency. Time and time again I have had users debate this one methodology and many times it comes to how they were taught in school. After much debate, those who were open-minded enough to try were impressed (if not amazed) at how much faster they were after changing this one simple work method.

If you’re a grip hater, please reconsider their use. You may find you will grow to love them, especially as you see how your efficiency improves. Sometimes we just gotta get a grip!

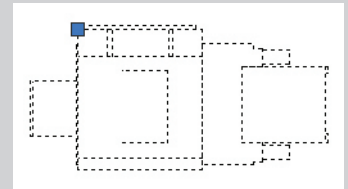


Walt Sparling has worked in the building design industry for 25+ years, starting as a hand drafter. He moved on to CADD in the mid 1980s and then into CADD and networking training and consulting. Walt has served as project manager and designer in the mechanical and architectural realms and currently works with an electrical engineering firm in Tampa, Florida. In his spare time, Walt maintains a couple of blogs and a personal website: FunctionSense.com and waltsparling.com

And Here's How... to Change the Insertion Point of a Block

If we need to change the basepoint for a block, most of us would Explode the thing, then Redefine the block. My friend, Ben Senior (tech editor, extraordinaire), suggested this very straightforward solution.

How to Use Block Editor to Change a Block's Insertion Point



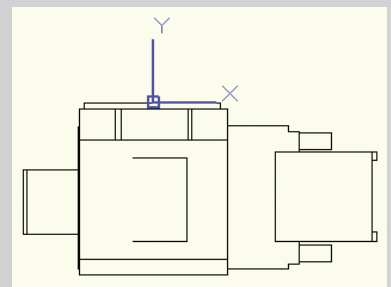
1. Single click on the block with the misplaced basepoint, then click Block Editor from the shortcut menu. If your right-click isn't set up that way, type BE, then select the block and press [Enter] to open the Block Editor.

MEMO: If it's not an attributed block, you can double-click on the block to open the Edit Block Definition dialog box, then press [Enter] to open the Block Editor.

2. By default, in the Block Editor, the UCS icon is placed at the Base Point of a block. With that understanding, enter UCSICON, then OR for the ORigin option. This will position the UCS icon where the Base Point is located on this block.

MEMO: Unfortunately, in the Block Editor, you cannot manipulate the UCS icon using grips.

3. Launch the Move command, select the objects, and specify a base point where you want the Insertion point of the block to be.




4. For the 'Second point of displacement', enter 0,0.
5. Click Close Block Editor and Save the changes. Click on the block to see a grip at the new Insertion Point!



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.

Revit Adaptive Components for MEP



 The initial release of Autodesk® Revit® (Architectural Design) and its early adoption by the architecture industry has afforded architects the ability to effectively utilize specialized features and functions over the platform's continued evolution. Over the years, Revit has released additional versions that focus on specific disciplines and workflows (i.e., MEP Engineering and Structural Engineering). As these disciplines have adopted the platform and its features into their workflow, the opportunity to utilize the features offered in other versions of Revit were not easily accessible or even thought to be beneficial—until now.

Autodesk Revit is now an application that combines the capabilities and features of all its Revit releases (Architecture, MEP, and Structure). As designers and technologists, we found an opportunity to research and experiment with features that yield useful results in efficiently managing MEP workflows.

A feature that architects are utilizing is the Conceptual Massing Environment as well as the use of Adaptive Components within this environment. Adaptive Components offer a high level of flexibility that allows the application to accommodate certain circumstances that the normal modeling tools would typically make difficult. With the introduction of Revit “One Box,” the flexibility of these tools can be applied to the MEP side to tackle difficult design constraints as well as advanced uses of parametric control.

FEATURES OF ADAPTIVE COMPONENTS

Most components in Revit look to the active set work plane. Adaptive Components use what is referred to as “3D-Snapping” and can host on alternate surfaces without having to change the active work plane. They have a set number of host points that allow them to be flexible per the design and complexity of the component.

USES FOR ARCHITECTURE

Adaptive Components are rapidly increasing in use among architectural modelers. This feature was found to be effective in patch and repair scenarios on complex curtain walls. To use them as a typical panel requires an excessive amount of manual production work. With the release of Revit 2013, the new Repeat tool has enhanced the credibility of Adaptive Components, especially in façade panelization.

However, apart from surface panelization, Adaptive Components are now often used for railings, mechanical and electrical fixtures, and an array of other purposes. Its flexibility to react to multiple host surfaces has opened avenues for exploration in generating iterative design workflows.

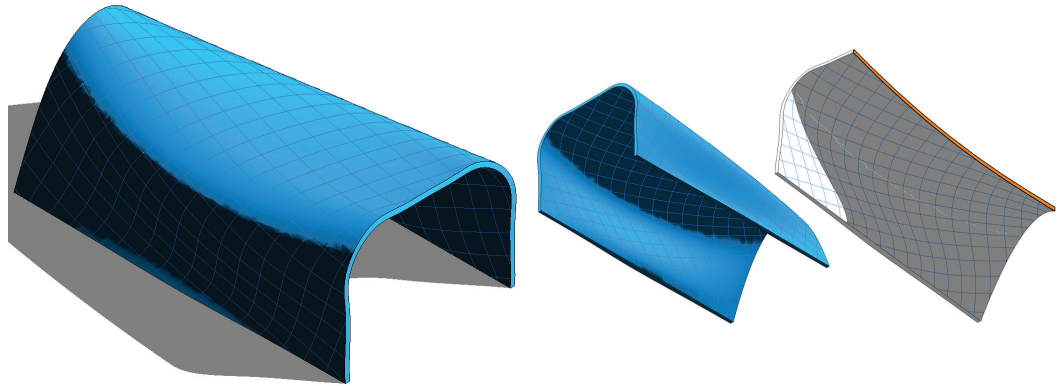


Figure 1: Example of curved architectural massing

SCENARIOS FOR MEP

At a recent conference, we demonstrated two scenarios that applied the use of adaptive points in MEP families. The first addressed complex architectural geometry—more specifically, hosting and adapting to changes in curved surfaces. The second made use of reference grids and advanced parametrics and logic for the automated placement of terminal components such as sprinkler heads.

Scenario One

This workflow was developed during a project where the modeling of fire protection and mechanical ductwork required the sprinkler heads and air terminals to be positioned normal to double curved walls and ceilings. Placements were determined from drawings provided by MEP consultants by way of reflected ceiling drawings. The task was to project those location points up to the double curved surfaces. Not only did these points need to be located correctly on those surfaces, they had to be flexible as updates to their placement arrived on a weekly basis by the consultant.

The Revit components included the fire sprinkler heads and air terminal families, which were generated from generic model tem-

plates. These families were established in order to control the correct sizes of components through parameters.

For hosting purposes, these families were nested inside face-based templates. This enabled their placement on any given surface even though their ability to be updated was limited due to a lack of strong placement points. Additionally, the Revit MEP Connect Into feature did not work properly with simple face-based families, as these face-based families would reference the level they were associated with rather than the offset from that level. This is where the value of the Adaptive Component emerges. By nesting the face-based families into an Adaptive Component and hosting it on an adaptive point, MEP systems will recognize the physical location in the space rather than any particular level with which they may be associated.

To highlight areas of skepticism, many will note the inability to connect systems to nested families. With this described method, it is now possible. By using the Tab key a user can locate the connector and “Connect Into” the desired path.

In order to update the workflow, the Adaptive Component needs to take advantage of the In-Place Massing environment. After creating an In-Place Mass, the user will need to divide the surface. Once a desired surface is selected, this feature becomes available within the massing environment and creates a UV grid that conforms to the complex surface.

For the MEP user to drive the placement of the surface-based family from the active working plane, they will need to project the locations from that plane up to the complex surface. The next step is to create perpendicular reference lines, which create intersections at each head location on the active workplane (where the linked CAD MEP placement drawing is hosted). This step is critical in order to create placement points for the desired sprinkler head or air terminal directly above the divided surfaces.

In order to project these intersections onto the surface of the mass, one needs to first turn off the UV grid pattern and instead choose the Intersect option for generating the divided pattern. Finally, nodes must be turned on for the divided surface, which will create a placement point for the Adaptive Components. With nodes

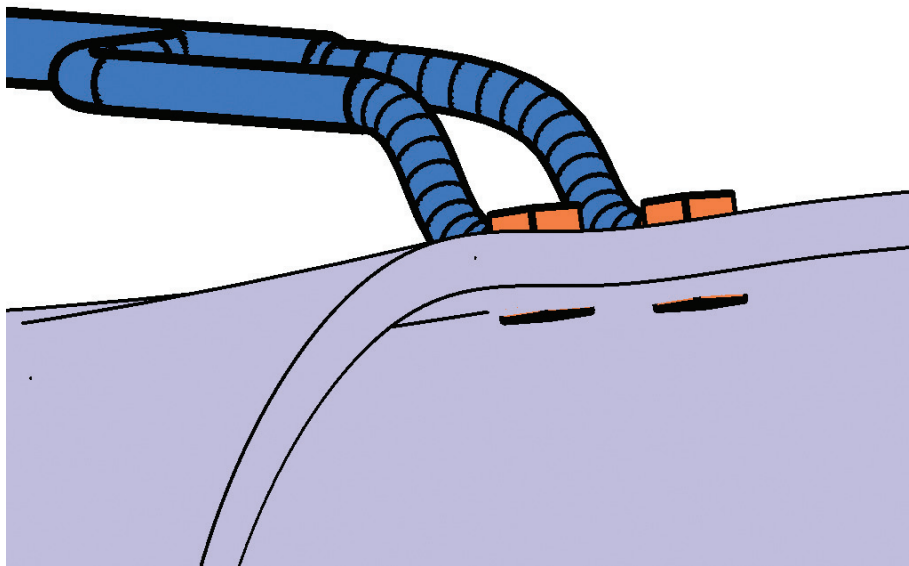


Figure 2: Air terminals hosted to architectural massing using adaptive components

visible, the custom Adaptive Component of either the sprinkler or the air terminal can be placed on the projected nodes. If the head is to be repeated across the points, the user can take advantage of the Repeat tool after the initial adaptive component has been placed.

When these steps are carried out, connections may be made to the heads and the systems tested. When an update arrives, the intersecting reference lines will need to be relocated to the newly provided locations. Simultaneously, the projected point locations on the complex surface will automatically update.

Scenario Two

The second scenario is one that would appeal to fire protection engineers, but the concept is certainly applicable to many of the building services disciplines. In this scenario we use the same concept of the adaptive terminal family from the previous scenario, but this time in conjunction with another architectural feature called Divided Surfaces.

Divided Surfaces works with the massing environment that we have already covered. What it does for our purposes is to essentially provide an adaptive analytical grid that is associated with a plane—in this case the ceiling plane that will host our sprinkler heads. The grid is parametric and adaptive so it allows the user to control the grid spacing and intersections, where it can adapt to the changes of the hosted surface. As an example, if a user defines certain constraints related to the spacing of sprinkler heads, such as code requirements, and the underlying size or shape of the ceiling changed, the grid can react to those changes.

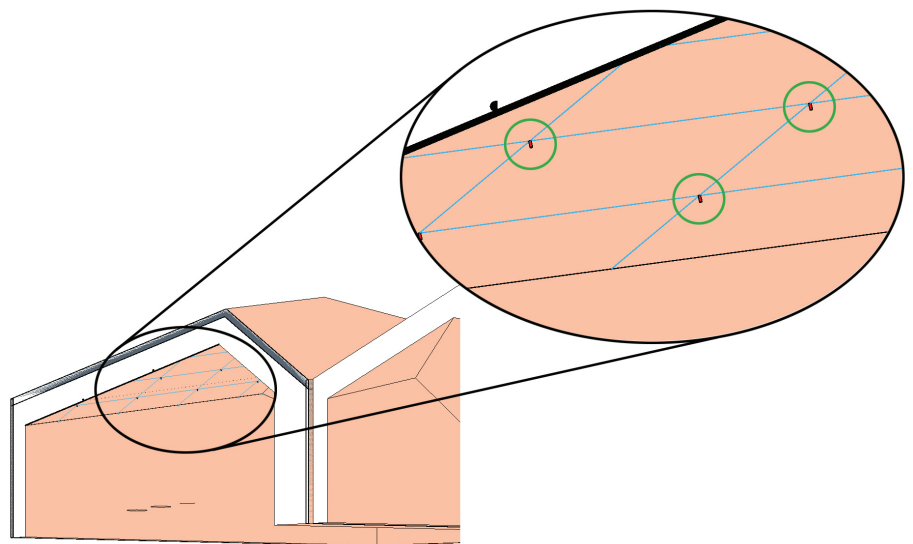


Figure 3: Sprinkler head family adapting to divided surface grid intersections

- Have a working MEP terminal family ready to go, or create one using your company's standard methods.
- Create a new instance of a Generic Model Adaptive family.
- Create at least one adaptive point.
- Set the required parameters or constraints for the point.
- Load the MEP family into the Generic Model Family, hosting it as desired.
- Save this completed family to be loaded into the project.

Now that there is an understanding of the steps involved, we will walk through each one.

So we have talked about the Divided Surface grid up to this point. Here is where it gets fun. The Divided Surface intersections that have been defined can be used to automatically place all of the sprinkler heads because they were created using Adaptive Components. As the underlying surface changes or the parametrics of the grid change to adjust to the various constraints, the sprinkler heads now have the intelligence to update accordingly based on the changing intersections.

SETTING UP YOUR CONTENT

Since the scenarios we tested focused on face-based terminal devices, we will refer to them as the default scenario moving forward. For the most part, little changes will be made when it comes to the MEP content. All the existing terminal devices that exist in the user's library will

work under the scenarios outlined here. Essentially, there is no reason that any device used in the past cannot be adapted in the ways we have outlined. Here is a brief rundown of the steps involved.

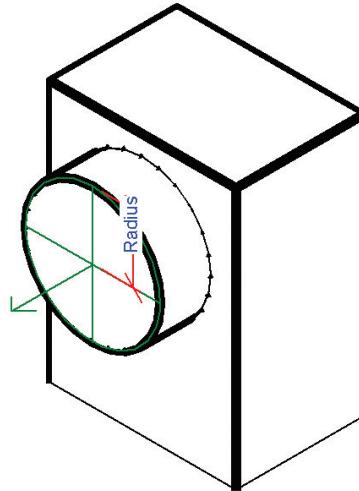
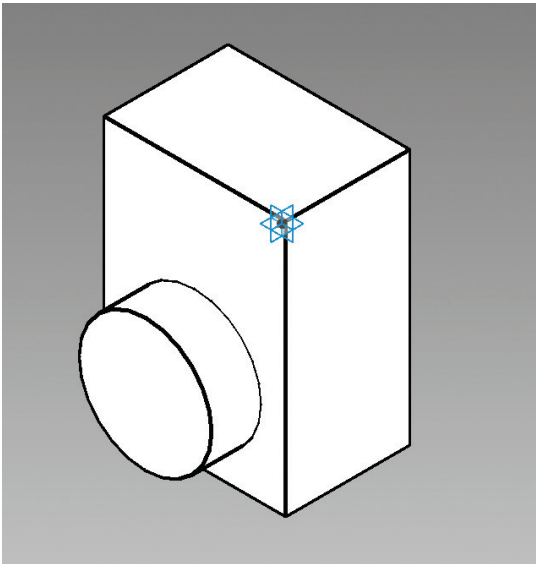


Figure 4: Air terminal family nested inside an Adaptive Component family

MEP FAMILY BEHAVIOR

One of the interesting aspects of these techniques is that due to the nature of the platform, we must load these adaptive families under the dreaded Generic Model category. As a result, it presents a host of questions and issues about how this might affect scheduling and visibility graphics settings, as well as integration with MEP systems and their associated flow calculations.

Our initial concern was that all these scenarios would not only prove to be difficult to address and result in a failed outcome, but also that it would ultimately be detrimental to our project and negate any benefits that we may have seen. As long as the nested MEP family is properly categorized and fully functional, even though it is nested inside of a Generic Model family, it will integrate into the model as expected. This is to say that it schedules properly, becomes hidden when toggling the visibility graphics override (in this case Air Terminal), the filters recognize it, and it can work as part of a system.

INTEGRATION WITH SYSTEMS

Of the scenarios outlined in the previous section, the only one requiring some explanation is integration with systems. Since these terminal families are nested at least one level deep in a generic model, and in some cases two levels deep if inside an in-place mass, the user must appropriately highlight the element. The way to do this is to use the tab key to go deeper into the selection level. This is standard practice for many scenarios, though it is not usually employed in this manner. For example, to properly select one of the air terminals to change the airflow parameter or to highlight the connector, the user must tab through the desired number of levels, usually once or twice, before using the left mouse button to make the selection. One can always check if the proper family is selected by verifying its name and category in the Properties window.

When it comes to connecting duct or pipes, the workflow may differ slightly. To use ductwork as an example, it is possible the air terminal will not show the connector as anticipated. The best approach we have developed to make this work successfully is to start the initial run of duct upstream of the terminal, and then make the final connection at the terminal itself. When hovering over the connector area, a snap indicator should appear, allowing the user to make the final connection to the terminal. Because the use case for air

terminals is in hosted scenarios that require relocation and adaptation to design changes, we have found that the flex duct works well when the locations of air terminals move. In the case of sprinklers, layouts may need to be fairly complete prior to making the final pipe connections. We have had favorable results using the “Connect Into” feature to make the final connections to sprinkler mains with adaptive families.



Mark Green is the Director of Digital Engineering at Oldcastle BuildingEnvelope®. He leads efforts to leverage the potential of BIM in Architecture/ Engineering/ Construction (AEC) design-to-fabrication practices. Mark holds a Master of Architecture, from Columbia University and a Bachelor of Science in Architectural Studies from the University of Utah, graduating summa cum laude. Mark is also a candidate for Doctor of Education (Ed.D) from Teachers College at Columbia University. He is an adjunct Professor at the GSAPP and the University of Utah's College of Architecture + Planning. Mark resides in New York City.



Alan Jackson is a Senior Design Technology Specialist at CASE and specializes in MEP engineering and consulting. Alan's passion for sustainability, master planning, and energy performance analysis has translated to an interest in utilizing energy modeling platforms and related analysis tools to address and improve building performance.

Navistools—

Tools for BIM

Profox, an Autodesk partner, has developed a set of tools to enable and support your collaborative BIM processes and provide asset and facilities management throughout your project lifecycle.

Integrated with Autodesk® Navisworks®, Navistools allows additional project information to be added and linked to your Navisworks model.

This additional data is held in a separate, relational database that can bring together many forms of data and which is available throughout the entire lifecycle from construction to operation and decommissioning.

Information in the database can be organised, embedded in the model, and extracted to reports or external systems.

Additional modules of Navistools enable automated publishing of Navisworks project data, smarter management of point cloud data in Navisworks, on-site data capture using our Navistools Field application, and easy client-handover of Navisworks-based projects using Navistools Project Export.

Navistools can help streamline your BIM processes, leading to reduced project timescales, reduced re-work, quicker access to project data, and easier collaboration—all leading to reduced project costs.

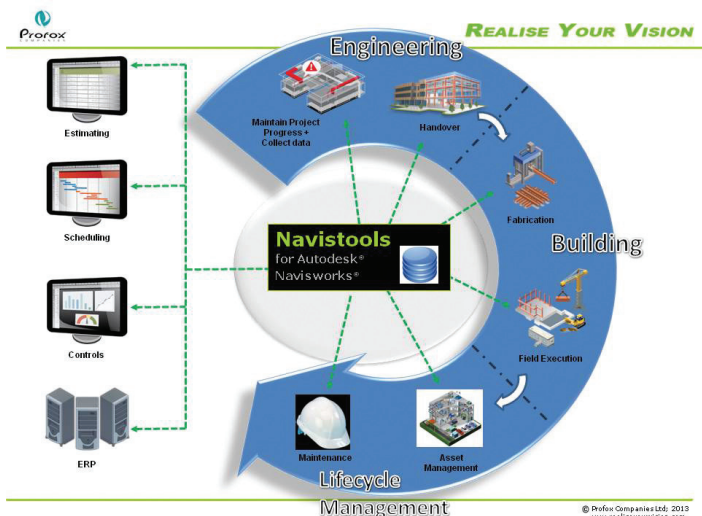


Figure 1: Navistools through the project lifecycle

NAVISTOOLS STANDARD

Use Navisworks as a visual project portal

Navistools for Navisworks is an add-on solution for asset and plant lifecycle management, construction management, and FM (facilities management). Navistools includes Data Management and Reporter modules running a Navisworks-like graphical user interface built around a SQL database that can be easily integrated with other database applications.

Navistools provides the means to manage an entire project containing information and documentation into a single manageable resource that can be handed over or transferred between project stakeholders throughout the design, construction, management, and lifecycle phases.

Running Navisworks with Navistools provides the functionality to search, link, tag, and report on information stored in Navisworks or BIM models, as well as the ability to add new construction and maintenance data captured on-site.

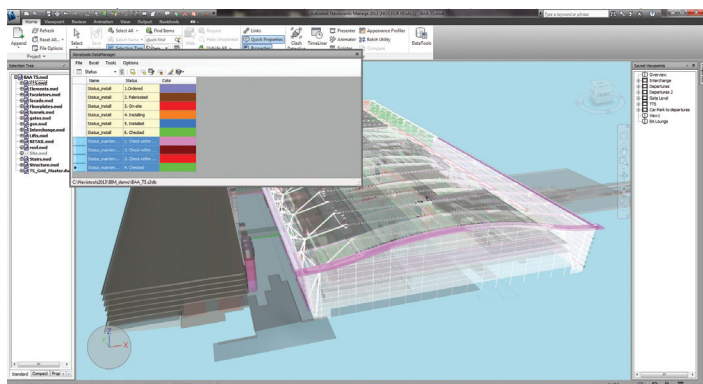


Figure 2: Navistools multiple status

Navistools is a tool for builders, planners, and subcontractors. Information collected in Navistools Data Manager helps define a comprehensive digital model that can be handed over to the project's owner/operators as a deliverable, thereby allowing our customers to offer extra value to their clients and help them win more business.

With Navistools you can:

- use with Navisworks on any BIM or CAD model.
- select any object from database or model to retrieve project information.
- track multiple status information using colours.
- generate custom reports of project data.
- add multi-format asset data.
- link to third-party applications and services.
- automatically update database with data captured on-site.
- export entire project data for easy client hand-over.
- access embedded project data using Navisworks Freedom.
- access all the project data you need, when you need it.

NAVISTOOLS POINTCLOUD

Manage point cloud data better in Navisworks

Navistools Pointcloud manages laser scan data within the Navisworks environment. Navistools Pointcloud introduces dynamic management and visualisation tools that increase productivity of your renovation projects in Navisworks.

- Dynamic positional point cloud loading
- Manage point clouds better in Navisworks
- Improved point cloud performance
- Improved visualisation
- Reduced model sizes
- Better point cloud analysis, review, and coordination

The software enables dynamic management of large point cloud datasets in Navisworks by giving you control over which point clouds are loaded based on proximity to an object's location or the user's navigational position in the model. This gives huge benefits when visualising, reviewing, or coordinating a Navisworks project that contains point cloud data. Navistools Pointcloud uses Navisworks as a platform and so supports the use of all the commonly used point cloud, CAD, and file transfer formats.

Navistools Pointcloud works within the Navisworks model containing the CAD model data and dynamically manages the required structure of point cloud data. The software requires that the scan positions in Excel format and that the scan data is pre-defined in published .nwd files, though the Navistools Publisher software can be used to facilitate this process.

Navisworks Manage 2013

The scan positions are held in the associated Navistools SQL database along with associated user-defined data such as photographs and other required documentation. Navistools is built upon Profox Navistools software, the project portal which allows external project data to be easily linked and managed within Navisworks.

Navistools Pointcloud enables easier management of renovation projects containing large unwieldy point cloud datasets by creating visual demolition project plans. Navistools Pointcloud enables easier comparison through visualisation between as-built data and design data through the design review process and for space management and facilities management.

Navistools Pointcloud saves on project time scales and costs through reducing the traditional requirement to produce costly CAD models from laser scanned point cloud data.

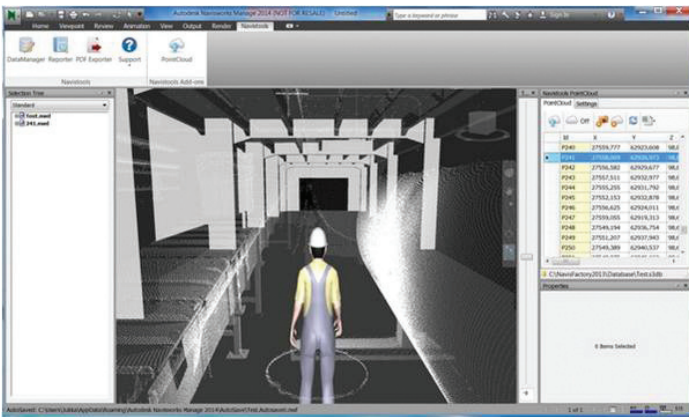


Figure 3: Navistools Pointcloud

NAVISTOOLS PUBLISHER

Manage Navisworks projects more easily

Let's say you are project coordinator and on a regular basis you encounter the problem that the Navisworks files available to the project team aren't up-to-date. In many cases, one of the project members has the responsibility to make sure the Navisworks models are updated several times a week, which can take a serious amount of time.

Navistools Publisher for Navisworks enables you to automatically publish your CAD models to the familiar .nwd format. Publisher is equipped with "AutoDetect" functionality that continuously monitors a designated project folder and detects when a new or modified CAD model appears, and then publishes it automatically to a specified location.

If you prefer to publish on a given date or time such as overnight, for example, then Publisher is also the tool for you. The "Scheduler" functionality allows you to publish on the time and date that you want. This functionality means all your systems and licenses

of Autodesk Navisworks stay available and you can delay the publishing action to the non-productive hours of the day.

Navistools Publisher also includes the following features:

- If you use Navisworks properties during publishing, then Publisher will use these same properties as well. You can even set the properties for your Navisworks models using the Publisher; it is not necessary to activate Navisworks for that.
- To use Publisher, Navisworks only has to be installed on the system where you want to use the Publisher. Publisher uses the Navisworks engine in the background; you hardly even notice when it's running.
- Publisher is delivered with "AutoDetect" and "Scheduler"—there are no separate licenses required.

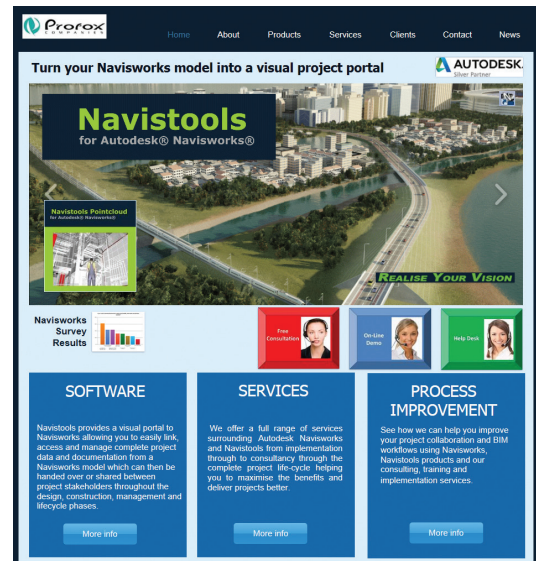
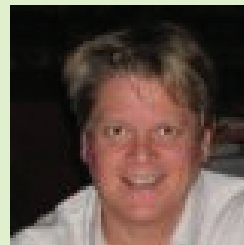


Figure 4: Navistools website



John Foster is a Director of Profox Companies Ltd, an Autodesk partner and software development company based in Helsinki, Finland and Cambridge, UK. Profox specialises in all things Navisworks and offers products and services to enhance the benefits and increase efficiency of the Autodesk Navisworks products. Central to this is the unique Navistools suite of products, which is benefitting Navisworks users in the Building and Construction, Process Plant, and Civil Engineering sectors. Prior to Profox, John worked for NavisWorks Ltd and Autodesk Ltd. Find out more and download a free trial at www.navistools.com. John can be reached at john.foster@profox.com or at +44 7770 502456

CADPOWER AND GEOTOOLS V14

<http://www.4d-technologies.com/>



CADPower and GeoTools V14 are productivity add-on programs for AutoCAD® 2007 through 2014.

“CADPower is an add-on program to help you increase your productivity with AutoCAD. It helps you work smarter, faster, and eliminates various bottlenecks you might face. In short, CADPower adds more value and power to the AutoCAD software.

GeoTools is an add-on program for AutoCAD which provides you with a number of useful productivity tools that are designed exclusively for the geographic data user. It is a heterogeneous collection of CAD tools that are useful for users in the mapping, surveying, GIS, facilities planning, real estate, and infrastructure management industry.”

CADLEARNING PLUG-IN FOR AUTOCAD 2014

<http://www.cadlearning.com/products/software-plug-ins>



CAD Learning plug-in is an add-on for AutoCAD® 2012 through 2014 that allows for instant access to video lessons from inside the AutoCAD software and can be downloaded for free from the Autodesk® Exchange Apps Store.

“Combine the power of video and AutoCAD software... Try our Autodesk App to access our CADLearning video tutorials from within the AutoCAD UI. CADLearning Plug-in products offer just-in-time learning for your AutoCAD software. This Autodesk App features a CADLearning palette that presents links to video tutorials based on tasks you perform in the software. With instant access to video lessons, users are provided with an adaptive learning and help system that is immediate and relevant and get instant, visual answers to questions via video tutorials.”

MAGICAD

<http://www.magicad.com/>



MagiCAD® is a productivity add-on for AutoCAD and Autodesk® Revit® software that allows you to design with real world HVAC and Electrical products, and provides collision control for installations and the building.

“MagiCAD contains Europe’s largest database, with hundreds of thousands of products from leading international manufacturers. The products have correct dimensions and all relevant technical data. This means your calculations are accurate and the installations can follow your design. Contractors know they can work as planned, saving time and improving quality. New products and manufacturers are introduced into MagiCAD constantly. The products are available free of charge for both MagiCAD for AutoCAD and MagiCAD for Revit users.”



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brings
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in Autodesk
and related
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The BIM Manager's Balancing Act

“You are only as good as the people that work for you.” This quote rings true for all managers, especially ones that manage a technology-driven field such as BIM or VDC as it relates to Preconstruction Management. This is because not only do you, as BIM Manager, oversee a group of professionals, you also lean heavily on each Subject Matter Expert or “SME.” You reach for their intellectual input on crucial matters, and you gather all of the intel and assemble it all into one respective bowl to then execute—whatever it is that you are executing.

It could be a new strategic plan to change the software platform with which your company has been drafting for the past 10 years while making sure not to hinder current projects. It could be an implementation document or standards/convention packet that requires input from all of the members of the “BIM Board” with each respective group being represented by an SME, before you could move further. These SMEs, who have specific knowledge for each facet of 3D Drafting, VDC, Prefabrication, and Technology/IT, are the puzzle pieces who put the whole picture together when drafting such strategic plans to be eventually put in place.

This is not to say that the BIM Manager is simply gathering information from these SMEs and compiling it—that would do a great injustice to all BIM Managers across the board. The BIM Managers must not only compile the intel and opinions from all trusted SMEs, and all specific information and subject matter from each and every member of the group who chooses (or doesn't) to participate, but they must also put *their own* information into these

critical plans and procedures. This is information that the BIM Manager would have, and that the SMEs may or may not have based on their previous experience and education.

The BIM Manager then decides which piece of information is fact; which is opinion; which is tried, tested and true; which to leave out due to risk or other factors; which to keep and highlight or showcase—and all the while keeping the ‘political rhino’ at bay. This means making sure that everyone is satisfied, nobody feels ‘left out’, hard work is noted, pats on the back are given with specific distinction, and certain technical leads are taught and coached for the next critical stage with maybe certain feedback as education. It's all a game of chess, and with the BIM Managers' tasks and operations, it is not an easy one. Sometimes one must wear several different caps throughout the normal day: the field cap, the technical cap, the managerial and leadership cap, the coach, the analyst... the list goes on.

The BIM Manager job is not easily comparable to any other job title, and this is what makes this market so quick to grow (compare VDC and BIM now to five years ago, then three years ago, and even one year ago). This is also what makes this market so quick to phase into confusion as an industry. I am sure that all of you have at least once gotten into a lengthy discussion after someone at a dinner party asked you, “So what do you do for a living?,” only to see their inquisitive look quickly fade to confusion and boredom. You then have to eventually say, “I'm an engineer” just to get the conversation moving to a new topic that is less taxing on all. This is not always bad, though.

The best part is that we all now know that BIM—as an intelligent process, from any facet—is not going anywhere. It is only growing. The highest ranked colleges in America (and internationally) now have Preconstruction Management and Building Information Modeling/Management as a major. This is a market that is not yet saturated. Some will contend, I am sure. But look at it as a whole, and look at the figures and statistics versus, say, Integrated Project Delivery, for one similar example. This gives those of us who have the heavy expertise in this small niche the power to capitalize on these opportunities before this becomes yet another flooded market in which new graduates have to climb over each other for a good fight to the top.

There are definitely things you can't learn in the classroom. Then again, for the sake of the future of BIM and Preconstruction Management, think of how this will affect the baseline knowledge of these SMEs going into it. What if you had the advantage of knowing the power-plays of General Contractors, Subcontractors, Owners—and statistical intelligence from the BIM industry as a whole—as a baseline before you started your experience 10 or 15 years ago from 3D Drafter into your now BIM Manager role. I personally think it would be a huge advantage, and for our future BIM generation, this puts a smile on my face.

Because BIM requires so much technical knowledge and industry insight, in order to be a great example of leadership as a BIM Manager, you must be extremely team-driven—and even more so—extremely democratic. Also, because BIM from an external/project perspective requires teamwork from all project stakeholders, which is the name of the game, it also demands it from an internal perspective as well. It doesn't necessarily matter how your specific company is broken up in terms of an org chart. You could have, say, a Virtual Design & Construction Group that focuses on the projects that need coordination and collision detection for internal project benefits for cost-savings that we all know and love, and a Detailing Group that focuses on our installation drawings, spool sheets, prefabrication drawings, and the like that are pulled straight from our intelligent BIM model. Then you could have a generalized BIM Group that stitches all of these processes together with respect to estimating, cost, commissioning, scheduling, start-up, bidding, and C/D sets.

I even recently came across a company that has its own BIM Technology R&D Group. (Think Tony Stark's basement from "Iron Man"—only "BIM" instead of "Humanoid Robotic Outfits"). How cool is that? This company sees the massive internal cost-savings (and future revenue generation) potential that BIM offers. So much so that they were smart enough to create a small outfit that focused on "The Future of BIM" in order to give them a leg up and to see where the industry is headed in the coming years so that they don't ever have to make a massive costly internal change at the drop of a hat. This hypothetical process would be caught in advance, and would be able to march to the company's cultural drum when need be. Not to mention that, though some of these efforts are overhead costs, this group also is in charge of database generation and upkeep, BIM/IT services as they relate to hardware and software to fix the all-too-well-known fatal errors that we have all seen over the years,

and other billable processes. These are the things that keep me going, when it sometimes seems like my visionary mindset is proprietary to myself and myself alone.

To end with a quote as the article started, "Leadership is defined by Results, not Attributes." As cliché as it may sound, I have found in my previous experience with BIM groups, Engineering Groups, and Precon Groups in the MEP trades, that excellence is almost always achieved by a leader putting his SMEs on the same plane he or she is on, and by coaching them along the way. I was fortunate enough to have a few great coaches in my career, and in turn, I have had the opportunity to *be* one. Learning from what each has to say in return (100 percent of the time, they know something you don't).

Being humble and open does not make you weak—it strengthens your qualities as a manager, strengthens each link in the chain, and makes your team respect you that much more for valuing their input. You must do all of this, however, while still maintaining company and personal values, staying on track with the company's future in mind, and all the while completing the plethora of specific day-to-day tasks that a BIM Manager has to do.

With that being said, all BIM Managers must do a balancing act with Technology, Logistics and Planning, Field, and Personnel. Whichever managerial style you decide to take, it will have a profound impact on not only your BIM team, but also your company's design, engineering, and construction efforts as whole. Profits are always, of course, top priority, but the driving force behind them—team morale, employee satisfaction, and overall guidance and management support—is what drives your company's success.



Bill Campbell works for a top AEC contractor in the San Francisco Bay Area. He started, owned, and operated a small BIM firm in Michigan that ended in 2011, and has over 11 years experience in BIM and VDC. Bill is an Autodesk Certified Professional for 2012 and an Autodesk Certified Expert for 2008. He has written many whitepapers for the industry over the years, and is currently harvesting "new and improved" Implementation, Execution and Maintenance/Enforcement plans for BIM as a whole. He is currently working to help standardize the way that BIM is defined in the industry with his new project, "BIMKit." He is also working on a niche blog, "TheBIM-Blog.com," which hopes to serve the same purpose. In his non-professional free time, Bill enjoys writing, surfing, playing tennis, golf, and hockey, and being a husband and father.



HIGHLIGHTS FROM THE AUGI FORUMS

Did you know that there are well over a million posts on the AUGI forums? It seems only fitting that the first discussion topic from which we share some snippets is...

What Is Your Motivation?

<http://goo.gl/PPqcn>

Jrobker: What drives you to help others? I need to know, what's in it for you?

Moliva: Mostly just to pay my dues, so to speak. When we started with Revit MEP it was a jump in on a HUGE job and try and figure it out.... these forums were extremely valuable and I really would not have made it through that initial job without it. I hope I can help when anyone needs it, just as the others helped me when I needed it, and to continue to add to this resource.

And, like mwiggin says, I come here to learn too....which is why I'm usually hanging around here. No better place to keep current with what's going on and new "workarounds".

RevitNinja: The AUGI forums can be a great resource if used properly. One has to know how to post a question intelligently, and if it is responded to, how to harvest the relevant information from subsequent posts. Let's face it - not everyone on forums asks questions intelligently and not everyone answers them correctly. I owe some of my professional progress to this forum and sometimes it feels good to give something back.

daniel.morrison: Firstly, I wish I could do more, strict(ish) internet controls and a time difference means I tend to get into a thread too late a lot of times. When I have answered queries here - put my two cents in, so to speak, it has always got me thinking about things and has often given me 2-3 more ideas on what I can do to improve my own workflow in the future.

-- No matter the personal or professional reasons, the fact is that thousands of members exchange ideas and advice on the forums every day. Many of us are participating in appreciation of others having helped us in the past and also enjoy the challenge of trouble-shooting. Skimming forum topics on a semi-regular basis can introduce methods and workarounds that might not be common in your office.

Nostromo 2011

<http://forums.augi.com/showthread.php?130491-Nostromo-2011>

dave.drafting762382: After reading some old threads about people using the Razer Nostromo as a left hand drafting keypad, I decided to try it out.

After a month of tinkering and learning I can honestly say that I would hate to be without it now.

I'll post up my keymaps (as of today, it's a work in progress) in case anyone's interested. I have the keymaps colour coded according to the lights on the Nostromo, and I hold either the thumb button or the (thumb) d-pad to move between keymaps. When I let go with the thumb it returns to the default map.

A couple more tips:

Start with something like my 'default' page but tweak it so it makes sense to you. After you get that set up add in numbers (I hold the button to enable them). Just leave it at that for a bit, try to get used to that much.

I have a large smooth lump of hardened blu tack on my O3 key, above the centre key. I also have a small lump on the 13 key, below the O8 key. This lets me feel the centres on all rows, helps a lot.

I use the nostromo in conjunction with a ribbon panel, anything that I use a lot goes on the Nostromo, [anything I] use less I add to a ribbon panel. That way I'm covering everything.

When recording macros turn off 'insert 50ms space between keypresses' but if you stack heaps of commands you might need to insert pauses to let acad catch up. EG things like audit/purge/tile-mode take time for acad.

Key 15, the big thumb button, is obviously enter. Mine was very stiff to begin with, a bit awkward. Now it's loosened up nicely. Also sometimes you get 'stuck' on another keymap - so I have set the round button (toggles numbers normally) to return me to default keymap from any other keymap.

tekcon13: Three of the five drafters in our office use the Logitech Wireless Trackball M570: <http://www.logitech.com/en-ca/produ...trackball-m570> As you

surmised, it does take some getting used to, but once you do, you will love it. I use one at home with my laptop. I just put it on the arm of my chair and don't have to worry about having a proper surface to move a mouse around on. It's great for portability.

Of those three drafters, two also use the Nostromo.

-- You can use your preferred Autodesk products with just a keyboard and mouse, but there are many other folks in the Hardware forum discussing a wide variety of peripherals if you are thinking about adding anything else to your arsenal. This particular thread has a number of users discussing how they, and the other users in their office, are using and customizing their accessories.

Saving an AutoCAD Drawing as an Image

<http://goo.gl/kuuJP>

jagnag1359425: Anyone know how to save AutoCAD LT geometry as an image file (jpeg, tiff, etc.)?

bgingerich: BMPOUT, JPEGOUT, TIFOUT, PNGOUT, or EXPORT? You can also make WMF's and DGN's too.

Wanderer: Those built-in commands should work... but I tend to do mine quick and dirty just by using a printscreen app that lets me select a portion of the screen and automatically saves it to a file for me. It won't work on a huge drawing as well as exporting out the whole file, but I am just typically after a small section. [Gadwin PrintScreen free utility](#). It will save to bmp, jpg, png, gif or tiff.

Cadtag: If using Win7 (or presumably Win8?), the included Snipping tool works reasonably well, and will save to png, jpg, gif, and even .mht. Oddly enough though, not to BMP.

Jaberwok: or just hit PrintScrn, paste into Paint, select the area and crop.

Heinsite: You can also plot a layout to a PDF and later save the PDF to a variety of different raster formats... JPG, TIFF, PNG included.

Software Expertise Vs. Technical Subject Knowledge

<http://goo.gl/4JS6b>

zoomharis: In the case of a draftsman, do you prefer his knowledge in the CAD software to his technical subject knowledge (Like Electrical, Civil, Mechanical) etc.? I have seen so many people being absorbed into companies without knowing the ABCs of computer aided drafting. Moreover, whenever you attend an interview as a CAD draftsman, most often you are supposed to design and draft something as per the interviewer's suggestion (maybe for the first and last time) and the skills you have acquired in drafting are of little use if you are not well aware of the subject.

Jaberwok: To be a drafter, as opposed to a tracer or operator, implies subject knowledge, doesn't it?

Reikajapan: This is an interesting subject and historically speaking it has changed over a relatively short time. When CAD was fairly new

and rapidly expanding (let's say mid 1980s) everyone in the industry had board experience, and of course, in a particular engineering discipline or architecture, etc. So when jobs opened up that required CAD, everyone assumed from your years of board experience that you knew the discipline; consequently their main focus was on your CAD knowledge. Over the years since then, it seems more people have taken CAD classes that apparently, more often than not, focused solely on the software. So now, fast forward 25 years and there are lots of CAD techs that know the software inside out but may not know much about drafting or possess depth in an engineering discipline. Given the above, today I would focus interviews on the engineering knowledge and less on the CAD knowledge.

Statler: We are moving into a new age where sharing a model will take preference over the traditional drawing issue. The model is going to be how your company is going to be judged by not only your end client but also peer companies and the quality (or lack of) will affect future orders/jobs.

The days of 'as long as it looks all right on the paper copy' are going to end sooner rather than later. For an example, exploded/amended dims are just going to infuriate other designers/drafters when their items don't fit.

I would like to include another important trait for the job. You need a person with Technical knowledge, Software skills and Draughting ability (the pretty bit, but also the ability to disseminate the design as clearly as possible).

rmckee.93951: I'd prefer the perfect job candidate to be experienced at both. A happy medium of sorts. However, if you only had a choice of one or the other, the technical expertise is preferred. Reason being, if you get a person well versed in my arena (Architecture) they tend to carry over habits they've learned from other firms. This is not always favorable. I prefer to keep them green. I can teach Architecture to anyone, because it's all the same. To use AutoCAD, well there are a 100 different ways to do the same thing and for some it's more expedient to do it their way as opposed to yours. I'd prefer to direct a person to get from Point A to Point B, not necessarily how to get there. In the business model, if you are spending time telling people HOW to draw things in AutoCAD, you are wasting time and money.

-- Whichever perspective you carry, there are certainly benefits of being adept with software and being well versed in your discipline. The open mind and lack of entrenched bad habits are a benefit of the inexperienced, but the internalization of the understanding of one's industry is the trademark of the experienced. I think a combination of those two sides of the coin are a necessary component of any team.



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This is what your competition is using.



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