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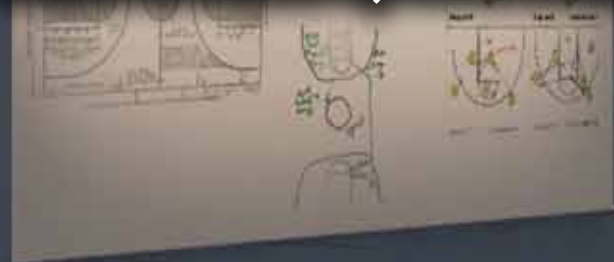
## Also in this issue:

- **The Power of Commands**
- **Defining BIM**
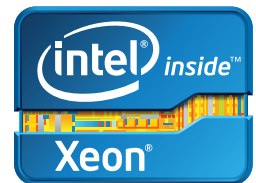- **Measure Your Environmental Impact**

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# AUGIWorld

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# Editor's Note

## AUGIWorld
www.augiworld. com

Hello *AUGIWorld* reader,
We have all heard of it and we all experience it at some level. There's you, the program you use, and then there are the other applications you put into your system to get even more functionality out of your core program. Such is the way of life for a third-party application.

In this edition of *AUGIWorld* magazine we take notice of the wonderful and beneficial third-party apps that exist in the Autodesk industry. Some you may have heard of before and others may be totally new. Here is your chance for a sneak peek at what they can do for you.

But before we run down the issue I would like to extend a thank you to Tracy Bird with Hummel Architects located in Boise, Idaho USA, who provided the cover rendering of a project they developed. As mentioned before, just contact me if you have work you would like to submit for an *AUGIWorld* cover.

Also this issue we include our Product Review status for some of the programs we tested. To achieve a rating, the author must personally use the application and provide a rating he or she feels is appropriate. A rating of 10 is perfection—and how can software be perfect? A 9 is just about as good as one could or would expect in a third-party application. And a rating of 8 is very good, but good can always be better.

We start up with Lisa Bernacchi, who tells us about the power of some AutoCAD commands. Then John Segler talks about BIM Project Coordination clash detection in Navisworks Manage. And Andra Marquardt offers a Product Review of Surveyor's Companion for AutoCAD Civil 3D. She rates it 9 out 10 stars.

Next we have David Fano and Don Rudder extend Revit Architecture further with a plethora of apps. Then Bill Campbell works to define BIM under the AutoCAD MEP platform. And then I run down the latest updates and patches in this month's Heads Up column.

Our AutoCAD Architecture guru, Melinda Heavrin, talks about making ACA extraordinary with a slew of third-party application options. And then Paul Chambers shows how to put families at the ready with his Product Review of popIcon and Revit Structure. He rates popIcon an 8 out of 9 stars. Next there is John Evans with his Product Review of Eco Materials Adviser for Inventor; another 8 out of 10 stars.

Aaron Maller provides a Product Review of Kiwi Codes. After his exploration he rates this application 9 out of 10 stars. Our man on the street, Erik Lewis, runs down a few very new applications to hit the market recently in this month's Inside Track. And then Todd Shackelford brightens his world with a Product Review of ElumTools for Revit MEP. He rates it an 8 out of 10 stars.

And with that, we wrap this issue and ship it! Have a great time getting lost in third-party applications.

Take care,

*David Harrington*

by: Lisa Bernacchi

# The Power of Commands

The integration of the Windows operating system into AutoCAD® was monumental. Buttons made accessing tools much easier and dialog boxes improved flexibility. As the years have passed, AutoCAD has included more and more tools that make geometry easier to create and modify.

And yet, those of us who used R10 and earlier know of a few secrets still buried in the program that can be helpful tricks for anyone using AutoCAD today. Several of the command line tools we used with DOS and early Windows operating systems are still accessible but unknown to many users. Remember the command line? It is still a powerful access point that lets you do things that cannot be done in the more GUI-rich environment. And don't worry if you weren't using AutoCAD way back when. This article will cover several handy commands and system variables that will have you tapping into the power of the command line.

All of the following commands and system variables must be typed into the command line. The command may or may not open a dialog box. You might be wondering if there are new commands that supersede the typed ones. No. Although some are in the ribbon, many of the commands and system variables noted below offer different options or address fundamental user interface settings that the ribbon buttons do not. The typed tools are particularly useful when creating custom ribbon panels, scripts, recorded actions, and toolbars.

**MAXSORT** – AutoCAD will alphabetize the layers. It does so up to a certain number of layers. MAXSORT determines the quantity AutoCAD will alphabetize. When the quantity is exceeded, the remaining layers will be randomly located throughout the list. Type MAXSORT into the command line and enter the number of layers that need to be sorted. The layers will immediately be organized. MAXSORT is a computer-based system variable, therefore it applies to every drawing file.

**ZOOMFACTOR** – Using the mouse wheel to zoom lessens the number of mouse clicks and will improve your efficiency. The speed at which the wheel zooms in and out is determined by ZOOMFACTOR. Type ZOOMFACTOR into the command line and enter an integer between 3 and 100. Entering 100 will enable the fastest zoom effect.

**MENUBAR** – I prefer to utilize the new GUI (graphic user interface) of each release of AutoCAD. Using the new GUI keeps me up to date and able to use AutoCAD on any machine. It took quite a while to get used to the ribbon. After four years there are still commands—even with a lot of customization—that I cannot easily find. MENUBAR set to 1 allows access to many commands in a familiar way but, unlike the Classic workspace, the ribbon is visible and fully functional. The MENUBAR setting is saved in Workspaces.

**EXPERT** – EXPERT mode can save quite a bit of time but can also be dangerous. When EXPERT is set above 0, certain dialog boxes and questions do not appear. Unfortunately, this variable is drawing-based and must be invoked in each drawing. There are multiple ways to automate this function: LISP, a script, a recorded action, and a custom button. This article will not address the

Controls whether certain prompts are issued.

| | |
|---|---|
| 0 | Issues all prompts normally. |
| 1 | Suppresses "About to regen, proceed?" and "Really want to turn the current layer off?" (-LAYER) |
| 2 | Suppresses the preceding prompts and "Block already defined. Redefine it?" (-BLOCK) and "A drawing with this name already exists. Overwrite it?" (SAVE or WBLOCK). |
| 3 | Suppresses the preceding prompts and those issued by the LINETYPE Command prompt (-LINETYPE) if you try to load a linetype that's already loaded or create a new linetype in a file that already defines that linetype. |
| 4 | Suppresses the preceding prompts and those issued by UCS Save and VPORTS Save if the name you supply already exists. |
| 5 | Suppresses the prompt, "That name is already in Use, redefine it?" issued by the -DIMSTYLE Save option when you supply the name of an existing dimension style. |
| | Suppresses the same prompt issued by the -SCALELISTEDIT Add option. |

When a prompt is suppressed by EXPERT, the operation in question is performed as though you entered y at the prompt. Setting EXPERT can affect scripts, menu macros, AutoLISP, and the command functions.
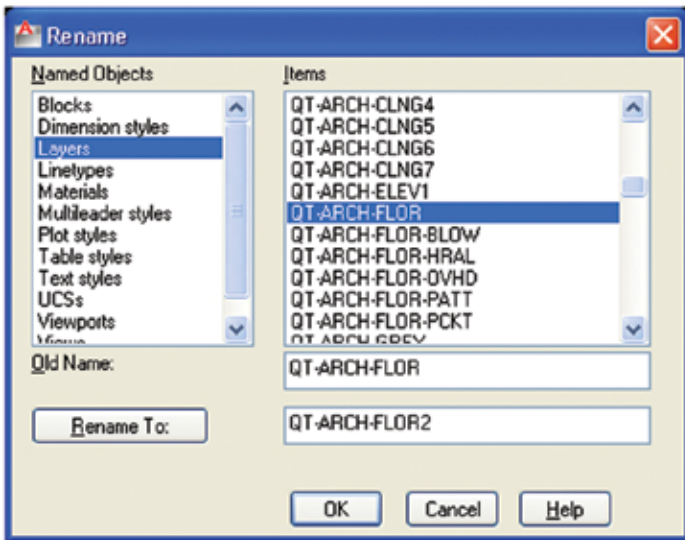
customization, but there are several Autodesk discussion group threads that can help. The settings, listed in Autodesk Exchange, are shown below.

**RENAME** – Sometimes entities need to be renamed. They do not need to be redefined, replaced, or relocated—just renamed. By invoking the RENAME command, you can edit the names of a variety of entity types. Once the entity type is selected, the specific instance is selected. Enter the new name in the bottom box and press the Rename To button.

**SELECT/SELECT** – There are many great ways to select objects. Quick Select is effective when a large quantity of objects with similar properties need to be selected. Narrowing the selection to a small group of objects can be cumbersome. By typing SELECT, enter, SELECT, enter, several selection tools are listed in the command line. All of the selection tools are available when you invoke modify commands, but if you need to change the properties of selected objects, SELECT is an effective command. Some of the options given in the SELECT command have been superseded in newer releases. Some of the most useful selection commands are as follows:

F (Fence) – Draw a polyline of sorts through the desired objects.

WP (Window Polygon) – Draw a polygon and all of the objects within the polygon are selected.

CP (Crossing Polyline) – Draw a polygon and all of the objects within or touched by the polygon are selected.

P (Previous) – Selects the objects that were previously selected.

L (Last) – Selects the last visible object that was created.

SI (Single) – Selects the first object or set of objects designated rather than prompting for more selections.

Point modification tools – There are three drawing-based system variables that change the size and shape of points, also known as nodes: PDMODE, PDSIZE, and DDPTYPE.

• PDMODE changes the shape of the points. There are several different shapes. The values associated with each shape, listed in Autodesk Exchange, are shown to the right.

• PDSIZE changes the size of the point. If a positive value is entered, the point size is absolute and will not change when you zoom in and out. If a negative value is entered, the size is relative so the point will become larger or smaller as you zoom in and out in the drawing.

• DDPTYPE opens a dialog box that allows both the size and shape to be edited at the same time. When editing the point size, you are given the choice to set the size as absolute or relative. The graphic representation of the shape options is very helpful. There are not as many options, though, as the PDMODE command.
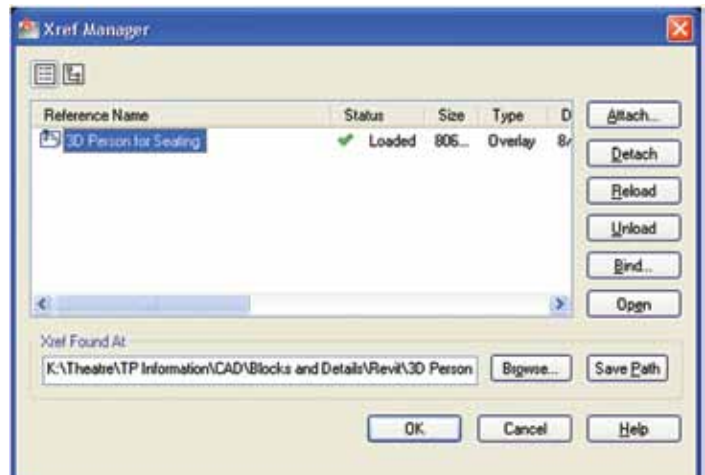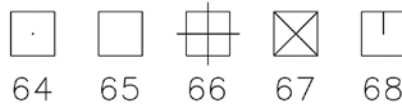




CLASSICXREF and CLASSICIMAGE – The new external reference palette has many great features. Unfortunately there is one fundamental tool missing from the palette, but was included in the

external drawing and image reference dialog boxes. Save Path is extremely useful when absolute pathing is utilized. Often, relative pathing is preferred, but absolute pathing is sometimes more effective. If referenced files are moved, absolute paths are lost. A quick way to get all of those re-pathed is to place the drawings in the same folder as the external references and images, open the drawings, and enter CLASSICXREF. When the external references are selected, the Xref Found At line will show the desired path. Pressing Save Path will change the saved path to the one listed as the found path. The drawings can be moved to their desired location and the correct path is saved.

Frame Settings – The ribbon contains a tool to change the frame settings for underlay and image references. Sometimes, though, you need control of individual frame types. I will often want the image frames but not the wipeout frame to print. IMAGEFRAME, PDFFRAME, DGNFRAME, and DWFFRAME control each individual type of frame by entering three value types. Enter 0 to turn the frame off. When the frame is off, the object cannot be selected or modified. Enter 1 to turn the frame on and make it printable. Enter 2 to turn the frame on, but not plot. Wipeout frames can only be turned on or off by typing WIPEOUT, entering F for frames and typing ON or OFF to control the visibility.

Plotstyle Table Settings – As a specialty consultant, we work on several projects simultaneously and with several clients. Though our drawings are plotted using named plotstyles, many, but not all, members of the design team continue to use color-dependant plotsyles. Often, the drawing plotstyle type needs to be changed from color-dependent to named. There are two commands that make this conversion: CONVERTCTB and CONVERTPSTYLES.

CONVERTCTB converts the current color-dependent plotstyle table to a named plotstyle table. Beware—if you select a custom-named plotstyle table within this command, the table will be saved over. I prefer to keep the ACAD.CTB and ACAD.STB files generic and select those tables during this process.

Once the CONVERTCTB command is complete, CONVERTPSTYLES will actually convert the drawing from color-dependant plotstyles to named plotsyles. When the command is invoked, you will be asked which plotstyle table to assign. You can only assign tables that have color mapping tables. Color mapping tables are created using CFG, PCP, or PC2 files. Color mapping tables are used to map plotstyles when opening a pre-2000 drawing. Unless you have your CFG, PCP, or PC2 files from R14 or earlier you cannot create a named plotstyle with color mapping. ACAD.stb has color mapping. It is easiest to select ACAD.stb and assign the desired table in the Layers palette or the various plotting dialog boxes when choosing the plotstyle table during the conversion.

Once both of these commands are complete, the drawing is converted. Note that the conversion from named plotstyles to color-dependant plotstyles only requires that the CONVERTPSTYLES command is invoked.

- command – Many commands can be invoked in the command line by adding a dash (-) before the name. Though most of the

options are available in the ribbon, the command line tool version may provide additional options and will be used to create custom commands. Two tools that contain additional options are - ARRAY and - PURGE.

```
Command: -purge

Enter type of unused objects to purge
[Blocks/Dimstyles/Groups/LAyers/LTypes/MAterials/MUltileaderstyles/Plotstyles/SH
apes/textStyles/Mlinestyles/Tablestyles/Visualstyles/Regapps/Zero-length
geometry/Empty text objects/All]: r Enter name(s) to purge <*>:
Verify each name to be purged? [Yes/No] <Y>: n Deleting registered application
"ACAD_MLEADERVER".
Deleting registered application "ACAD_PSEXT".
Deleting registered application "AcadAnnoPO".
Deleting registered application "ACAUTHENVIRON".
Deleting registered application "AcDbDynamicBlockTrueName".
Deleting registered application "RAK".
6 registered applications deleted.
```

-ARRAY – AutoCAD 2012 introduced a great array tool. It is dynamic and easy to manipulate. For certain tasks, though, I prefer the old array tool. By typing the dash before array, you will invoke the command line version. The objects in the array will not be connected, and the editing is not dynamic.

-PURGE – The purge dialog box is very comprehensive, though one option not provided is purging regapps. A registered application is the named group of extended data associated with objects. When the object is deleted, the registered application is no longer referenced by an object but remains in the drawing. Multiple unreferenced registered applications will dramatically slow the drawing performance. To delete the applications without asking about each application, type –PURGE into the command line, enter, R, enter, *, enter, N, enter. Depending on the quantity of regapps, you will see an immediate increase in performance.

As useful as the ribbon and dialog boxes are, for those of us who started using AutoCAD in R10 or earlier, there are command line tools we cannot give up. Typed commands can be invoked on any computer regardless of the ribbon, palette, and toolbar customization and are sometimes simply faster than navigating the ribbon. Tools are not often used do not belong on the Home ribbon tab and can be buried deep, making them difficult to find. Hopefully, this article exposed you to older tools that are still useful and allow you to be more efficient.

*Lisa Bernacchi is a Theatre Consultant and the CAD Manager in Schuler Shook's Chicago office. She has been working with AutoCAD since release 10 and is responsible for developing and maintaining theatre graphics standards. She can be reached at lbernacchi@schulershook.com.*

# BIM Project Coordination– Initial Clash Detection
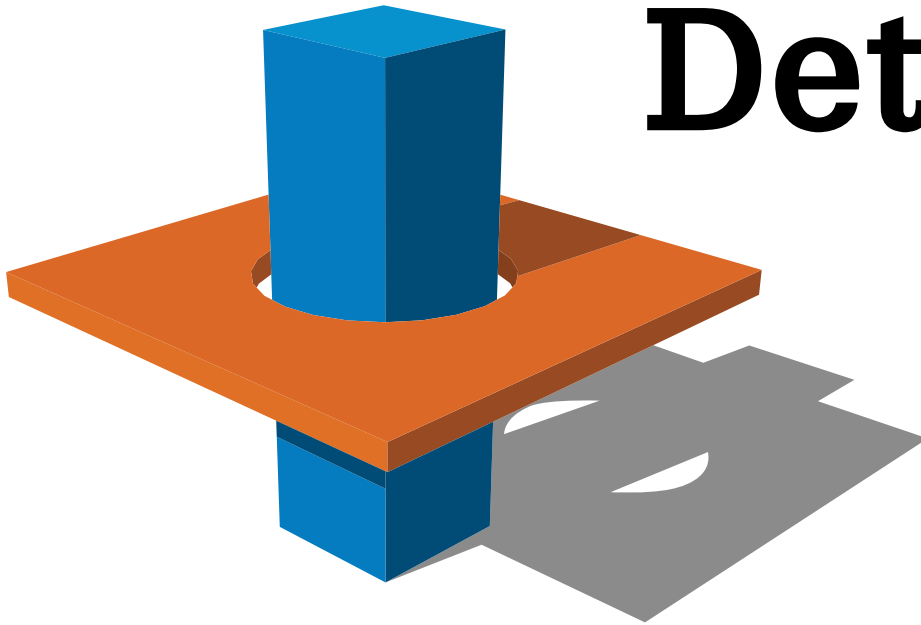
IM project coordination, when reduced to its lowest terms, is simply building a project in virtual space first, in order to uncover and fix as many construction problems or conflicts as possible. In a perfect world, it would find all of the problems and the actual construction would go smoothly, be completed on time and within budget. Alas … this is not a perfect world.

With Autodesk® Navisworks, we have come a long way from the days when a group of high-priced journeymen from several trades stood around pointing fingers and saying things like: "Well that's your problem. We were here first," or "Mine is bigger than yours" (referring, of course, to ducts versus pipes), or the ever popular "It's already installed! You can submit a change order and we'll be happy to move it for $,$$$." The huge waste of time and money wasn't limited to needless change orders and wasted material. The cost of those impromptu "Oops, it doesn't fit" meetings was phenomenal.

When BIM project coordination is done right, everyone comes out ahead. Owners get expected results, at or below budget, GC's get to manage the project instead of dealing with crisis after crisis,

sub-contractors have predictable material and labor costs and can pre-fabricate large sections in house, then ship them to the jobsite for installation. This creates material and labor efficiencies, along with added profit.

## LINE 'EM UP

For now, let's look at what to do when all of the models have been submitted to you for initial clash detection. The number of models that will become part of your compiled work will vary from project to project, but typically will include at least architectural, structural, mechanical (ducts and hydronics), electrical, plumbing, and fire prevention. More often than not, your model will also include framing and/or drywall, acoustical ceilings, and any special building features such as sky lights or solar tubes.

Navisworks is very good at interpreting, combining, and displaying 3D files from many different software packages. At last count, I think the number was over 40 file formats. However, it takes a little planning and a great deal of reminding your group of contributing contractors what the project origin is and its proper orientation. That seems simple, but don't ever assume it is understood by everyone, even after it has been discussed.
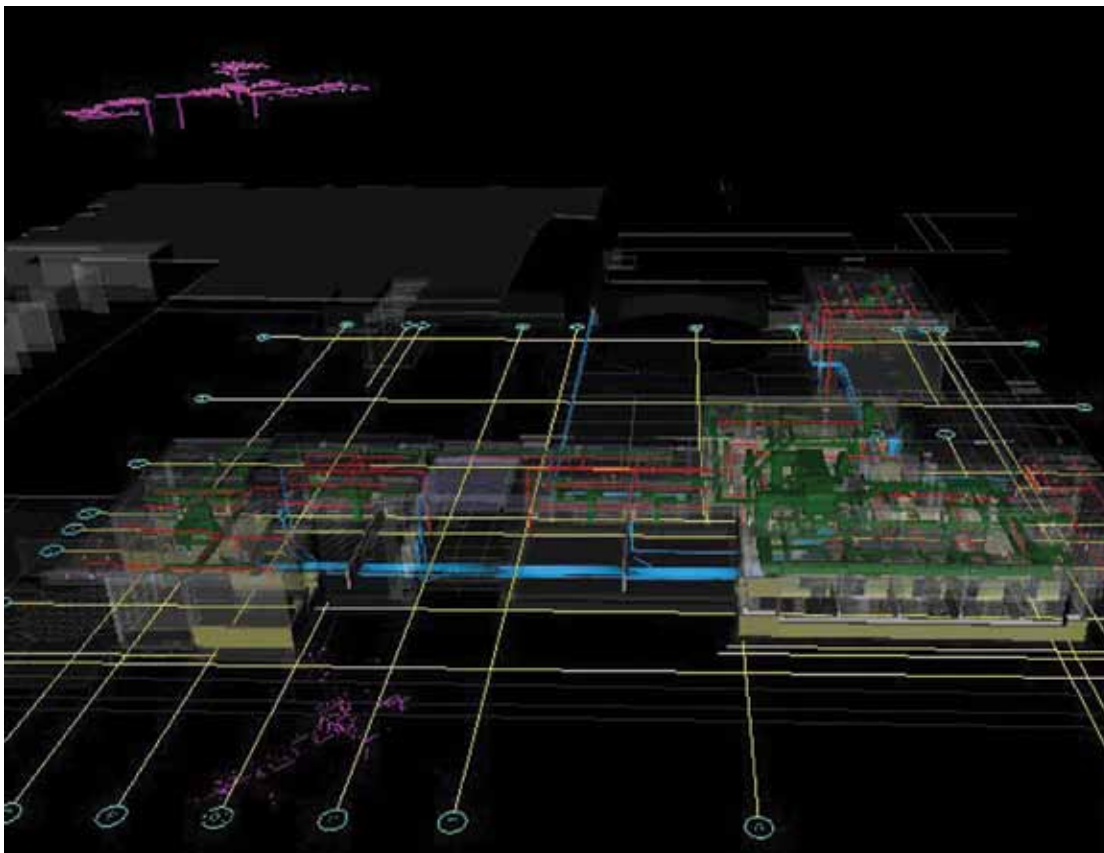
# Navisworks Manage 2013



*Figure 1: Origin and orientation may not be understood by all.*

The results Navisworks gives you the first time you do a clash detection on a newly compiled model might be a bit daunting. You may get numbers in the hundreds, maybe even thousands, depending on the size and scope of the models you have brought together. Don't let the numbers scare you. This is why you get the big bucks, but more importantly, this is your opportunity to differentiate yourself from others who claim to be BIM project coordinators. Now is the time to work your magic. It is up to you to take the seemingly endless sea of clashes laid out before you and make it understandable. Not just understandable to you, but to everyone in your coordination meetings and everyone who will ever view the file.

Different 3D design packages treat origin and orientation in vastly different ways. So be very clear on these points at the kick- off meeting and all pre-coordination meetings. If you think you've mentioned it too often, it's time to bring it up again. Think of it the way we used to vote in Chicago under the original Mayor Daley— do it early and often!

In Figure 1 we see a project where these two "minor" details were apparently not very clear to all parties. As you can see, clash detection can become downright impossible when individual models are not lined up properly in all three planes. When you're coordinating multiple trades in tight spaces, even fractions of an inch matter.

## INITIAL CLASH DETECTION

Before you actually run your first clash detection, open the clash detective, go to the "Batch" tab and set up the items you want to compare in your Navisworks model. These would be the same things you would be looking for on the job site, if there was no BIM coordination being used. Typical examples are mechanical versus electric; fire versus plumbing; steel versus mechanical; electric versus framing; and so on. Be sure you include every combination of the trades you are coordinating. There is nothing worse than getting to a point in your coordination effort where it looks like everyone is clash free and then realizing you forgot to include "something versus something." It is truly a "Wanna Get Away" moment. Not that I have ever experienced such a thing. Uh ... moving right along.

There are several tools at your disposal to help make this happen. The first one you should employ is the Rules tab in the clash detective. This is especially helpful when managing clashes involving drywall, floors, footings, architecture, and others. We all know that pipes and ducts have to go through walls. Navisworks,
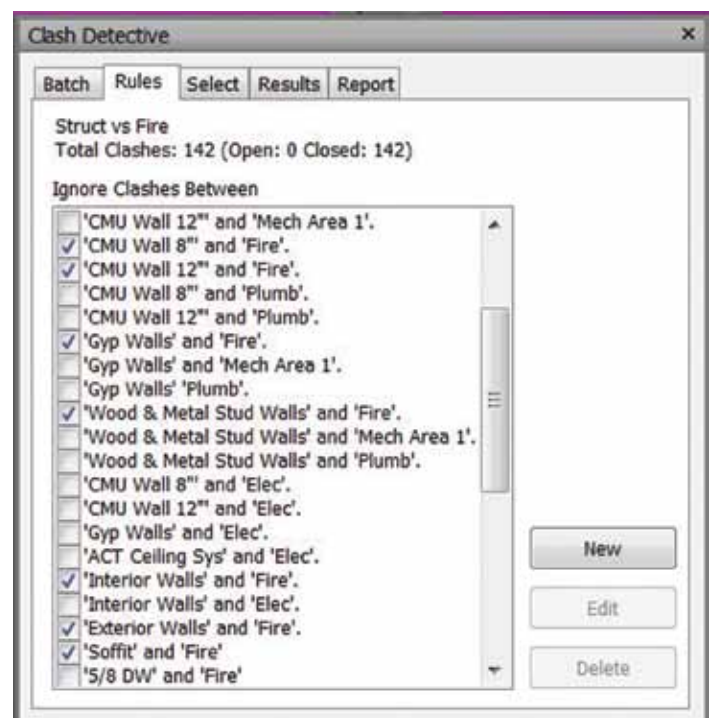


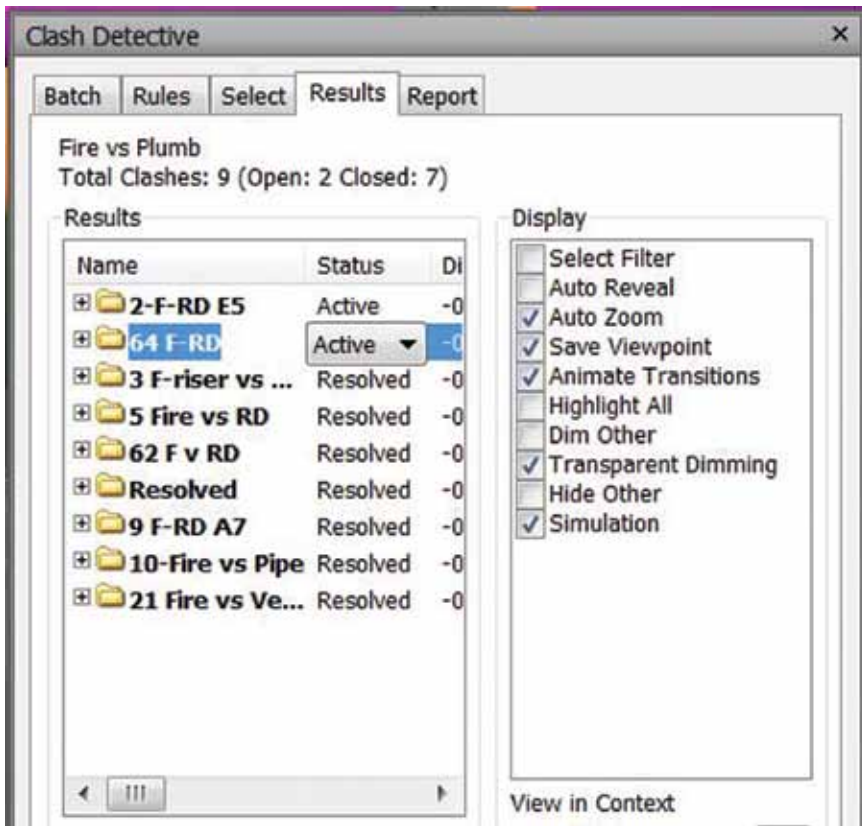*Figure 2: Use Rules to trim your clash list.*

*Figure 3: Group clashes to save time and brain cells.*

Another good use of clash groups is to combine all clashes with the same status. Approved or resolved clashes have already been dealt with, and just get in the way of your productivity. Your active clash list will be long enough without sifting through these, as well. Make a folder for each and simplify your work by cleaning up the clutter. By grouping, you can also save time, because when you change the status of a folder, say from active to resolved, the status of all clashes contained in that folder changes. Figure 3 shows some folders used to make large numbers of clashes manageable.

## USE VIEWPOINTS FOR FREEDOM

Viewpoints are valuable tools you can use in your coordination effort. They are snapshots of scenes you feel are important that can be named and saved. You can add text, dimensions, clouds, etc. in order to further clarify a particular situation. An even more important reason to use viewpoints is that there is a good possibility that all of the people who will have the need to view your coordination file will not have access to a full featured version of Navisworks. Some of them will be using Navisworks Freedom, the viewer provided by Autodesk at no charge.

While Freedom has many excellent features and is an amazing piece of software for free, it cannot see the clash detective or any clashes contained in it. It does, however, allow the user to see all saved viewpoints. Pick the best view in each group-o-clashes, then save it as a viewpoint.

Viewpoints are also a great way to quickly jump between different project views and conditions. If there's an area of the project that you know will be discussed, take your time to get the right view angle and scene composition then create a viewpoint. Like clashes, they can also be organized in a logical folder and file structure to make your life easier. And isn't an easier life almost always a good thing?

Stay tuned for further tips on how to become a Superstar BIM Project Coordinator.

being ever vigilant, generates a clash each time something goes into and out of a wall. By defining some Rules, Navisworks will look the other way, when you tell it to, and you can eliminate a multitude of clashes that would just end up being approved anyway. Figure 2 shows some common rules that might be helpful. Use rules to your advantage, but be careful not to rule out too many conditions. A pipe that is supposed to run parallel to an exterior CMU wall, but is in fact modeled so that it resides partially into the wall, will not show up as a clash if you have ruled out pipes and exterior CMU walls.

## ORGANIZE CLASH GROUPS

Grouping is your next weapon in the fight against chaos. When you group clashes, they instantly become more manageable for you and more understandable for your team. Because of the way Navisworks creates, displays, and thinks about objects, there will be many times when what looks like a single clash between two components, such as a duct and a fire sprinkler head, will generate multiple clashes—perhaps 10 or more. These clashes presented for your resolution will most likely not be listed together. They might be clash numbers 6, 7, 8, 11, 14, 15, 16, 17, 29, 42, etc. So instead of taking the time in your coordination meeting to find and show each micro view of the same clash, create a folder in your clash detective results list. Give it a name that is short but descriptive. I like to begin with the number of the first incidence of the clash. Then drag and drop all of the other views of the clash into the folder. Voila—many become one.

*John Segler has been working in Mechanical and Architectural Design, with AutoCAD since release 9. Revit and Navisworks have become his weapons of choice for 3D Modeling and BIM Coordination, since their 2009 release. He is the BIM Manager for Create 3Ds in Las Vegas, Nevada. John is also a Licensed General Contractor and can be reached via jsegler@create3ds.com.*

# Surveyor's Companion:
## Removing the Guesswork & Increasing Efficiency
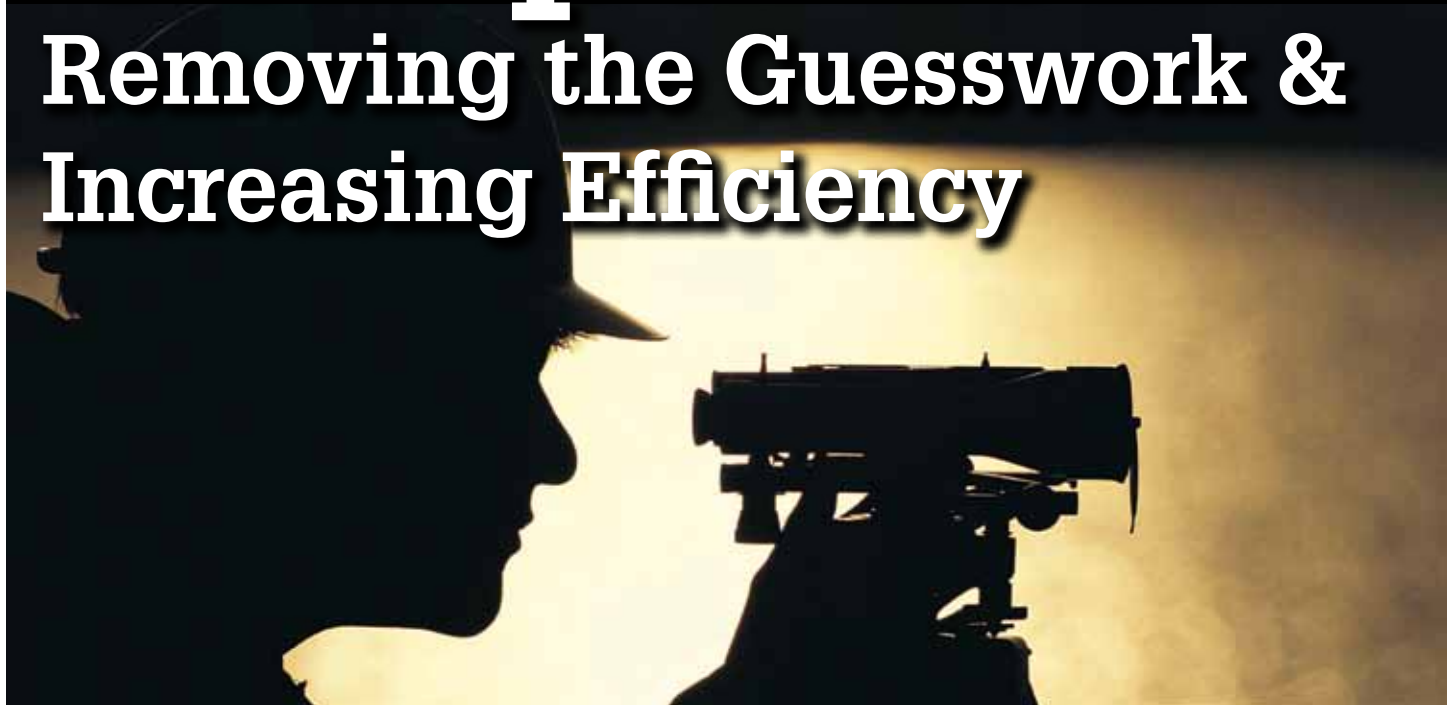
A utoCAD® Civil 3D® has created methods to figure coordinates that are fairly simple and efficient, but Surveyor's Companion from Eagle Point Software takes the process a step further. Since there are too many options available in Surveyor's Companion to cover in a single article, I will concentrate on figuring points for construction staking and imputing record legal descriptions.

## PLACING POINTS MANUALLY

After the software is loaded, and you open Civil 3D, you'll see another tab on the ribbon that says "Surveyor's Companion."

Placing points manually is similar to Civil 3D, except a different dialog box pops up (See Figure 2a). (Note: Every command within Companion starts with the Batch Processing settings dialog box, but I rarely use it. It's good if you want to keep track of what points were figured, or for some reason need to reset the same points later on.)

The difference between this and Civil 3D is instead of imputing the defaults under the Point Settings in the Toolspace including starting point number and description, you input it in the Place Points dialog box (Figure 2b). The nice thing about this is if you don't know the next available point number, you can type in one
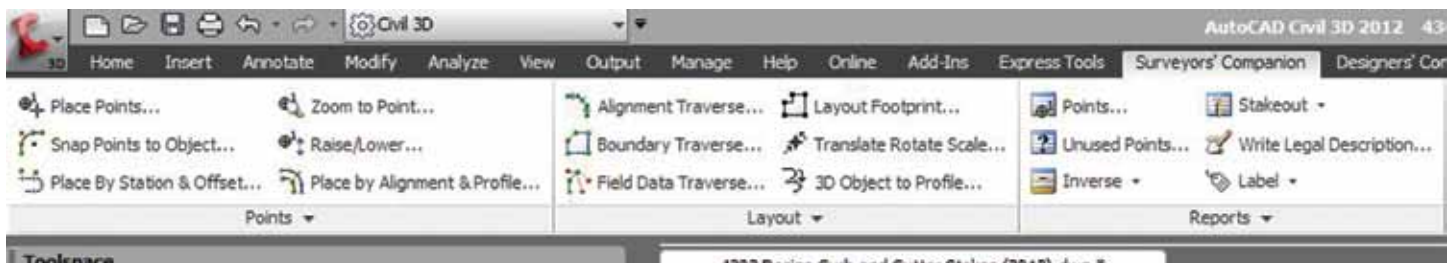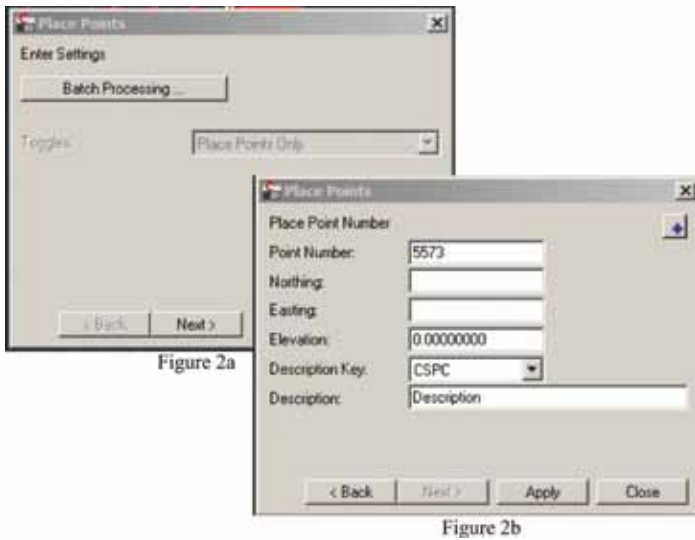


Figure 1: Surveyor's Companion ribbon

*Figures 2a and 2b: Placing points manually*

that's close. It will warn you if you chose one that already exists, and, if not, will find the next one available. It also uses the Description Keys that are already loaded in your drawing.

You can also add a secondary description that follows the Description Key, or you can leave it blank and only the Description Key will end up in the final point description. You can input the coordinates manually or click on the small point icon in the upper right of the dialog box to place it in the drawing. I use this method when setting only a few points at a time such as property corners or points where the description changes fairly often. I find it more user friendly than Civil 3D because I don't have to keep looking at the command line to see where I am in the command.

## POINTS ALONG ALIGNMENT OR CAD ENTITY

When you're not concerned about elevations, but need to set points along either an alignment or CAD entity at a particular station, click on "Place by Station & Offset…" In the next dialog box (Figure 3), you can either pick a named alignment or CAD entity (by using the point icon in the upper right).
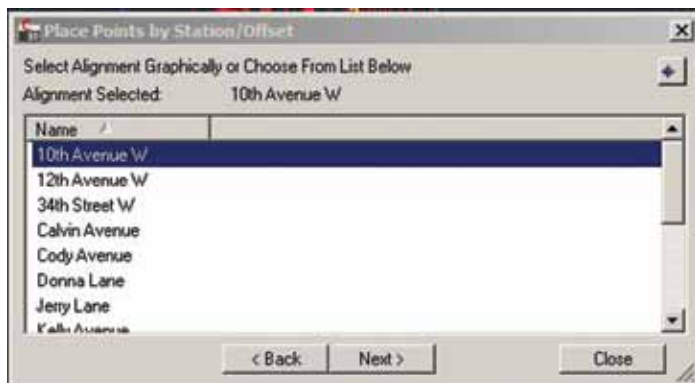


*Figure 3: Place points by station/offset*

The next dialog box (Figure 4a) shows all the options similar to the Place Points box except it also asks for a station and offset. If you

want to set more than one at a time, click on the "Multiple" button. Figure 4b shows how you can do multiple stations at a specific interval. This is especially handy when setting points for a roadway or points along a property line.
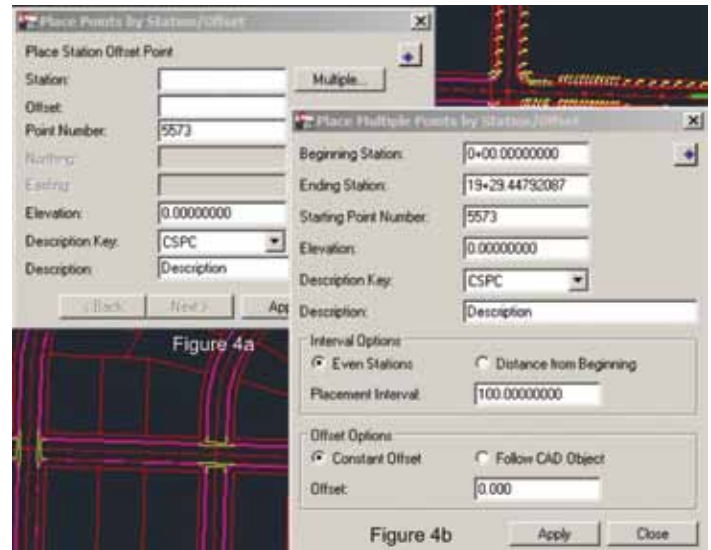


*Figures 4a and 4b: Staking multiple points by station/offset*

## STAKING ALONG AN ALIGNMENT WITH ELEVATIONS

Now you may be wondering about setting stakes with proposed elevations such as final centerline grade or curb and gutter. Note: This next section goes under the assumption that you created an alignment with a proposed profile in Civil 3D.

Click on "Place by Alignment and Profile…" command. The Station and Coordinates (Figure 5a) dialog pops up. Here you can choose the alignment and profile you want to set points for. It defaults to 100' intervals, but if you want 25 instead, simply replace it with 25 and click the "Calculate" button. You can also include horizontal and curve stations. The command also defaults to the centerline of the alignment. The real beauty of the command is not



*Figures 5a and 5b: Station and coordinates*

# AutoCAD Civil 3D 2013

only the ability to offset the points at a specific station interval, but also to add or subtract an amount from the chosen profile.

This can be used for creating points with back-of-curb elevations or even dirt grades depending upon your needs. To accomplish this, click on "Additional Constant Offsets" button (Figure 5b). Note: Positive numbers in the offset figures points along the right side of the alignment, whereas negative numbers figures points on the left.

If you click on the New icon, you can also add other stations if needed. Once you've chosen all the stations and offsets, simply click on "Place Objects." The next dialog box (Figure 6) gives you even more options, including the description. Usually only the Place Points option is highlighted. The other two options are equally self-explanatory.

Besides adding the points along the stations specified, Surveyor's Companion also adds the alignment name, station, and offset in the point descriptor (See Figure 7).

## IMPUTING LEGAL DESCRIPTIONS FROM RECORD TITLE

One other useful command is "Boundary Traverse." How often do we need to draw in a recorded deed or easement? Too often to count, I bet. Boundary Traverse beats drawing it in using simple AutoCAD commands or even Civil 3D's method of first having to create a Site and adding Parcels. The first dialog box (Figure 8a) gives you the option to add points along with an object (a polyline), points only, or object only. Figure 8b lets you either pick an existing point, type in the coordinates manually, or pick a point within the drawing. It asks for a starting traverse point which you can either place, or click on "Next" to ignore.



Figure 6: Placing objects
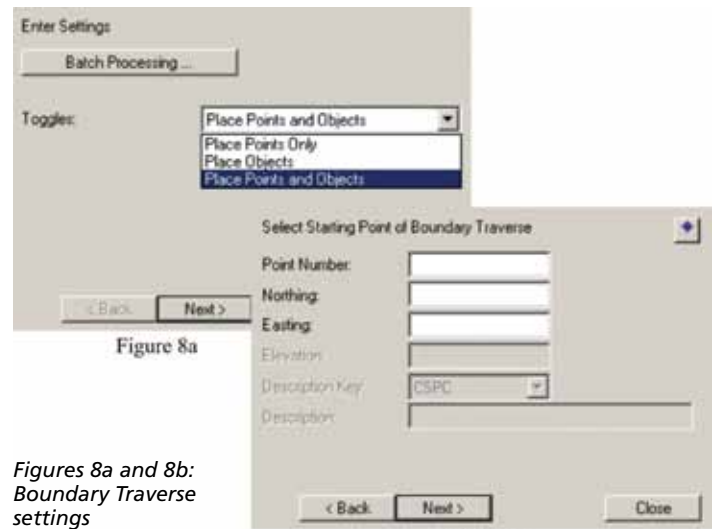


Figures 8a and 8b:
Boundary Traverse
settings



Figure 7: Coordinate listing

**How often do we need to draw in a recorded deed or easement? Too often to count, I bet. Boundary Traverse beats drawing it in using simple AutoCAD commands or even Civil 3D's method of first having to create a Site and adding Parcels.**

*Figure 9: Entering boundary line data*

*Figure 10: Entering curve data*

The next dialog box (Figure 9) asks for Traverse Direction (N/SE/Wdd.mmss format ex: NE89.2325 or AZdd.mmss for azimuths) and distance. If there's a curve in the next leg, simply click on the curve icon. All the data required for developing a curve is available (Figure 10), but you don't have to add all of it. One of the first three such as delta and one of second three such as arc length are enough, and Surveyor's Companion will fill in the rest. This is useful as a check if the legal description has more information.

## CONCLUSION

Surveyor's Companion contains many more commands including writing legal descriptions, rotating and translating, and field data traversing, but to go through all of it would take up far too much space. As good as Civil 3D is at calculating points, Surveyor's Companion makes the job even more efficient. In a field where time is money and at a price of $595 (yearly subscriptions also available), it's more than a reasonable purchase. For more information, including videos on how it works, go to www.eaglepoint.com/products/surveyorscompanion.

*Andra Marquardt is a Professional Land Surveyor in the State of North Dakota, and has worked for Toman Engineering Company in Mandan, ND since 1997. She has used Auto-CAD starting with Version 9 to the most current version of AutoCAD Civil 3D. She is also AUGIWorld's Content Manager for AutoCAD MAP, so if you'd like to write articles specific to Map, please email her at amarq013@yahoo.com*

PRODUCT FOCUS

by: David Fano and Don Rudder

# Extending Revit with "Apps"

As hard as software vendors try, they will never be able to add every feature you could possibly want. That is why they focus on providing tool such as APIs and SDKs to allow users and third-party developers to build on top of and extend the manufacturers' platforms. We're going to take some time to talk about custom programming, some of the tools we have been releasing, and some great places to find more third-party applications.



*Figure 1: Starting a project in Microsoft Visual Studio. For more on building add-ins check out http://goo.gl/FlazR*

## REVIT API AND SDK

If you want to use software, you use the buttons and graphic commands it provides. If you want to extend software, you need to look at the API and SDK. For a little background for the non-coders out there, an API is an Application Programming Interface, basically a way to work with an application via programs (code). What you mainly work in is the GUI or graphic user interface. The SDK is the Software Development Kit—the instructions and documentation for how to develop on top of a platform (i.e., use the API).

Now that we have those definitions down, how does this relate to you, and more importantly, the tools you use? We're going to talk mainly about Autodesk® Revit®. For those of you who don't know, Revit was not originally created with an API. This made it tough, initially, to extend Revit as a platform, but since Autodesk acquired Revit they have created an API and made it better with every release. All new features added to Revit are accessible via the API. When scheduling permits, the Revit team also goes back and adds old features previously not accessible. The Revit API is so complex that it has its own product manager and team. Revit 2013 has seen a ton of new improvements and is really starting to open up the possibilities for what can be done on top of Revit.

## APPS.CASE-INC.COM

As a direct result of the Revit API becoming more and more open, one of the fastest growing parts of our business at CASE is software development. As a way to play with features in the Revit API we are releasing a new "App" every month at http://apps.case-inc.com. We have also recently started a Revit API 101 series for anyone who wants to try and learn to code their own add-ins (http://goo.gl/qgQI4).
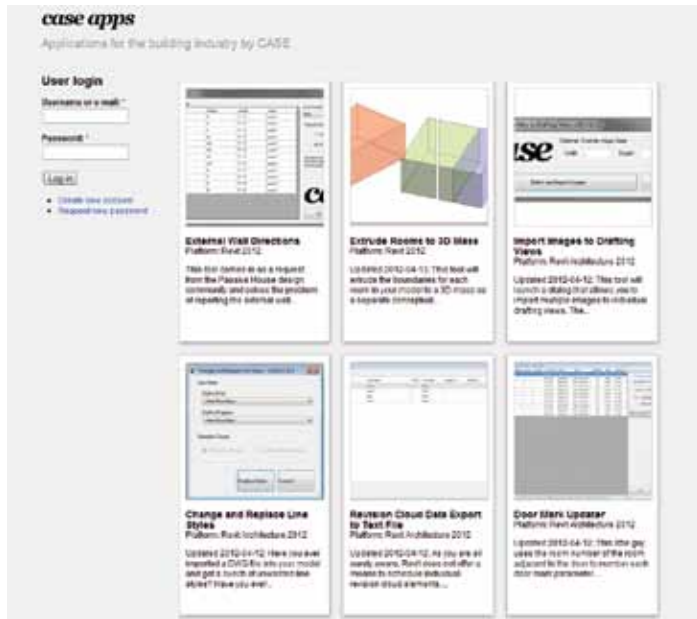


*Figure 2: apps.case-inc.com is where we are hosting free Revit applications that are released monthly.*

Besides exploring new features in the Revit API, we want to promote what can be built on top of Revit and reinforce the idea that you are not limited to features that come out of the box. We also want to push ourselves to make minimal yet useful applications so we imposed some time limits on how much time we spend in originating the apps. The basic rule is that the first version of the app has to be launchable with a day or less of work. That helps us keep the tools very focused to solve a specific need (i.e., "Change and Replace Line Styles"). Apparently, people are using them; we're averaging about 300 uses per day across all the applications. Following are some that people seem to be using quite a bit.
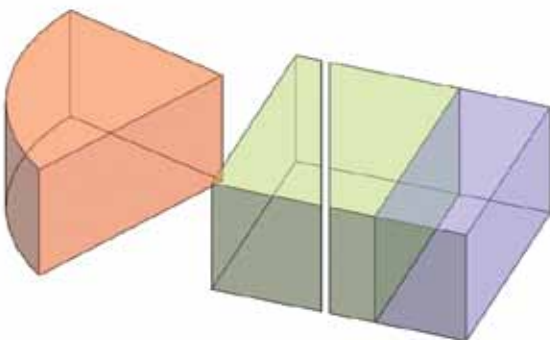


*Figure 3: Extrude Rooms to 3D Mass*

Extrude Rooms to 3D Mass – This tool will extrude the boundaries for each room in your model to a 3D mass as a separate conceptual mass family and load it into your model placed exactly where the room is.
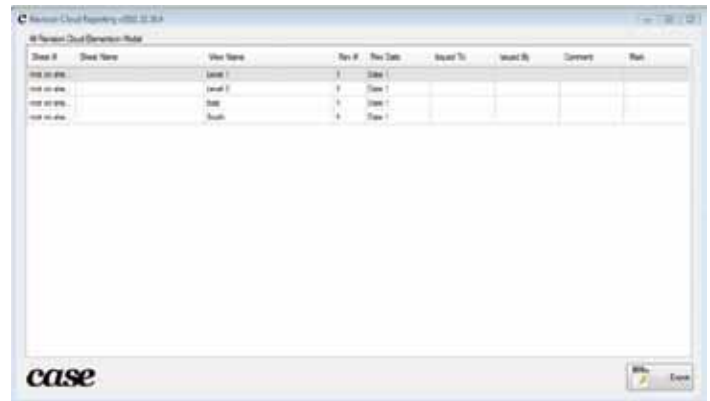


*Figure 4: Revision Cloud Data Export to Text File.*

Revision Cloud Data Export to Text File – As you are all surely aware, Revit does not offer a means to schedule individual revision cloud elements. This tool will export all instances of Revision Clouds along with the revision name, date, and description that they belong to. The view and/or sheet that the cloud element is on is also exported along with the comment data entered directly onto the element. This tool rocks for blasting a quick revision report for your revision related needs.
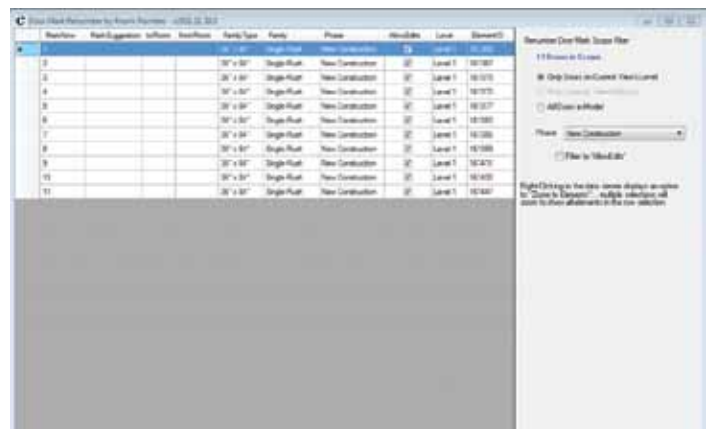


*Figure 5: Door Mark Updater.*

Door Mark Updater – This little guy uses the room number of the room adjacent to the door to number each door mark parameter. Where multiple doors are along a common room number, the remaining doors are presented as an alpha suffix to the room number (1001A, 1001B, etc.). You will have the option to update doors by selection, common level, or the entire model all in a single click.

Change and Replace Line Styles – Have you ever imported a DWG file into your model and got a bunch of unwanted line styles? Have you ever wanted to quickly change those line styles to your standard styles already loaded into your model? This tool does just that.

# Revit Architecture 2013
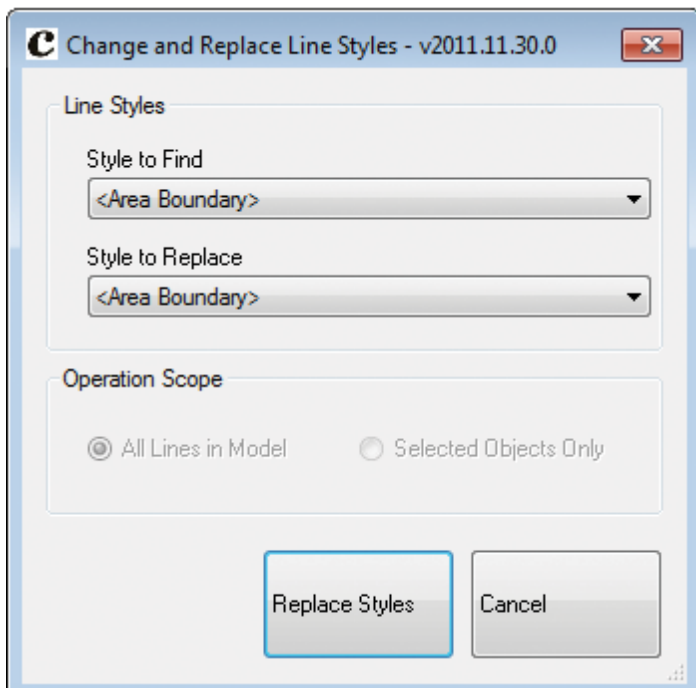


*Figure 6: Change and Replace Line Styles.*

## MORE APPS!

Like we have seen with many of the other App platforms (iOS and Android), it soon becomes difficult to manage and find the best or most relevant apps. Enter the "App Stores" and communities. Here are a few places you can look to manage and sort through the ever growing list of apps that can extend your BIM workflows.

With the release of the Revit 2013 platform, Autodesk also opened up the Autodesk Exchange Apps site (http://goo.gl/etcWw). It was already open for AutoCAD, but now has a collection of Revit Apps. One of the great things about this is the distribution for App developers. The link to the site is embedded right within Revit. There are still some logistics to figure out as far as the enterprise distribution and support of Apps goes, but this looks like a really promising direction.



*Figure 8: The Revit Application store.*

The folks over at Astacus Labs AB have put together a great site with a slew of Revit Apps as well as some great ways to manage them and quickly install them. Head over to http://www.revitapplicationstore.com/ and check them out.
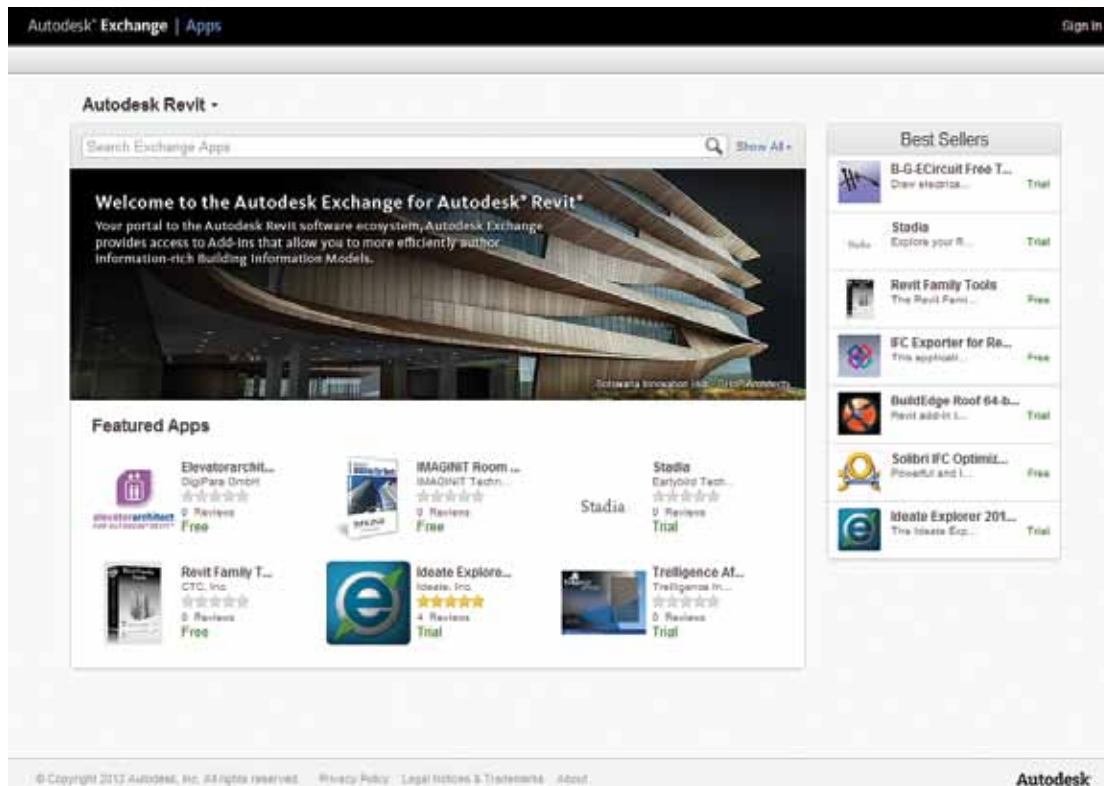


*Figure 7: Autodesk Exchange Apps site.*

Tim Grimm was a little frustrated with tracking down all the great apps that people are releasing so he did the community a favor by creating http://goo.gl/3OA2t. Tim does a great job of posting links to all the Apps he finds and gives full attribution to the authors. One of the toughest challenges being presented by the endless distribution possibilities of digital media is findability, and one of the things people can do to provide great value is to take the time to curate and point people in the right direction. Tim is doing just that.

Last year we were working on a project with SOM (http://som.com/) and needed to build a list of all the third-party apps out

*Figure 9: Revit Add-ons blog.*



*Figure 10: AEC apps.*

*David Fano (@davidfano) is a founding partner of CASE, a virtual design and construction (VDC) and integrated-practice consultancy based in New York City. At CASE, David is primarily responsible for leading technology implementation, knowledge capture and sharing, social media initiatives, and business development. He has provided firm-wide BIM support, training, and guides to clients such as Woods Bagot, Pelli Clarke Pelli Architects, and Skidmore Owings & Merrill. David has also contributed to the design industry with the development of DesignByMany.com, a challenge-based virtual design community, and DesignReform.net, a digital design publication and free tutorial resource for design professionals.*

there for the AEC industry. We began by asking around the office and that worked for a bit, but we quickly lost track and it became very difficult to manage. At that point we proposed to SOM that we crowd source the list and do in such as a way that it operated more like a community/wiki. Enter aec-apps.com. The intention is not to create an "App Store," rather an organic database of all the applications relevant to the AEC community. We're hoping it goes way beyond just Revit Apps and people start to post other scripts and link to software that enhance BIM workflows. Look for a complete site overhaul in the next few months.

## CONCLUSION

The AEC industry is seeing an explosion of technological innovation and it is only going to grow. We are going to keep seeing new platforms and those platforms are going to allow for the expanded workflows and techniques. As problems arise and as the APIs continue to evolve, we will see great applications that can solve these issues. That being said, it is also becoming easier and easier to learn to code. We hope that the main take-away is that any application with a robust enough API can be extended beyond what comes out of the box. This should be seen as an opportunity and not a challenge.

*Don Rudder (@aybabtm) is the CTO and Director of Software Development at CASE and focuses on the creation and management of specialized software and add-ins for various applications developed for client support. With over 16 years of experience in the AEC industry, Don has held positions as CAD manager for Harris Consulting Engineers in Las Vegas and BIM Manager at HOK in San Francisco, supporting the architectural and MEP groups. He subsequently became the Revit Applications Developer firm-wide. Self-taught in 14 programming languages and versed in .NET, web-based AEC tools, and pretty much any kind of automation, Don has presented at Autodesk University and the Revit Technology Conference. He has also written the last three API chapters for the Autodesk Official Training Guide Series, Mastering Autodesk Revit Architecture.*

# Defining BIM
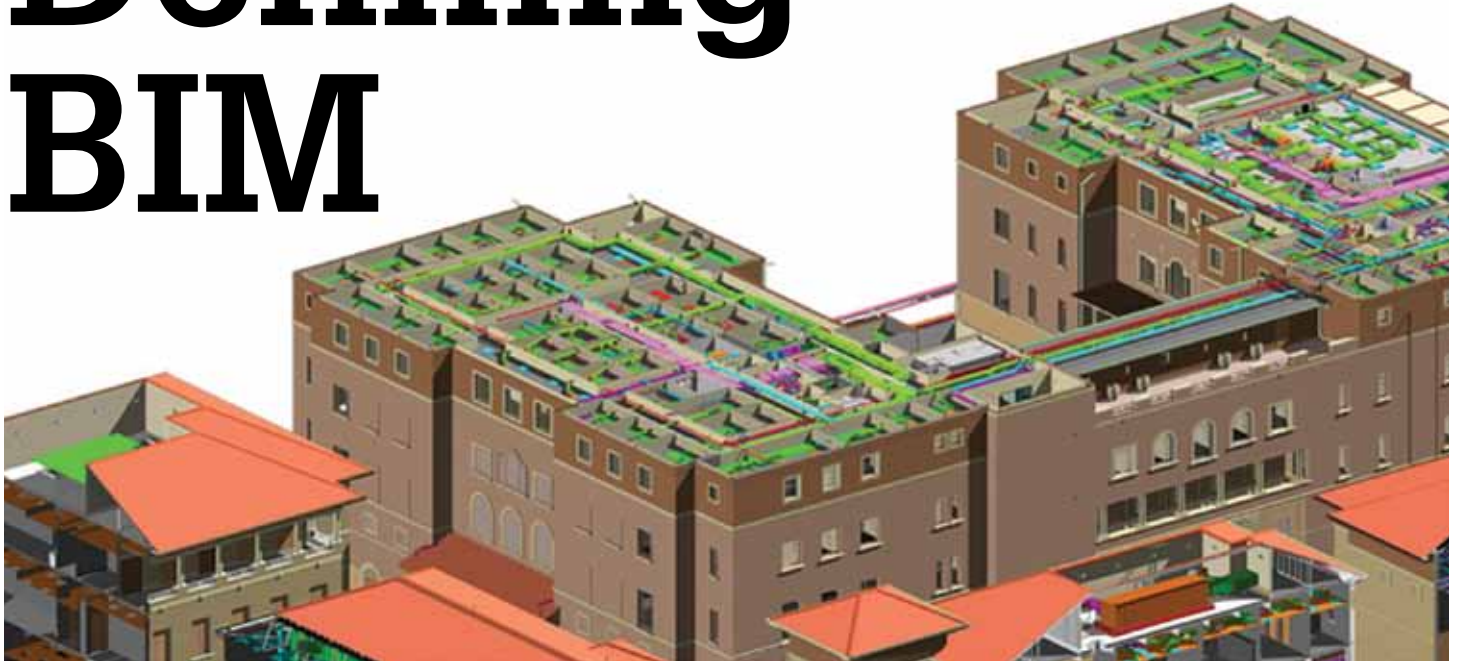


Ten years ago, BIM was just a glint in the eye of some project engineer in middle America. Now it has become the most prevalent and fastest growing engineering and construction-management design, scheduling, and coordination tool since we moved from manual drafting to using AutoCAD on a computer peripheral. Some could even say that BIM has become a household name in AEC firms worldwide. Because of this notion, and the fact that BIM is still relatively new to the global engineering and construction management process, there is no set-in-stone definition of what BIM actually is, what it entails, its limitations or boundaries, and even what the acronym BIM stands for.

Because of all this, we will peel back the layers of Building Information Modeling and try to define the most well-known and commonly used facets of this process. We'll try to standardize certain aspects of it—even though it's nearly impossible to do that from only one person's point of view—and attempt to answer some simple questions that people who are new to BIM often have.

If you ask 10 different people who work for 10 different companies in 10 different industries "What is BIM, exactly?" you are sure to get 10 very different answers. This is because this acronym has been thrown around so loosely that the term is almost akin to 3D modeling. This is one notion that is simply false no matter how you look at it. The definition of 3D modeling is exactly what it appears to be: modeling a drawing in 3D. To simply extrude shapes to create a three-dimensional model does not mean that you are now utilizing BIM. This is especially true if these models are populated with "dumb" objects—3D objects that have no intelligence built

into them and are neither parametric nor have any constraints or advanced details. This is the misunderstanding that I think most firms have about BIM. Just because you generate 3D models does not mean that you are taking advantage of all BIM has to offer.

Because BIM is such a general tool and has many factors at play, some firms decide to approach the process in piecemeal fashion—using separate definitions or micro-BIM definitions. Here are a few.

1.  Populating a 3D model with intelligent, parametric objects so that each contains information such as manufacturer, part number, size, type, gauge, voltage, and so on.

    This will enable you to export all of the intelligent objects in your model into a real-time bill of material that reflects actual part numbers from manufacturers, types, sizes, and amounts—and will change constantly, based on how your model changes. AutoCAD® MEP is one example of a design application that allows you to do this. In the product's newer releases, it's as simple as typing the command "BOM". This saves a noticeable amount of time and effort by replacing the previous way of manually entering data to complete a BOM based on information shown in the model—over and over again—every time the model changes. By populating a model with intelligent objects, you can also globally change items easily, select only certain "types" of objects, have Autodesk® Navisworks® Manage display every object's part number when flying through your model, and drastically reduce file size.

2.  Collision detection and coordination.
    This is, by far, the most popular piece of the BIM pie that firms use across the board. No matter if you have a model that

is populated with dumb 3D solids or intelligent parametric objects, you can bring each model together in a program like Navisworks Manage and perform a collision detection study against each trade in your project.

Identifying each collision between trades in a virtual world before ground is broken on your project will save an endless number of man-hours and change orders in the field due to real-world clashes between trades when installation efforts begin. These are typically identified and resolved in weekly or bi-weekly coordination meetings held by either the appointed Lead BIM Coordination (LBC) firm or the General Contractor. It is hard, these days, to find a large project that isn't utilizing this part of BIM, and this was the first step that took us to the point we are now. Where we once stood around light tables comparing different trades' drawings on to-scale blueprints, we can now fly through a virtual world of MEP and catch these hits before they happen in the field. This is currently the #1 reason that GCs and owners alike choose to use BIM on their projects.

3.  Stage visualization and schedule modeling.

    Another great, but lesser known feature of the BIM process is the staging aspect for the building owner. Navisworks Manage allows you to take your installation schedule and import it from Primavera or Microsoft Project directly into your model using Timeliner, a tool that runs inside Navisworks Manage, and create a "stage animation." You will place certain trades' objects on certain "layers" within the model that will tie into certain points of interest on the schedule.

    Let's say that steel is the first to be laid out in the field. You would select all steel in the model, assign it to an installation effort on your schedule along with the dates associated with it, and it would enter the steel into this variable. Then you do the same for framing, architectural walls, ceiling t-bar, mechanical, electrical, plumbing, and so on. Once you assign all of these pieces to the different areas and dates on your installation schedule, you will create a staging layout based on the exact dates of your schedule. You will then be able to click the beginning of your new schedule within Navisworks, click "play," and see your virtual project be put together in an animation—showing the dates as the project flies by. You can click on certain dates and see what your project will look like on that certain date. Hopefully if you click on the end-date of your project schedule, you should see a complete building.

    Owners love seeing these stage animations because they can see their project's evolution before they even lay out the construction area for demo/excavation. The best part about this facet of BIM is that since your schedule and model has to be complete anyway, it doesn't take much more work than tying the two together to create something that looks like it took months to do.

4.  Data management and infrastructure.

    The final piece that I will be touching on is the 'collaboration' aspect of BIM. Autodesk has come up with many solutions for this as well, one of the better ones being Buzzsaw. Buzzsaw allows all the different subcontractors to share their drawings with one another in one centralized location, allowing subs to download the latest and greatest models from other team members to integrate into their building information model, assuring that they are looking at the newest true model available. We all don't share a common network drive among the project team, so sometimes it isn't as easy as clicking on a drive letter to grab another company's files for coordination.

    Another great collaboration and data management tool from Autodesk is Vault. This application allows team members to centralize their models and drawings internally as a team, allowing you to check-in and check-out drawings for others to work on and giving you more revision management capabilities. Vault, as opposed to Buzzsaw, allows for tight support, direct to the program that you use, whether it be an AutoCAD-based or Revit-based application. It will keep archives, letting you easily access historical data to check old models versus new ones. This is another great collaboration tool to be used alongside Buzzsaw.

With all of these different aspects to look at in regards to BIM, it is no wonder that the acronym is tossed around so loosely. To say that your project utilizes BIM is a generalized statement. Which part of BIM are you taking advantage of? Are you using 4D for real-time simulations? Are you using 5D for cost analysis? Are you doing trade coordination to stop change orders from occurring in the field? Because of all of these different aspects, I am sure that in the near future, BIM will become an AEC standard for all companies and trades alike to view and to which they will abide. We will all be on the same page, and bid a project based on BIM I, BIM II, BIM III, etc. If this happens, there will be a lot less confusion in the industry and more specific scopes of work when bidding jobs.

*Bill Campbell lives in the San Francisco Bay Area, is an AutoCAD 2012 Certified Professional and works for a top engineering construction firm in San Jose, CA as 'BIM Lead'. He enjoys surfing and jogging the beach with his wife and dogs, snowboarding and traveling abroad. Bill previously owned and operated a 3D BIM firm in the Detroit area. He is quite adept to customizing and tweaking AutoCAD and other Autodesk products for ease of use & functionality, and actively beta-tests Autodesk's upcoming BIM-based software. He is currently working on standardizing BIM definitions within the AEC industry with his new project, "BIMkit".*

**COLUMN**

# HEADS UP!
## Updates, Service Packs and Top Known Issues obtained from product pages at Autodesk.com

### Autodesk 2013 Products

2012-Mar-26    Autodesk IPv4 Network License Manager for Windows
http://goo.gl/VHFEX

2012-Mar-26    Autodesk IPv6 Network License Manager for Windows
http://goo.gl/p2hgN

### AutoCAD® 2012

2012-May-24    AutoCAD 2012 Service Pack 2
http://goo.gl/KWwpx

2012-Mar-13    AutoCAD and AutoCAD LT 2012 SP1 SMB V2 Hotfix
http://goo.gl/21ocM

2011-Dec-13    AutoCAD and AutoCAD LT 2012 SP1 Ribbon Hotfix
http://goo.gl/OK7jQ

### AutoCAD LT® 2012

2012-May-25    AutoCAD LT 2012 Service Pack 2
http://goo.gl/JfdwC

2011-Dec-13    AutoCAD and AutoCAD LT 2012 SP1 Ribbon Hotfix
http://goo.gl/1Fj8a

### Autodesk® Revit® Architecture 2012

2012-May-10    Hotfix - Autodesk Revit 2012 - Sketch Grid Performance
http://goo.gl/WQzh8

2012-Apr-16    Hotfix - Autodesk Revit 2012 - Material ODBC Export
http://goo.gl/xPnv8

2012-Apr-16    Hotfix - Autodesk Revit 2012 - Material ODBC Export
http://goo.gl/C4lne

2012-Mar-09    Hotfix - Autodesk Revit 2012 - Point Clouds
http://goo.gl/L4B9u

2012-Feb-21    Hotfix – Autodesk Revit 2012 – Improves stability when working with large datasets (64-bit only)
http://goo.gl/2G4sl

### Autodesk® Inventor® Professional 2013

2012-May-21    Mold Design Content Libraries for Autodesk Inventor Professional 2013
http://goo.gl/O9IaO

2012-May-08    Hotfix - CurrentCulture does not honor Formats setting in Region and Language
http://goo.gl/3qg1F

2012-May-02    Hotfix - Unexpected exit resulting from removing default Material/Appearance Libraries
http://goo.gl/DIFoj

2012-Mar-27    Hotfix - Entitlements not refreshed by license escalation with Inventor Optimization as a result of the dynamic licensing mechanism
http://goo.gl/cqXwF

### Autodesk® Inventor® Professional 2012

2012-May-28    Autodesk Inventor 2012 Service Pack 2
http://goo.gl/vI3Gq

2012-May-23    Autodesk Inventor 2012 Service Pack 1
http://goo.gl/jr6mR

2012-May-08    Hotfix - iLogic BOM override is inconsistent
http://goo.gl/YyjSY

2012-Apr-25    Hotfix - GeneralDimensions.AddLinear errors out when passing intent created on 3D sketch geometry
http://goo.gl/11cxP

2012-Apr-03    Hotfix - Unable to set alpha channel option when writing out png file
http://goo.gl/ZHSMX

2012-Apr-25    Hotfix - GeneralDimensions.AddLinear errors out when passing intent created on 3D sketch geometry
http://goo.gl/3YKeX

2012-Apr-03    Hotfix - Unable to set alpha channel option when writing out png file
http://goo.gl/4XVcv

### AutoCAD® Architecture 2013

2012-Apr-25    AEC Section Display Hotfix
http://goo.gl/2myYe

2012-Apr-16    AutoCAD Architecture 2013 & AutoCAD MEP 2013 Content Browser Migration Hotfix
http://goo.gl/QAFpU

2012-Apr-25    AEC Section Display Hotfix
http://goo.gl/OsTIM

### AutoCAD® Architecture 2012

2012-Apr-12    Insert Dynamic Block Scale Hotfix for AutoCAD Architecture 2012 Service Pack 1
http://goo.gl/Jyrd5

2012-Apr-12    Insert Dynamic Block Scale Hotfix for AutoCAD Architecture 2012 Service Pack 1
http://goo.gl/aJAjW

2012-Feb-06    AutoCAD Architecture 2012 AEC Dimension Hotfix
http://goo.gl/VMQeM

2012-Jan-23    Service Pack 1 Silent Installation (Nordic Version Only)
http://goo.gl/GoeQd

### AutoCAD® Civil 3D® 2013

2012-Apr-24    AutoCAD Civil 3D 2013 Survey Hotfix
http://goo.gl/xqzwB

2012-Apr-24    AutoCAD Civil 3D 2013 Survey Hotfix
http://goo.gl/rYlJf

## AutoCAD® Civil 3D® 2012

2011-Dec-13    AutoCAD and AutoCAD LT 2012 SP1 Ribbon Hotfix
http://goo.gl/GWuoS

2011-Dec-08    Autodesk 2012 Content Explorer Service Hot Fix 2
http://goo.gl/N7hj5

## AutoCAD® Map 3D 2013

2012-Apr-03    FDO SQL Server Spatial Provider HotFix
http://goo.gl/8mROv

2012-Apr-03    FDO SQL Server Spatial Provider HotFix
http://goo.gl/Hiiz1

## AutoCAD® Map 3D 2012

2011-Dec-13    AutoCAD and AutoCAD LT 2012 SP1 Ribbon Hotfix
http://goo.gl/Md4tj

2011-Dec-08    Autodesk 2012 Content Explorer Service Hot Fix 2
http://goo.gl/QyS0E

## AutoCAD® Mechanical 2012

2011-Nov-14    AutoCAD 2012 Performance Slowdown Hotfix (32/64 bit)
http://goo.gl/IuMss

2011-Oct-27    AutoCAD Mechanical 2012 Service Pack 1
http://goo.gl/P8nQu

## Autodesk® 3ds Max® 2013

2012-Apr-19    Autodesk 3ds Max 2013 Product Update 1
http://goo.gl/VdRvq

2012-Apr-19    Autodesk 3ds Max 2013 Product Update 1
http://goo.gl/e5ZkH

## Autodesk® 3ds Max® 2012

2012-Apr-24    Autodesk 3ds Max 2012 Product Update 6
http://goo.gl/NiI4n

2012-Apr-24    Autodesk 3ds Max 2012 Product Update 6
http://goo.gl/MSCav

2011-Oct-25    Autodesk 3ds Max 2012 Service Pack 2
http://goo.gl/FxPNm

## Autodesk Alias Design 2013

2012-Apr-16    Hotfix - Help links in Alias 2013 incorrectly point to 2012 Wiki content and unexpected exit when use of "Use Embedded File Setting"
http://goo.gl/dPxCN

2012-Apr-16    Hotfix - Help links in Alias 2013 incorrectly point to 2012 Wiki content and unexpected exit when use of "Use Embedded File Setting"
http://goo.gl/dPxCN

2012-Apr-16    Hotfix - Help links in Alias 2013 incorrectly point to 2012 Wiki content and unexpected exit when use of "Use Embedded File Setting"
http://goo.gl/0EbRK

## Autodesk® Alias® 2012

2011-Aug-09    Alias 2012 SP1
http://goo.gl/Q7cWK

2011-Aug-03    Hotfix - Unable to open CATIA V5 R20 files with DirectConnect 2012
http://goo.gl/9Cssc

2011-Jul-08    Hotfix - Import shrink option not functioning properly with DirectConnect 2012
http://goo.gl/0FsRS

## Autodesk® Maya® 2012

2012-Mar-01    Backburner 2012.1.1
http://goo.gl/Rllyc

2012-Jan-25    Autodesk Maya 2012 Service Pack 2
http://goo.gl/qhN9p

2011-Oct-11    Autodesk Maya 2012 Service Pack 1
http://goo.gl/DarDG

## Autodesk® Navisworks® Manage 2012

2011-Dec-19    Clash HTML Tabular Report Hot Fix
http://goo.gl/5kP4E

2011-Sep-12    Autodesk® Navisworks® 2012 Service Pack 1
http://goo.gl/IEEwN

2011-Mar-22    Autodesk IPv6 Network License Manager for Windows
http://goo.gl/oyRaB

## Autodesk® Vault 2013

2012-Apr-23    Hotfix - Localized Help
http://goo.gl/xwLno

2012-Apr-13    Hotfix: Unable to install English product from French/German Vault For AutoCAD product.
http://goo.gl/2vFaj

2012-Apr-23    Hotfix - Localized Help
http://goo.gl/fSlgf

2012-Apr-13    Hotfix: Unable to install English product from French/German Vault For AutoCAD product.
http://goo.gl/nBhGY

2012-Mar-28    Hotfix – VE Folder Properties
http://goo.gl/qfxrl

2012-Mar-28    File Revision Hotfix
http://goo.gl/ADtKc

## Autodesk® Vault 2012

2012-Feb-22    Multi Issue Hotfix
http://goo.gl/f0owT

2011-Nov-30    Suites Update
http://goo.gl/WgRnX

2011-Nov-17    Update 1
http://goo.gl/tmp8L

2011-Sep-30    Autoloader Update
http://goo.gl/vIteu

PRODUCT FOCUS

# Making ACA Extraordinary

In every industry, there are many third-party tools that can help in all aspects of drawing quality. AutoCAD® Architecture is certainly no exception. Even though AutoCAD Architecture is excellent software with vast capabilities, let's look at a few of the tools that can help it to become extraordinary. This article will provide a brief overview of the following software.

- PdfImport
- ATHENA
- AcadDecke
- VisionREZ
- CostX
- PointCloud
- GuidSIGN



*Figure 1: PdfImport by DotSoft*

## PDFIMPORT

PDFImport 2.2 is a great tool developed by DotSoft. It is used to import the contents of PDF files into AutoCAD Architecture as polylines, text, and images that can be edited. Attempts to screen capture a PDF can result in a low resolution image that doesn't plot well and can't be snapped to. PDFImport fixes this. If the PDF file contains vector geometry, use of the Import tool will result in highly usable polylines in AutoCAD Architecture. If the PDF contains text annotations, they will become text objects. Images embedded in the PDF are extracted and placed as image references. This program allows a visual preview before the import is complete to ensure you are getting the information you want. Multiple page files are handled with ease.

## ATHENA

ATHENA 2012 is a product developed in Germany by CAD-PLAN GmbH for AutoCAD Architecture versions 2010 to 2012. ATHENA is excellent for curtain wall/storefront design and facade engineering. It has been used successfully by many curtain wall companies, fabricators, and design offices involved in curtain wall technology. ATHENA is used to draft plan views, elevations,

sections, details, and workshop drawings in 2D using the intelligence of the ARX objects through to free 3D constructions. Isothermals, sound insulation, and metal sheet processing is available, along with the computation of structural analysis.

ATHENA is divided into four sections: 2D Design, 3D Design, Engineering and Metal Sheet Processing.

2D design is used for quickly creating plan views, sectional drawings, details and elevations. In addition, production drawings can be produced very simply.

3D design is used for the free planning of complicated geometries, such as sloping polygon facades, glazed roofs, bays, and so on. Part lists and production drawings can be produced from the 3D design.

Structural analysis program (Engineering): Powerful computational tools are available for structural analysis and building physics.

Metal Sheet processing is used to simplify and speed the design of metal sheets and the generation of sheet developments.
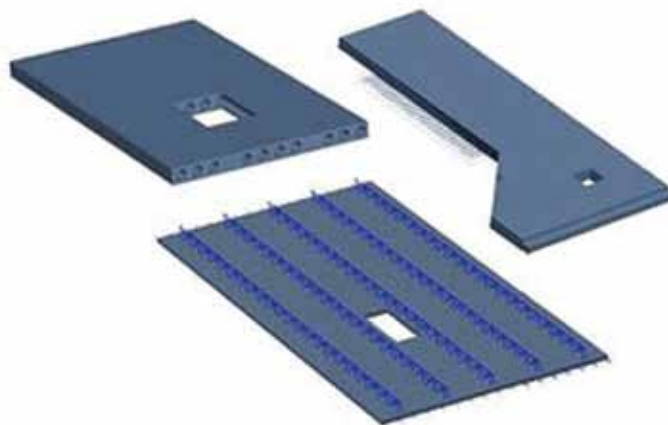


Figure 3: AcadDecke by IDAT GmbH

sions of the slab, reinforcement amount and spacing. In addition, the software provides a complete list of all fabrication parts and creates a file for the quantity survey. The input and computation data can be stored in a relational database for further use later.
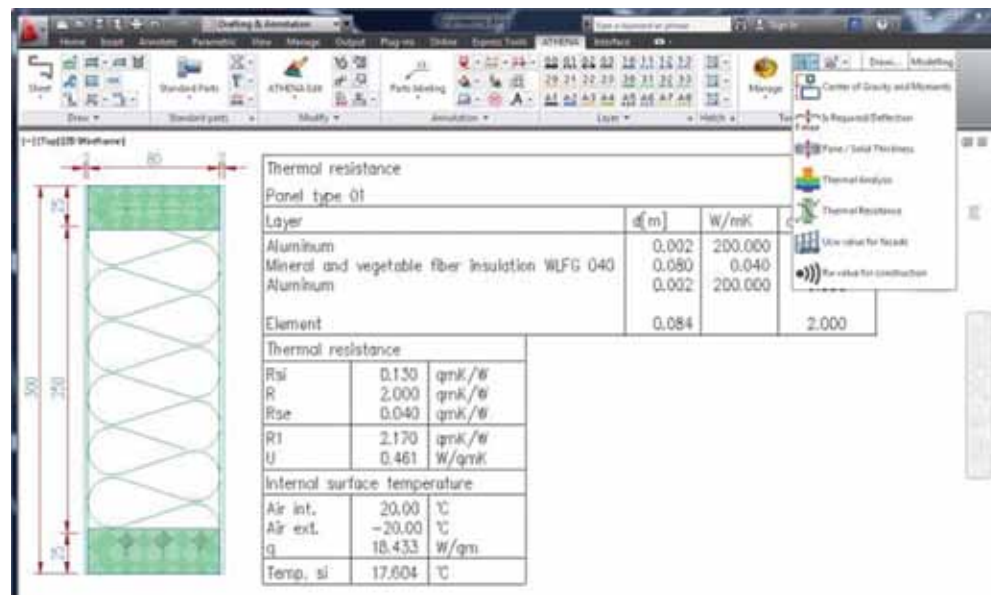
## VISIONREZ

VisionREZ 7.0, designed by architects and developed by Ameri-CAD, Inc., is an architectural productivity solutions program for residential applications. This program works well with AutoCAD Architecture 2010 or higher. Plug In and Stand Alone versions are available. VisionREZ Plug In is purpose-built for AutoCAD Architecture. VisionREZ Stand Alone is powered by Autodesk Technology on the AutoCAD Architecture 2008 OEM platform. The VisionREZ platform offers procedures that enhance productivity without compromising power and flexibility.

VisionREZ includes a suite of tools, which specifically optimize areas such as full-featured roof object and trim, detailing, labeling, and bills of material. VisionREZ advantages extend beyond the model creation to include leveraging the industry-standard DWG file format as well as providing customizable drawing standards.



Figure 2: ATHENA by CAD-PLAN GmbH

## ACADDECKE

AcadDecke 6.6 is a product developed in Germany by IDAT GmbH. This software is a complete package for prefabricated reinforced concrete slabs and works with AutoCAD Architecture 2012 or higher. With AcadDecke, the building model from AutoCAD Architecture can be used directly to create the drawings for the slabs. The program can be used to create hollow concrete slabs, solid slabs, 4 cm thick slabs, etc. The input data include geometry of the plan, holes, lengths, loading, beams, and reinforcement spacing. The program automatically generates the mesh for slab elements by considering technical fabrication parameters. It also performs structural computations. It is possible for you to input different reinforcement types. The printout includes a fabrication plan for each slab with all needed construction information, such as dimen-

The VisionREZ residential roof behaves the way a roof does in the real world. Various styles of fascia trim can be added and adjusted to represent the way it is truly built. Transitions between rakes and eaves are shown in plan and model views and can be inserted automatically or manually. The VisionREZ residential roof will span from one floor to another. Trim can be added to roofs, windows, doors, or openings. Various styles can be created and applied to the many objects allowing the changing of sizes or shapes while automatically adjusting the trim.

# AutoCAD Architecture 2013



*Figure 4: VisionREZ by Ameri-CAD, Inc.*

VisionREZ contains a live background drawing. By typing in at the command line or selecting simple commands from a toolbar, the floors below or above will appear in different colors in a locked state so one can draw directly on top of them and will always be an accurate reference of what is happening with the other floors. Also, a large number of preset styles have been created to cover a large segment of the residential market, allowing the user to draw out of the box. These include walls, doors, windows, stairs, roofs, and schedules. Preset content is available for items such as appliances, cabinets, electrical, and plumbing. Area schedules have been created that will correctly display the square footage and totals.

## COSTX

CostX 3.30 is a product developed in Australia by Exactal Pty Ltd. CostX automates estimation for both BIM and traditional design systems and works well with AutoCAD Architecture 2011
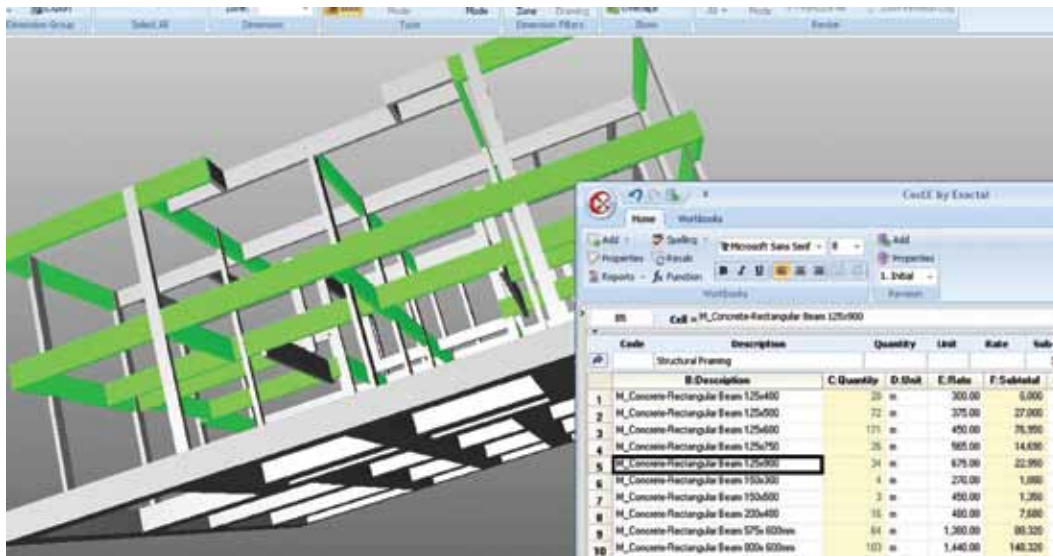
or higher. CostX can use the output from AutoCAD Architecture to extract measurements and estimate costs. CostX reads all formats produced by Autodesk products.

Various products are available in the CostX range. These include:

CostX – enables you to measure quantities from 2D and 3D drawings and generate automatic quantities from 3D BIM models.

CostX Takeoff – enables you to have all the power of the CostX on-screen measurement system when you just need to takeoff dimensions.

CostX 2D – enables you to measure from scanned, PDF or CAD drawings in 2D using an accurate measurement system.

CostX Takeoff 2D – enables you to quickly and accurately takeoff quantities from scanned, PDF, or CAD drawings in 2D.

CostXL – tightly integrates into Microsoft Excel, allowing you to access all your CostX data in an Excel spreadsheet.

CostX supports existing standard drawing formats (dwg, dxf and dwf). Measurements and cost information can be exported to Excel. Automatic quantities can be generated from 3D BIM models. CostX quickly and accurately measures from scanned, PDF, or CAD drawings. You can compare drawings, highlight changes, and update quantities and workbooks. A cost plan can be automatically generated from dimension information.



*Figure 5: CostX by Exactal Pty Ltd.*

## POINTCLOUD

PointCloud 7 is a product developed in Germany by kubit GmbH. PointCloud supports the visualisation and analysis of laser scanner 3D points in the AutoCAD Architecture environment and works well with AutoCAD Architecture 2011 or higher.

PointCloud supports the visualization and analysis of millions of 3D points in the AutoCAD Architecture environment. The points captured by a 3D laser scanner can be treated by means of the standard 2D and 3D func-
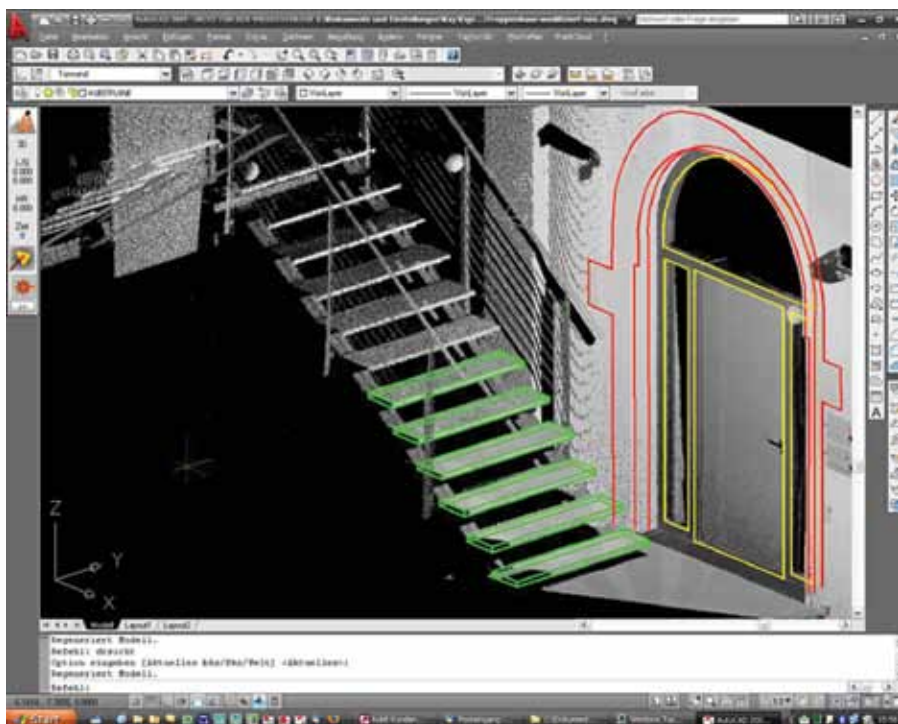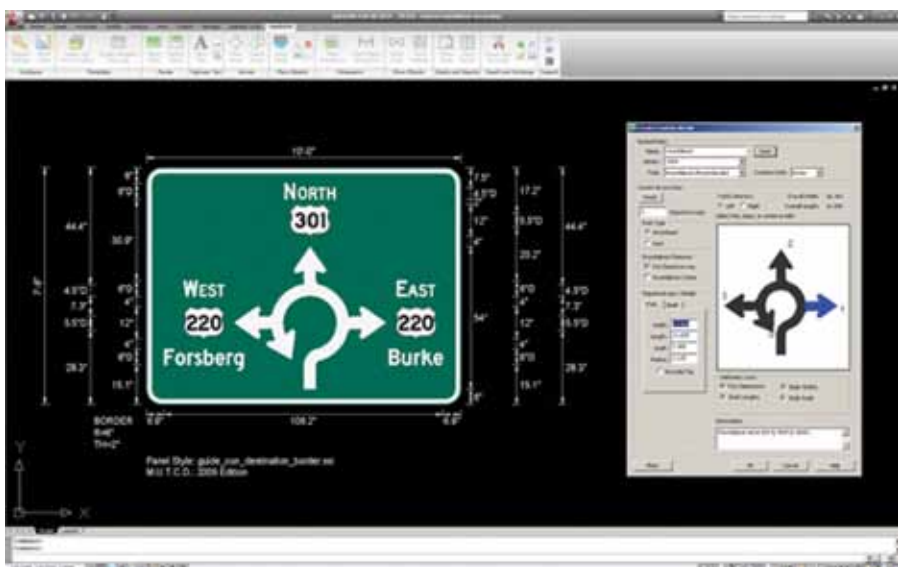
Figure 6: PointCloud by kubit GmbH



Figure 7: GuidSIGN by Transoft Solutions, Inc.

tionalities provided by AutoCAD Architecture. Enhanced computer graphic technology allows the management of huge colored point clouds in a CAD environment. The orbit and zooming functionality, as well as the possibility to hide and show parts of the point cloud, provide a very easy and transparent way of 3D navigation. The support of the Pointsnap allows the identification of the 3D coordinates of each single point. This information can be used by AutoCAD Architecture commands to directly access the accurate geometry of the scanned object. As-built documentation of industrial structures, historic buildings, and many more are possible in all levels of detail. The point cloud can be augmented or combined with other information such as CAD drawings, photos,

and floor plans. The most common data formats are supported. PointCloud is hardware independent so it will work with any scanner on the market.

## GUIDSIGN

GuidSIGN 6.0, developed in Canada by Transoft Solutions Inc., is an AutoCAD-based roadway and highway sign design software and works well with AutoCAD Architecture 2005 or higher.

GuidSIGN is a user-friendly program that automates the process of designing highway and roadway signs. A user can simply select a panel style from the standard library of Federal MUTCD styles and then add text, route markers, arrows, exit panels, or other sign objects. Based on the type of sign selected, GuidSIGN automatically ensures that the correct highway fonts are used, text strings are spaced accordingly, border widths and corner radii are correct, and symbols conform to industry specifications.

GuidSIGN's customization options provide maximum flexibility for the design of any type of sign. GuidSIGN is equipped with all the necessary predefined MUTCD sign styles. You may also select from more than 60 design parameters and override preset values, making customization an easy process. You may also incorporate and save your own custom shields, arrows, and standard symbols. Selected objects within a sign can be exported to dxf format, which is easily read by most cutters and plotters.

## CONCLUSION

This article has touched on just a few of the many third-party applications available to aid your productivity with AutoCAD Architecture. My advice is to research what's available and see what works best for you in your individual working environment. Most importantly, have fun!

*Author's Note: All images herein are compliments of the software manufacturers' respective websites.*

*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.*

# popIcon Puts Families at Your Fingertips
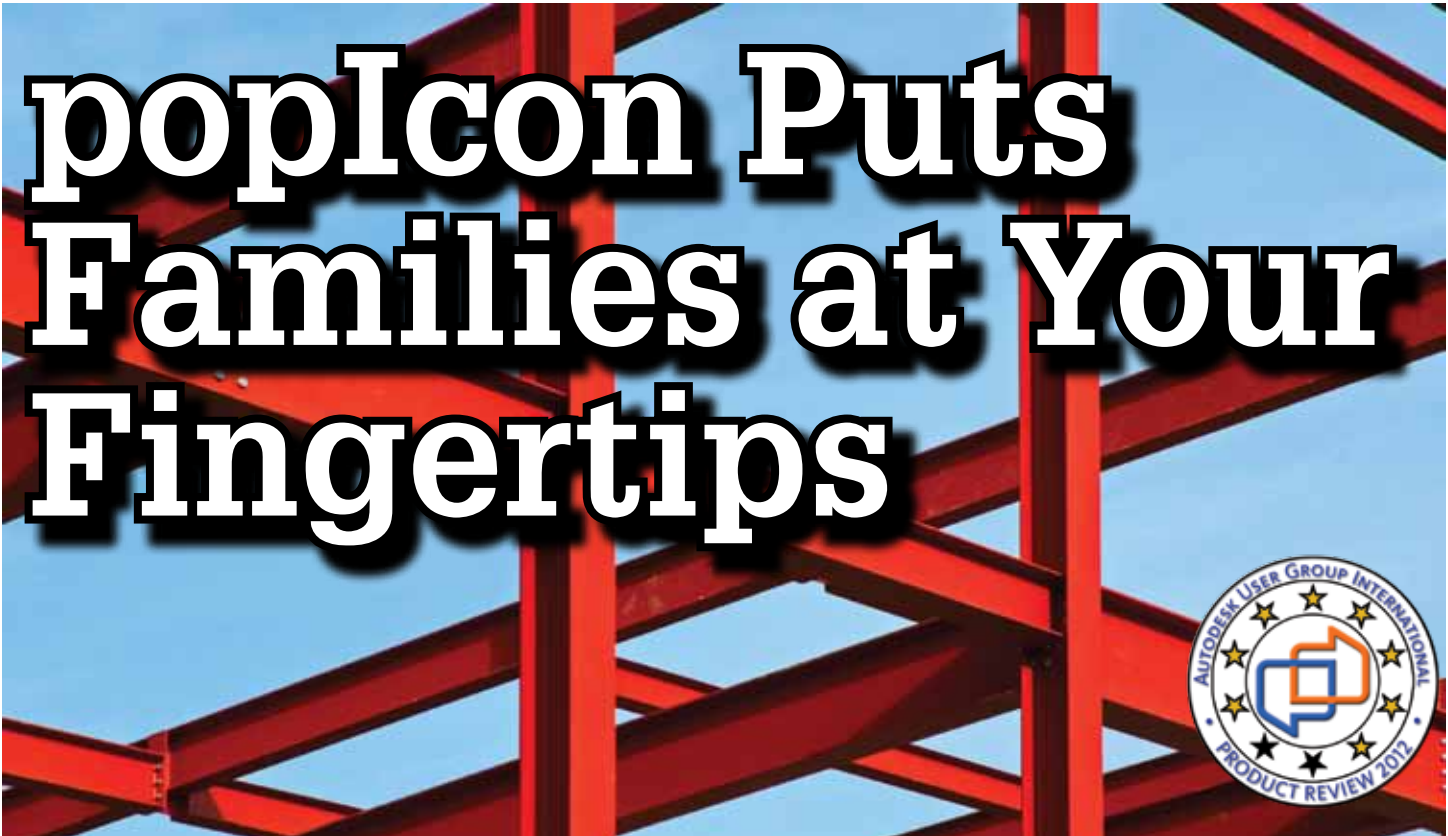


Rutherford & Chekene, a 52-year-old structural engineering firm in San Francisco, has developed popIcon software, a third-party plug-in for Autodesk® Revit® Structure. popIcon addresses the difficulty that Revit sometimes poses in finding families, components, and symbols by incorporating new ribbons and tools into the Revit interface.

The popIcon interface is ribbon- and task-based with easy icons that are consistent with Revit's out-of-the-box user interface. Features are logically grouped based on task.

## RIBBONS FOR DETAILING AND MODELING

### 1. Steel Ribbon



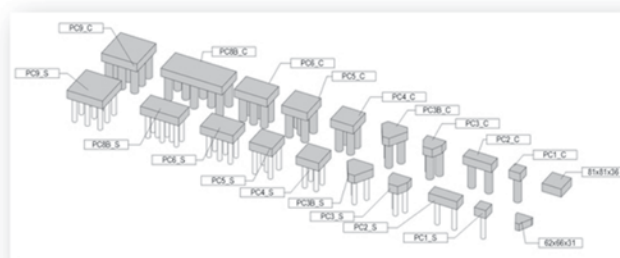*popIcon's Steel ribbon is for loading 3D and 2D steel components in one menu.*

Along with speeding up the load time of regular steel shapes, popIcon's API contains a number of custom families including three different buckling restrained brace (BRB) systems commonly used in the United States from two different manufacturers, Nippon (Unbonded Brace) and Star Seismic (Powercat and Wildcat BRB systems).
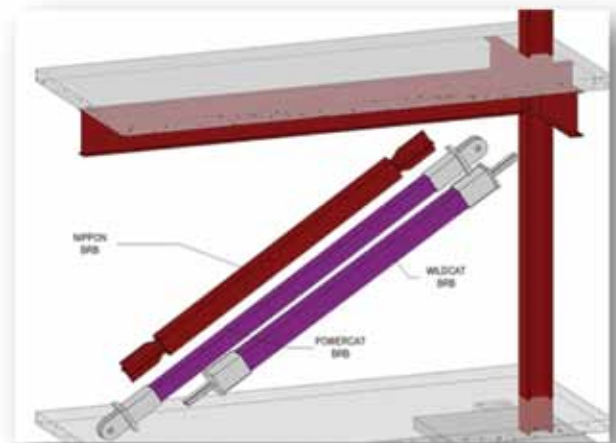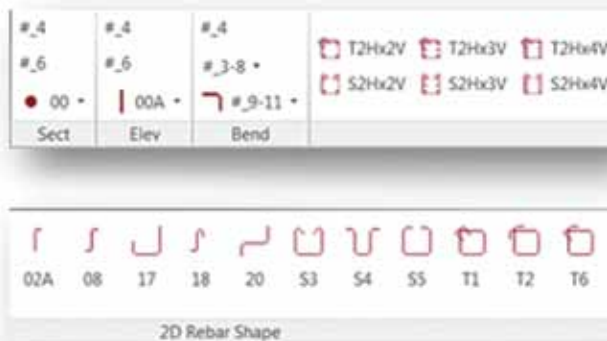


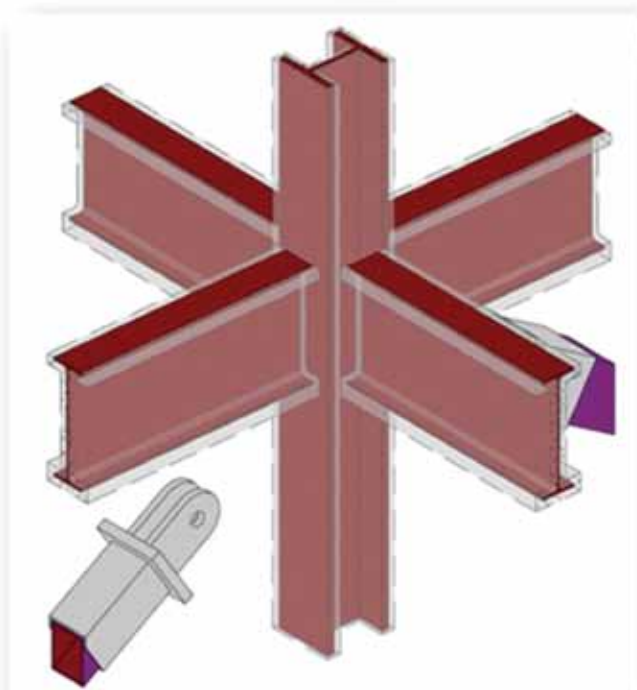The API also includes a unique tool to enable modeling of steel framing with fireproofing. There are three main reasons for wanting to model your steel framing with spray fireproofing. They will make others on the project team happier and might help you win more work in the future.

1.  Enable accurate clash detection inside Navisworks
2.  Aid the architects in their detailing in Revit
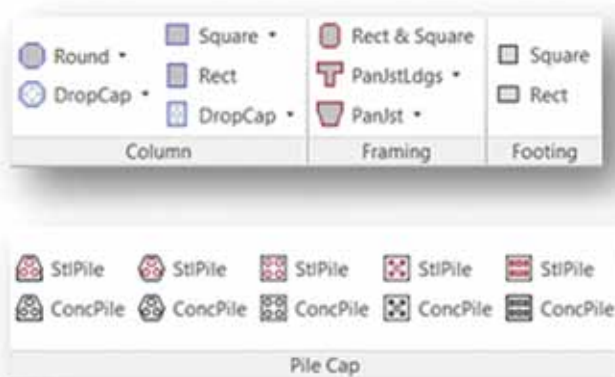3.  Quantify fireproofing volumes

## 2. Concrete Ribbon



*popIcon's Concrete ribbon accesses 3D families for columns, beams, footings, and pile caps.*



## 3. Rebar 2D Ribbon



*The Rebar 2D ribbon has 2D components for rebar detailing.*

The main reason most practicing engineers do not tend to model rebar for construction documents in 3D is that (honestly) for every element modeled comes a opportunity for error, or a requirement for extra work to keep the model accurate. For these reasons, 2D rebar detailing prevails. Out of the box, Revit does not provide a 2D palette of ACI-compliant rebar shapes to aid in the 2D reinforcement detailing process. This is a bit of a problem. Of course, you could just draw your own rebar shape using the line work tools, but this is not ideal. popIcon provides a Rebar2D ribbon to perform the rebar detailing tasks in 2D using parametric families. The ribbon contains tools for individual bars (in section and elevation), stirrup sets, and longitudinal bars for column and beam sections in one parametric family (see above), and various other ACI bar types for general concrete sections and distributed bars for plan rebar callouts.
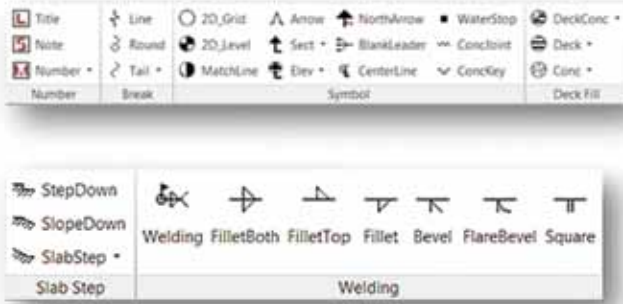
## 4. Connection Ribbon



*The Connection ribbon features 2D components for steel details.*

# Revit Structure 2013

## 5. Symbols Ribbon



*The Symbols ribbon features commonly used symbols.*

Below is a Symbols ribbon example showing various slab step symbols in action. On a typical project you need to document where there are folds or steps in your structural slabs. popIcon provides common symbols for ridges, valleys, curbs, single steps, and multiple steps.
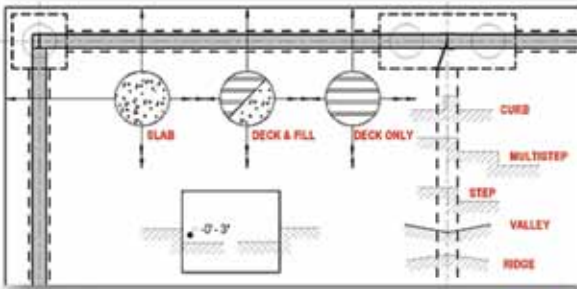


Below is another example of a typical steel detail that uses 11 different symbols from our symbols ribbon (highlighted in blue in the second image) to complete the detail. These symbols include the following:

+ Break line
+ Custom double break line
+ Two different welding symbols
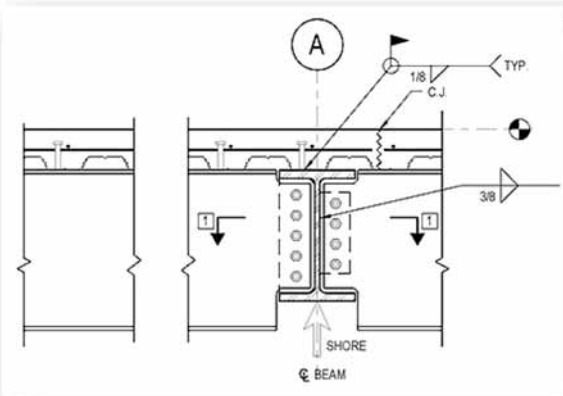


+ Custom two-click section cut
+ Detail box callout
+ Grid head bubble
+ Construction joint
+ Level symbol
+ Large arrow head (for shoring this detail)
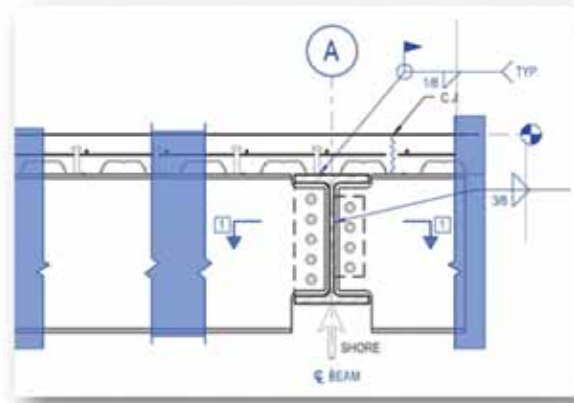


When detailing steel framing in 2D in Revit, a problem commonly encountered is how to efficiently apply coping to the out-of-the-box 2D beam elevation families. There are a number of ways to solve this problem including filled regions, masked regions, or customized version of the beam families. However, all of these options have their drawbacks. popIcon solves this basic but frustrating problem by creating a specialized "break" family as shown below.
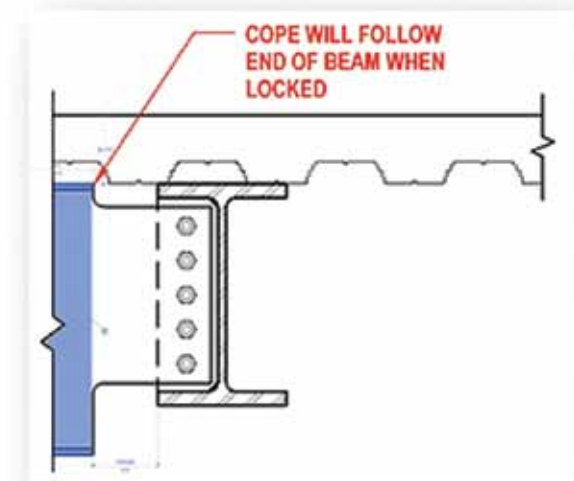


## 6. Tools Ribbon



*popIcon's Tools ribbon contains a variety of miscellaneous tools.*

An example of one of these custom tools is the Delete Selection (DelSlct) tool, which is primarily used for compressing Revit files for project coordination with the other design team members. It can also be used to audit models to purge out unnecessary views that creep into a project over time.

On our firm's structural models (fully detailed in Revit with no linked 2D CAD files) the use of the DelSlct tool has reduced file size to one-fifth of the original size.

Remember, the smaller your linked file footprint, the more stable your session of Revit is due to reduced memory requirements. This can be quite significant on "mega" sized projects where linked files can add up to gigabytes.

Another useful tool provided in the Tools ribbon is a hosted floor opening. The rectangular openings can be dropped onto the floor in plan, documenting the opening in 2D and 3D. Compound shapes can be made by aligning multiple instances as shown below. The user also has control over whether the "OPEN" text and linework "X" are visible.
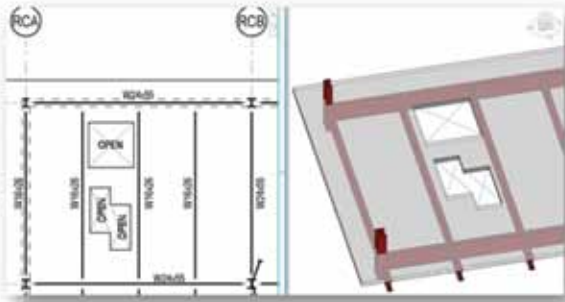
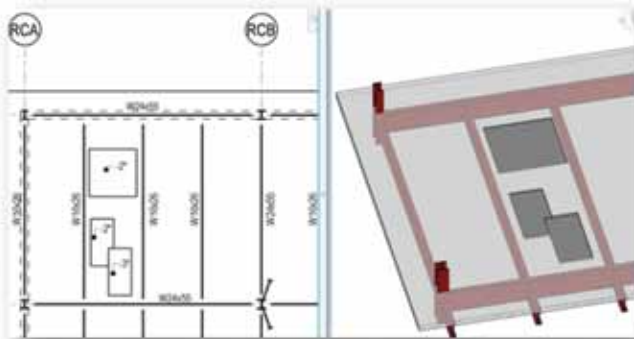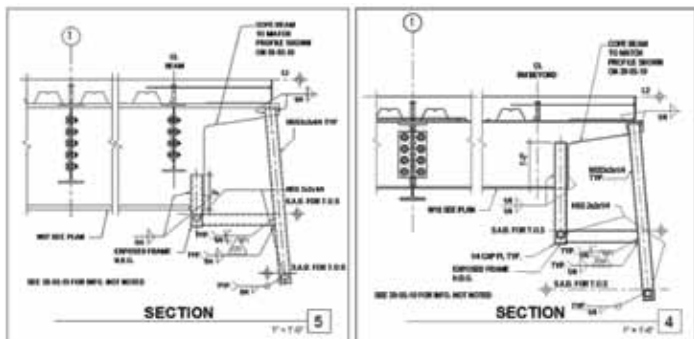*The Tools ribbon contains tools for hosted slab depressions.*

## NO MORE AUTOCAD DETAILING, PLEASE

The Revit/AutoCAD workflow has many drawbacks when it comes to overall CAD productivity. popIcon allows you to "cut the cord" of reliance on a workflow that combines the use of Revit for 3D modeling, plan work and smaller scale elevation with AutoCAD for larger scale details.

Below are sample details from the last project where we had to endure a combined Revit/AutoCAD workflow. The details show a reasonably intricate support frame for an expressed architectural cladding system. As all of you practicing professionals can prob-

ably appreciate, over the course of the development of this building's design, many details needed to be tweaked many times to meet the final architectural expression of these key building parts. The tweaks led to the following productivity problems.

- We still had to model these elements in 3D for coordination with the architect, plus we had to manually redraw from scratch in another CAD program.
- We had to link each individual .dwg file back into Revit.
- We had to then cut dummy sections to link the CAD details to callouts on the plans.
- If the details on the sheets needed to be reordered, we had to rename the CAD file, go into Manage Links, and tell Revit where to reload the file with the new naming to get everything to work correctly.
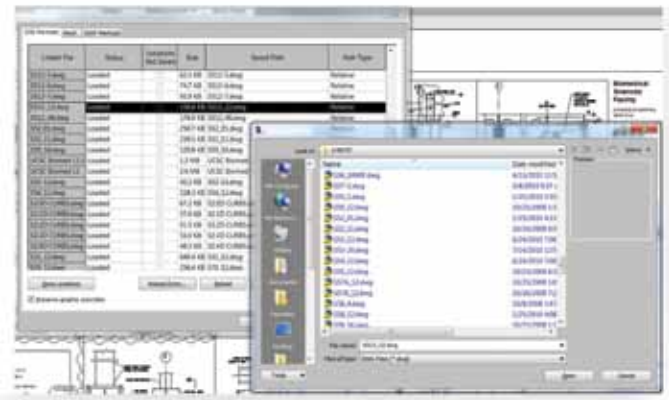
*Text and dimensions fonts are difficult to get "just right."*

popIcon has been used office-wide at R&C since 2010 with great success.

Our Revit 2013 release is in beta testing and we plan to make it available on the Autodesk Exchange App Store in the very near future. This release is also being developed for the international market to provide architects with similar tools for modeling and detailing productivity.

For more information, please feel free to visit popIcon software's website at www.popiconsoftware.com. Or visit our YouTube website to see more of popIcon in action: http://goo.gl/9e22Y.
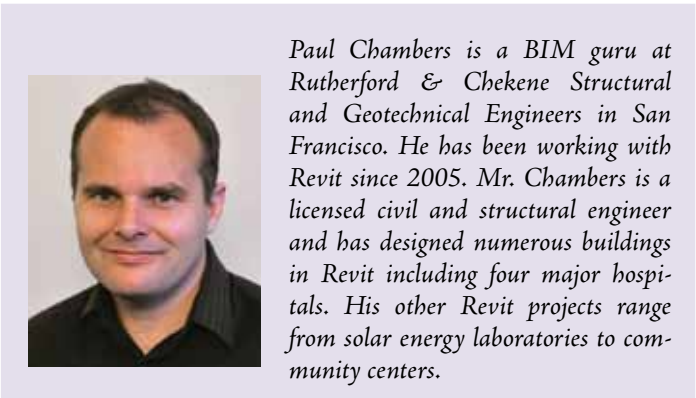
*Paul Chambers is a BIM guru at Rutherford & Chekene Structural and Geotechnical Engineers in San Francisco. He has been working with Revit since 2005. Mr. Chambers is a licensed civil and structural engineer and has designed numerous buildings in Revit including four major hospitals. His other Revit projects range from solar energy laboratories to community centers.*

# Measure Environmental Impact with Eco Materials Adviser

There are many reasons people look to materials library databases—strength and mass properties would most likely rank at the top of the list. However, as companies become more and more conscious about the environment (and how people perceive their behavior with the environment) they look to the databases for other information such as determining how the material will ultimately impact the environment.

- Access the cloud-hosted materials property database that includes nearly 3,000 metals, plastics, composites, ceramics, and natural materials.
- Apply the materials properties to the BOM to be cataloged by Autodesk® Vault and used by other applications such as simulation and analysis.
- Eco analysis on any size Inventor assembly.
- Calculate energy and $CO_2$ for the full product lifecycle—includes transport and use phases in addition to raw materials, manufacture, and end-of-life.

## ALONG COMES GRANTA

Granta is a United Kingdom-based materials information technology company offering services including libraries, management services, and education related to materials. Granta was founded in 1994 from collaboration between professors Mike Ashby and David Cebon at the Cambridge University Engineering Department. Its services are used by companies around the world, and the company has grown to be the largest organization focused on niche areas of materials information technology.

So what is better than having that vast library available to you? How about having it available in Autodesk® Inventor?

## THE GRANTA ECO MATERIALS ADVISER

The Granta Eco Materials Adviser (EMA) is an installable environment for Autodesk Inventor that allows users to:
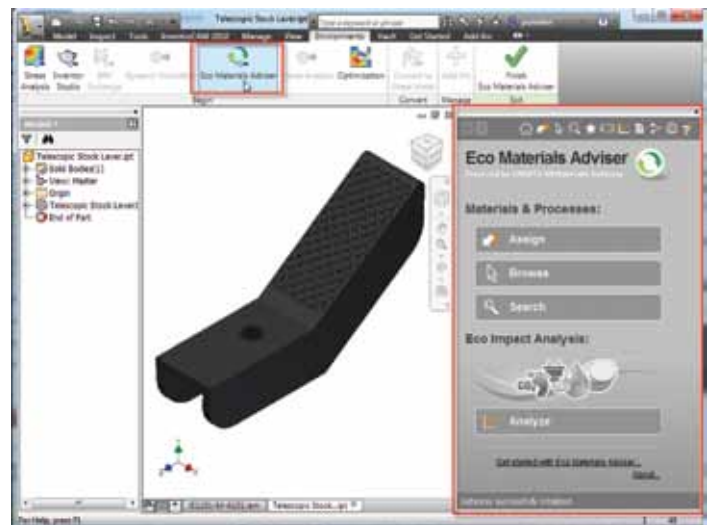


*Figure 1: The Granta EMA in Autodesk Inventor.*

- Add consideration of finishing processes—painting, electroplating, powder coating.
- Calculate the cost, water usage, RoHS compliance, food contact compatibility of your product.
- Guide materials selection and substitution—search for suitable materials from ~3,000 options and rapidly assess the impact of a materials change.
- Generate PDF reports to communicate your analysis.

Following are some interface highlights and comments for users interested in a great embedded material database add-in.

## MATERIAL ASSIGNMENTS

The EMA will display the material mapping for the entire document assembly, and adapts to encompass the component set in the current document of focus. This alone is a great feature.
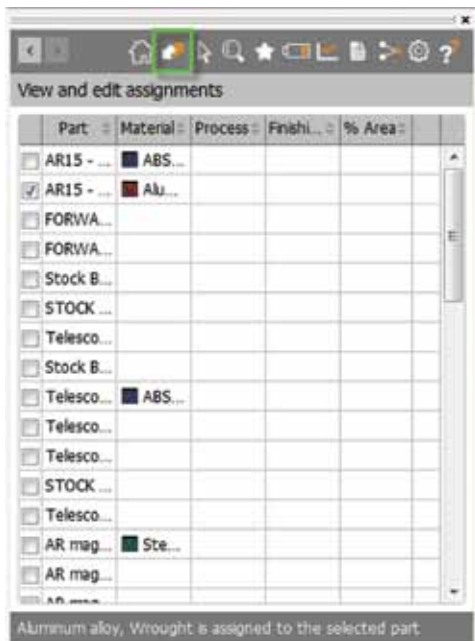


*Figure 2: EMA materials assignments.*

As a component or components are selected through any manner including the Inventor Graphics View area, the EMA delineates the selection by a checkbox next to the component name.
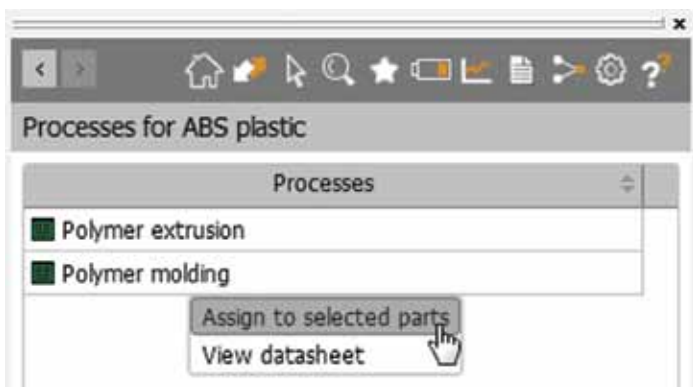


*Figure 3: Assigning processes.*

Manufacturing processes for each material can be selected and assigned to each component as desired for further analysis.

## MATERIAL BROWSING

The database can be browsed for materials under two headings: Material Universe and Typical Materials. The latter is simply a convenient selection of commonly employed materials, which is kind of thoughtful considering there are nearly 3,000 different types to navigate.



*Figure 4: EMA material browser.*

The materials are divided by type:
- Ceramics and Glasses
- Composites and Honeycombs
- Elastomers and Rubbers
- Ferrous Metals
- Foams
- Non-Ferrous Metals
- Plastics and Elastomers
- Woods and natural materials

Each material type is color coded, giving a greater awareness when reviewing the assignments for large component assemblies.

From here, materials can be selected and applied to the current component selection. (Actually, the material assignments can be applied from any place a material is listed.)

## BOM AND STYLES

Once materials are assigned, the Bill of Material is updated, and creates a new material style in the local Autodesk Materials Library.

As the components move to other areas of design, the full material data is transferred with it, including purposes such as simulation and analysis.
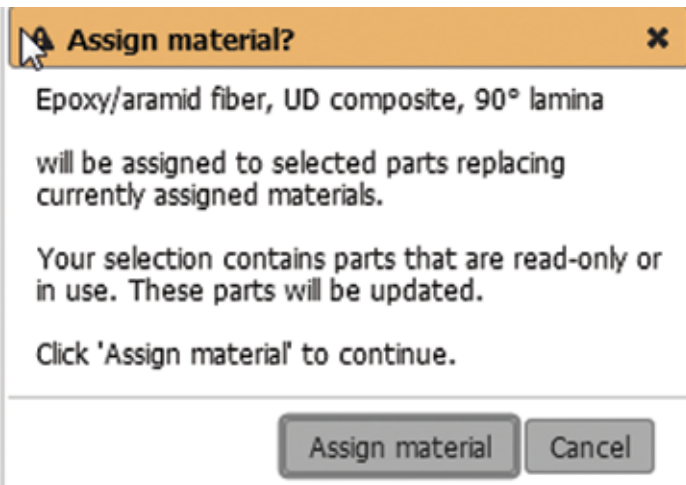
*Figure 5: EMA BOM warning.*

Additionally, color styles can be created and added to the material style and saved locally, exported, or even added to the permanent style library.

## DATASHEETS

Every material in the library is represented by a very complete datasheet. Items include mass and makeup properties, strengths, electrical properties, environmental concerns, and so on. These datasheets can be viewed at any time, printed, or saved as a PDF and cataloged as needed.
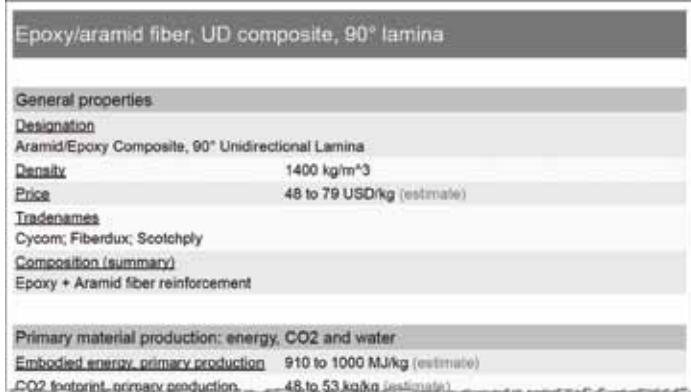


*Figure 6: Material datasheets.*

## DATABASE SEARCH

The Granta database can be searched through an impressive list of criteria, including price and strength.

A list of materials is returned that match the criteria given. If any criteria are out of range, the EMA highlights the problem and notes it in the status line.

## FAVORITES

Favorites is a simple list of materials that you want to save for future operations. This convenient feature is easy to manage and use.
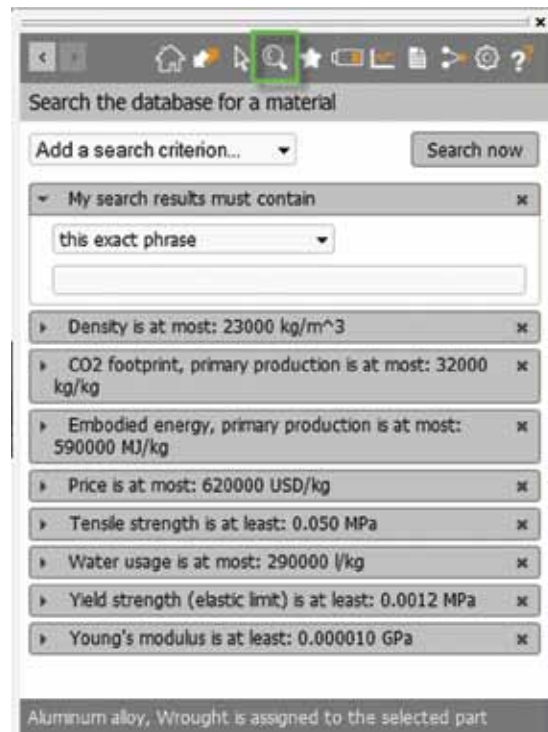


*Figure 7: EMA database search criteria.*
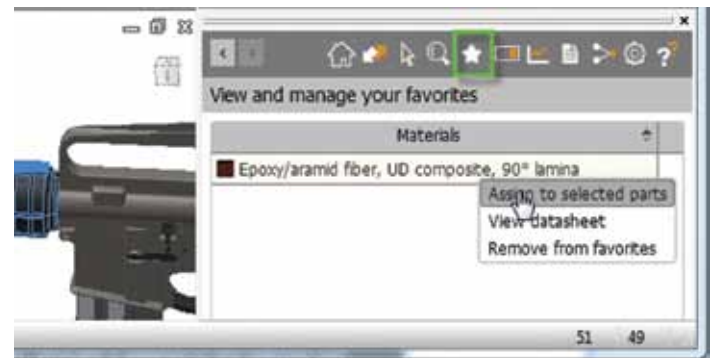


*Figure 8: EMA favorites list.*

## TRANSPORTATION AND USE

The EMA allows users to establish how the product is intended to be used, how it is carried in transportation, and what type of energy sources are employed. These factors include type of transportation, frequency of transport, and more.

The Adviser then factors those into the costs and CO2 production of the material assignments and reporting.

## ECO IMPACT DASHBOARD

The Granta EMA dashboard is where all the information comes together. It serves as a guide and benchmark to how changes in the design affect the environment in a positive or negative manner. The factors measured are:
- Embedded energy
- CO2 footprint
- Water usage
- Estimated raw materials cost
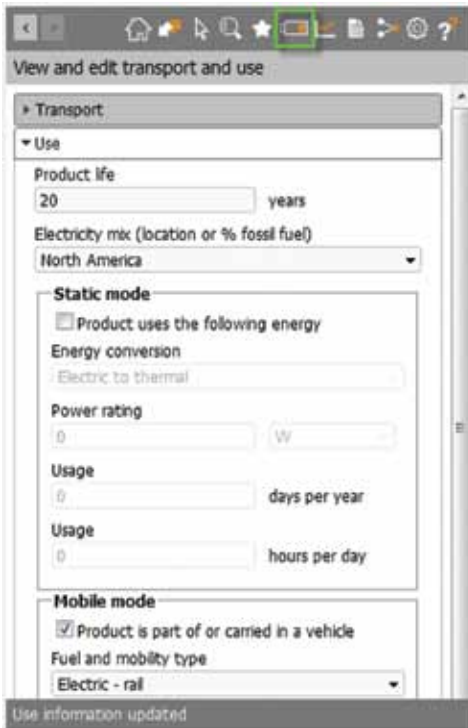
*Figure 9: EMA transportation and use section.*
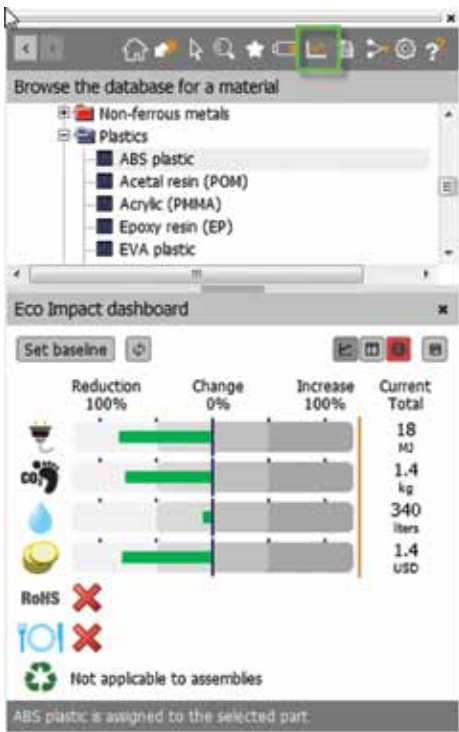


*Figure 10: EMA analysis dashboard in Summary mode.*

- RoHS (Restriction on Hazardous Substances)
- Food compliance
- End-of-life behavior

The baseline can be set at any point or time while working on the assembly. Once set, any changes that are made to the assembly are evaluated against the baseline material configuration. The results are then displayed graphically on the dashboard.

You might establish all the basic materials in the component assembly, and then set the baseline. Thereafter, proposed changes can be easily evaluated against factors of concern to you.

The dashboard can be displayed while other areas of the EMA are being used. It can be turned off with one click.

## MODES

The dashboard can be used in any of three modes:
- Summary
- Details
- Recommendations

The default mode is Summary, which is the graphical display shown previously. The Details mode delivers a spreadsheet-like account of every factor considered by the EMA. Each of the main factors considered have their own page and can easily be paged through as needed.



*Figure 11: EMA dashboard in Details mode showing energy usage.*



*Figure 12: EMA dashboard in Recommendations mode.*

# Inventor 2013

The Recommendations mode is simply a list of areas in the design where materials and process assignments could be improved.

## REPORTS

The EMA contains two report types:
* Eco Impact
* Eco Impact Comparison
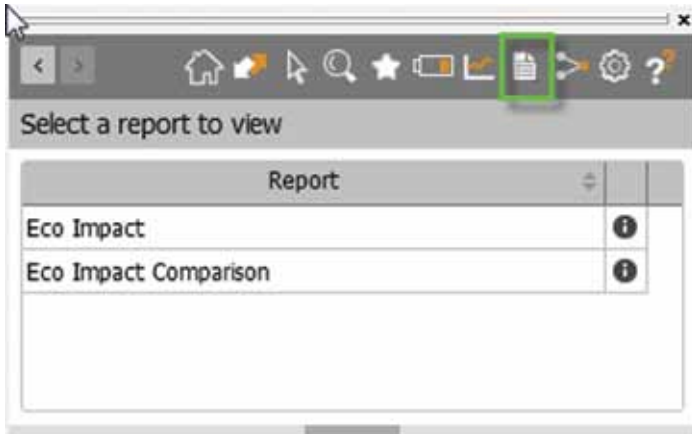


*Figure 13: EMA reporting.*

Simply stated, the Eco Impact Report delivers a summary of the materials and factors considered, arranged in a manner that makes it easy to see where improvements might be achieved.

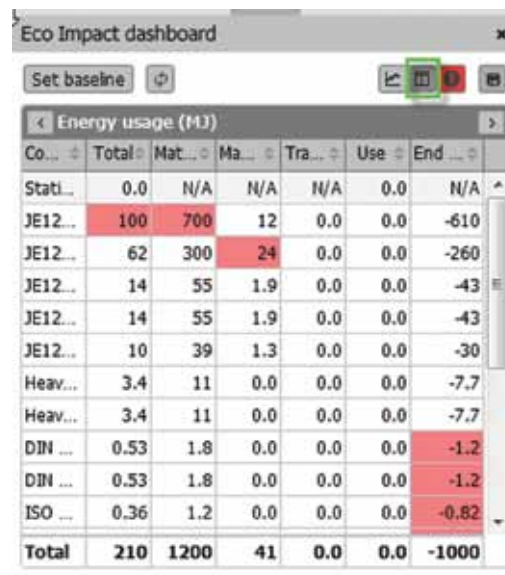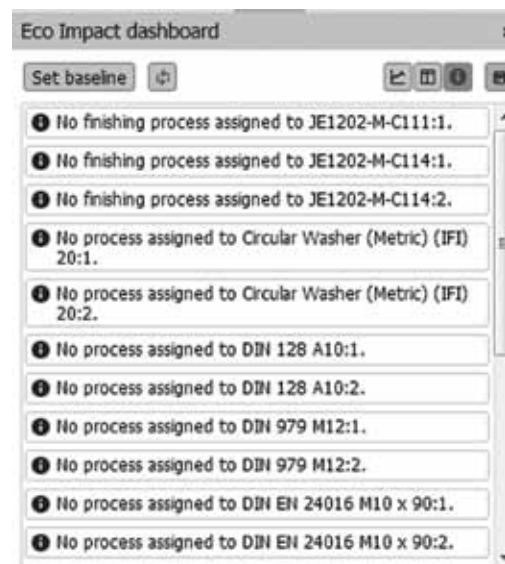The Eco Impact Comparison Report is similar to the latter, but biased toward the comparison with the baseline material assignments to record how proposed material alterations perform against the baseline configuration.
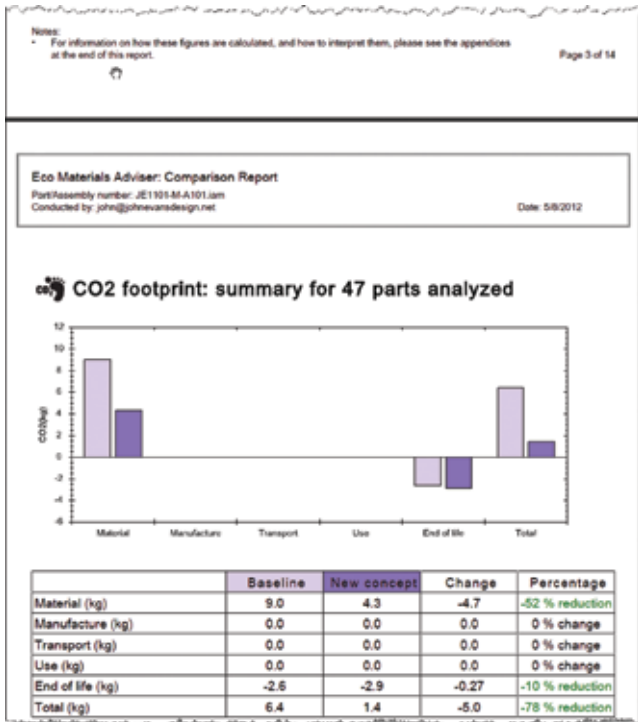


*Figure 14: EMA Eco Impact comparison report.*

## MATERIAL MAPPING

Since material nomenclatures are not universally identical, mapping of materials from the Granta materials database to the Autodesk materials library had to be established. The Material Mapping area shows how these assignments have been established by Granta.
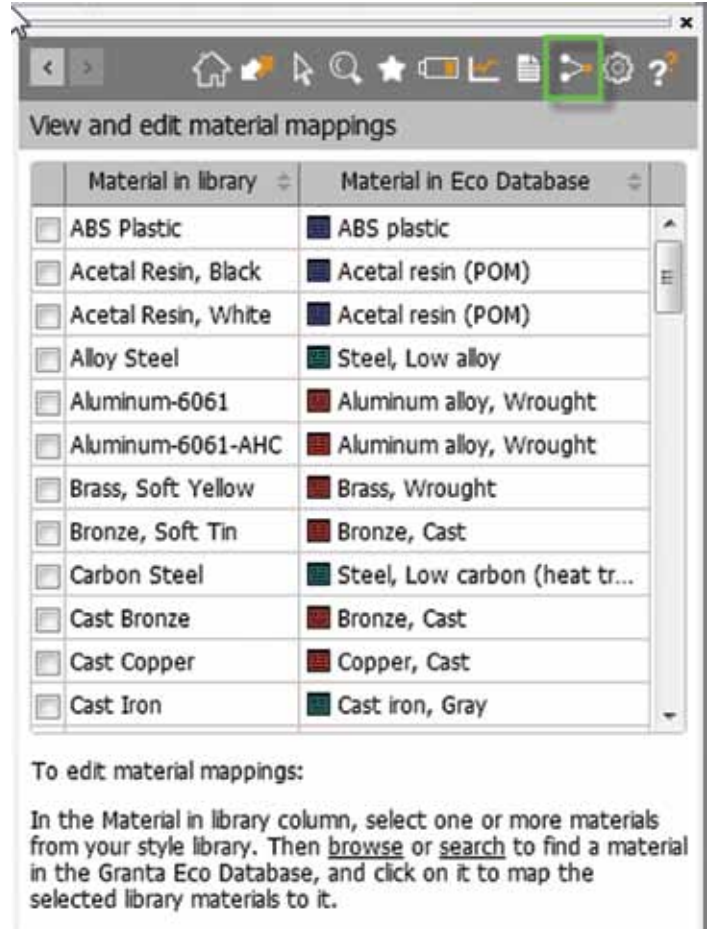


*Figure 15: EMA to Inventor material mapping.*

The material mappings can be changed at any time. This allows users to map user-defined material styles to the Granta equivalent, or to remap materials as needed.

## SETTINGS AND HELP

The settings are fairly simple, and include basic preferences and Internet connectivity.

The help button opens the default web browser and displays the online help system.

## BASIC AND FULL VERSIONS

Granta offers a base version and full version of this marvelous tool. The topics discussed above relate to the full version. The base version is free, but restricted as follows:
* Access to only 50 typical materials
* Analysis of 20 or fewer components in an assembly
* Reporting of baseline configurations only
* Some processes are not evaluated

Figure 16: EMA settings.



Figure 17: EMA lifecycle chart.

Additionally, it has been noted by users that the base version of the EMA does not transfer the properties to the BOM, and as a result cannot be further utilized by other digital prototyping processes. This, however, does not mean you cannot gather the data from the datasheets and manually enter them.

## CONCLUSION

The Granta Eco Materials Adviser is a wonderful tool. Having 3,000 materials available with detailed physical properties for each is by far my favorite capability of this tool. Because my focus is usually component performance, the ability to map these properties directly to the BOM and save them to the Autodesk Materials Library is marvelously convenient. Once established in the BOM, the material data transfer seamlessly to Inventor Stress Analysis and Autodesk Simulation Multiphysics.

There is so much more to the EMA environment than just material strength properties. Unless you absolutely don't care how the product will perform in any aspect, the EMA conveys information that is important to everyone. Everything, from the evaluation of $CO_2$ production in manufacturing to the cost estimation of transportation and recycling, is in there.

The datasheets are wonderfully detailed and include somewhat difficult-to-find information such as heat of combustion.

The MSRP of this product is $995 USD. Right now, Granta is still running its promotion for the tool at $795 USD for a one-year subscription.

Granta also offers numerous other material property services on its website. Customers include General Electric and Raytheon,

and support for just about every modeling and simulation platform is available in one manner or another.

More information is available on the website at www.grantadesign.com

Evaluation of this tool was made possible by the efforts of the generous people at Granta Material Intelligence and the Autodesk sustainability team.

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# Efficient Navigation with Kiwi Codes



In my role as BIM manager at The Beck Group, I am responsible for firm-wide Revit implementation. We have deployed the Kiwi Codes Family Browser (Kiwi Codes Solutions, Ltd.) as our standard content navigator and browser. The Family Browser, an add-in for the Autodesk® Revit® platform, allows for a tabbed browsing experience of our office's content library. It runs in a modeless window, so it can remain on a second screen even when you are not using it. In addition, it features auto-hide capability. It has a look and feel very similar to the Autodesk® Design Palettes, for those familiar with, or migrating from, AutoCAD® or AutoCAD® Architecture.

## HOW IT WORKS

Content navigation has emerged as a critical issue for successful BIM implementation, and that has led to a number of tools and solutions coming around in the marketplace. A large part of our decision to go with the Kiwi Codes Family Browser was due to the

simplistic nature of the setup and user experience, compared with some of the more complex add-ons available. The Family Browser ("the FB" as we call it) provides you with tabbed "Palettes," each of which correspond to a folder in your content directory. The tabs in the FB are controlled through a series of .txt files, which list out the folders with which to populate each "Tab Group" of the FB.

This makes navigation immensely more efficient, since each "Tab Group" can have different combinations of tabs. This leaves actual organization up to the BIM Manager or user. At The Beck Group, we keep groups set up by building location: Shell, Interiors, Furniture, Healthcare EQ, Plumbing, Lighting, Furniture, Structure, and, of course, Detailing for our Detail Component Library. As an example, opening up the Structure Group shows three tabs: Columns, Framing, and Foundations.

The FB references both the text files and the directories live, allowing us to populate changes throughout the office immediately. The moment I add a new piece of content to a directory, it appears on everyone's FB the moment they refresh the tab (switching tabs refreshes them). This makes disseminating knowledge of new content in the library effortless: It shows up right next to content they are familiar with, on the browser.

In addition, FB lets you create custom icons (at custom sizes) for each piece of content. We do this in the project environment, eliminating the issues of "sideways previews" that came about with face-based and hosted content. You can also show them in context in the preview.

FB has support for Type Cataloged Families as well. Flyouts will show the types from the TC, allowing you to load a single type into a project at a time, bypassing the Type Catalog Prompt that comes up from the standard Load Family dialog.

The user interface is a single (simple) window, set to auto-hide or remain persistent. Clicking on the tabs moves to a new series of families instantly. Search functionality exists right on the UI, and typing in the search box searches all tabs, looking for the search string in the families file names. Admittedly, some people desire searching by more metadata than the file name, but I haven't had the need.

Currently we employ a family naming strategy that includes: Category Abbreviation, Item Classification (subcategory, if you will), Manufacturer, Model Number (Or Beck Type Mark Classification), and hosting type. The naming convention stemmed from

# Revit Platform 2013

pre-FB days, when the component button (the only option) was purely alphabetical. Searching for metadata may be more critical for MEP firms, but I have not had enough desire for it to even ask for its inclusion.

## HOW IT HELPS

The Beck Group has several hundred Revit users, spread out among five main offices, several smaller offices, and many job sites with users running mobile workstations. Content distribution, education, and navigation was a big challenge, as was finding a way to keep all of the users as current as possible. The Family Browser, combined with some simple windows functionality, allowed us achieve this in short order.

### The Main Offices

For the offices using a Distributed File solution across a WAN, things may be simpler. For now, we don't have one employed, so all our users are "based" out of one of five main offices. Our entire content directory is synchronized from our home office to the other locations nightly. In addition, text files for all five main offices exist in the content directory. Making updates to them is a simple "find and replace" for each office's directory name, making changes

to the FB happen in all five offices in scant minutes. (We create yearly Revit libraries for each release. Writing all of the text files for all five office's 2013 libraries was less than fifteen minutes of work.)

### The Workstations

The majority of our users are on the go, constantly. This presents a challenge, not just with the content directories themselves, but with the content navigator as well. There is zero opportunity to update every machine simultaneously. If your firm uses SCCM software to push updates to everyone, then that is a potential solution. If not, though, there is a much simpler approach: Editing the .addin file of the Family Browser, you can re-path the location of the .DLL, and move them to a networked location. Note that in Revit 2013, due to .NET4.0 requirements, you need to update a configuration file for Revit for this to work (currently it doesn't work). It is, however, fully functional in 2011 and 2012. Ours are in a similar location to the Content Directories themselves. Then, Windows Sync Center (Offline Files) is used to sync the entire content library and FB DLL Directory (permissions intact). When they are disconnected from the office, they still see and have access to the content library. While it doesn't guarantee real-time
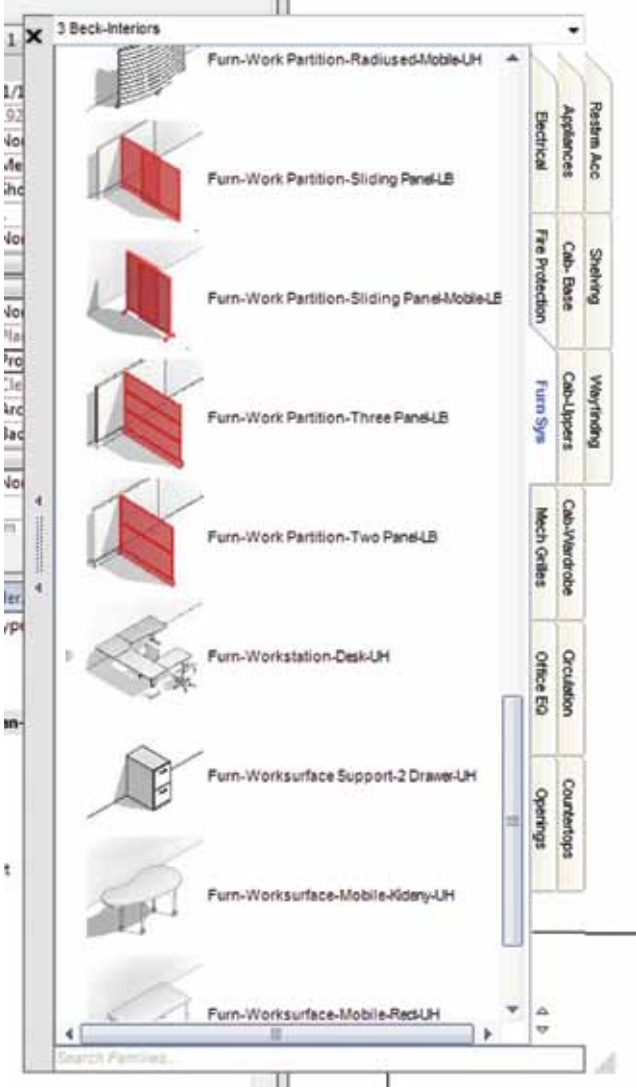
updating, it guarantees that as soon as the user touches a "home base," not only will he or she get updates to content and libraries, but to the FB add-in as well (which has seen four major releases and about a dozen minor releases in two years).

## The User Experience

For me, the seamlessness of the interaction for my design teams was paramount in picking a solution for content navigation: I don't believe users should have to stop working to hunt for content. I don't want them to have to search, and I don't want a model experience that forces them to enter > step > find > load > exit, and resume work.

For the user interaction to remain consistent and effortless, it needed to be small (or resizable). Some of the solutions in the marketplace—which admittedly offer a lot of functionality—are just plain huge. That equates to a user needing to get rid of it and, subsequently, it not getting used. The FB is small enough to auto-hide, or shrink at the users' discretion. And since you don't *need* to search or type in keywords to find content, you *can* shrink it down and use it in a minimal amount of real estate.
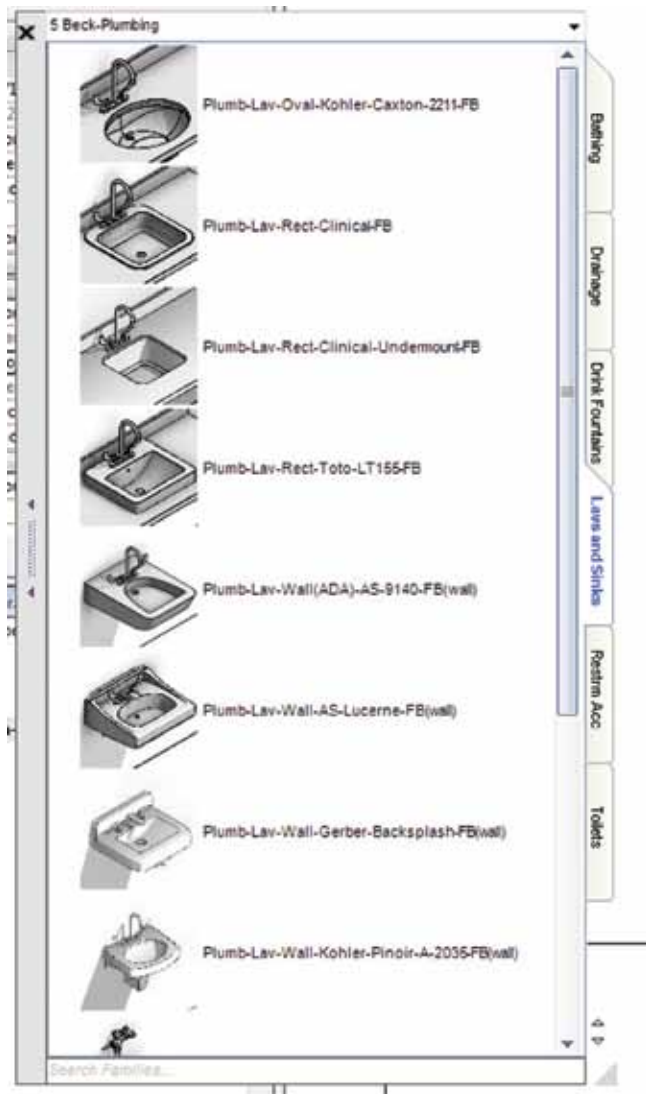
To be sure, the FB isn't teaching the users how new content works, although it has right-click functionality to engage the URL of the family type, which we have explored tying to our internal Share-Point Guide for content. Plus, the content shows up automatically, which lets the users know something new is there (and they see it), instead of having to ask to be directed to it. For an office that is constantly expanding its content library, it also means not having to send dozens of emails a day with family locations. A simple "Switch back to the tab in a second," tells a user the family is there and ready for use.

My transition out of CAD and into BIM took place a number of years (and several BIM platforms) ago. While being a proponent of innovative solutions, I also advocate that we remember to look back—not to work the way we used to "because that's how we did it," but to see what we used to do that really worked well. The Design Palettes were among those things. They were a chore to set up, but they were great at getting content to the masses in a quick and simplistic user experience. With Family Browser, Kiwi Codes gave us just that, in BIM form. It is one of the few add-ins I consider a "must have" for a successful Revit implementation.





*Aaron is currently the BIM Manager at The Beck Group (www.BeckGroup.com), specializing in Revit Implementation. His current role includes streamlining use of the program, exploiting its efficiencies amongst the Architectural Design, and Construction groups at Beck, as well as Revit Infrastructure Management and Training for all users. His work experience includes implementing and supporting Revit in a variety of offices, and using Revit for all phases of Architecture (from Design to Construction including fabrication), on projects of varying scopes and genres. Passionate about Revit and Architecture, he's an avid contributor on AUGI (twiceroadsfool) RevitForum.org (twiceroadsfool) and is active in the Revit Community. You can read more at his blog, the Malleristic Revitation. www.malleristicrevitation.blogspot.com.*

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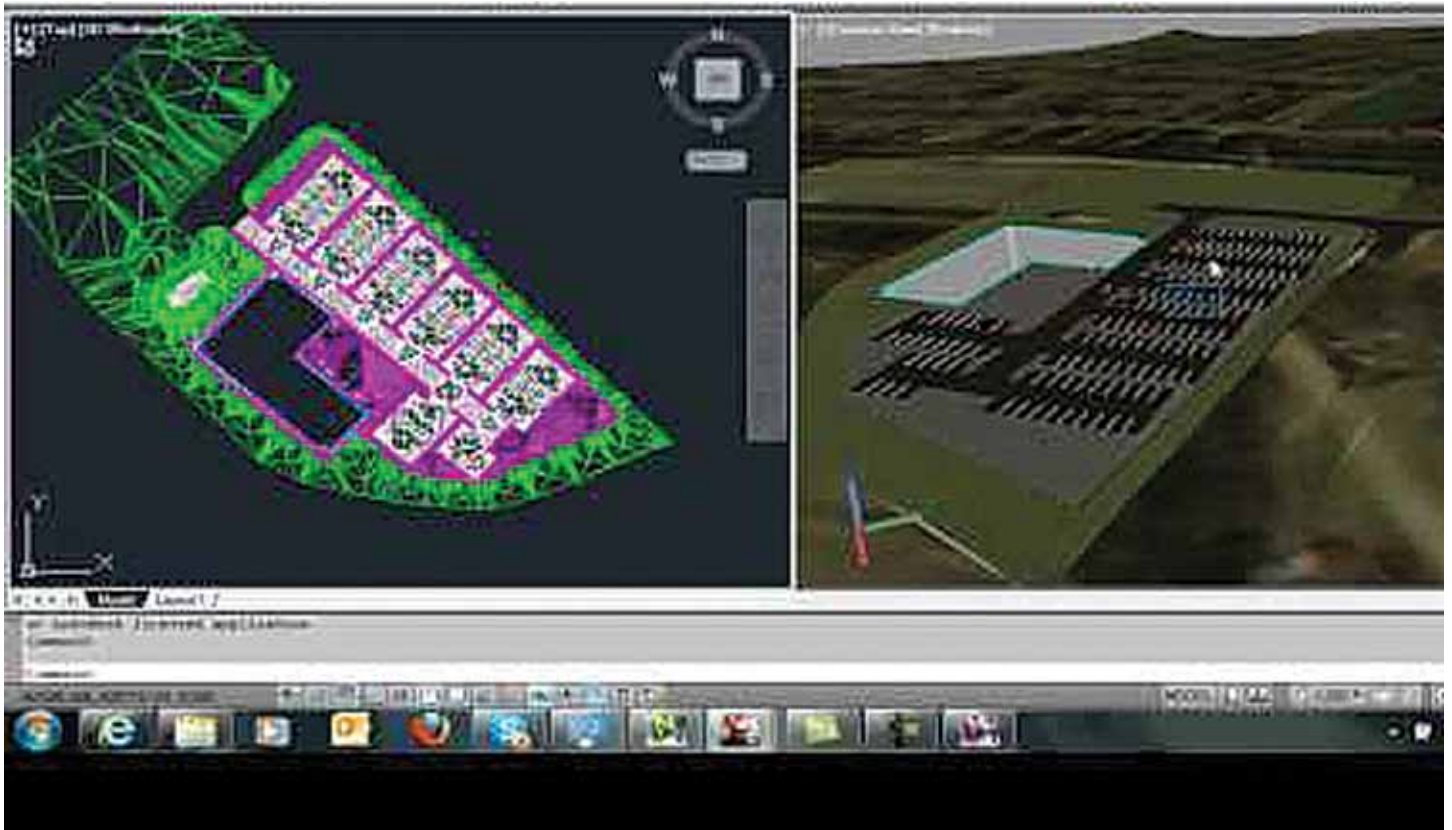
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Although this application was released some time ago, there are a whole new crop of informative videos at: http://goo.gl/jxt69
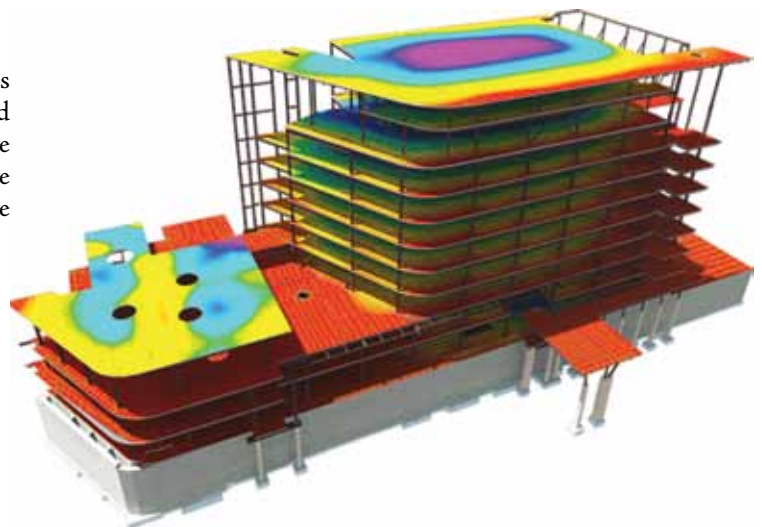


**Until next issue!**

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# A Brighter Future with ElumTools

The world of lighting design has been disjointed since the advent of BIM in that lighting calculation software usually requires remodeling of building elements, and importing Autodesk® Revit® elements is usually more work that remodeling. Then last year, Lighting Analysts introduced ElumTools, the first fully integrated lighting add-in for Revit. This application brings lighting analysis into the BIM process and integrates it with building designer's software of choice, Revit. This article discusses ElumTools capability and workflow.

Once ElumTools is installed, an ElumTools tab is added to the Revit ribbon. The tools are arranged left to right to follow a typical workflow. The Settings tool accesses the calculation parameters, file system setup, and other miscellaneous items. Web-based support is available from the Help Info tool.

The Luminaire Manager tool opens a dialog that controls parameters of lighting fixture families found in the model. Light fixture families must have a photometric source and an associated IES file for an accurate lighting simulation. Families in the model without a photometric source and an associated IES file will be shown with a Red "X" indicating there is an issue.



The IES data appears in the definition tab: it even includes a total light loss factor calculator. Other tabs allow the user to adjust the source size and position, its display, and to classify it as an emergency fixture. A tab of this dialog also shows photometric web or polar curves views of the selected fixture. This interface allows the user to tweak the lighting without editing each individual family. This is immensely time saving and fits a process of iterations very well.

The Material Mapping tool links to the materials in the model. It sorts the materials in use from those merely present in the model. Each materials link can be set to None, Unidirectional, or Bidirectional. This is indicated by a red vertical bar, a two-headed ar-
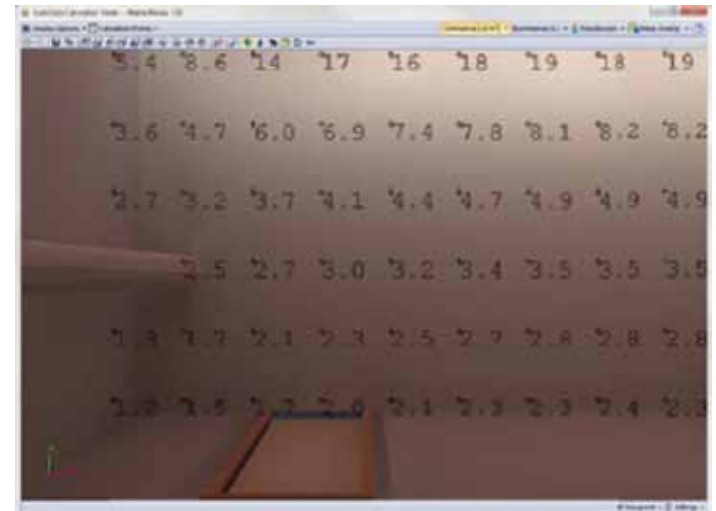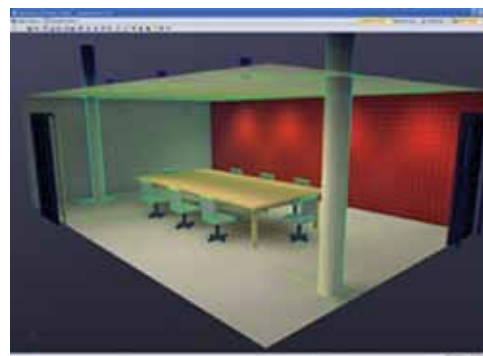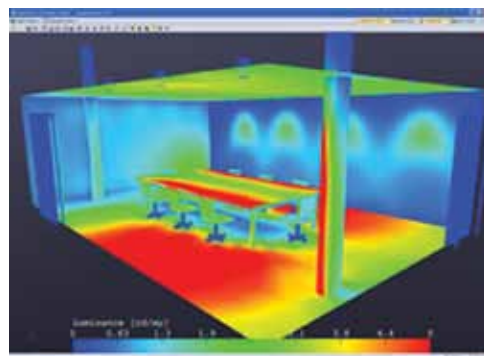
row, and a single-headed arrow, respectively. When materials are altered in this dialog, the link is automatically set to the vertical red bar, breaking the link. The user can then decide to make it a bidirectional link and push the changes back into the Revit model. This allows the user to use the ElumTools interface to drive the materials or let Revit round trip the materials individually. It is important to ensure the material parameters are accurate to get the desired results.

The Current Revit (API) does not provide access to materials "Render Appearance" information.



Once the luminaire settings and material settings are complete, the Calculation Points tool is used to assign planes for the calculations. Calculations Points do not have to be placed to get surface exitance and visualizations, but they must be added for point-by-point calculations. Under the Add Points tool the Room and Space workplane tools can be used to add points based on Revit room and space objects. The workplane height of the points is adjustable after initial placement. To place points on a vertical or raised surface, use the Planar Face tool. Unfortunately, the points do not display at this time because they do not yet have a value associated with them.

Calculation and Visualization by Room or Space is done much the same as placing calculations points. After the area selection is made, the Calculation and Visualization window opens and the radiosity calculation process begins. When complete, the calculation points can be viewed in luminance visualization, mesh, and pseudocolor.

The images can be adjusted while open. The viewer can be closed as desired, but must be re-rendered to view again.

The View/Update Results tool displays the calculated points inside of Revit. The Hide Results tool, well, hides the points.

Statistics are shown when the room/space object is selected in the Properties dialog. To see average values by space or room, create a schedule using Revit's built-in scheduling tools. ElumTools data is added to the model as shared parameters. Since calculation points can be placed three ways—by room, space, or plane—the parameters are actually different. This means that trickery will have to be used in order to schedule combinations of room, space, and planar data into a single schedule. Consider the final output when creating the calculation planes.
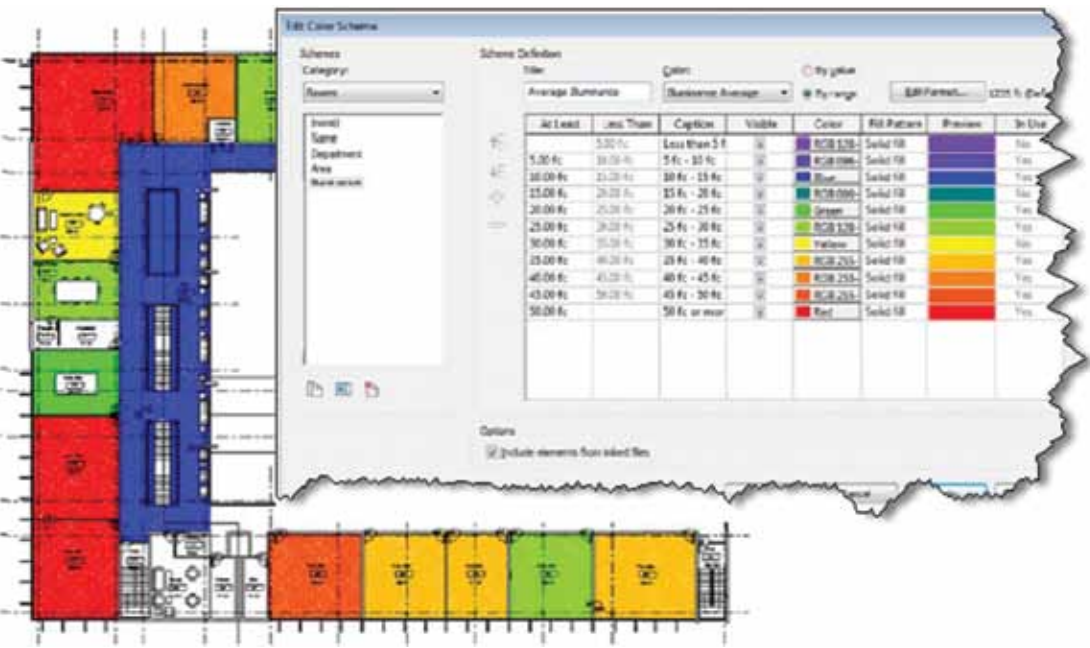
## BENEFITS AND "GOTCHAS"

The following are things to know about how ElumTools when working with linked models.

• The light fixtures used, the rooms or spaces referenced, and the calculation points must reside in the

# Revit MEP 2013

host model. Light sources in linked models will not function along with linked room/space objects.

+ Materials in linked models need to be mapped using the material mapping tool. It is a good idea to spend time up front setting the standard Revit materials as required, or creating a set of standard materials for quick use ahead of time.

+ ElumTools likes each model to contain a 3D view in which all the needed geometry is visible. This aids in its ability to find the geometry.

+ ElumTools will have difficulty with the Calculate Selected Elements tool if any of the selected elements are in a linked file, because Revit does not want to individually select linked objects.

+ ElumTools cannot tap the phase mapping of linked models and may produce unexpected results when the host and linked files are using different phases.

+ Surfaces that do not have a material assigned to them are ignored by ElumTools with the exception of luminaire surfaces. Luminaire surfaces are automatically assigned the default material. Users can use the Revit Paint tool to apply materials as required.

Because ElumTools adds data in the form of parameters into the host Revit model, room/space tags can now include handy information such as luminance minimum, average, and maximum values by adding those parameters to the required tags.

Color fill legends can also be created that can show items such as average illuminance by room. This view can be used to quickly identify trouble spots that are over- or under-lit with a quick glance of what color is currently filling a given room.

When it comes to lighting fixture families, it is not uncommon for firms to build their own generic content in addition to using manufacturer-supplied content. In either case, be aware of how ElumTools deals with the modeled geometry of the lighting fixture obstructing or redirecting light from the light source. If the light source and the modeled components of the light fixture are created in the same family, ElumTools ignores the modeled geometry as far as obstruction, deflection, and reflection is concerned. When light source families are nested into a parent file, ElumTools will show obstruction, deflection, and reflection. Nested light source families need to be "shared" or ElumTools will not recognize them in the project.

ElumTools is brought to you Lighting Analysts, the same fine folks that make AGi32. That knowledge should give users a lot of confidence in the underlying engine and the capability of the software. In fact there are many other functions and options like luminaire switching and dimming, luminaire luminous area, an emergency mode setting for emergency fixtures, controls for tweaking the mesh material and color bleed in radiosity, and capability for self-luminous surfaces.

ElumTools is a welcome addition to a market short on third-party tools and applications for Autodesk® Revit MEP®. If a BIM workflow is the goal, applications such as ElumTools are required for reuse of data and to "pay it forward" to future consumers of the model. The interface is surprisingly straightforward for a complex tool. ElumTools harnesses the Revit platform and leverages every last bit of its functionality. The learning curve is not steep for a confident lighting designer, but a solid understanding of Revit is also required to work this solution. That might be the hard part in the short term, but in the long term, Revit wins, and so does ElumTools.

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