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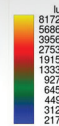
The Official Publication of Autodesk User Group International

August 2013

WEST ELEVATION - ILLUMINANCE STUDY

lux
81727
56867
39569
27533
19158
13330
9275
6454
4491
3125
2174

Confer
Communicate
Collaborate

STEEL BEAM - W18X55
TORSIONAL CONSTANT - 1.66
AREA - 16.2 IN^2
60 LBS PER FT.
X-X AXIS - I = 890 IN^4
Y-Y AXIS - I = 44.9 IN^4

CONCRETE - FOUNDATIONS
3000 PSI
SOIL COMPACTION 45%
MODIFY PROCTOR OR 98% OF
STANDARD PROCTOR
SOIL STRATIGRAPHY - FINE
SAND "UNIFIED SOIL
CLASSIFICATION - SP"
STANDARD PENETRATION
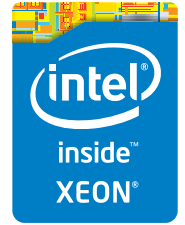TEST - AVG. N = 8
SOIL BEARING NET
ALLOWABLE - 2500 PSF.

STEEL TUBE COLUMN - 6X6X.5
AREA - 10.4 IN^2
35.2 LBS PER FT.
www.augiworld.com
RADIUS OF GYRATION - 2.21 IN

Also in this issue:

- Gain Control with Project Navigator
- Part Solutions for Inventor
- An Interview with Seid Tursic

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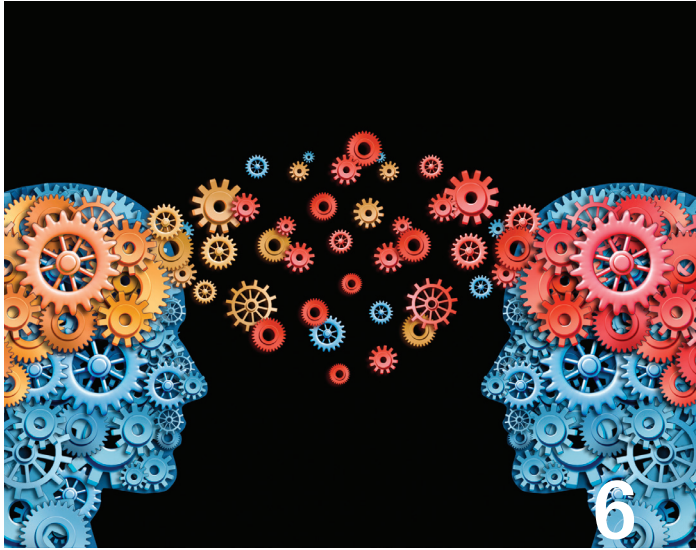
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Editor's Note

Hello, AUGIWorld Reader!

Welcome to the August issue. We have some great content for you this month so hold onto your seat! As you know, *AUGIWorld* has a theme each month and this time it is Collaboration. Anytime you are working with more than just yourself and your drawing or model, you are collaborating. So as you go through this issue keep an eye out for the theme, but there are other gems intermixed as well. ☺

A quick word about the cover art this month. It's the winning presentation submission from the Revit Technology Conference North America 2013. It is a composite image that highlights a number of presentation styles and was a real hit at the competition. Do you have something cool as well? Consider sending it to us—we love to show the world what you can create!

Okay, here is our rundown this month. We start off with an article by Brian Benton on using Autodesk Design Feed (found in AutoCAD and other Autodesk applications). Accompanying this is Michael Beall's monthly tip—assigning a custom view in a viewport. And then Melinda Heavrin gains control of the Project Navigator in AutoCAD Architecture 2013.

Next we have John Evans writing about Part Solutions in Inventor 2013. He breaks down this new online component catalog for us and shows where to find the best stuff! This is followed by a talented Revit gang getting together and dominating for BIM project success! This article was developed by Jay Zallan, Marcello Sgambelluri, Troy Gates, and Darren Roos.

New to *AUGIWorld* is Brian Chapman, who has taken the reins of 3ds Max for us. His first contribution is an interview with Seid Tursic of the TripleClaim Game Collective. And then Glenn Jowett helps define collaboration as it relates to Revit Structure 2014. Next we have Sam Lucido covering AutoCAD Civil 3D 2013 and his collaboration method using data shortcuts.

For Revit MEP 2013 we have R. Robert Bell giving us a kick-off FAQ for kick-starting RMEP! And Lee Ambrosius brings the latest and greatest information in this month's Inside Track column.

Okay, so there you go—another wonderful issue of *AUGIWorld* magazine! Has the writing bug bit you yet? If so, contact us… ☺

Take care,
David Harrington

ARCAT BIM INFO Content

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PRODUCT FOCUS

Collaborate with Autodesk Design Feed

A fact that's common to all industries and jobs is that we all have to work with other people. There is no job that does not require some sort of data sharing. Even if you are self-employed and work out of your home, you still have to deal with somebody and you will have to exchange something, even if it is only the money for your services.

Designers around the world have been sharing project data for decades in one way or another. The key is to use a method that everyone can access. Another important factor is to present that data in a format that all can read and understand. One format that has been accepted worldwide is the construction document; also known as a drawing. Hollywood refers to them as "blueprints" even though they are rarely blue anymore. This type of document can take on many different forms: a blueprint, sketch, picture, text, drawings, render, and others. It can also be a combination of two or more of these formats. The final construction document, or product, is what we are trying to achieve. Once that is done, it is easily transferred, shared, sent, copied, printed, emailed, uploaded, snail-mailed, or downloaded.

Communicating the end result is easy. The real problem is sharing the project data during its creation.

COLLABORATING DURING THE DESIGN PROCESS

There are a series of events that happen during the design process. Here is one look at a possible course of events. The beginning of a project starts with the client having an idea of what they want to do. They contact you or send out an RFP (Request For Proposal) and the process begins. You have to put together a proposal. This process requires communication with the client to make sure you are headed down the right path. Things are very general at this point, but you need enough detail to make sure you are on that proper path. This is a risky time. You want to put enough work into your efforts to get the job, yet you also want to minimize your lost time and resources in case your competitor gets the work. This is where accurate communication with the potential client comes into play. Verbal communication is quick and easy to do, but is not always clear and accurate. Getting ideas documented early on helps to better define what is needed and expected. Autodesk Design Feed is a tool that can help do both, and more.

AUTODESK DESIGN FEED

The Autodesk Design Feed tool is found in several Autodesk products including AutoCAD® 360 (Autodesk's mobile CAD platform), AutoCAD® 2014, and all AutoCAD 2014 verticals (AutoCAD® Civil 3D®, AutoCAD® Map, AutoCAD® Mechanical, etc.) Design Feed allows users to communicate from within the actual CAD file. It shares several different types of information in several formats, all of which is accessible from within the file itself as well as the cloud. The shared data is mobile and easily accessed. The tool creates a "paper trail" of questions and answers that will document to the designer and client what was discussed and decided. This tool can prove to be invaluable to the design process.
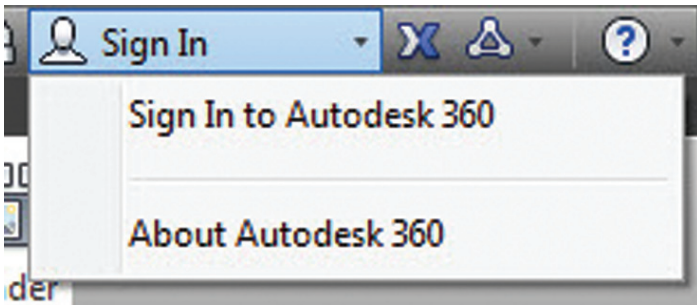
Figure 1: Sign into your Autodesk 360 account while inside AutoCAD

HOW WE COLLABORATE NOW

Before we look at how Design Feed works, let's look at how we get work done now. There is nothing inherently wrong with how we share our information now, but it is cumbersome and manual. We read the client's RFP and decide on a direction to take. We have a meeting to discuss it with the project manager, the designers, the technicians, and anyone else who might be involved in the process. Notes are taken, napkin sketches are made, and we distribute the new data we generated via email or store it all in a folder on our server.

If these files change, we make a new copy, date it, change the file name or use some sort of established process to track these changes. We put together a concept plan and any other design documents that need to go with it, put it all in a PDF file and send it out for review. The client prints the PDF files, marks it up in red (hopefully it's red and not blue or, worse, black or pencil), scans it, PDFs it, and emails it back to us. We print that out, print our drawings (again) and mark those up in red. Distribute the mark-ups, have a meeting or two, make the changes, print again, markup again, print again, PDF again…you get the idea.

HOW WE WANT TO COLLABORATE

When we collaborate we want less back and forth, less printing, fewer meetings, better commenting tools, clear communication, and less time spent redoing work. We want to get it done right away and

on the first try. Regardless of how great our tools are, this goal will always be difficult to achieve. Design Feed is not perfect and will not make everything rainbows and unicorns, but it can provide a set of tools we can use to help us get closer to these design process goals.
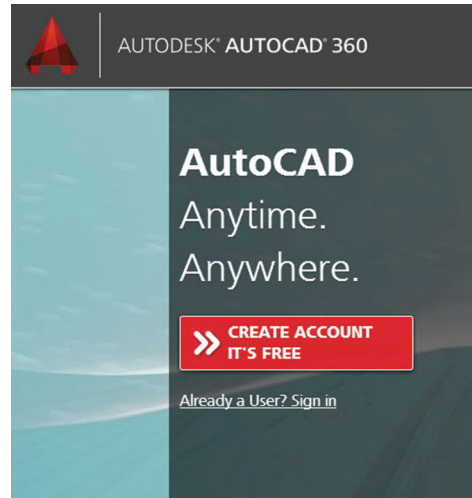
Figure 2: AutoCAD 360 is Autodesk's mobile and browser-based CAD program

HOW DESIGN FEED WORKS

Design Feed is found inside AutoCAD and is very mobile. How many times have you had to stop working to ask a question only to have to wait until the person you queried gets back to you? Design Feed is native to AutoCAD 2014. Using it requires this version of AutoCAD and an Autodesk 360 account (which is free). Sign into your account from within AutoCAD and share your file. Now the client (or coworker, project manager, city official, builder, planner, designer, inspector, etc.) has access to the file. Both of you can comment and ask or answer questions at any time.

Let's say you are designing and have a question. Ask it from within AutoCAD using Design Feed. Point to the exact place in the drawing file that you have a question about and type in your question. This triggers an email to the person you tagged in the question, alerting them to your question. Because they are clever
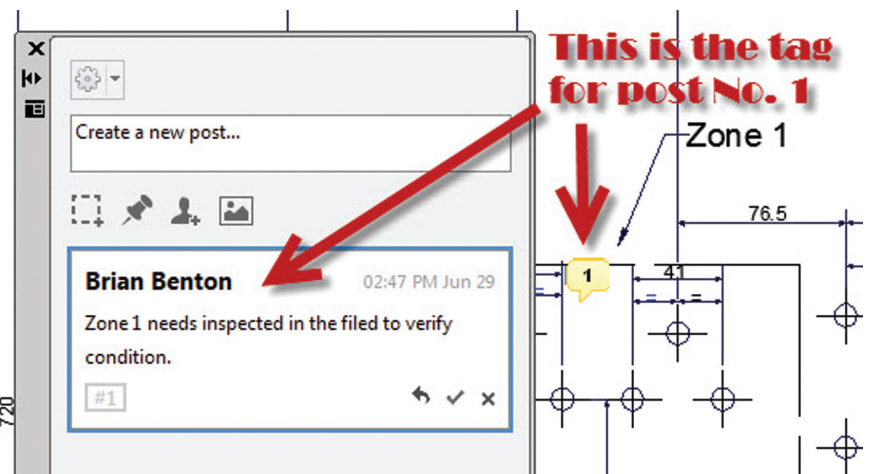
Figure 3: Design Feed in AutoCAD is a palette. See the TAG balloon locating the area the post is describing

and have a smartphone with them wherever they go and have installed AutoCAD 360 (Autodesk's mobile CAD program), they are immediately alerted to your question even though they are golfing instead of sitting in front of their desktop computer. They can view the file on their device, see your question, and immediately type in a response, click send, and grab the next golf club they need. You then receive the alert and see their response and can continue to work on the project. You never left the file, you didn't print anything, and there are design notes saved in the CAD file that document the interaction. If you didn't archive the emails that were sent, there is still proof of the communication in the file that you can access. Lots of time saved and work never stopped. This is possible because Design Feed is mobile and is embedded within AutoCAD. That is its key feature.

COLLABORATE FROM THE FIELD

Suppose that you, your inspector, your fabricator, your builder, or your client needs to leave the office for a site visit (or needs to visit the fabrication plant, etc.) to see how construction (fabrication) is going. They can carry a clipboard, a set of rolled-up drawings, a laptop, measuring tape, camera, etc. Or they can bring just a smartphone, tablet, and that measuring tape. The drawings are saved in their Autodesk 360 account and are accessible on the tablet and/or smartphone. Open the drawings in the AutoCAD 360 app (on the smartphone or tablet) and make your notes in the Design Feed tool. All notes are saved in the CAD file.

Did you take pictures while on your visit? Do you know the area they were taken? Doesn't matter. You added the pictures to Design Feed, which tags the location of the pictures in the drawing file. Which corner of the room were you in when you took that pic? No need to write extra notes or keep track of file names of the picture because Design Feed associates that picture with the location in which it was tagged. Putting the picture into Design Feed uploads the picture file to AutoCAD 360 in the cloud. The Tech at the office has been alerted from AutoCAD 360 that there are new field notes and pictures and gets right to work on the drawing. The Tech knows what to do because you included instructions in the Design
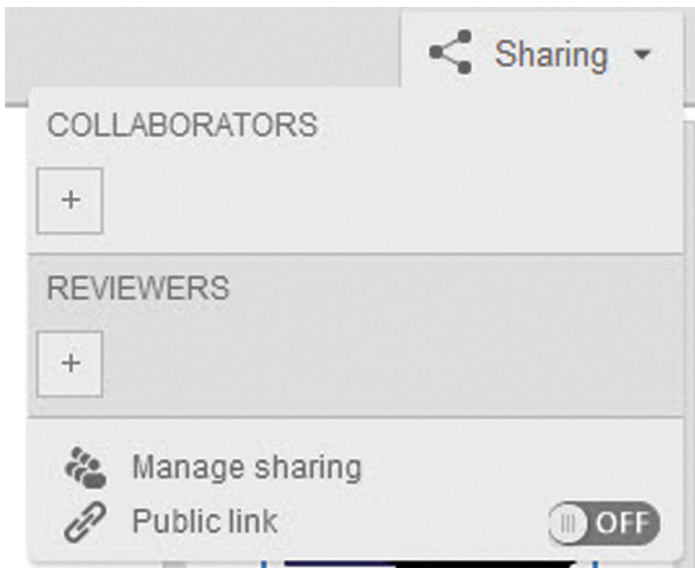
Feed notes. You do not need to save an archive of the old drawing because AutoCAD 360 saves a history of your drawings for you and allows you to access those older versions whenever you need to.

COLLABORATION, ONE STEP AT A TIME

Design Feed is a great tool with a lot of potential. Before you can use it you have to set up an AutoCAD 360 account and so will anyone you will be collaborating with using this tool. Storage size on these accounts is free but limited, so you can't store all your files in it. The free account will fill most of your needs, but if you need to be able to use larger CAD file sizes and need more storage space there are premium accounts available that really aren't that expensive. You will also have to use the cloud and so will your collaborators.

The cloud is a great tool but it also scares some people, and for good reason. In order to fully utilize this tool all parties involved will have to learn to trust the cloud and deal with their fears of using it. This is not an easy task and many people will be reluctant to create yet another account on yet another service. IT and CAD managers might also object to having to deal with another service and one that can be out of their control. It's not something that you can jump into and expect everything to be perfect. There will be new issues to deal with and problems will arise. But Design Feed, Autodesk 360, and AutoCAD 360 do offer new tools that have a lot of potential to assist you when collaborating with others. Try it out first in-house. Share files with group or team members before you expand its use to include clients or any other third-party group.
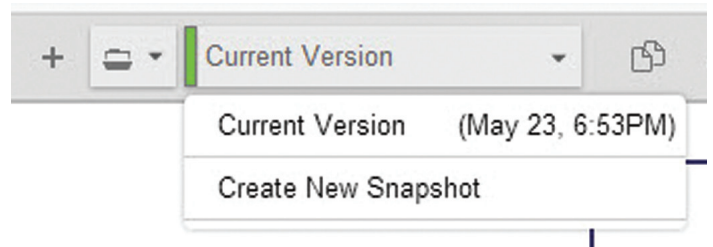
Figure 5: Create a "New Snapshot" to establish a new version of your file while working in AutoCAD 360 browser version

Figure 4: The Sharing tab in AutoCAD 360 browser version. Click here to share/review files

Brian Benton is a Senior Engineering Technician, CAD Service Provider, technical writer and blogger. He has over 19 years of experience in various design fields (Mechanical, Structural, Civil, Survey, Marine, Environmental) and is well versed in many design software packages (CAD, GIS, Graphics). He is Cadalyst Magazine's Tip Patroller, AUGI HotNews Production Manager, and Infinite Skills AutoCAD training video author. Contact him at cad-a-blog.com

And Here's How…
to Assign a Custom View in Viewport Controls

Named views have always been a favorite that folks don't seem to take advantage of very often, but I think once you are introduced to a quicker way to access them, you may reconsider.
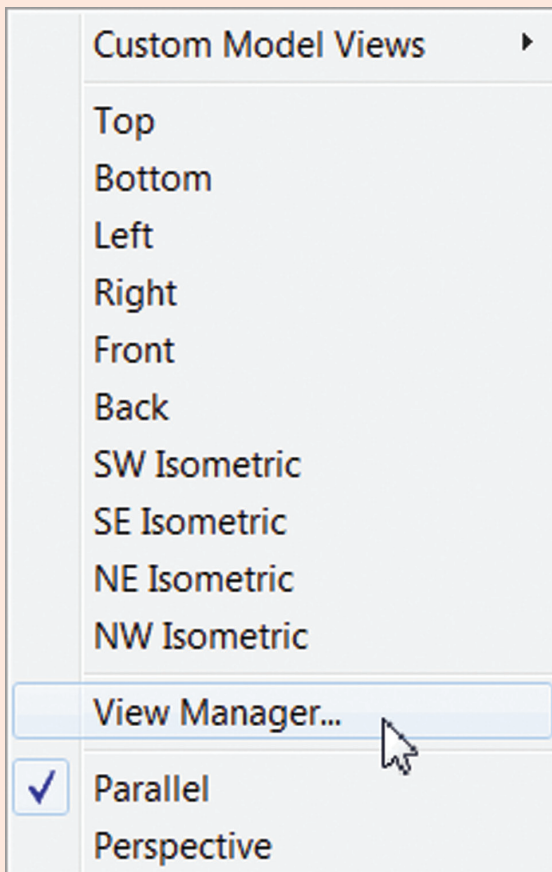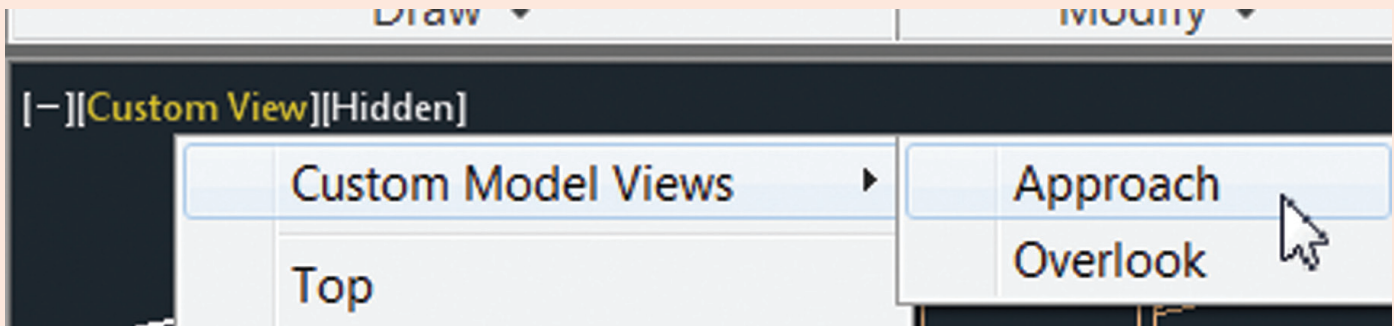
The Viewport Controls were added in AutoCAD® 2012, and in addition to the collection of view positions, you can also create named views and they are added to the Custom Model Views list.

HOW TO CREATE A CUSTOM VIEW

1. Set the desired view—either 2D or 3D.

2. Click the middle item of the Viewport Controls, then click View Manager.

3. Click New, enter the name of the view, then click OK. You will see Custom View displayed in the Viewport Controls.

4. Click Custom View then hover on Custom Model View to see the list of named views in that drawing.
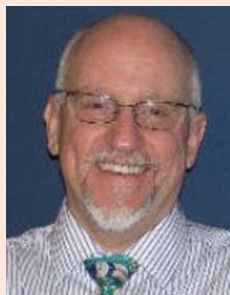
Michael E. Beall (B. Arch.) is an Autodesk Authorized Author and the owner of CAD Trainer Guy, LLC. He has been presenting onsite CAD training around the planet for more than 30 years. Contact him at michael.beall@cadtrainerguy.com or give him a call at 502.500.2267.

AutoCAD Architecture 2013

by: Melinda Heavrin

Gain Control with Project Navigator

The Project Navigator in AutoCAD® Architecture is the main point where you work with a project. The Drawing Management environment within the AutoCAD Architecture Project Navigator helps you organize, create, and access all your project drawings in one unified interface. Creating sheets for plotting is easier with the streamlined coordination that is built into the Project Navigator. The Project Navigator has four tabs that you can use to enter project data. These tabs correspond to the main phases of project creation: general project information, creating building data (constructs), and creating building documentation (views and sheets). We will look at an overview of each and then will look at them more in depth.

PROJECT CATEGORIES OVERVIEW

Each of the basic categories is represented by a folder in the Drawing Explorer within the project structure that helps you to organize your project files. For every building project in AutoCAD Architecture, the following basic category structure is displayed on the Project tab of the Project Navigator palette:

+ <ProjectName>: This is the top node in the project and is represented by a folder with the project name.
+ Constructs: This is the default category for constructs within the project. When you create a construct, it is saved into the Constructs category.
+ Views: This is the default category for view drawings in the project. When you create a view drawing, it is saved into the Views category. It is important to note that if you create model space views within a view drawing, they will be placed under the view drawing in the same category as the view drawing itself.
+ Sheets: Sheets in the project can be viewed in two ways: the Sheet Set View and the Explorer View. Each of these views will be discussed in more detail later in the article.

The main category structure listed above is fixed, but you can create subcategories and subcategory trees within this structure. Subcategories typically represent aspects of your workflow. These

subcategories can be set up in different ways. For example, you might set up subcategories by discipline, by view type (presentation, section, and rendering) or by sheet type (floor plan, ceiling plan, and elevation). It is important to note that you cannot mix basic category types. For example, you cannot create a Construct subcategory within the Views category.

Categories offer excellent organization for a project. Even small building projects contain a large number of individual drawings that can be difficult to track. By putting them into descriptive categories, you can quickly find the correct files you need for your project.

THE PROJECT TAB

The Project tab on the Project Navigator tool palette is where you enter information that pertains to the entire project. The Project tab allows you to do the following:

+ Change project properties
+ Launch the Project Browser
+ Launch the Content Browser to access the project library
+ Add, modify, and delete levels
+ Add, modify, and delete divisions
+ Synchronize the project with project standard styles and display setting
+ Enable and configure project standards
+ Refresh the project
+ Close the current project
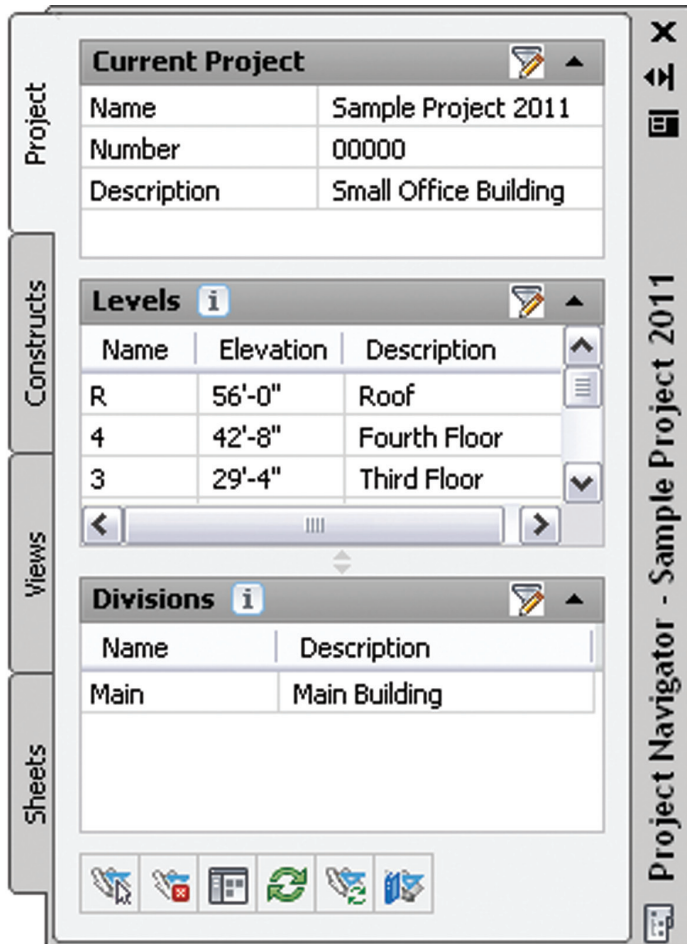
Figure 1: Project tab

THE CONSTRUCTS TAB

The Constructs tab of the Project Navigator tool palette is where you add the basic building objects for your project. Constructs are basically the main building blocks of the building model. A construct represents one unique portion of a building such as a building core or an entire floor. You will need to assign a construct to a level (floor) and a division (area of the floor) within the project. For example, you could assign an architectural construct named Interior Partitions—Second Floor/West Wing to the second level and the west wing division of the building. Constructs can span more than one level, which is useful for objects such as curtain walls.

The Constructs tab allows you to do the following:
+ Open and close existing construct drawings
+ Add, modify, and delete constructs within the project
+ Create categories for constructs
+ Launch the Content Browser to access the project library
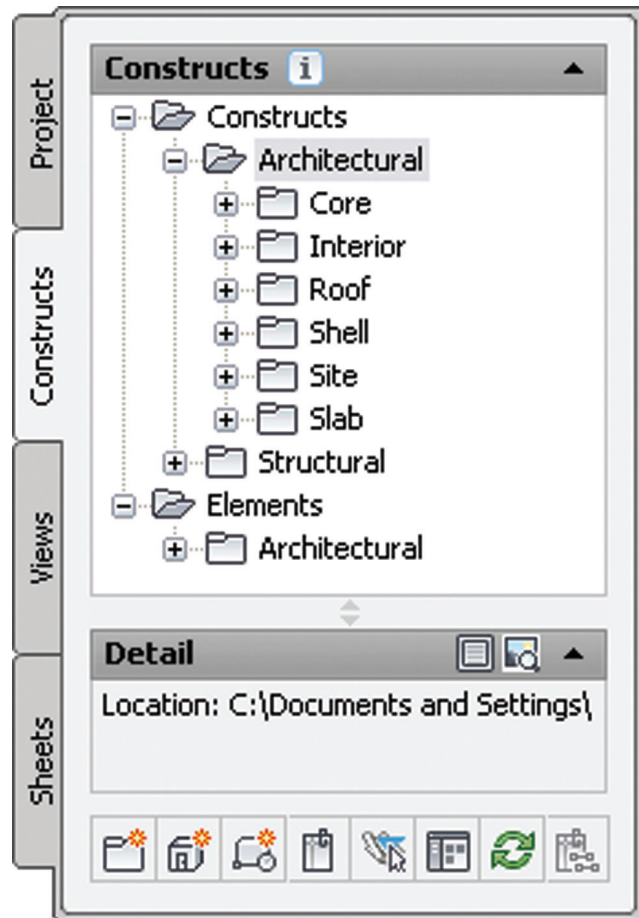
Figure 2: Constructs tab

THE VIEWS TAB

The Views tab of the Project Navigator tool palette is where you can create individual views of your building data. Views contain constructs and are the primary location for you to add annotation like notes, tags, and dimensions within the project. After you have created a view drawing, you can then create model space views within it.

AutoCAD Architecture 2013

After the structure of the building project has been defined and constructs have been assigned to both levels (floors) and divisions (area of the floor), you can then start to create view drawings within the project. A view drawing references any number of constructs to present a specific view of the building project. In order to create a view drawing, you must first decide which portion of the building you wish to look at and which type of view you wish to generate. View drawings will automatically reference the appropriate constructs in accordance to their level/division assignments within the building. For example, to create a floor plan of the west wing of the second floor, you would create a view that references all constructs that are assigned to the second floor and the west wing.

The Views tab allows you to do the following:
* Open and close view drawings
* Add, modify, and delete model space views
* Add, modify, and delete general views, detail views, and section/elevation views
* Change the contents of view drawings
* Create categories for view drawings
* Launch the Content Browser to access the project library
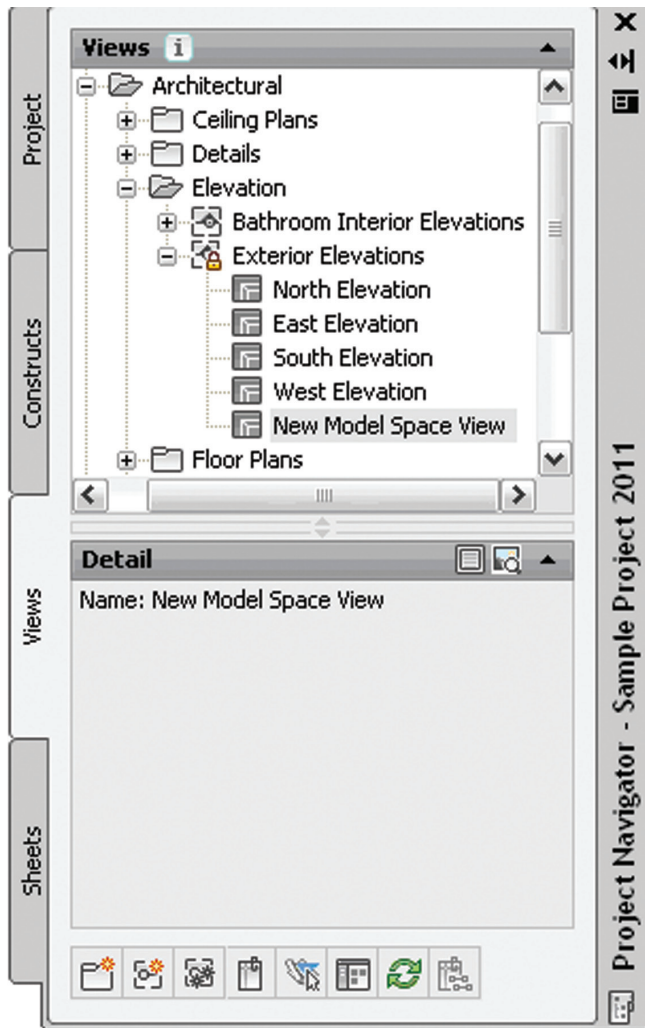
Figure 3: Views tab

THE SHEETS TAB

The Sheets tab of the Project Navigator tool palette is where you create and organize sheets for your project. Sheets reference views and are used for plotting drawings. The Sheets tab is also where you manage the project sheet set. This is where you will perform tasks such as creating a table of contents, managing page setups, or publishing to a plotter, a PDF, or a DWF file. The buttons at the top of the Sheets tab let you view sheet information in either of two ways: the Sheet Set View or the Explorer View.

The Sheet Set View is a tree view of the project sheet set in which you have access to all publishing capabilities. The Sheet Set view allows you to do the following:
* Add, modify, and delete sheets in the project
* Open and close sheet views
* Assign numbers to sheet views
* Insert a table of contents
* Electronically transmit the sheet set
* Archive the sheet set
* Create sheet selections for specific tasks
* Manage page and publishing options
* Launch the Content Browser to access the project library
* Publish the sheet set to a plotter, a PDF, a DWF file, or to an alternate page setup

The Explorer View is a view of the folder structure and sheet drawings in the project. The Explorer View allows you to do the following:
* Open, close, and delete sheet drawings
* Create categories for sheet drawings
* Launch the Content Browser to access the project library

Sheets are organized into sheet subsets in the Sheet Set View. Sheet subsets are a logical structure. The sheet folder category does not need to be identical to the sheet subset in which the sheet is placed. To avoid confusion, however, it is recommended that you have parallel structures in the sheet set and the sheet categories. You can rearrange sheets into different subsets within the Sheet Set View, but that will not change their physical location in the category or folder. Also, when you remove a sheet from a sheet subset in the Sheet Set View, only the reference of the sheet to the subset is removed. The layout itself and its containing sheet drawing are not deleted from the Sheets folder or subfolder.

In the Explorer View, sheet drawings are placed in folder categories. When you create sheets or sheet views within a sheet drawing, they are placed in the sheet drawing.

Figure 4: Sheet Set view

Figure 5: Explorer View

THE DRAWING EXPLORER

The Drawing Explorer is a tree view that is common to the Constructs, View, and Sheets tabs of the Project Navigator. This is where the drawing files are organized. With the exception of the Project Tab, each tab of the Project Navigator has a Drawing Explorer tree where the associated project drawing files are displayed.

Drawing files belonging to a project are displayed on their respective tabs in the Drawing Explorer tree view. This tree view lists the drawings within their category. You can drag and drop or copy and paste drawing files in the Drawing Explorer.

EXTERNAL REFERENCES

The Drawing Management feature uses external references (xrefs) as a means to create a project and maintain it. Elements are referenced into constructs, constructs are referenced into views, and views are referenced into sheets. The mechanism of referencing is identical to the regular AutoCAD External References Management feature; however, the background methods employed have additional features.

Xrefs that are created in drawing management can automatically make use of project data, while those that are created manually through the xref palette or command line cannot. If you are working in a project environment, the best practice for referencing project drawings into other project drawings is to use the Project Navigator rather than the standard AutoCAD Xref Manager. The AutoCAD Xref Manager cannot differentiate between project drawings and non-project drawings. If you reference a non-project file into a project file by mistake, you cannot use the full Drawing Management functionality on that file.

It is important to keep the following considerations in mind when working with a project:

+ Do not delete any XML files generated by the Drawing Management feature as they are vital for the project.
+ Use the Project Navigator to create, modify, and reference project files within the project. If you want to use existing non-project files in a project, convert them to project files first.
+ Drawing Management supports the use of relative paths for external references. In the project setup, you can decide whether to use full paths or relative paths. Working with relative xref paths makes moving the project and transmitting it easier and reduces the need to repath the project.

REFRESHING THE PROJECT NAVIGATOR

When multiple people are working on the same project simultaneously, one person's Drawing Explorer view on the Project Navigator palette can become out of sync with the changes of another. To prevent this situation, refresh the Project Navigator by clicking Refresh Project so all items are updated to reflect the current project status. It is highly recommended that this is done frequently during a project session if there are multiple people working on the same project.
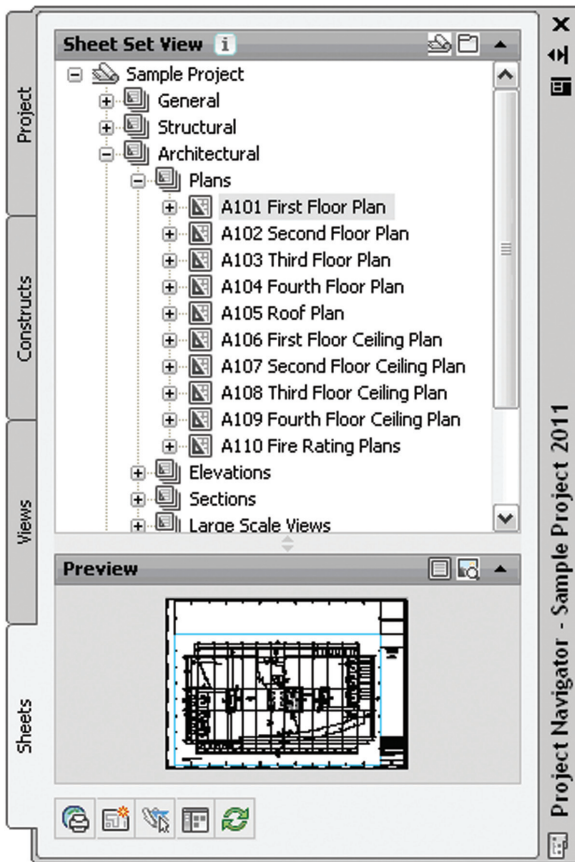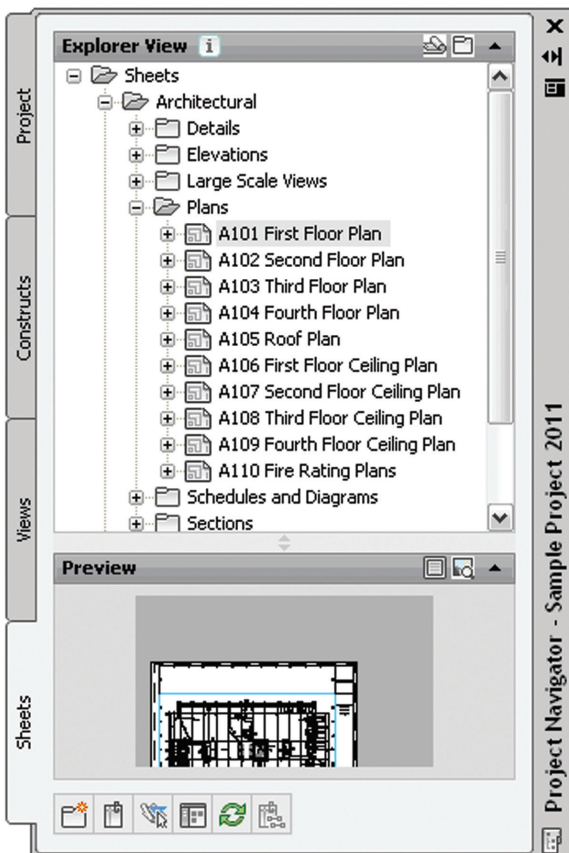
AutoCAD Architecture 2013

On the Quick Access toolbar, select Project Navigator. Next, select the tab where you want to refresh the file tree. Then select Refresh Project.

REPATH THE PROJECT

A repath is necessary after you make any of the following changes within the project:

* Rename a project file
* Move the project to a different location
* Move a project file to a different category
* Move a subcategory from one category to another

In addition to updating the project files, repathing will also update the paths of support files, images, and schedules that are referenced in the project drawings.

When you zip a project and then send it to another user who unpacks the project to a different location on another computer, the project will be updated in its new location when it is set current for the first time on the new computer. However, this will update only if all project paths were correct and current when you zipped them. If you have moved the project to another location on your computer before zipping it and not repathed it before zipping, the repathing on the new user's machine will not work correctly. Before you zip and send a project, you must make sure that all external reference paths in the project are valid.

You have the choice of repathing a single project file, all files in a category, or all files in the project. On the Quick Access toolbar, select the Project Navigator. Next, change the name or the location of a project file or project folder in the Drawing Explorer. The Project Navigator - Repath Project dialog box will display (see Figure 6). Specify when you want the repathing to be done (Repath Now or Repath Later).

It is important to note that when you repath a project that was saved in a version of AutoCAD Architecture prior to 2010, the drawings are saved in the new file format. You will no longer be able to open these drawings in a version of AutoCAD Architecture prior to 2010. Synchronizing a project with the project standards will also save the project drawings in the new file format.

CONCLUSION

The Project Navigator is a useful organization tool provided in AutoCAD Architecture. I have found that the complexity of the organization is scary to many people, but don't be intimidated. Once you have incorporated the use of the Project Navigator, you won't be sorry!
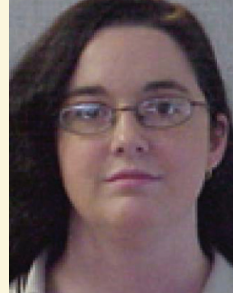
Melinda Heavrin is a CAD Coordinator & Facility Planner for Norton Healthcare in Louisville, Kentucky. She has been using AutoCAD Architecture since release 2000. Melinda can be reached for comments and questions at melinda.heavrin@nortonhealthcare.org.
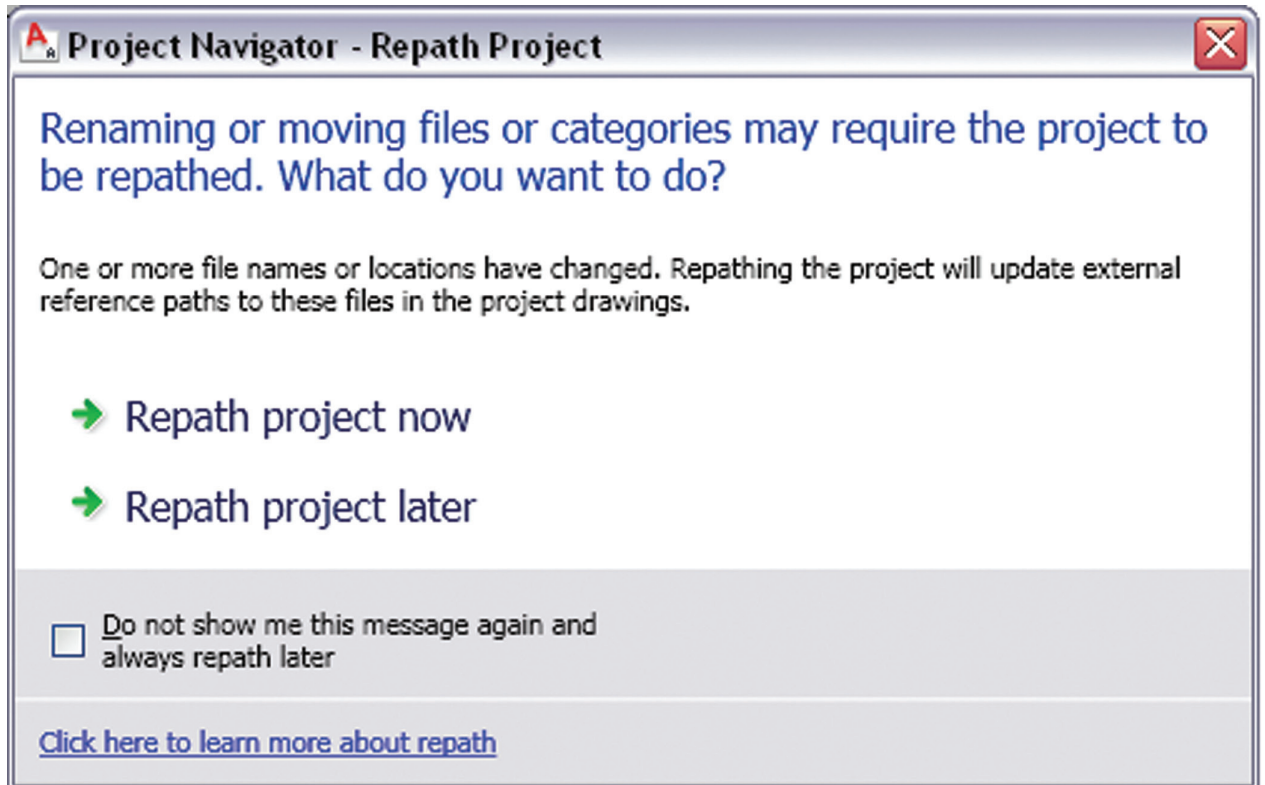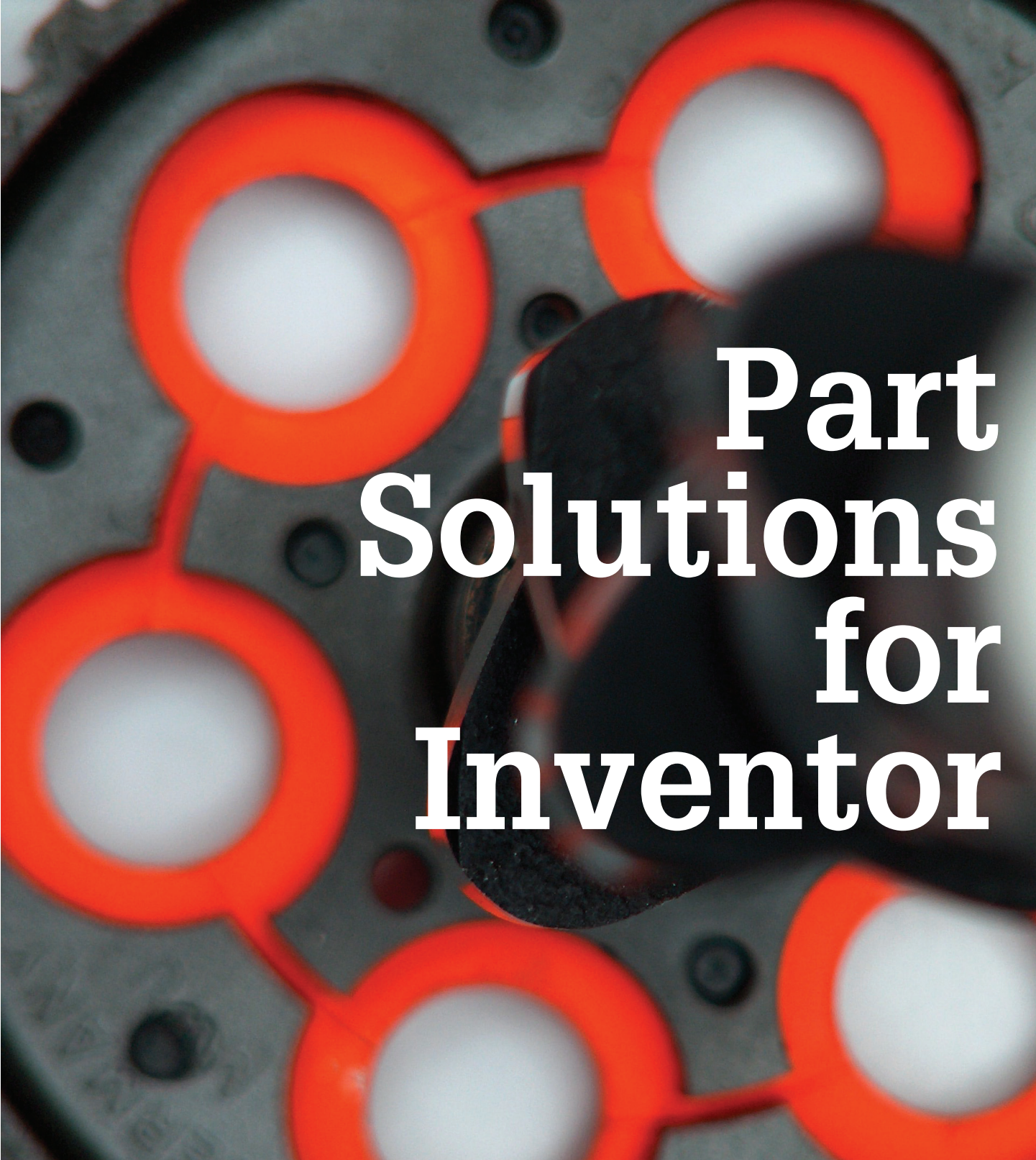
Figure 6: Repath Project dialog box

Part Solutions for Inventor

So you need a component—perhaps a bearing solution or a motor. You need it now, but don't need something mocked up or hokey… and you need specifications. You may not have been aware that Autodesk Inventor® offers a great solution to your problem.

I was at a trade conference this month and had the opportunity to chat with Douglas Korneffel, the director of technical services at Cadenas Part Solutions, who gave me a tour and discussed their solutions to these types of issues. Let's take a look at Cadenas Part Solutions online parts catalog, see how it works, and what the company has to say about the product.

Inventor 2013

WHAT IS PART SOLUTIONS?

Cadenas Part Solutions is an online component catalog with 3D CAD models of just about everything you might need to get your Inventor project going. Valves, bearings, motors, dampers… and on and on. The list is pretty impressive.

The catalog is searchable over a web interface, to which Inventor offers a direct link through the ribbon:
Ribbon -> Autodesk 360 tab -> Web panel -> Supplier Content

Once selected, the user is directed to his respective vendor's part community, such as http://autodesk.partcommunity.com where respective manufacturers components are displayed in a web browser (see Figure 1).

The web catalog offers the following:
+ Search
+ Manufacturer catalogs
+ Previews
+ Component configurations
+ 3D CAD Model download
+ Specification sheets

The best part is that it is certified and free.

SEARCH

Searching the catalog for a specific component can be accomplished a few different ways:
+ By keyword (full text)
+ By manufacturer and order number
+ By manufacturer's country
+ By 3D model upload comparison (geometric 3D)
+ By sketched geometry comparison (sketch 2D)

Keyword searching is as you might expect. You enter keywords about the component desired. Further refinement is available using the variables list to select companies and their variables, such as order number and dimensions.

Once a search is completed, the possibilities are listed by rank in terms of matching criteria, as well as manufacturer's name, part number, and description.

Geometric 3D
Geometric 3D is where things get funky. Say you need a coupling to fit an application. You might bang out a rough solid shape to fit your application, and then upload it to Part Solutions using the online interface. Part Solutions then builds geometric criteria about the supplied solid, and searches the database for similar components that match that shape. Circular, grooves, hole through
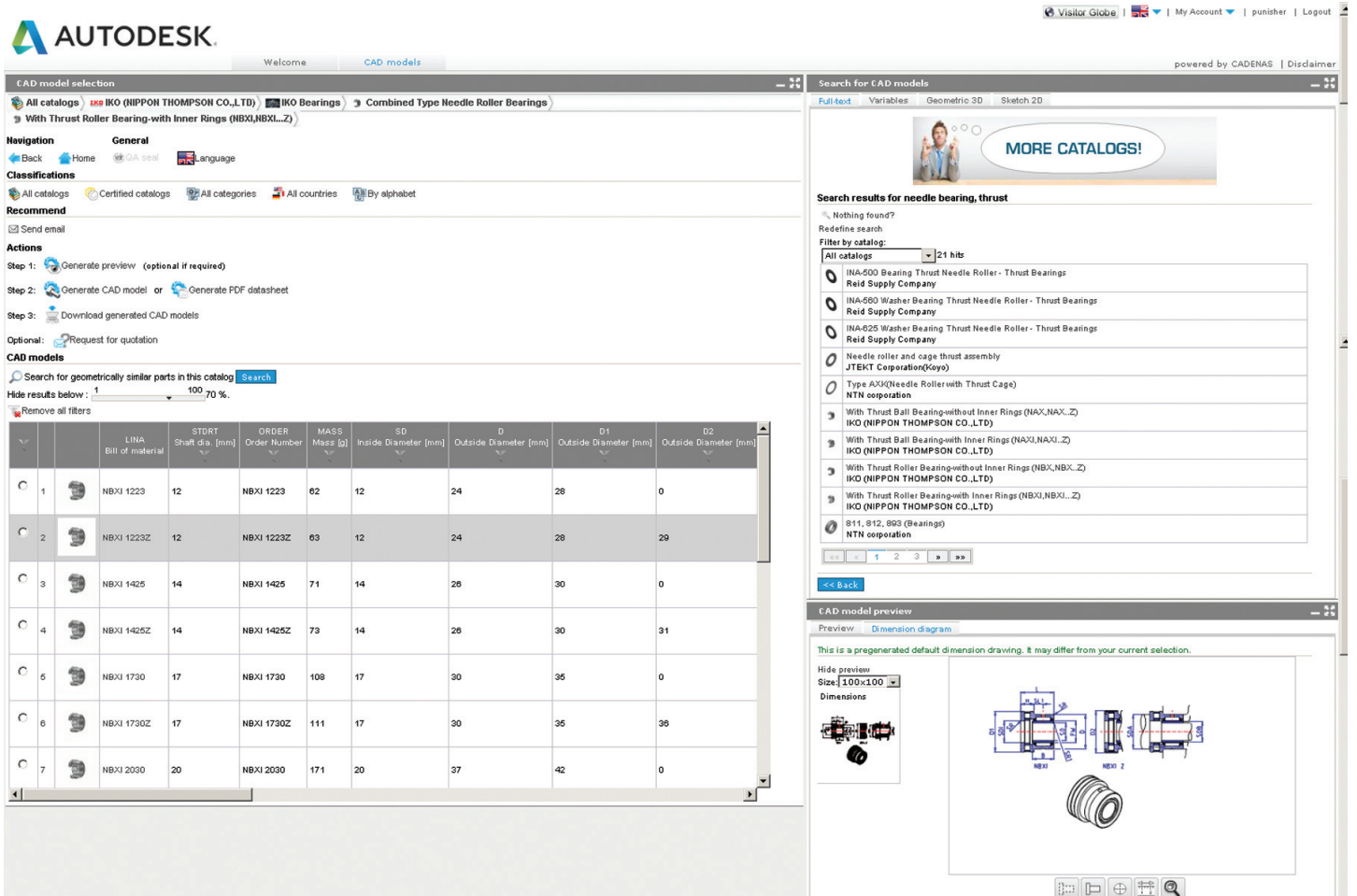
Figure 1: Manufacturer components in browser
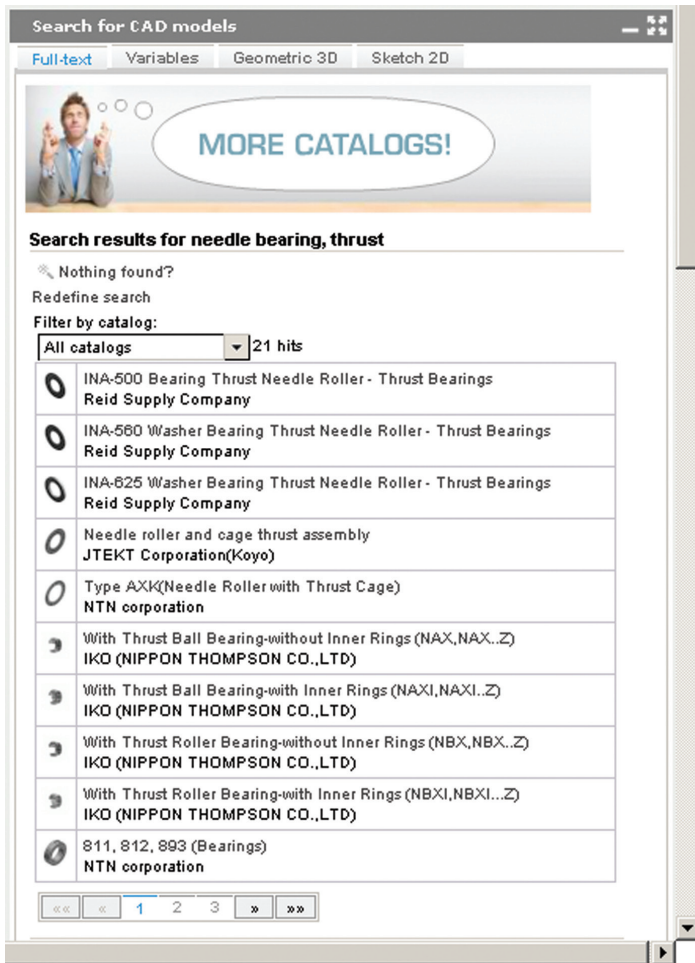
Figure 2: The query results
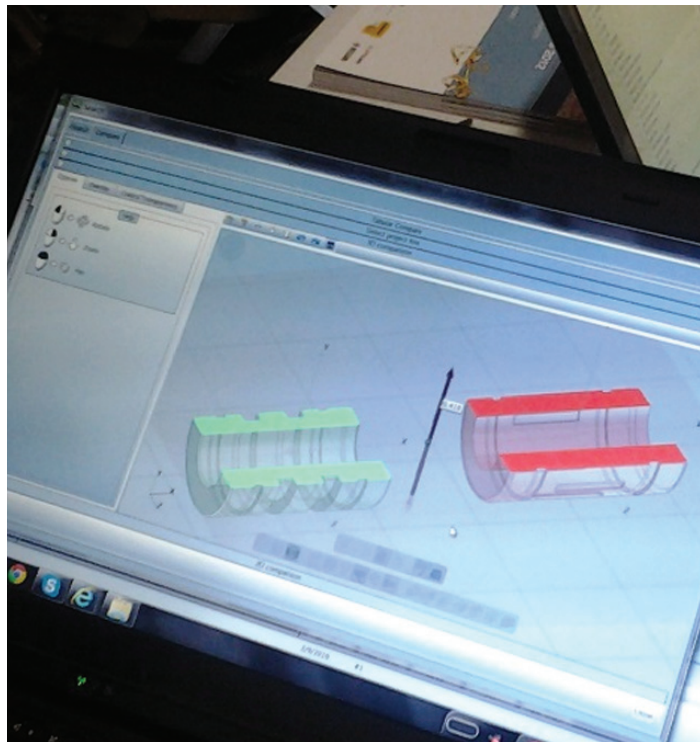
Figure 3: Image of the live demo of the Geometric 3D comparison functionality, here shown in side-by-side comparison mode

middle, etc. It then returns the list to the catalog interface just like a keyword selection. No joke.

Moreover, after you select something to preview, the interface allows you to compare your solid to selected parts in the list in a wicked little overlay. Further comparison options include various methods of visualizing the differences between the two.

Sketch 2D

Was that not enough? How about sketching your own 2D views on an interface, and have the system figure it out right there? It actually works fairly well.
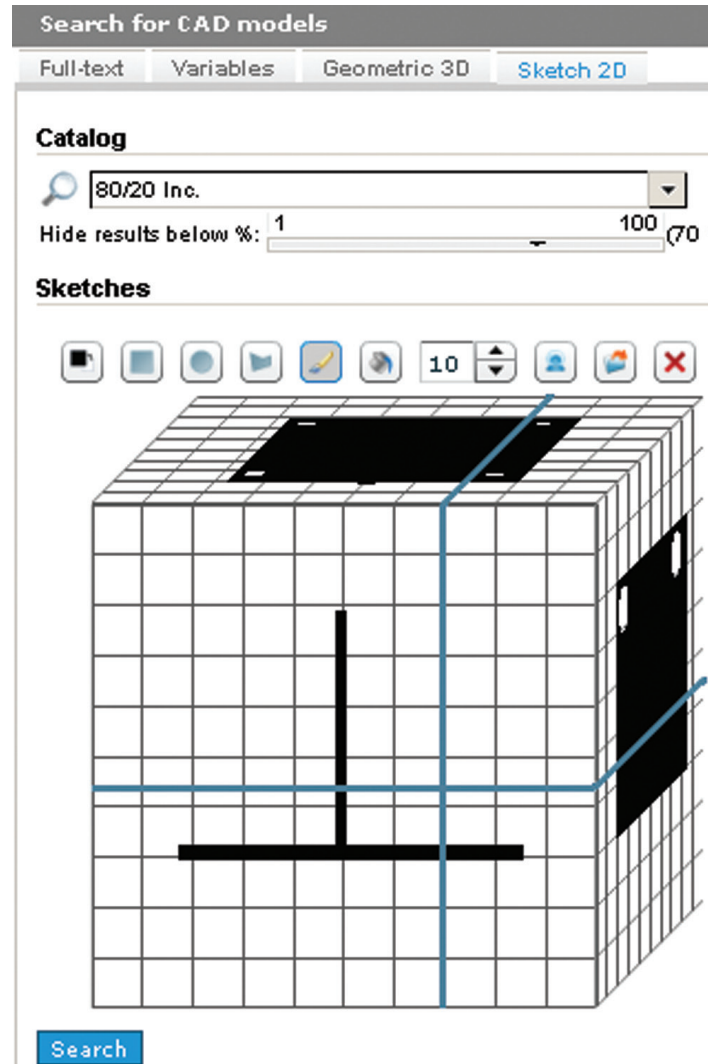
Figure 4: 2D Sketch interface looking for a bracket

The results I received with this search included a T-shaped floor plate, a hinge plate, and a lot of odd things that I didn't know existed.

Neither the Geometric 3D nor the 2D Sketch searches are perfect. They do, however, show promise and can help get you onto a component when you are just not certain of the specifics.

Inventor 2013

Figure 5: The manufacturer's part configurations

PREVIEW AND SELECTION

Once a manufacturer's part is selected from the results list, the complete configuration for that component are posted to the left with the sizes, etc.

Simultaneously, a dimensional preview is posted to the right, allowing users to see very clearly how the component is made up, along with dimensions related to the configurations list.

The preview allows users to zoom in and out as well as turn on and off dimensions, hidden lines, and so on.

DOWNLOADS

Once a specific configuration is selected, the 3D CAD model can be downloaded. If you are not ready to download at this time, the model stays pending in a download area for the user.
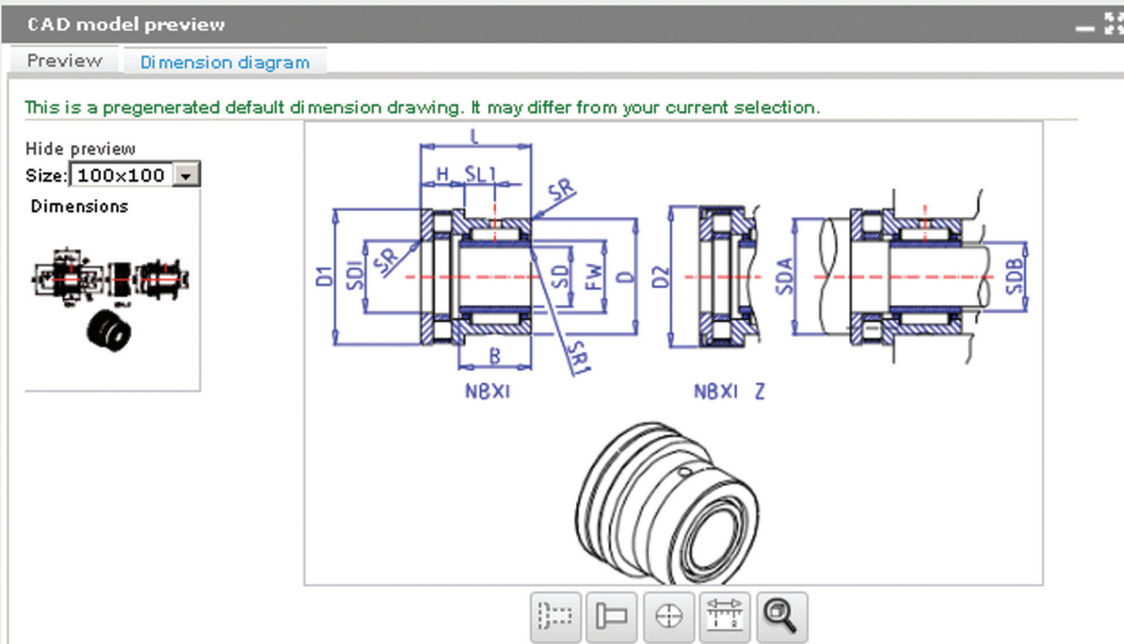
Figure 6: The dimensioned preview (my favorite feature in the interface)
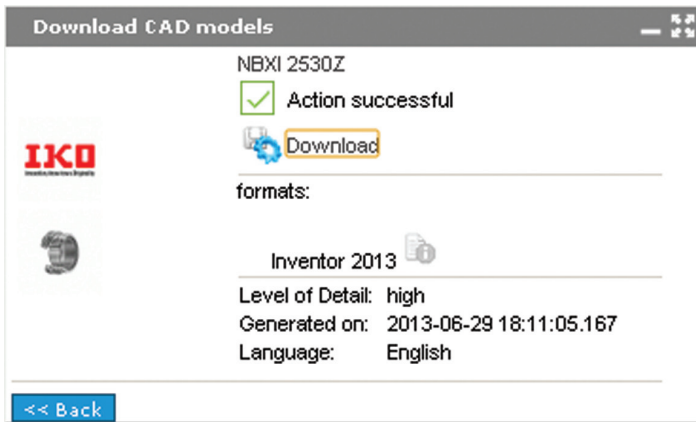
Figure 7: Component download panel

Figure 8: Assembled thrust bearings from the online catalog

Numerous formats are available including Inventor 2013, Solid Edge, NX, Solidworks, and others; however, once in your respective parts community, the model types are filtered to your respective software vendor. For Autodesk, AutoCAD, Inventor, and DXF are available.

Part2CAD plugin
Korneffel discussed a nice plug-in for various vendors' CAD applications that allows users to drop the desired component directly into their assemblies. I checked out the demo video for Part2CAD, and found that not only does it drop the components into the assembly, but they come fully constrained as well. I believe that the components also include iMates, but have not confirmed that, nor the source of the plug-in.

You can see the demo here:
http://partsolutions.com/blog/part2cad/

HOW EXACTLY DOES FREE WORK?
That's right ladies and gents, you pay nothing to download certified components. The manufacturers pay the cost of building and maintaining the parts library. Cadenas then outfits them with an interface that the manufacturer can then use to source their own online previews and downloads. When new components come along, Cadenas adds them to the library at the cost of the manufacturer.

Manufacturers know that when looking for a new component, you may not necessarily have a loyalty with a specific vendor. It is incredibly difficult to design with null-sized components. Therefore, it's quite beneficial to have the components sized accurately, and easily available for immediate use. Furnishing the component specification sheets is icing on the cake.

CERTIFIED
Each of the manufacturers' components available on partsolutions. com is verified by the manufacturer. None are released to the public without the direct consent of the respective manufacturers. Once approved, the model, all its configurations, and the specifications page are uploaded to the library.

Korneffel said that Cadenas goes further to ensure the quality of components by hiring its own team of modeling experts to develop the models accurately. The team is outfitted with the best in technologies and equipment, further ensuring that the work is completed in a timely manner, and that there is no sourcing or quality control issues.
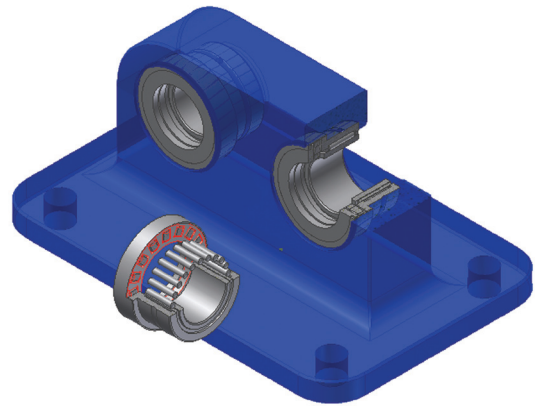
THOUGHTS
I love this capability and the ease with which I can get certified manufacturer's components online and quickly resume my design. The certification from the manufacturer and the specifications really are a nice touch because without these, it is difficult to know if the components will actually fit and whether the components will handle the prescribed loads.

The website can be awkward to navigate at times, such as when your search criteria is a bit vague. However, the company has invested a great deal in giving users as many options as possible in order to help them get what they want as fast as possible.

Hopefully more manufacturers that we often depend on, such as Timken, will join in soon as well.

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

Revit Architecture 2013

by: Jay Zallan, Marcello Sgambelluri,
Troy Gates and Darren Roos

Coordinate and Dominate: BIM Project Success

Coordination techniques using Autodesk® Revit® software as one's Building Information Modeling (BIM) authoring platform can enable a changing of the game, as it were. Modeling and project execution capabilities are becoming so comprehensive that we need equally comprehensive processes for collaboration and coordination. Hardware, software, processes, paperwork… what is most important?

Every BIM project and, frankly, every architectural project have multidiscipline teams. The question: Are those teams working together? The best projects have the most coordinated teams, greatest dynamic information flow, and most efficient communication and interaction strategies employed.

INTERACTION | COMMUNICATION | COLLABORATION | COMPLETION

In this article we will be briefly discussing ideas that are simply too big for a 1,000-word article, let alone the over 10,000-word class paper upon which this was based.

Collaboration is work—a lot of hard work. With that in mind as well as the link below (to the entire Autodesk University (AU) Class Handout on this), let's get on with the show.

http://bit.ly/15gbWOW

The difficult parts of coordination and collaboration are not always the technical parts; linking a file, building models, etc. are comparatively easy in the context of the entire project. There are always people who can handle the technical button pushing. The most important and often difficult main point in coordination is Interaction.

Revit models contain extensive amounts of rich and intelligent data and the use and application of these Revit models are virtually endless. Therefore, it is extremely important to establish boundaries for the Revit models with the architect, engineers, owner, and contractor.

Think of coordination between the disciplines, for any given project, as being made up of one part technology and five parts human interaction. This means that the essential ingredients for successful coordination are the personal interactions and the communication paths. Think of it this way: If you, as a Structural Engineer, do not get the information you need from the architect, how could you proceed? And vice versa.

Revit Architecture 2013

As we have seen, the process of effective project collaboration takes communication, but not like meeting or talking, more like the communication of artists or musicians. The Producer/Musician relationship is a good model to consider.

Using the BIM Execution Plan as the basis of your BIM orchestral score, the integral teams and players must be united in a single vision: to create as efficient a project as possible.

Given the dynamic and fluid state of many AEC projects, it is also requisite to remember what the main goal is: The Built Project. Hint: Flow with unforeseen obstacles.

Develop your orchestra—have experts in every chair. Not just decision makers, but also thinkers, creative, and technical players as well.

When all players are smoothly adept at their instrument (or discipline), then and only then can quality music possibly be created. So too in BIM.

THE BIM ORCHESTRA

If the extended team is an orchestra whose players are working in concert with one another, then the project can reach levels where the disparate parts blend with and balance out one another, working with one another's distinct offerings with harmony and productive counterpoint.

Do not take this lightly. Managing the human interaction on a project is probably the most difficult, yet potentially most rewarding, aspect to managing BIM from concept through operations.

"Who owns what and for how long" is paramount to decipher. Once decided, further plans on how to transfer these from one 'author' to another become necessary. Try to keep it easy, but provide the appropriate levels of complexity. This is the time to ask all the questions and strategize the "Project Systems." Who will do what, when, how. The AIA E202 and upcoming E203 are good places to start. Those and other necessary assets are described in-depth in the AU Handout (from that link mentioned earlier).

BIM EXECUTION PLANNING

A well-planned program between all of the AECO design professionals is fundamental to coordinated BIM. The BIM Execution Plan is a basis that establishes many things, such as how each model is organized and how each model, drawing,

document, spec., etc. is to be exchanged, developed, and formatted. This all helps the coordination process and eventually creates a smooth road.

In our minds, we do not want you to create the oft-typical Single Author Document (SAD) BIM Execution Plan (SAD BEP), otherwise referred to as a BIM Fascist Plan, where one player exhorts his or her will on the other players. That's not very team-oriented. Rather, we profess that a Coordinated BIM Execution Plan be created and authored by all players: A, E, C, and O. In other words, a true BIM Interaction Plan.

The BIM Execution Plan is the essential lifeblood of any well-coordinated Revit/BIM Project. The BEP is the guide to which all team members will adhere. That is all great in theory; however, as with all great "plans," they are only effective if everyone follows them. The best way to get everyone to follow a BIM execution plan is to have everyone contribute to its creation.

Working throughout each phase of the project it is important ...who am I kidding?... it is **mandatory** for successful endeavors to coordinate and collaborate in order to dominate!

COORDINATING CHANGES

The process and players are now known elements. The space to perform the coordination sessions have been set up.

What is the best setup? That answer comes down to budget and project type. For a 5,000 SF pad building, not much more than a conference room with a large monitor and a computer on which to view the aggregated model may suffice. For larger, more complex projects, we could use a 'Cave' where there is a computer and large monitor for each discipline, plus another with the aggregated model, so as items are discussed each player can control their needed changes, while the CM, etc. can manage the overall process.

Is there a need for or a case to make that Virtual Reality is to be used? (BTW: this would have been brought to light in the planning stages and included in the BEP.) If so, does there need to be space provided for that? Do prospective tenants/users need to have other sessions where they can virtually test the pending design, to ensure proper clearances, etc. such as in the case of Surgical Theaters, for example?

MODEL AUDITING

The following audits must be performed to assure quality and coordinated efforts and output (The Virtual Project). You may have more audits as well:

- Visual audits (human clash detection)
- Interference audits (clash detection reports)
- Standards audits
- Model integrity audits

This is all distinct from the Architectural and Engineering technical audits and reviews that need to happen.

- Pencils-Down is no joke when considering getting projects coordinated properly!

- Strategize pencils down so the model-lag is evened out prior to (at least) major submittals.

In every case, these live coordination sessions should use models from each discipline, individually color-coded for ease of visibility. Cut the model using a live 3D view and keep moving the 'cut line' through the building a foot or so at a time. When completed from the first direction, uncut the view and repeat the process in a perpendicular direction.

These visual audits are the same as for internal coordination, but can highlight many potential issues well before they are built or planned on being built.

COPY MONITOR WHAT YOU CAN

Using Copy Monitor can make it extremely efficient to modify the design to match new geometry or design options. Setting up the Revit model to look for the latest linked models can make reloading the latest version of consultants' models very simple and efficient. Remember that Copy Monitor works on only five elements at this time: Beams, Walls, Slabs, Grids, and Levels.

When working with a new model from a consultant, it is definitely a best practice to utilize whatever new grids or levels have been created or modified in their model. These items are the cornerstones of the BIM and should be maintained very accurately, which is easy to do if using Copy Monitor on them.

COORDINATING WITH NON-REVIT DESIGN TEAM MEMBERS

For very large Revit models, the combination of all discipline's models will, at this time, require that Autodesk® Navisworks® or VEO, etc. be used. The use of such software can make it easier to clash check and visualize very large or complex models, especially if some of the design team members are not using the Revit platform.

Another of the many useful tools that Revit has for coordination in conditions where a multi-platform BIM is in effect is the use of the 3D dwf file, which is a very lightweight file that can be emailed if necessary.

Revit is able to batch export 2D or 3D CAD files from the model, which can make it very easy to work with non-Revit consultants who require dwg or dgn files for coordination. The export of such files is streamlined and should be tailored to suit the standard layer and linetype setup for the company CADD standards.

METHODS TO ACHIEVE WELL-COORDINATED DOCUMENTS IN REVIT (A PARTIAL SUMMARY OF)

- Set up linked views that show only specific elements and control this with view templates in each design team's Revit model, so when the models are linked there no extra elements showing.
- Clean up models before linking/importing.
- Consider project size before linking/importing.
- The modeler should be aware of the frequency of revisions (weekly, bi-weekly) of the other models.

Revit Architecture 2013

- Origin (0 North/South, 0 East/West, 0 True Elevation) should be maintained throughout all design team members' drawings. This is much more crucial than in 2D drawings.
- The standard organization can work for smaller projects, but custom organization may be necessary for larger, more complex projects.
- Customize for intuitive understanding by others who may work on the model.
- Use "Project Parameters" and apply to Views for custom organization. (i.e., "For Reference Only" or a separation of "Perspective" and "Orthographic" for 3D views may be necessary).
- Keep in mind that copy/monitoring elements depends on the project and that there is no absolute standard.
- Consider the fact that the party responsible for the geometry (i.e., slab outline – architect) may be different than the party responsible for its properties (slab thickness and reinforcement – engineer).
- Coordination Review can be used only after copy/monitoring is set up and there will even be an automatic notification.
- Create/save HTML Coordination Review Report once Coordination Review is completed then export to Excel format because it allows for better organization and manipulation of data.
- Identify the person responsible for the "actions" (manager or modeler). Do not ignore the "add comments" option for recordkeeping purposes.
- Exporting to AutoCAD is useful for design team members who do not use Revit.
- 2D DWF may work better than 2D PDF for simpler viewing and printing.

CONSTRUCTION ADMINISTRATION

Construction, Construction Administration | Updates, Closeout, Completion, FM. This is not the time to go away from the strategy. Keep communicating...

Do Not Trust Your Beliefs
Empirical data can be helpful, but can also be hurtful if held as 'absolute' in many cases. Keeping an open mind is paramount in coordinated interactive projects such as AECO endeavors!

Teams may believe there is not much coordination that needs to occur in this phase unless the project has a large amount of addendums and supplemental submittals (which they all pretty much do!). What is more in focus is getting all the contractor's changes and additions/subtractions included into the As-Built BIM. Who is to do this? Who is to pay for this? What does the BEP say about this?

Consider this to be an extension of the CD phase, of sorts. This section refers to those areas of the project that correspond to when shop drawings are being created and eventually under "construction."

Make sure to update the structural model and ask if the architect is doing the same with his or her models.

Consider the following when updating the model in the CA phase and use a separate model if updates get in the way of submittals.

- Model updates may be required after BID Phase
- Update model per RFI responses
- Update model per shop drawing reviews
- Update model per site "fixes"
- Pro-actively document the model

COORDINATE AND DOMINATE | BIM PROJECT SUCCESS

Every building is constructed and maintained differently, due to particular needs and constraints. Plan and create accordingly.

Beginning with the end in mind is critical to ensure that the BIM project is successful throughout.

Building Information Models and the interactive AECO teams themselves must be created, coordinated, and managed. Then, finally, the virtual project delivered, constructed, and operated in a way that will best help the end user achieve the goal: using the built environment.

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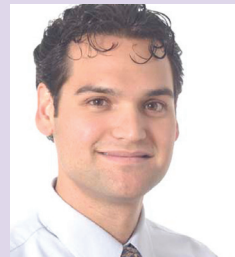
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Not Just for Games

Brian Chapman interviews Seid Tursic, lead 3D character artist for TripleClaim Game Collective

Figure 1: The Mexican by Seid Tursic using 3ds Max

It seems today's entertainment is so saturated with visual effects and near-perfect resolution that sometimes it's easy to miss the art that sparks the imagination. But every once in a while I come across something different that catches my attention. Lately, it has been the work of Seid Tursic.

If you Google Tursic you might find a pirate, a master of mice, or perhaps a musketeer. You would even find Oliver Twist, which Tursic describes as "a character that endured a miserable existence," noting he portrayed him in his own way. One thing is certain, if you're like me you will find a masterpiece and be astonished to know it was created using Autodesk® 3ds Max®.

THE INTERVIEW

Brian: Would you tell us about yourself?

Seid: I am a CG Artist from Sarajevo, the capital city of Bosnia and Herzegovina. I am a self-taught 3D artist, but I also finished traditional printmaking at the Academy of Fine Arts last year. I always look at the traditional art as the inspiration and forerunner of the modern digital arts and effects; it is probably connected with my educational background. I previously worked in some creative agencies and studios, but I am now working as a freelancer on various interesting international projects with some good artists.

3ds Max 2013

Figure 2: The Little Mice Master by Seid Tursic

Figure 3: Oliver Twist by Seid Tursic using 3ds Max

Brian: When did you realize character illustration was something you wanted to pursue?

Seid: I have been inspired by people and all different characters since I attended my studies at the Academy of Fine Arts. I always like to draw and paint portraits. I realized soon that 3D computer graphics offers all the same tools and possibilities, and even more, so I decided to give it a try. Since then I stuck with all 3D characters. It was a long journey to be able to spend time modeling characters for a living, but it is definitely something I would like to do more in the near future.

Brian: What, or who, inspires you?

Seid: Traditional art, modern CG art and design, music, interesting books, and so on—quite a few things. You can never get enough inspiration. Traveling is also very important for collecting inspiration. Inspiration is everything in the actual process of creation, it gives you the strength to start new things and push it until you are satisfied with the results. Inspiration is everywhere.

Brian: What do you think is the most important quality to have as a 3D character artist?

Seid: I think it is the understanding of people, their behavior, and appearance. Maybe it does not have much to do with drawing, but it actually does in some way. Concentrate on what you intend to do, not how you want to do it, and new possibilities will open up in front of you. Of course a good fundamental understanding of forms, shapes, anatomy, and motion are also very important aspects of a good characters artist.

Brian: What is your favorite project and why?

Seid: Private projects that are done in my spare time are always more fun than the everyday tight deadline projects. I really do not have a favorite project in mind, but I favor projects if there are many good artists involved in different aspects of art and design. It feels good to contribute with my skills to a bigger picture and have a great team to work with and learn new things through the process.

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3ds Max 2013

Figure 4: Knight Girl by Seid Tursic using 3ds Max

Brian: When did you first start using 3ds Max, and is there a particular feature you like most?

Seid: I think 3ds Max was the first 3D software I came across and since then it is the most important piece in my workflow. Since I spend most of my time modeling, I particularly like the new Graphite modeling tools. It is really easy to use and gives you perfect control over all the polygons and vertexes, especially when it comes to retopologizing.

Brian: Would you describe your basic workflow or process for creating characters when using 3ds Max?

Seid: I use different software through the process, but I always start in 3ds Max. As I mentioned the Graphite modeling tools, it is easier for me to add or remove the basic objects from the start. It gives you the perfect overview of the shapes and forms consisting of different objects that are easy to create inside 3ds

Max. From building up the base objects to further sculpting and detailing to the final tweaking and retopologizing, this software gives you the best possible control.

Brian: Can you remember or describe a particular problem that you were able to solve with 3ds Max?

Seid: There are always new problems that jump out during work, but luckily, there are so many features to solve them. There are no big problems that I remember, since I was able to solve them through some exploration. I remember doing the mice for my art work, "The Little Mice Master." I was able to create very easily realistic fur and hair with the built-in plug-in, Hair and Fur, and I was not dependent on expensive third-party plug-ins for the realization.

Brian: Do you have any advice for 3ds Max users who might be following in your footsteps?

Seid: I recommend 3ds Max to everyone—it is a great piece of software with new great features every year. But no matter what software you use, it is always important to practice your artistic skills and let the software follow your habits and workflow.

Brian: Can you tell us about the projects you are working on now?

Seid: I am working on some new characters with a very good international team for a short animation advertisement. I am responsible for the overall visualization in 3D. Also, I am starting with some friends our own creative game studio—it is really a long-term plan with a promising start. We have a great team with very talented people and we want to pitch up the game to the CG industry here in Bosnia and Hercegovina. Check out tripleclaim.com!

ONE SMALL STEP FOR MAX KIND

Tursic used programs such as Photoshop, Zbrush, and plug-ins such as Hair and Fur with 3ds Max to complete his pieces. Here I'll demonstrate Max's Hair and Fur plug-in on a mouse of our own.

To start, you select the mouse body, locate the Modifier Tab in the Command Panel, and select the drop-down Modifier List. If the Hair and Fur plug-in is installed correctly, it will be located under
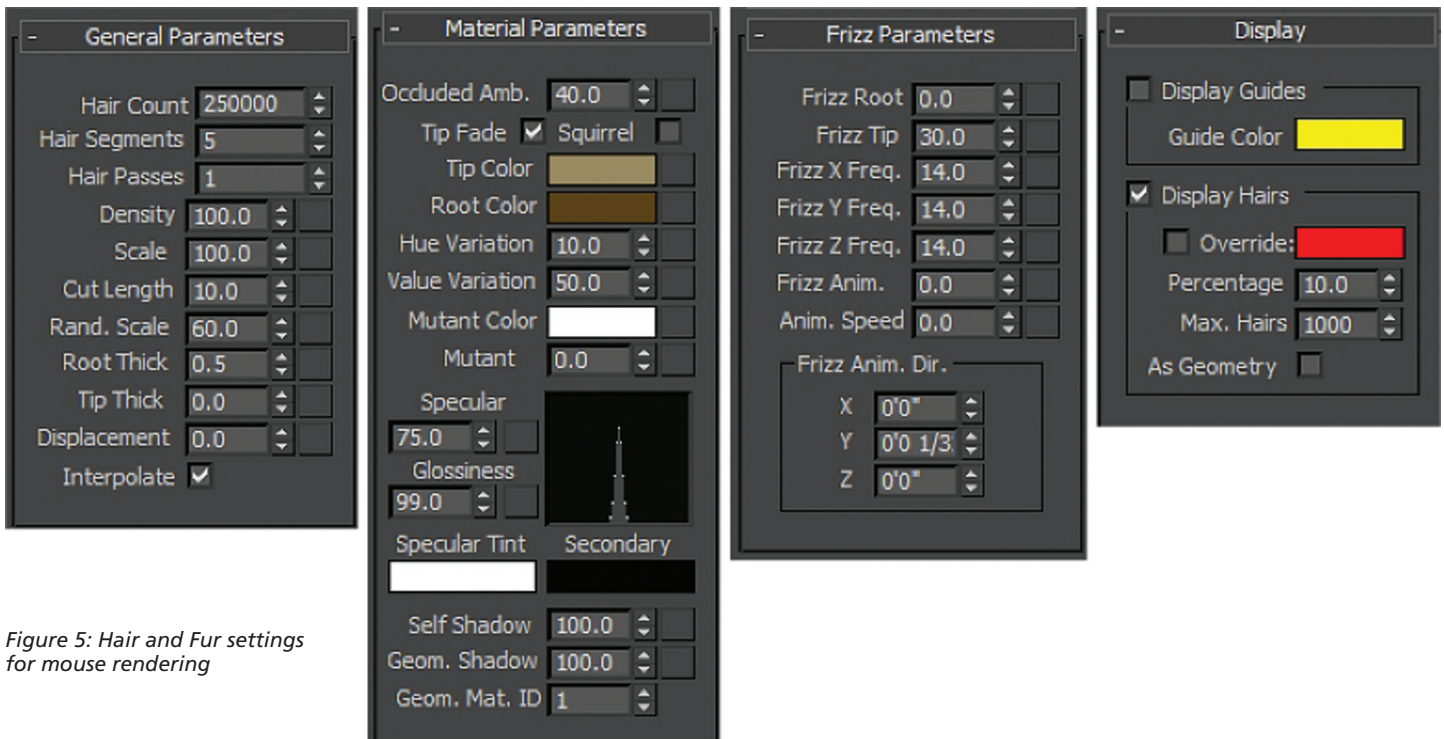
Figure 5: Hair and Fur settings for mouse rendering
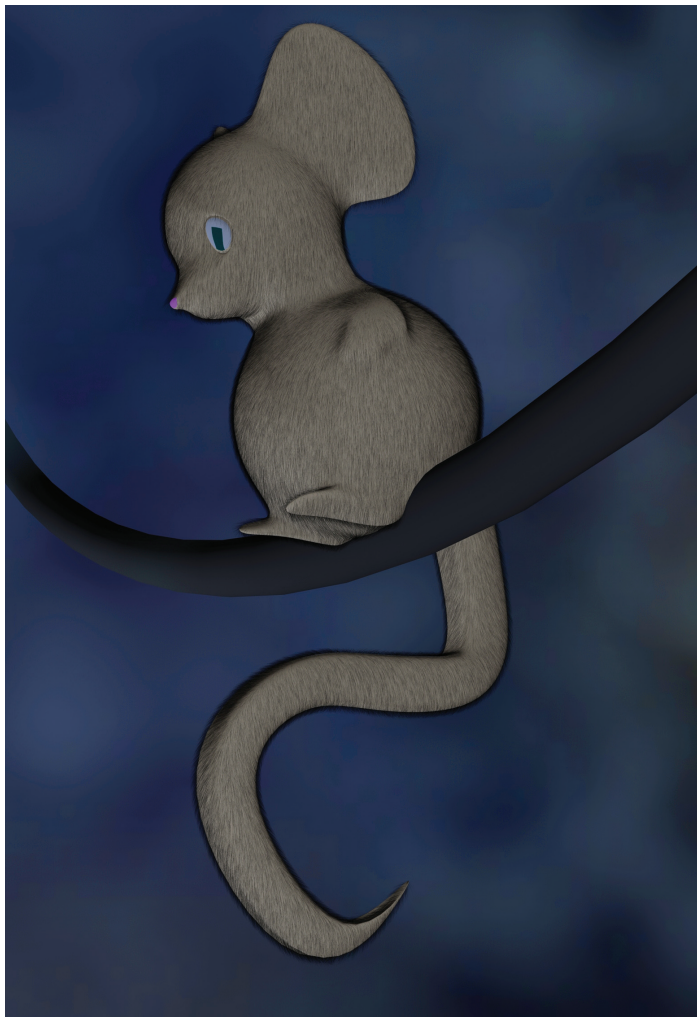
Figure 6: Our mouse with fur

3ds Max Hair. When you select it, fur will be added to the body with its default settings.

To continue we'll adjust several settings including Hair Count, Cut Length, Root Thick, Frizz Root, Frizz Tip, and Display Hair properties to match the settings displayed in Figure 5 (Tip: You may wish to start with a much smaller Hair Count than 250,000 depending on the graphic capabilities of your computer).

Next, in the style roll-out, select Style Hair. Here you can choose several options, but we'll want to select ReComb to comb the hair how we see fit. When complete, select Finish Styling and proceed to render. As a general tip, to obtain a finer look with the hair, increase the Hair Count and decrease the hair Root Thick properties.

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Schedule Tables

Hello, fellow AUGI members. Over the past few issues of *AUGIWorld*, I have written a series of articles starting with something basic and building from there. We started by building a block-based MVPart, next we associated Property Set Definitions to that part, and now I'll show you how to utilize that information. In the May 2013 issue, I wrote about taking our block-based MVPart and associating Property Set Definitions [PSD] to the part. At that time, I didn't fully explore how we can use the PSD information, just how to insert and manage the information. This time I will show you how to put all of that information together using fully customizable Schedules.

Before we begin, I'd like to talk a little bit about why and how this information can be so useful. At the basic level, as a CAD drafter or similar position, we often have to track quantities/locations/information about objects in our drawings. By utilizing the PSD/MVPart tool we have set ourselves up to easily do this whenever needed. We can pull information from our MVParts with PSD using a schedule that we customize to our needs. At a basic level, we can use this to track objects/devices/components as we are drawing.

But maybe we want to take this a step or two further. Let's look at the design and development stage of a project. What if we could start with an accurate count of every device, cable tray, conduit, mechanical pipe, HVAC duct and door? This

can certainly be done using our simple process; make an MVPart corresponding to a device, assign PSD information, then generate a schedule of values showing exactly what we want. Or we can generate a schedule pulling information from the already existing information in the AutoCAD® MEP catalogs, lengths, sizes, bends—anything that exists in the PSD for those objects. Maybe we've already started a project and we need to perform start-up and accurately and quickly estimate quantities for ordering. Again, we can do this utilizing the process I've described in previous articles.

One last hidden gem that we can utilize are "zones" or "spaces" within AutoCAD. We can use AutoCAD to define zones in a drawing, then we can number and count devices by that zone. This can really help if we're trying to assist on building/updating a project schedule and need to know, by area, what we have to install.

The theme that these last couple articles have tried to bring together is that we can work smarter, faster, and help more people in our Project Management team than most people thought was impossible. From the Design and Development stage to construction to as-built/record drawings, we'll have information that is usable at every stage.

All that being said, let's begin building a sample schedule from our Fire Alarm Speaker from the May article. Let's start with locating the Schedules button located on the Annotate Tab (see Figure 1). Here you can see that there are a few options for different types of schedules. Now I'm working in the Electrical workspace so what you're seeing are the default electrical schedules, but there are default schedules for each type of workspace. Now I'm going to utilize AutoCAD's ability to generate a default table. That way I can pick-and-choose what information I want to pull
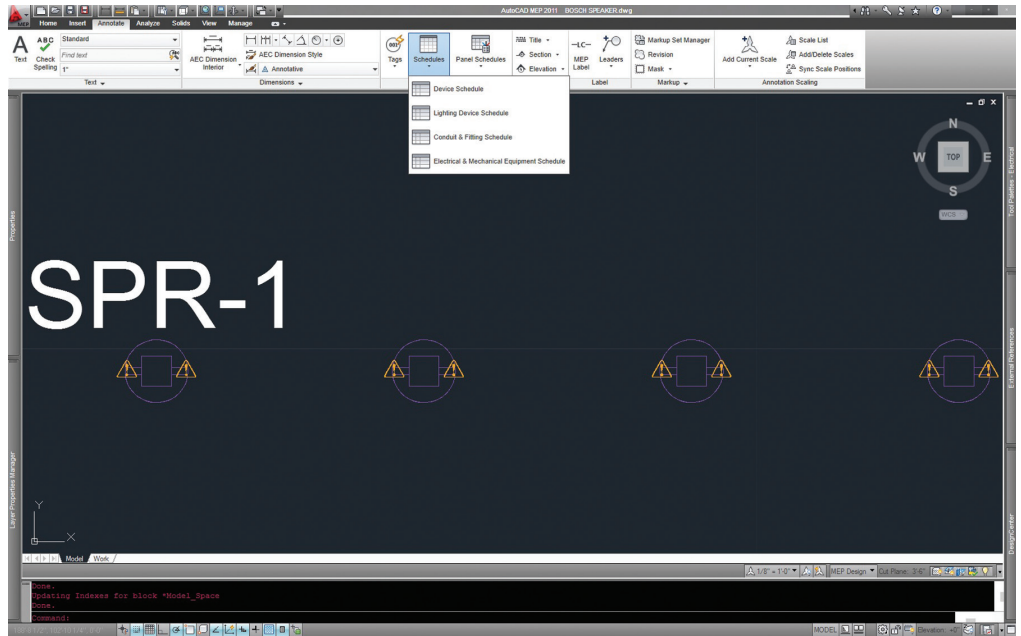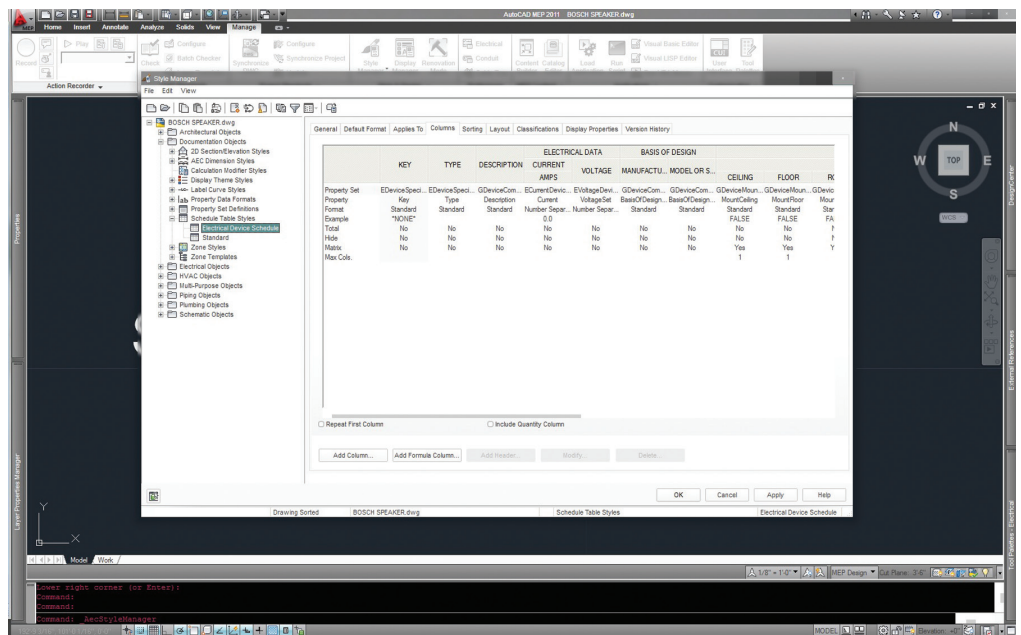

Figure 1

Figure 2

Figure 3

from my PSDs (see Figure 2). As you can see it generated a very generic table. But there are a lot of good values we can modify to make our schedule show what we want.
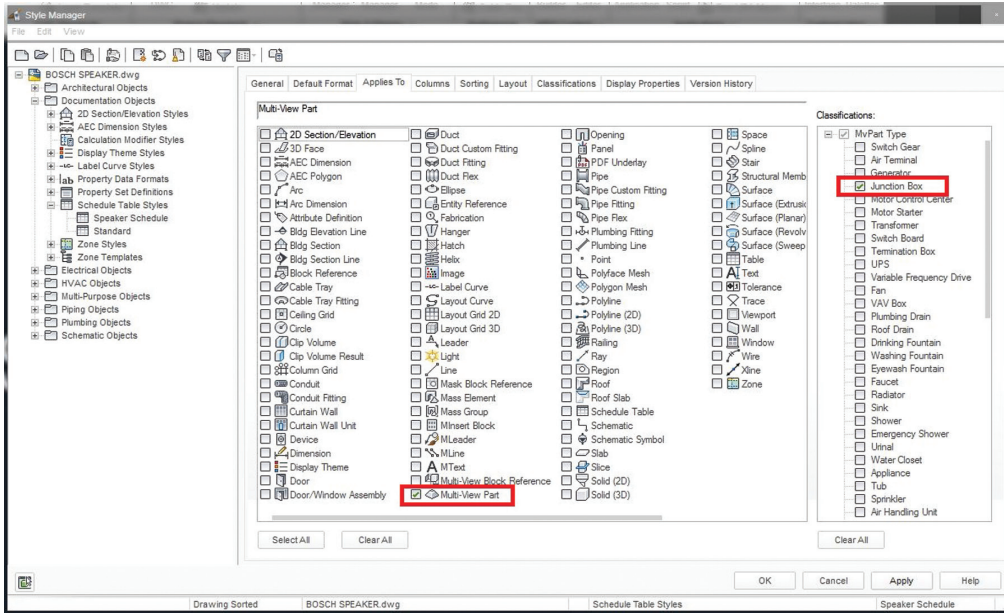
AutoCAD MEP 2013

Figure 4

Figure 5

Figure 6

We'll start by going to the Manage tab and opening Style Manager. Our drawing should show up on the left hand tree with different objects listed under it. We'll want to select the Documentation Objects tab, then the Schedule Tables tab (see Figure 3). Now we can see that the default Electrical Device Schedule was created. First we'll start at the General tab and rename the schedule to the device that we're working with; in this case it'll be Speaker Schedule. The next table we will modify is the Applies To tab. We'll need to select Multi-View Part on the left. Then on the right, under Classification, we'll select the classification under which our device falls—here it will be Junction Box (see Figure 4).
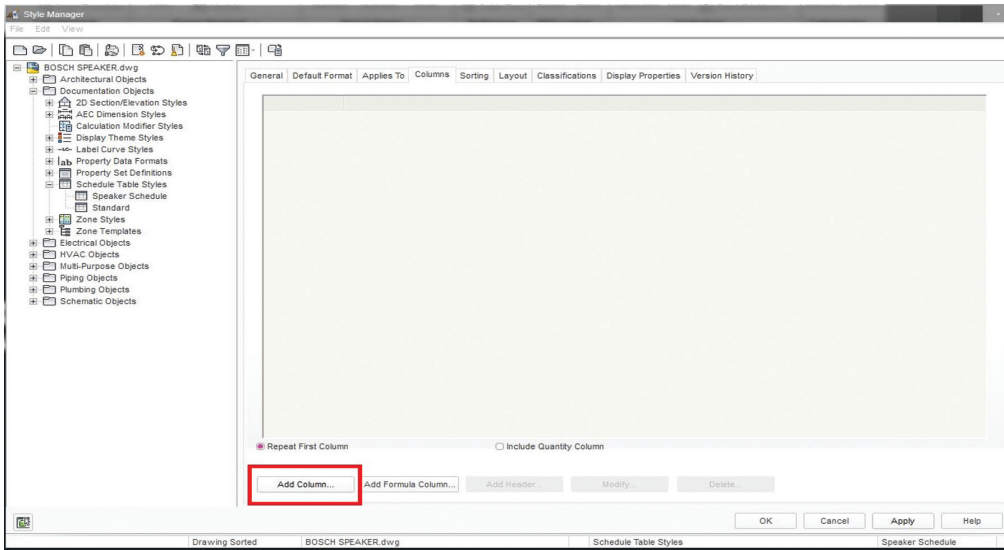
Next we'll jump to the Columns tab. Here you can see that there's a ton of information we don't need, at least for this case. With that being said, I'm going to delete it all and start fresh. Now that we have a clean slate to start with, I'm going to hit the Add Column button (see Figure 5). We'll start by using the Mark Abbreviation information from the PSD for the Speaker, and then changing the Header to Device Type (see Figure 6). Click OK and you'll now have a column labeled Device Type, showing information from the PSD. You'll also notice right above the "Add…." buttons, an Include Quantity Column option. We can select this box to automatically add the quantity of the selected objects to our table (see Figure 7). Let's also go to the Layout Tab and change the title of the schedule to Device Schedule.
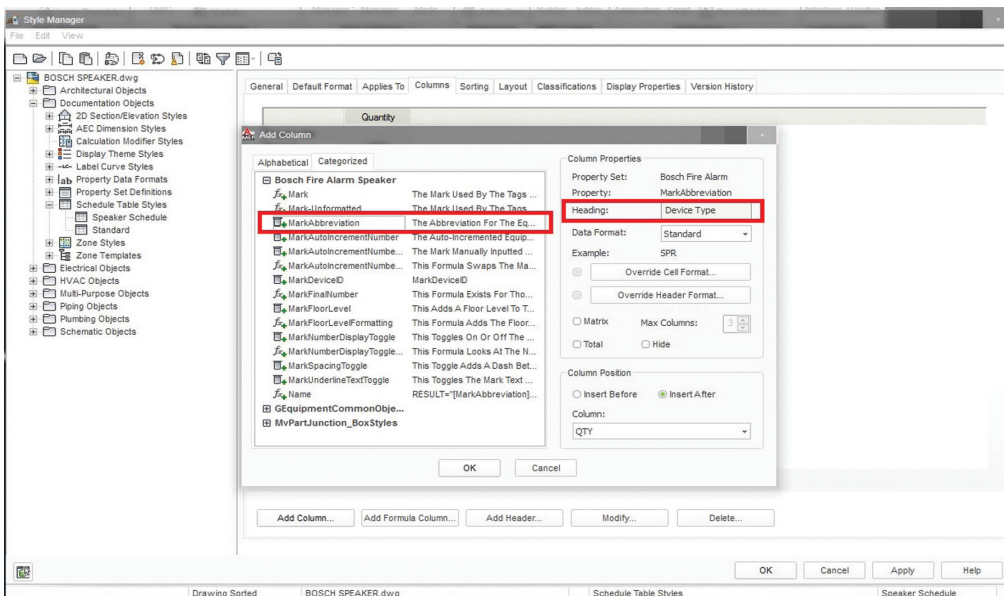
Let's stop here and go back and update our table into which we input information earlier, and see how/what we've done. Click OK and close the Style Manager. We'll be brought back to model space and we can see our newly updated table (see Figure 8). This first table isn't much to look at, but it's a very basic example as to how to begin to create your own schedules.

I'd like to continue to another slightly more complex example that involves cable tray. In this example we'll set up our schedule to track a few things:

- Length of cable tray in the drawing.
- Type of bend or connection.
- Quantity of those bends or connections.

We'll start with a simple layout showing a handful of T-Sections, some bends and straight lengths (see Figure 9). Again, we'll start by using the built-in MEP scheduling table and modify it. Under the Annotate tab there is the Schedules button. We'll select the drop-down menu and select the Conduit & Fittings Schedule (see Figure 10). Now, I know that this isn't what we want for this instance, but it'll give us a place to start. It will ask us to select some objects, which in this case do not exist. Just click OK and insert the empty table. This generates a table in the Style Manager that we can modify. Now we go to the Manage tab and select Style Manager. With the Style Manager open, we go to the Documentation Objects and expand the Schedule Table Styles. I'm using the same drawing I used for the last example, so you'll see that I have a Speaker Schedule, Conduit and Fitting Schedule, and a Standard Schedule (see Figure 11).

Let's start by selecting the Conduit and Fitting Schedule. We'll start at the General tab and modify the information as we see fit. I changed the schedule title to Cable Tray and Fitting Schedule. Next we can jump to the Applies To tab where we will select the objects that we want the table to look for in the drawing. Here I've selected a cable tray and a cable tray fitting. The last tab to change will be the Columns tab. Here is where we decide what information we want to display and how. After deleting and adding some
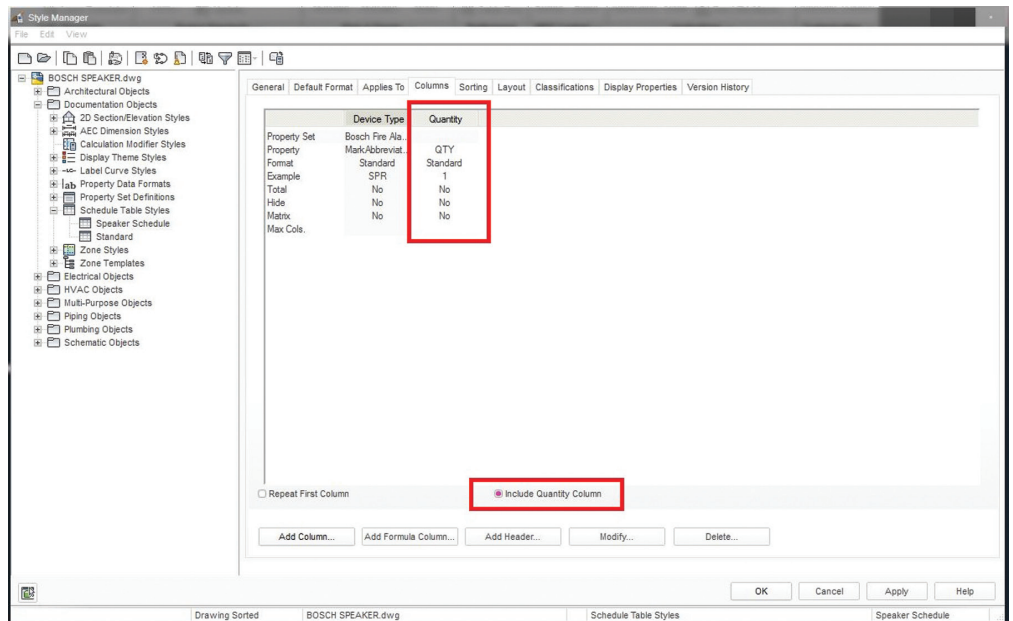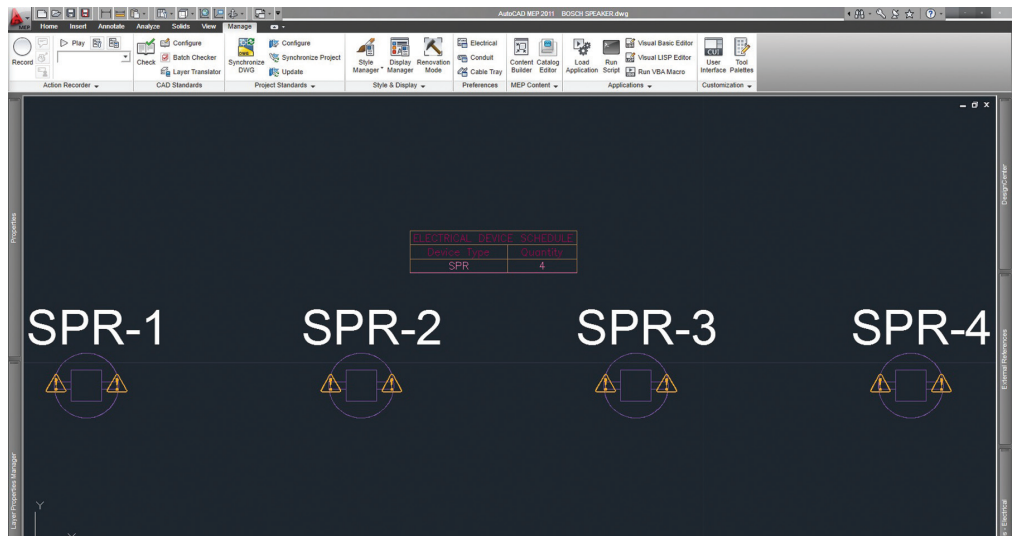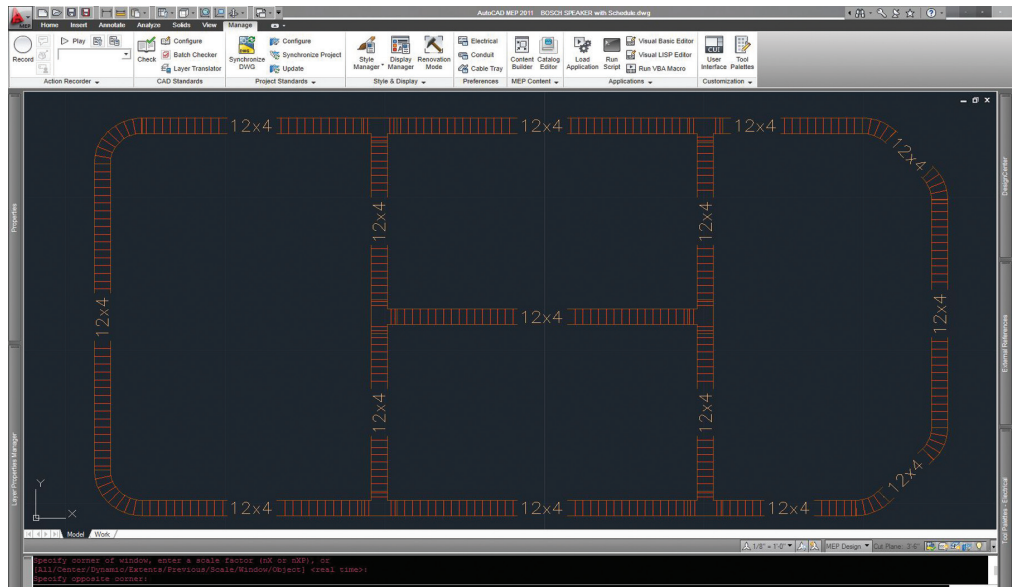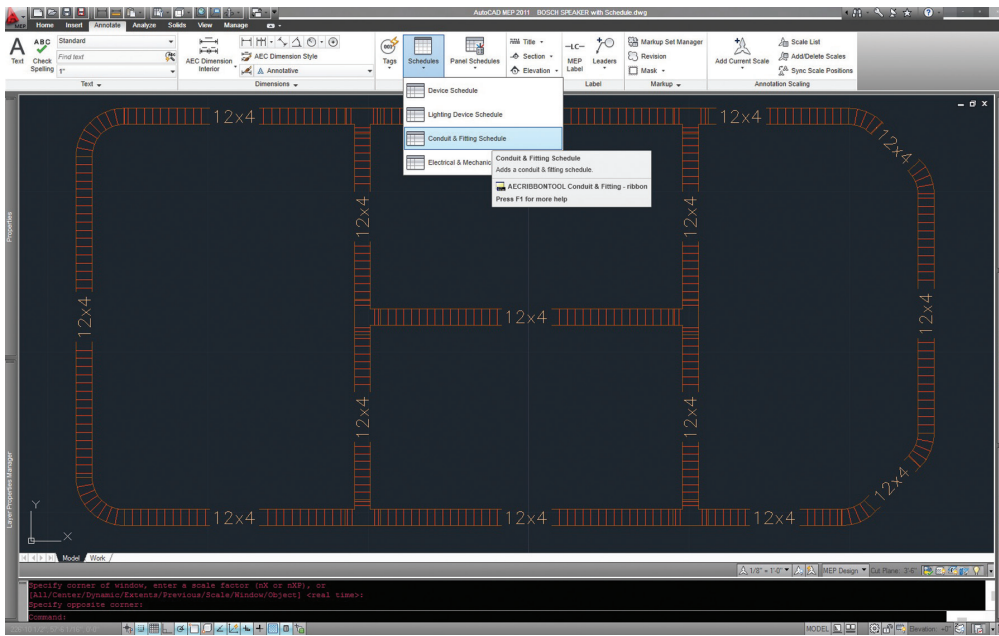

Figure 7

Figure 8

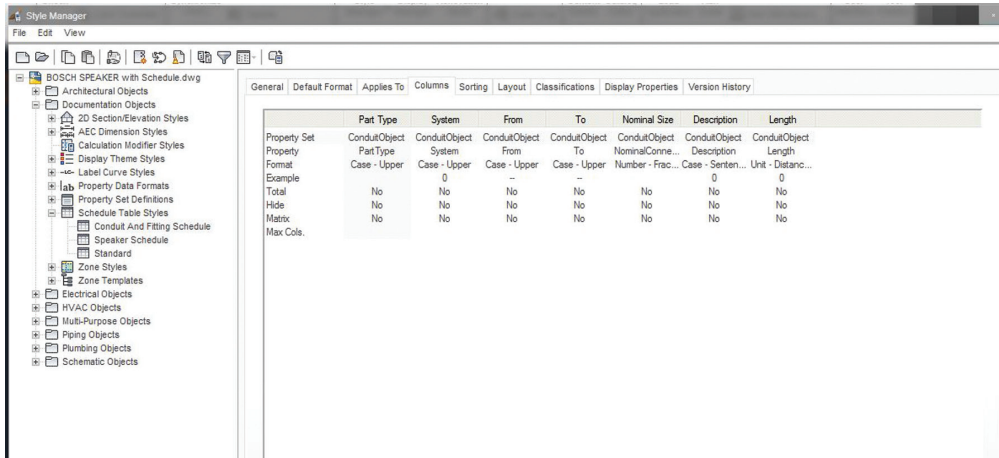Figure 9

Figure 10

Figure 11
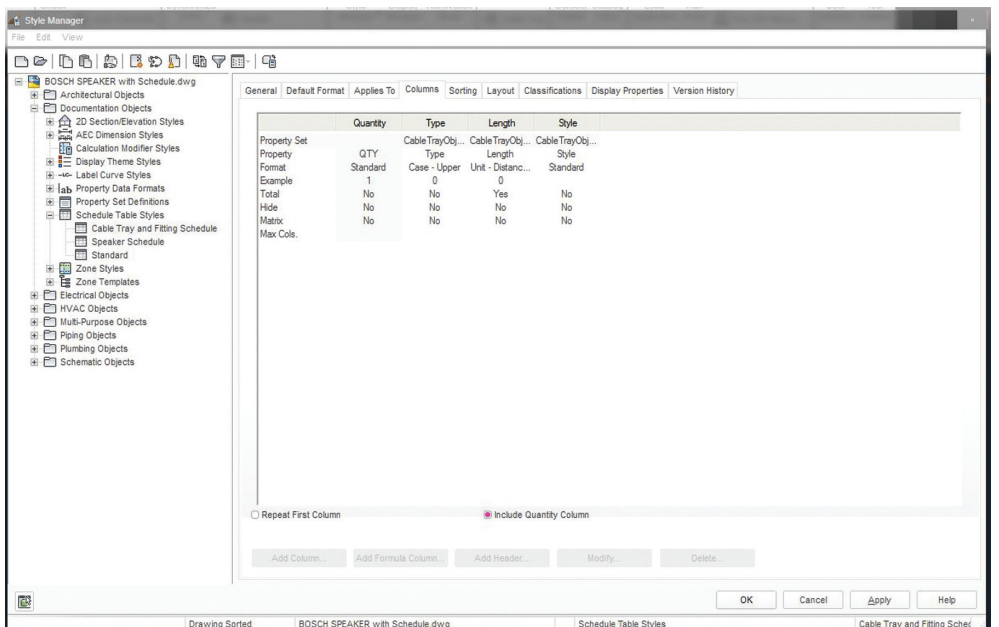
Figure 12

columns like in the example before, I end up with something like Figure 12.

We are looking for the quantity of each type of object, what type of object it is, how long (if applicable) and the style. We click Apply and then OK at the bottom of the Style Manager dialog box and we're back at the drawing. We can select the table we previously inserted, and on the tab bar we'll see a handful of options. We will want to start with Add Scheduled Objects. This will automatically update our table with the information that we entered in the Style Manager (see Figure 13). And that's pretty much it!

As you can see, the schedule table has pulled information from the existing PSD from the cable tray parts. It's showing the quantity of each piece, the type of object it is, its length (in inches as set from primary), and then the actual description of the object that we assign. We just easily figured out the footage of cable tray for a whole level, how many bends and Ts and what size tray to buy. And it's 100 percent accurate (as long as the information in the model is correct). (See Figure 14)

What I've been trying to show in this article series is that AutoCAD MEP is so much more powerful than many people know. It has so many built-in intelligent tools that can help a CAD operator/designer, BMI Detailer, or similar professional work faster and smarter, and allows them to assist an engineer, estimator, or project manager with many different aspects of the job beyond just drawing. Imagine if you're an electrical designer and you made an MVPart of a wall receptacle and a light switch, including the back-box, fittings, conduit, stub out, etc. Now you can simply insert those in any location as a premade assembly. Not only is it fast and more efficient, but you can
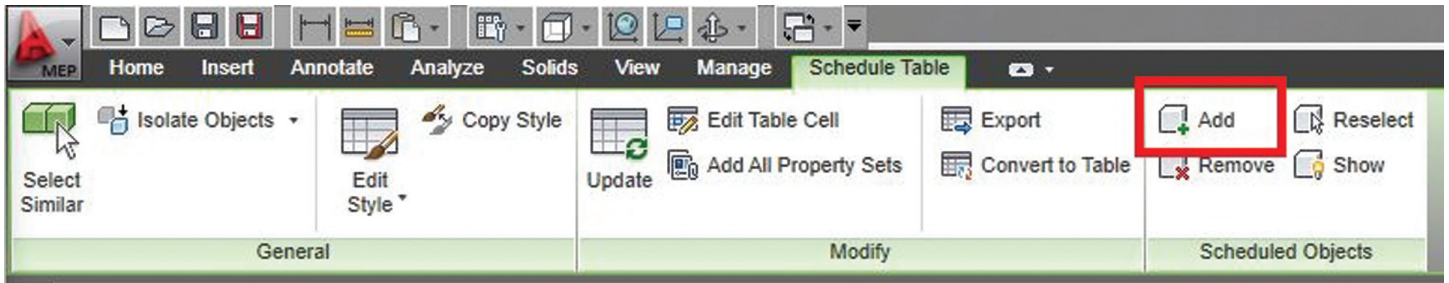
Figure 13
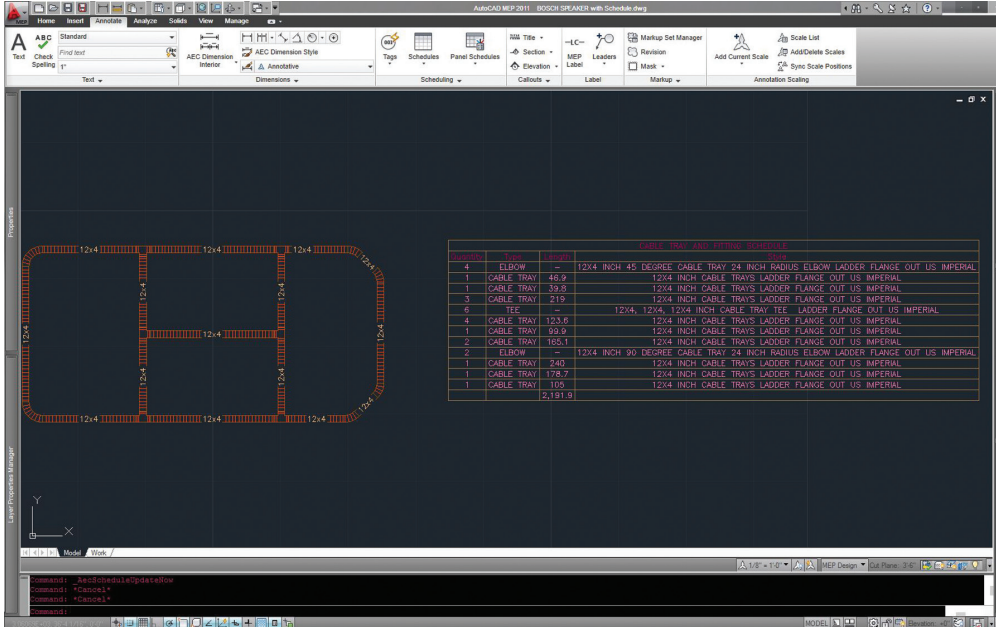
Figure 14

assign PSD to the MVPart and create a schedule of material needed. This is extremely helpful—saving time, reducing cost and manpower, essentially wasting less, and adding more information. I hope that this series has been helpful to you and your firm, and at the very least gave you something to think about!
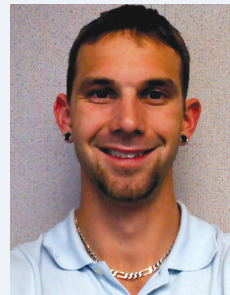
Elisha Sage currently works for Walker Engineering in San Antonio, TX. He is the BIM Coordinator and CAD Engineer for Walker's San Antonio branch. He grew up in Michigan and Attended Lawrence Technological University where he received his Bachelors in Mechanical Engineering. He has had almost 6 years' experience in the BIM coordination and CAD field working for electrical and low voltage contractors. He plans on utilizing his CAD and BIM skills to allow him to continue to grow with his company. He will be married to his wife of 2 years in June, who works as an RN at a children's hospital. Bruce Sims, of Alterman Electric in San Antonio, TX contributed technical information for this article.

by: Glenn Jowett

Collaboration Defined

Definition of Collaboration – col-lab-rat-ed, col-lab-ra-ting, col-lab-o-rates. To work together, especially in a joint intellectual effort.

C ollaboration is the foundation of all successful designs and "working together in a joint intellectual effort" is exactly what architects, engineers, contractors, and supply chain partners do to successfully take a project from design through to construction. The way in which we collaborate has changed from 2D visual collaboration on paper or with AutoCAD® to 3D digital collaboration with tools such as Autodesk® Revit® and Autodesk® Navisworks®. We are building things twice: once virtually and once again on construction sites physically.

The benefits of the collaboration process are similar to the BIM process. Collaboration follows a 360 degree circle starting with and ending with the client and, like the BIM process, every member of the design and construction team will benefit from improved efficiencies through collaboration.

For the Client – Early collaboration will give the client a clearer understanding of their building and the spaces they have to work with.

Not everyone understands how to read a drawing, but people can relate to images and animations. The ability to show a Revit model

Figure 1: Model coordination

or a Navisworks walkthrough to a client and discuss their needs early in the design stage is quite powerful; this will assist in ironing out any issues the client may have early in the process where most benefit can be gained.
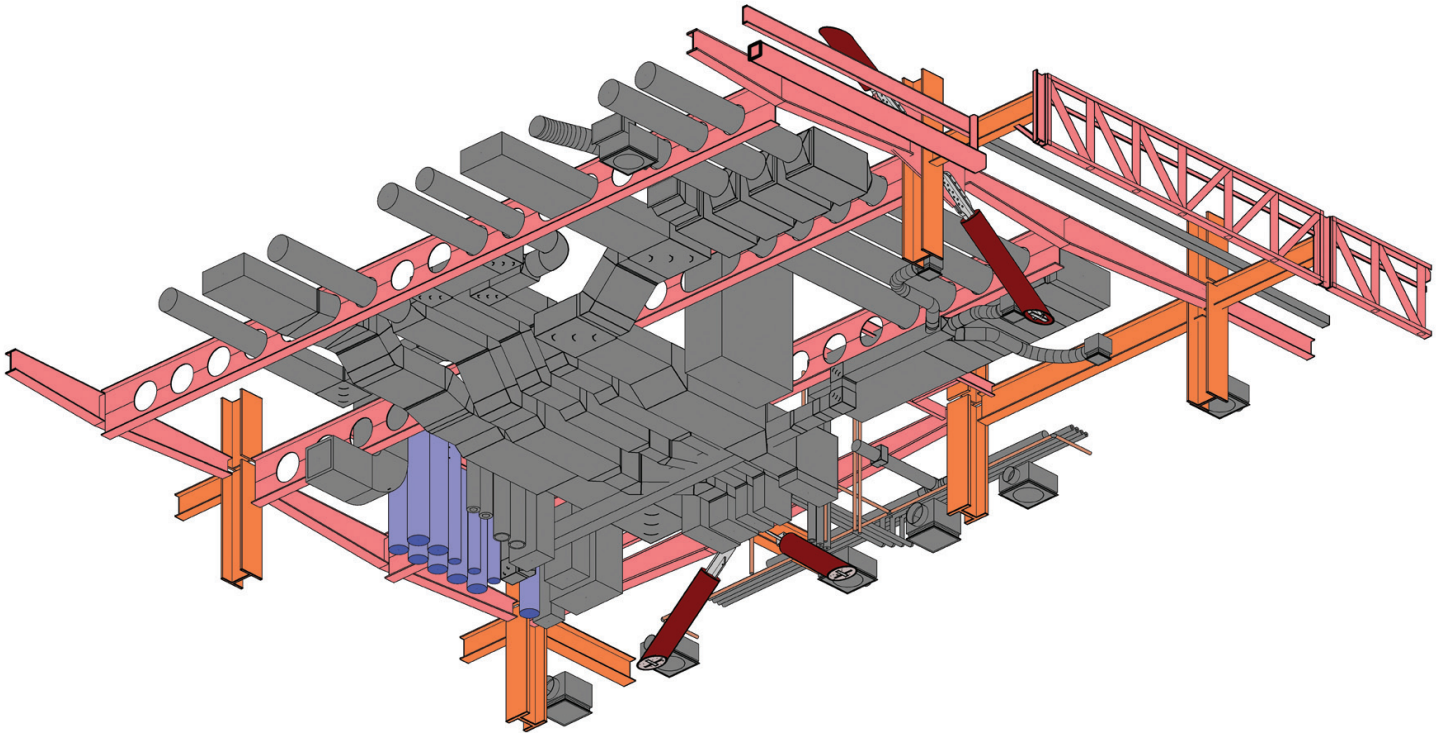
For the Design Team – Improved collaboration = improved coordination, which makes the whole design process smoother.

Revit gives Architectural, Structural, and Building Services designers the ability to collaborate in a digital 3D environment. The tools available in Revit such as interference check make coordination between all disciplines a much simpler process when compared with traditional 2D drawing. For me, the main advantage of interference checks lies with Structural and Building Services elements.

For the Fabricators – Collaboration with supply chain partners such as steelwork fabricators streamlines the process from design to fabrication.

More often than not steel fabricators will use tools other than Revit to produce shop drawings, I'm not saying Revit can't be used, but there are tools out there that are more suited to the job. For a steelwork fabricator receiving a Revit model in the form of an IFC, there is a two-stage process to go from Revit model to fabrication. A fabricator will import a Revit Structure model as an IFC. Depending on the software they are using, they have the ability to convert a model from 'reference' to 'physical' members in the model. This method isn't foolproof as catalogs can vary slightly

between packages, but once the model is converted, profiles and orientation of members can be checked and amended as required. Connections can then be detailed. Working from the same model as the structural designer saves the fabricator a huge amount of time and ensures the team is working with the same data, and reducing waste from the overall design to fabrication process.

For the Contractor – Collaboration results in improved design coordination between disciplines, which results in a practical, buildable solution when the project gets on site.

There is a lot of talk in the industry globally about virtual construction, "build it twice; once virtually (a digital prototype) and once on site" is one of the tag lines coming out of the UK government's BIM mandate. Revit not only allows the design team to virtually build a 3D model of a building, it allows the contractor to take that model and use Revit to break it down into a 'construction model' (for example, splitting floor slabs from one large slab into a series of pours).

From here the contractor will import the Revit model into Navisworks and use Navisworks to virtually construct the building, creating construction sequences to ensure every element slots into place, almost like a jigsaw. Linking the model to packages such as Microsoft Project will allow digital construction monitoring against the project schedule. This is happening all over the world—large contractors in the UK, US, and Australia are all doing this and there is also at least one major contractor in New Zealand following this exact process.
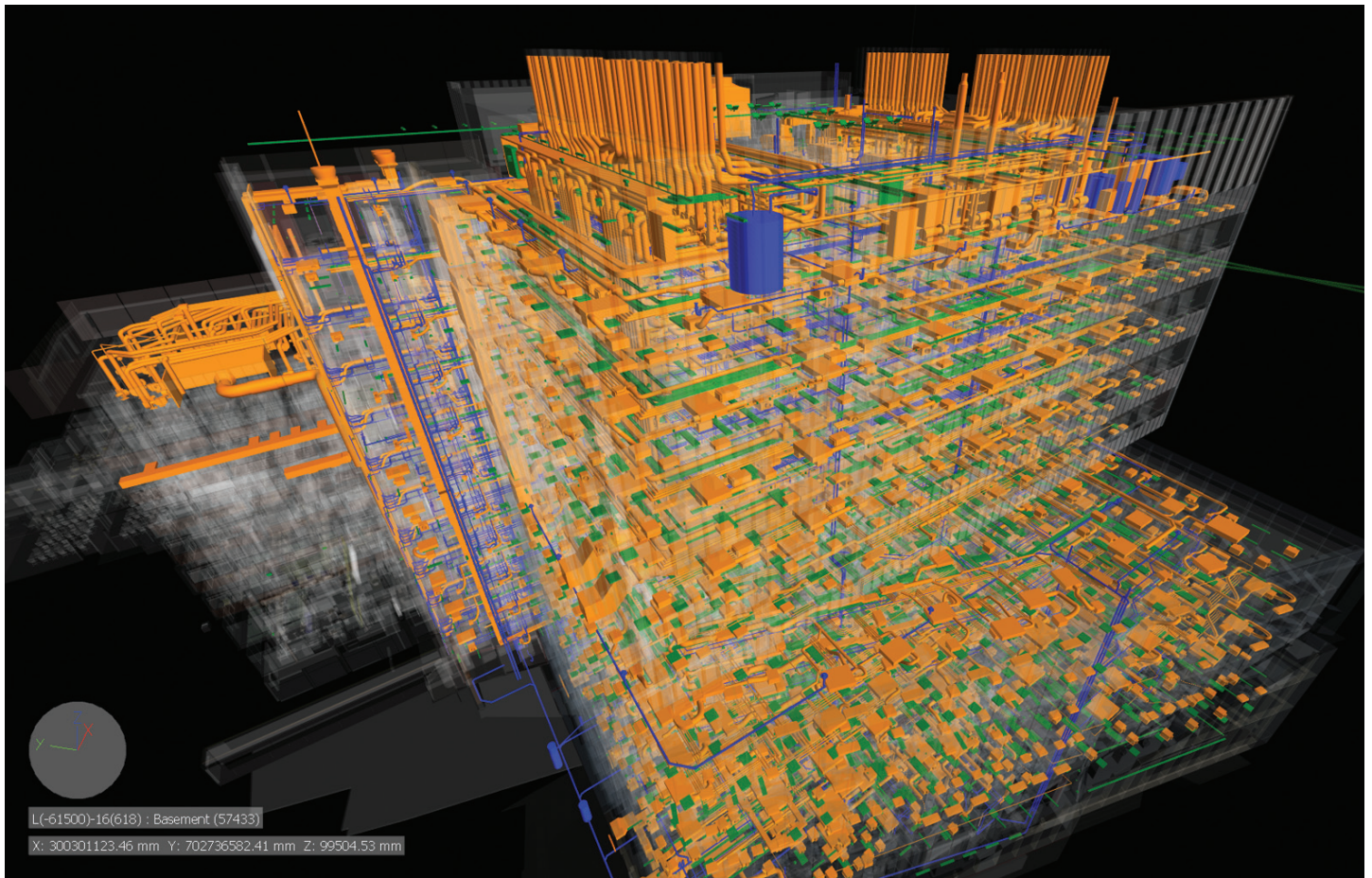
Revit Structure 2013

Figure 2: Navisworks Coordination

For the Client – As designers, our end goal is to deliver a project to a client on time, within budget, and to the best of our ability with minimal waste. Collaboration is essential to achieving this.

Using Revit to collaborate digitally across the different design disciplines has a number of client benefits. A key point that is raised over and over again when discussing the benefits of Revit is a reduction in RFIs, because the design team collaborated throughout the design phase to ensure no clashes between services and structure, for example, and the contractor followed this up with a more in-depth look at the construction process. The RFIs should be cut right back. I'd go as far as saying some projects could be completed with no resulting RFIs in relation to the team listed above. This results in a construction schedule that is on time, within budget, and with little or no variations.

A LOT OF WASTE

The construction industry still has quite a lot of waste embedded in its processes. If you look at the process of designing a steel-framed building, there is the potential for at least four steel frame models to exist within one design team—four models that have been built from scratch by different people within that design team.

Architect – The architect will add steel framing members to the model during the early design stage to try get a feel for how the structure will look and how it will impact the architecture.

Engineer – The engineer will create a structural analysis model using packages such as Robot Structural Analysis.

Modeler – The Revit Structure modeler will build a structural model for coordination and structural documentation.

Fabricator – The steelwork fabricator will create a fabrication model showing all connections, cleats, and bolts for fabrication purposes.

Sharing models and data across the design team will reduce a lot of this waste, but I don't think the tools are ready yet for designers to "create the information once and pass it downstream" without the need for some rework. Yet there are a lot of efficiencies to be gained by all disciplines from sharing information.

MODEL THINGS ONCE

In some instances, architects will need to model structural members in the early design stages if all they have to work from are engineers' hand sketches, but as the design progresses it is important that elements within the models are not duplicated across different disciplines' Revit models. Duplicating elements across models can lead to uncoordinated design—changes could be made in one discipline and not followed through into another discipline's model.

The design team should sit down at the start of a project and map out who owns what elements at what stage of the project. This might mean that in the early stages the architect models and owns all elements. When the structural engineer is on board, the architect will relinquish ownership of all structural elements (delete from their model or put onto a workset that is not visible by default in all views) in favor of using elements modeled by the structural designer likewise, with elements such as plumbing fixtures. As owners/operators become more educated in BIM and the benefits to their facilities management, eventually all design team members will hand ownership of all model elements over to the facility manager. This is still some way off, but in an ideal world this is what will happen, and maybe as designers we should play a part in this and start to educate our clients in what full-circle BIM has to offer.

One common "issue" I hear regularly from architects is that while they want to show the Structural model for steelwork, etc. as a linked file, they don't want to have to spend the time turning off the other elements in the model like structural rebar, steelwork connections, etc.

This is where view templates come into play. Each discipline should create view templates for their views based on what they do and don't want to see in the other disciplines' models. The one problem that is still to be resolved is who owns walls? Structural walls need to host reinforcement, and architects also need to host windows and doors in some structural walls. The Copy Monitor tools within Revit are far from perfect, but this seems to be the only option for walls at the moment.

COMMUNICATION IS CRITICAL

In the digital age we live in it is becoming more and more common for architects and engineers to make changes to their Revit model, and by simply sharing that model with other design team members they feel that all the changes they have made will be picked up "because it is in the 3D model."

A lot of people have forgotten how to use something that has been around since 1876, the telephone. The simplest form of collaboration is verbal communication, and as design evolves into a digital process I think the need for communication is critical to making collaboration work. Just because I have modeled my structure in Revit doesn't necessarily mean the architect will instantly pick up any changes I make.

In traditional 2D, drawings would be issued and revisions clouded; in the 3D model revisions can't be clouded and drawing issues between the design teams are becoming less and less frequent. This means any on-going changes that are being made to the model that aren't visible on drawing sheets can be difficult to pick up.

THE IMPORTANCE OF BIM START-UP MEETINGS

An initial BIM or Revit meeting should take place at the start of every major project, purely from a Revit and collaboration point of view. Items for discussion should be:

- File format for data exchange.
- How often are files exchanged?
- Clearly define what the model is to be used for at what stage in the design process.
- Who models what and when?
- Who owns what, and when does element ownership go from one discipline to another?
- Level of development (LOD) – what level of model information should I expect to receive at what stage? And does that meet my expectations?
- How often should clash detection take place?
- Project coordinates and project north position.

It is important that the above items (at least) are discussed before a project really starts to evolve, and the decisions on each item should be documented and set out in a BIM Execution Plan. Collaboration will be much easier to manage if every member of the design team has the same set of core principles to follow from start to finish.

SUMMARY

Revit and other Autodesk 3D design tools have vastly improved the way we in the design and construction industry collaborate with each other in recent years. As we move further into this digital era we shouldn't forget the basics—combining the 3D digital design tools we have at our fingertips with careful planning, regular communication, and good team management. This, I believe, is a recipe for success.

Glenn Jowett is a well-traveled BIM enthusiast with nine years industry experience. His current role as a senior structural designer with Beca (www.beca.com) based in Christchurch New Zealand, gives him the exciting opportunity to implement BIM principles on projects in a city that is recovering from a natural disaster. A regular Revit blogger http://revitst.blogspot.com, Tweeter @RevitST and Committee Member of Collaborate ANZ www.collaborate-anz.com, Glenn can be contacted at Glenn.Jowett@beca.com

PRODUCT FOCUS

Collaboration in Civil 3D with Data Shortcuts

When taking on a new civil design project I rely on a team of people to assist in getting the job done. This team does not work in the same office or even the same state. We need to collaborate online, via telephone, and over a network. So how do we collaboratively work on a design in AutoCAD® Civil 3D®? We create data shortcuts for Civil 3D objects. Justin can work on the grading plans, Laurie can work on the pipe network, and Qua can take care of the profiles. Finally, I will work with each member and pull the package together at the end, publishing in a sheet set and linking the shortcuts together. Data shortcuts are the key to our success.

WHAT IS A DATA SHORTCUT?

A data shortcut is simply a link to a Civil 3D object between drawings through the use of an XML file. This enables users to work in other drawings and share Civil 3D objects. For example, I can publish a data shortcut for the surface and Justin can use that shortcut to complete the final grading plans for the design. So why not use an xref? An xref is basically a link to another file where you can manipulate the properties of the xref within the current drawing. We do not want to manipulate the data—just use it as a reference. This means you can have separate drawings for surfaces and alignments and reference those together to complete the design.

SETTING UP THE WORKING FOLDER

For this example we are working in a drawing with an existing surface and two alignments created. We need to set up the working folder for the data shortcuts to be created. From the Manage tab on the ribbon, click Set Working folder as shown in Figure 1 below.
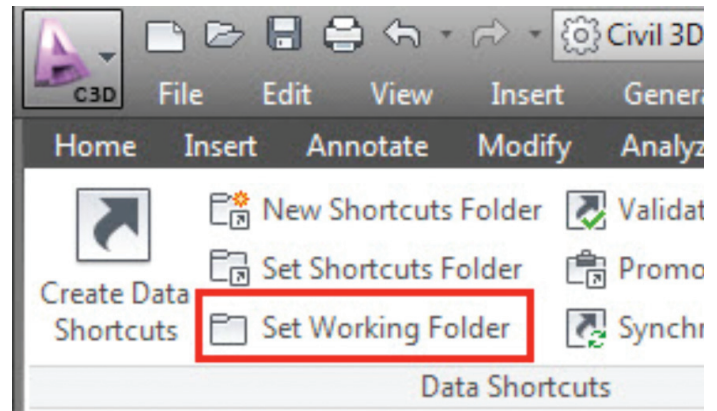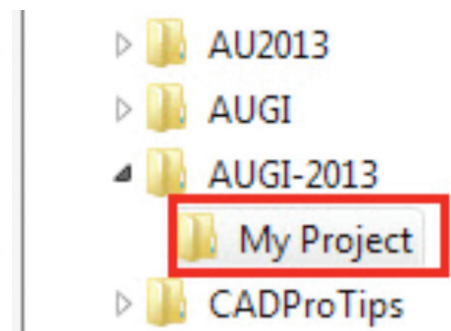

Figure 1: Set Working Folder

Figure 1a

After selecting set working folder, navigate out to where you have your drawings files or the root project folder (see Figure 1a). Highlight the folder for the project and click OK.

SET THE DATA SHORTCUTS FOLDER

Now that we have the working folder created we want to create the data shortcut folder. The working folder is the directory that will hold our project data. From the Manage tab, select the New Shortcuts Folder as shown in Figure 2 below.
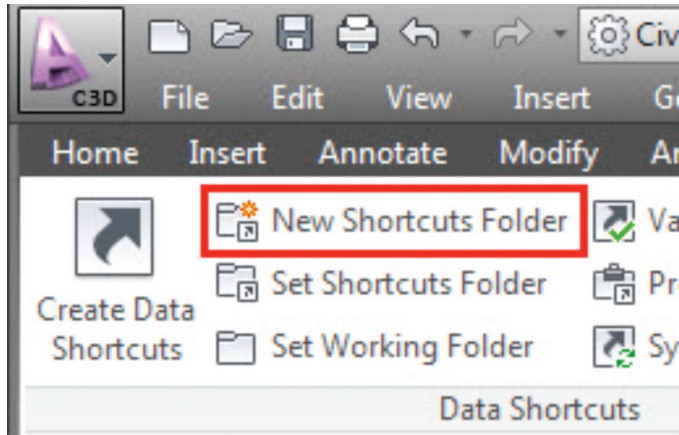

Figure 2: New Shortcuts Folder

This will only create a single folder under the working folder path. Make sure this is where your company wants to keep the data to help organize the information. After selecting, you will have to enter some information as shown below in Figure 3.
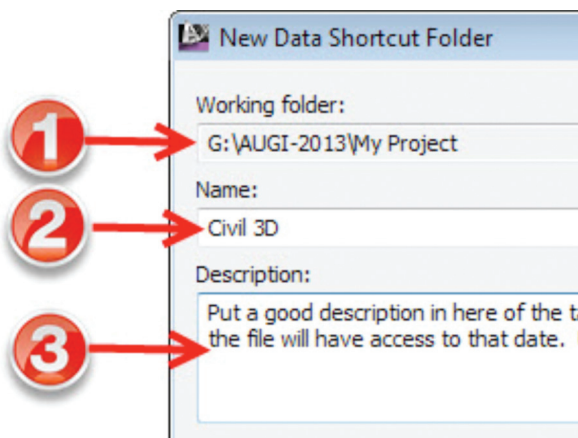

Figure 3: Shortcut data

1. The working folder (grayed out) has already been set.
2. The name of the folder where the shortcuts will be placed.
3. I believe in descriptions. As designers we can become very busy, but we need to describe what project we are working on, the date, and other relevant project information. This will provide a seamless transition to the next team member.

The name of the folder as shown in bullet item 2 in Figure 3 will be where the data shortcuts will be stored. Let's move out to Windows Explorer and see what Civil 3D has created. Notice how we have new folders as shown in Figure 4. This is where Civil 3D will store

the XML file for the data shortcuts. The XML file tells us where the drawing is and what object data we can extract. The XML file will be located within the folders shown in Figure 4.
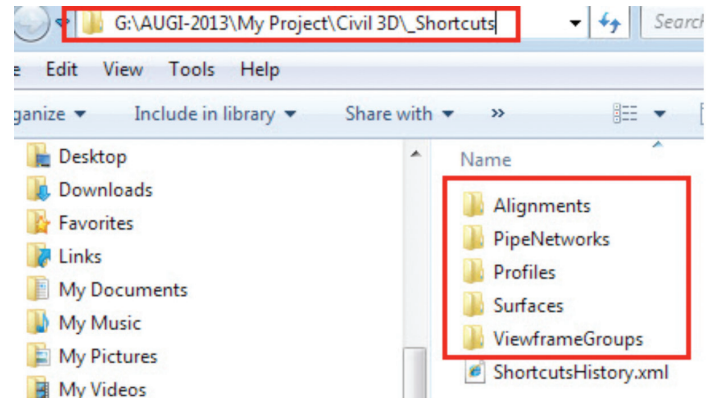
Figure 4: New folders

CREATE THE SHORTCUTS

Next we are going to create the shortcuts within our existing drawing so they can be used across the design project. In Prospector, right-click on your data shortcut folder and select Create Data Shortcuts as shown in Figure 5. We are using an existing drawing, which contains a surface (EG) and two alignments, cross sections A and B.
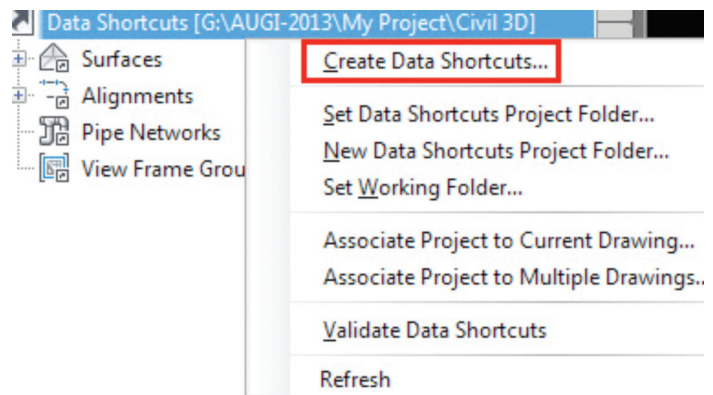
Figure 5: Create Data Shortcuts

Remember, you will not be able to create a data shortcut if the drawing you are in does not contain any Civil 3D objects. After selecting Create Data Shortcuts a dialog box will appear (Figure 6) and you will be prompted to check the Civil 3D objects you wish to use as data references. You have now created data shortcuts for the surface and the alignments. Civil 3D will place an XML file in the folder referencing each of those objects.

Figure 6: Select the shortcuts

We are now going to our next drawing within the current project and reference in the surface. In the Prospector tab, ensure that the data shortcuts points to the correct folder. Expand the selections as shown in Figure 7 and notice the objects we can reference.

Figure 7: Expand the selections

Figure 8: Create the References

Right-click on EG and select Create Reference (see Figure 8). We are also going to reference in one or both of the alignments.

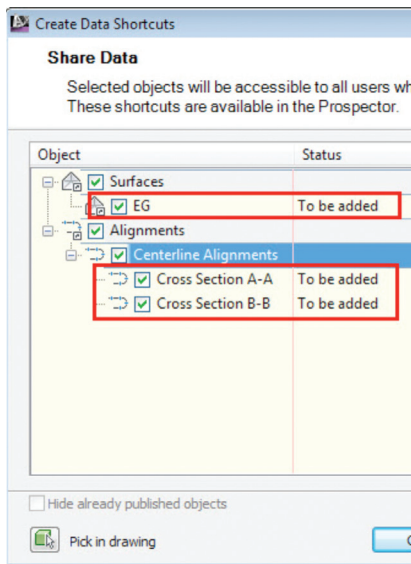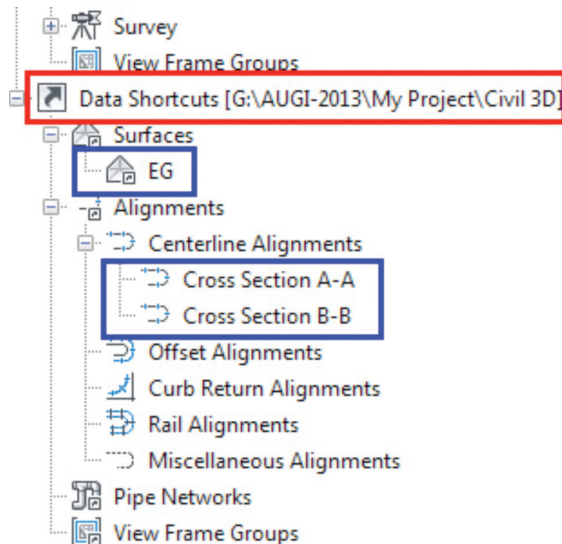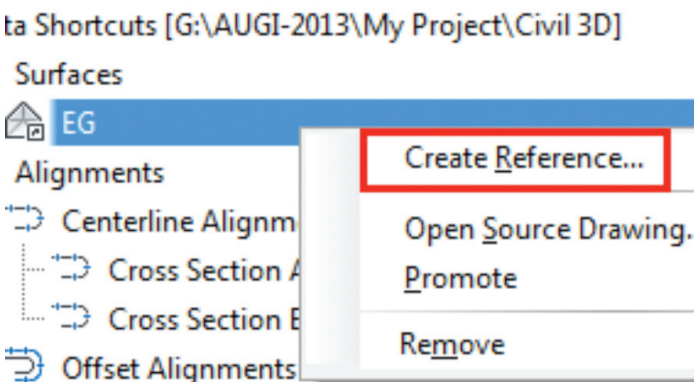Notice under the Prospector tab your surface shows up but has a small arrow image indicating that the surface has been referenced into your drawing using a data shortcut (Figure 9).
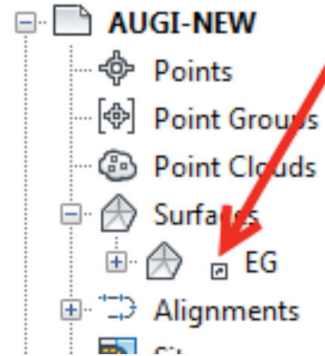
Figure 9: Data shortcut indicator

I can now have Justin complete the final grades and after we add the alignments I can have Qua and Laurie work on the profiles.

ETRANSMIT DATA SHORTCUTS

Projects that contain data shortcuts can be compiled and sent to clients, reviewers, and other members of the team using the Civil 3D eTransmit command. With eTransmit, all of the referenced files including data shortcuts (XML files) will be packaged into the zip file. This will eliminate errors when others are reviewing your design. It is important to include all files when sending off to outside sources for review.

CONCLUSION

Data Shortcuts in Civil 3D are a very important part of collaboration in project design teams. During my career I have realized that working together in a team is the key to a successful design—utilizing the skills of everyone involved to produce a high quality product at a lower cost.

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A Kick-Off FAQ Kick-Starts Revit Collaboration

Collaboration. Although collaboration is not among the words behind the acronym BIM, it is indelibly inherent in the process of producing a BIM. Think about it: how could you possibly produce a usable BIM without collaboration? At the very least, for the MEP trade, BIM means designing systems within an environment that screams for collaboration. "*What do you mean, the ductwork cannot fit through this area of the building?*"

However, collaboration in a BIM world is far more than just designing systems that fit in a model of the building. This definition of collaboration, from Merriam-Webster, is particularly compelling to this discussion: "to work jointly with others or together especially in an intellectual endeavor."

What are the impacts of collaboration in the process of producing a BIM using Autodesk® Revit®? What can we as consultants do to promote collaboration? Is the industry doomed to repeat the same mistakes as we did in the past, because we sacrifice collaboration for the sake of expediency?

COLLABORATION IN A REVIT PROJECT

Let's face it. A BIM project won't be successful unless the team understands:
+ How the models will be produced.
+ Why the models are being created.
+ What the consumers of the models expect.

Collaboration plays a key role in all three aspects. Collaboration is essential while producing the models so that time and effort are not wasted redoing work because of unclear workflow or failure to comply with modeling best practices. If there is no clear reason why the models are being produced, then the team has not collaborated to understand how the models will work together. Also, when the design team has no idea how the models will be consumed, then collaboration has been skipped and ill-defined expectations for the model will not be met.

An important part to understanding how models will be produced is the BIM Project Execution Plan (PxP). However, I am not a fan of many of the PxPs I've reviewed in the last few years. Why is that? Most PxPs attempt to describe in words or tables what can

only be described as complex relationships. The result is a massive document with tiny nuggets of valuable information concealed in a morass of verbiage. I'm not saying that PxPs should be discarded. They do attempt to lock in the details of how the models will be used. They usually describe why the models are being created, albeit in a boilerplate approach. Finally, some PxPs do document what the consumers of the models expect of the models. However, we are talking about collaboration in a BIM world, especially with Revit projects. The PxP will describe the LOD for the elements in the models, but what else do you need?

What information do you really need to set up or maintain your Revit models? What are the issues you run into, project after project, that you need to communicate to the rest of the project team regarding Revit models? How can you cut through the morass of documentation in a PxP to expose the critical information?

A HISTORY OF THE BIM KICK-OFF FAQ

I developed a short document called the BIM Kick-Off Meeting FAQ in response to our project managers' request for a document to use in early meetings to discuss issues related to BIM and Revit when they didn't necessarily have the technical expertise with Revit itself. Another reason for producing the FAQ was that we kept seeing the same issues arise in project after project and we wanted to make sure that the consultants' concerns were discussed before something happened to the models that resulted in expensive and needless rework.

As I saw it, the problem with the PxP is that it is rarely complete by the time the MEP team needs to start their models. In many cases, it is too late to address collaboration concerns once the MEP models are started. There is a need for a document that can be circulated to the design team before they start their models.

The FAQ served this purpose, too, because most of the questions are valuable to the entire team and not just the project managers. Another advantage to the FAQ is that it could be available to a design team that did not have a PxP for a specific project.

Ironically, in some cases when presented with the FAQ, the client would quake at the number of questions they needed to answer. True, the answers to some of the questions might be found in the PxP, but many are not. As you can see, most of these questions are critical for getting the Revit models started on a consistent footing and with clear expectations of specific workflows due to limitations in the Revit product. Despite some amount of reticence, many clients and consultants who have seen this FAQ have embraced it and incorporated it into their own project set-up process. Due to the evolution of this document in the past two years I now call it the BIM Kick-off FAQ because it is not just about the BIM Kick-off Meeting (that alone can be another article on collaboration!).

THE BIM KICK-OFF FAQ

The following is the list of questions in the current FAQ. The FAQ has gone through several revisions with input from the Seattle CAD/BIM Managers Roundtable and other MEP consultants across the world. A copy of the actual BIM Kick-off FAQ

document can be found on AUGI's Revit forums by searching for "BIM Kick-off FAQ."

1. What is the Revit version for the start of the project?
2. What is the plan for upgrading the models when new versions of Revit become available?
3. Are there BIM guidelines/requirements for this project?
4. What are the definitions for each Level of Development (LOD) for the project?
5. What is the LOD expectation for design models?
6. What is the upload schedule for the architectural models?
7. What is the upload schedule for the consultant models?
8. Is there a separate upload schedule for contractor coordination?
9. What method/process will be used for file exchange?
10. Is there a model filename guideline?
11. Is there a sheet naming/sheet grouping guideline?
12. Is there a workset naming guideline?
13. What model (specific filename) should be used to copy Project Information into the consultants' model?
14. Considering Project Information, are all the Project Information parameters in the model correct, including Project Address and (under Energy Settings) Building Type and Location?
15. From which model (specific filename) should levels be monitored?
16. From which model (specific filename) should grids be monitored?
17. In which model(s) (specific filenames) are the room elements to be used for coordinating the MEP spaces?
18. Which linked model(s) (specific filenames) are to be set to room bounding by the consultants?
19. Will all areas be defined as rooms with fully closed boundaries before MEP models are to be set up?
20. Are the ceilings going to be modeled before the first consultants' model upload is due?
21. Will the architect set ceilings to be non-room bounding elements?
22. What model(s) (specific filenames) are required to compose the typical background?
23. If the architectural model is split between multiple models (e.g., Core & Shell and Interior or Building A and Building B) how will sheet numbering and revision numbering be handled for consultants' single models?
24. Are linked DWG files going to be used as part of the backgrounds for consultants?
    a. If so, are they located in the same upload folder as the Revit models?
    b. If so, have the DWG files been verified to be dimensionally correct?
25. Which coordinate system is going to be used for coordination exports?
    a. Origin to Origin
    b. Shared Coordinates (recommended)
26. What model (specific filename) should be used to acquire coordinates?
27. Unless otherwise specified, will the team link Revit models using the following procedure?
    a. Link the model documented in question 26 first, using origin-to-origin.

b. Acquire coordinates from the model documented in question 26.

c. Link all other models using origin-to-origin.

28. What is the angle from Project North to True North?

29. What is the direction of the Project North arrow on the sheets?

30. What elements can be used to determine accurate linked model location, e.g., the intersection of Grids A/1 and Level 1?

a. What is the reported E/W coordinate?

b. What is the reported N/S coordinate?

c. What is the reported elevation?

31. What are the documented coordinates (documented outside of Revit) of the project's base point?

32. Does the team agree that the project base point will not be moved after the models are linked?

33. Does the architect agree to not change the elevation of levels after models are linked? If elevations do need to change then the changes must be communicated in writing with detailed instructions.

34. Are all links in the models going to be overlay type links? (Attached links cannot be removed when the host model is linked.)

35. Will the team agree to perform the following before uploading models?

a. Detach from Central with Audit selected

b. Remove unneeded linked files

c. Ungroup all elements (improves model performance)

d. Purge Unused

e. Relinquish All

36. What is the project titleblock's external family's filename (RFA)?

37. Are all models going to be central models? (This must be true in order to turn off levels/grids in linked models using worksets.)

38. Does the entire team agree to put levels and grids in the Shared Levels and Grids workset?

39. Does the entire team agree to put reference planes, scope boxes, and match lines in the Shared Levels and Grids workset?

40. What is the scale for the majority of the plan sheets (not overall plans or enlarged plans)?

41. Will the model be split across multiple sheets?

42. Will project phases be required?

43. Have all design options been resolved? (Revit MEP cannot create systems with elements in design options.)

44. If alternates are part of the construction documents, how will the consultants be expected to produce the models of the alternates (systems cannot connect to elements in design options, see question 43.)

45. RCP Coordination, which approach will the architect be using?

a. Consultant shall provide families for architect's use and then the consultant shall copy/monitor the elements placed in the architect's model (c/m elements in the models should be placed in a specific workset).

b. Directly use consultant's linked model.

c. Architect shall copy/monitor of consultant's linked model's elements (c/m elements in the models should be placed in a specific workset).

d. Place duplicated elements (place duplicated elements in a specific workset).

46. If an exact view position on sheets is required, will the architect set up scope boxes and a titleblock family with location markers before sheet setup by the consultants?

47. Will the architect provide a view per level that is specifically for consultants' backgrounds and updated throughout the life of the project?

48. Will the backgrounds be complete enough (2-line walls, doors, windows, casework, fill patterns, etc.) when the view's detail level is set to Coarse? (Coarse detail level is often used in MEP views.)

49. Does the architect agree to use the Coarse Scale Fill Pattern property for displaying fire-rated walls? (All other techniques fail for linked models.)

50. Contact information for each Project manager (add others as required):

a. Architect

b. Structural

c. Mechanical

d. Electrical

51. Contact information for each BIM Lead (or Manager):

a. Architect

b. Structural

c. Mechanical

d. Electrical

As you can see from the list above there are many questions that need to be answered for any Revit project, regardless of the ultimate purpose of the BIM. When there is little collaboration early in the project there can be significant issues with the Revit models throughout the life of the project when assumptions are made. Remember the definition of the word collaboration? Use the BIM Kick-off FAQ to promote a clear understanding of your Revit projects with the other members of the design team.

R. Robert Bell works for Sparling in Seattle WA US. He is their Design Technology Manager. He has used AutoCAD since v2.18 and Revit MEP since the first beta of Systems. He is currently serving on the AUGI Board of Directors. Robert is a frequent speaker at both Autodesk University and the Revit Technology Conference.

GrabCAD

http://www.grabcad.com/

GrabCAD is an online platform that allows you to share models with others through a free CAD library and private collaboration of 3D models on a web browser with GrabCAD Workbench. A recent partnership with Autodesk has introduced the ability to edit 2D models with AutoCAD® 360, and support for working with 3D models using Autodesk® Fusion 360™ is coming soon.

"GrabCAD Workbench is built from the ground up for CAD. We display all major CAD files right in the browser, no special software required. View the design in 3D, explore exploded and section views, and 'pin' comments and markups right on the model. Uploads are easy—just drag and drop the full folder structure and we do the rest.

"The GrabCAD mobile app gives you access to your projects in full 3D on your phone or tablet. Respond to comments and see the latest revision wherever you are. Available on iOS and Android."

AUGIWorld brings you recent developments in Autodesk and AEC-related software items

Feature Recognition for Autodesk Inventor

http://bit.ly/11dy5tB

Feature Recognition is an add-on for Autodesk® Inventor® 2013 and Autodesk Inventor 2014 that assists in cleaning up imported 3D models and can be downloaded for free if you are on Subscription from the Autodesk® Exchange Apps Store.

"The Feature Recognition application converts neutral 3D CAD models, such as STEP, SAT, or IGES solids, into full-featured Autodesk Inventor models. Feature mapping can be executed automatically or interactively as needed to maintain design intent."

Detail Filter for Autodesk Revit

http://bit.ly/14ZgZDu

Detail Filter is an add-on for Autodesk® Revit® 2013 and Autodesk Revit 2014 that provides enhanced filtering of selected elements in a model and can be downloaded for free from the Autodesk® Exchange Apps Store.

"Detail Filter is a tool for filtering selected elements in greater detail. Have you ever wanted to filter selected elements in more detail? The Detail Filter app helps filter the current selection of element(s) based on Category, Family, Family type, and Parts. Users can also use the detailed filtering function as a preview tool since the app also highlights the filtered element(s)."

Process Analysis by Autodesk (Technology Preview)

http://bit.ly/10JZXtB

"Process Analysis is a free technology preview that allows users to quickly model and simulate processes they are designing before implementing them. Users quickly build a functional model of their proposed assembly line, factory, or industrial machine and simulate its operation to identify potential bottlenecks and to optimize performance based on design criteria.

Process Analysis helps system designers, manufacturing engineers, and process engineers save time and reduce costs by enabling functional and throughput analysis. Specifically, it can be used to guide decisions regarding manufacturing alternatives, equipment decisions, capacity analysis and WIP reduction, improved line balancing, and general productivity enhancements."

Until next issue!

If you have some news to share with us for future issues, please let us know. Likewise, if you are a user of a featured product or news item and would like to write a review, we want to know.

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