April 2012

What's New in Autodesk 2013 Products?

AutoCAD® MEP 2013

Autodesk® **Revit**® Structure 2013

Autodesk® **Revit**® Architecture 2013

AutoCAD® Civil 3D® 2013

Autodesk® **Navisworks**® Manage 2013

Autodesk® **Revit**® MEP 2013

AutoCAD® 2013

$8.00 US

AUGIWorld

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Image Courtesy of Castro Mello Architects

Autodesk

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Image courtesy of AECOM

Autodesk

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Editor's Note

Hello, Dear Reader!

Or should I say Autodesk user? That is who is reading this magazine, after all. And, as you use Autodesk software, then this issue is the issue for you! Whenever Autodesk develops a new version of the software we all know and love, here at *AUGIWorld* we are put to task to clear the air and tell our story about the software. We don't sell these applications, so we just want to fully understand them and encourage even more development.

As most of us have some sort of AutoCAD background, that is where we shall begin. Brian Benton unveils AutoCAD 2013 and runs down the little changes that make a big impact. Then we have Tench Tilghman, who proves that AutoCAD Civil 3D 2013 is the real deal this time around.

Next we have Bill Campbell uncovering the solid improvements to speed design with AutoCAD MEP 2013. Then Kate Morrical explains how design can go beyond the desktop when using AutoCAD WS 2013.

This month's Heads Up contains a few 2013-related fixes released by Autodesk, along with others from 2012 released during the last few months. And then Marcello Sgambelluria and Jay Zallan team up to explain Revit Architecture 2013's specific enhancements.

This month we speak to Alice Palmer, Marketing Manager with the Professional Customer Engagement Team at Autodesk. Knowing how to tell the story is as important as hearing it the way it was intended! We then follow with Lonnie Cumpton's breakdown of Revit Platform 2013, i.e., the common features in all flavors of Revit 2013.

In our monthly Inside Track, Mark Kiker and Bill Adams run down a flurry of Mac-compatible products, both by Autodesk and other developers. Then we have Michael Smith exposing how Navisworks Manage 2013 finally addresses the Revit support problem (and others as well).

Todd Shackelford is feeling lucky with Revit MEP 2013 and explains the many updates specifically in the MEP version (such as thermal properties). And then Greg Hale's review of Revit Structure 2013 shows a lot of enhanced support for analysis.

Next, James Salmon provides some great financial solutions for infrastructure users. And finally, Bonnie Gorman takes a look at new technology enhances for the AEC/O industry—it goes beyond BIM, people.

And that is it! *AUGIWorld*'s take on what's new from Autodesk is waiting for you, dear reader.

Take care,

David Harrington

PRODUCT FOCUS

Little Changes, Big Impact
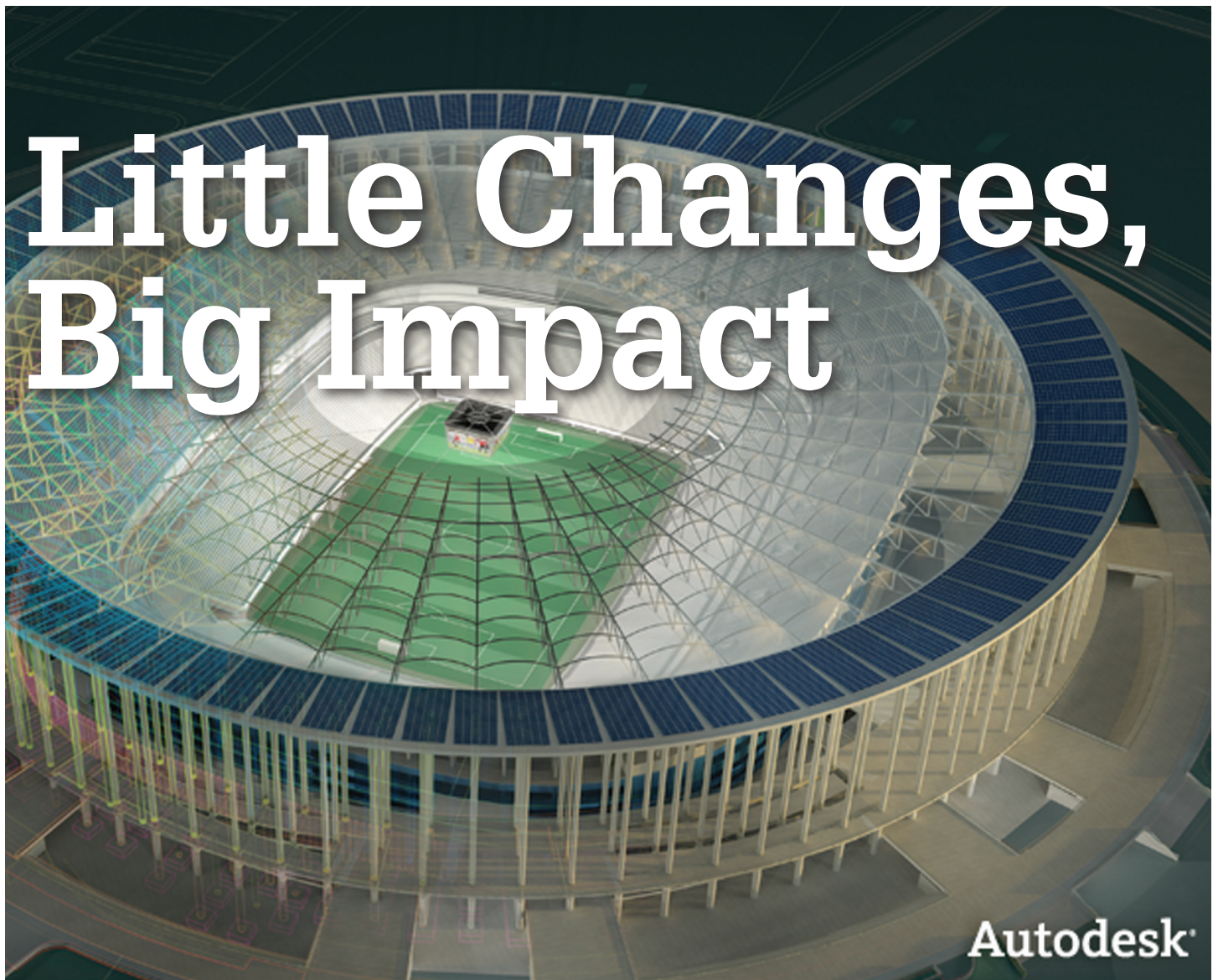
Image Courtesy of Castro Mello Architects

Autodesk has announced the 27th release of AutoCAD®! AutoCAD 2013 (code named Jaws during testing) has several new features, system variables, and a slightly revised user interface. The newest release also starts a new drawing file format. Note that previous versions of AutoCAD will not be able to open AutoCAD 2013 .DWG files. This new file format includes changes to the thumbnail preview file format and new controls for graphics caching. Thumbnails are now PNG files.

Many of the changes in this release are updates or enhancements to existing features. These changes pertain to the user interface or user interaction, model interaction, drawing documentation, and cloud connectivity.

INTERACTION

The last time Autodesk changed the AutoCAD interface we were given the ribbon. The changes in this release are not nearly as dramatic.

The Welcome screen displays first thing once AutoCAD is started. This in itself is not a new feature, but there are new features within this screen. There is the typical "What's New" and "Getting Started" video links. The screen also displays recently opened files, contains links to open a file or create a new file. There are links to the newly released Autodesk 360, the AutoCAD Exchange App Store, and AutoCAD-related social media sites. Of course, you have the ability to turn off this feature and access its content through the help menu.

The Command Line, while still there and functioning as it did before, has been reworked. There is now more control over its display properties. Instead of being a screen-wide palette by default, it is now a smaller, pop-up palette. It still has palette-like settings (you can return it to a full screen view) and it features display settings for color and transparency. It can also display command history by accessing recent commands automatically. It can be docked at the top or bottom of the AutoCAD window or left to float on the screen.
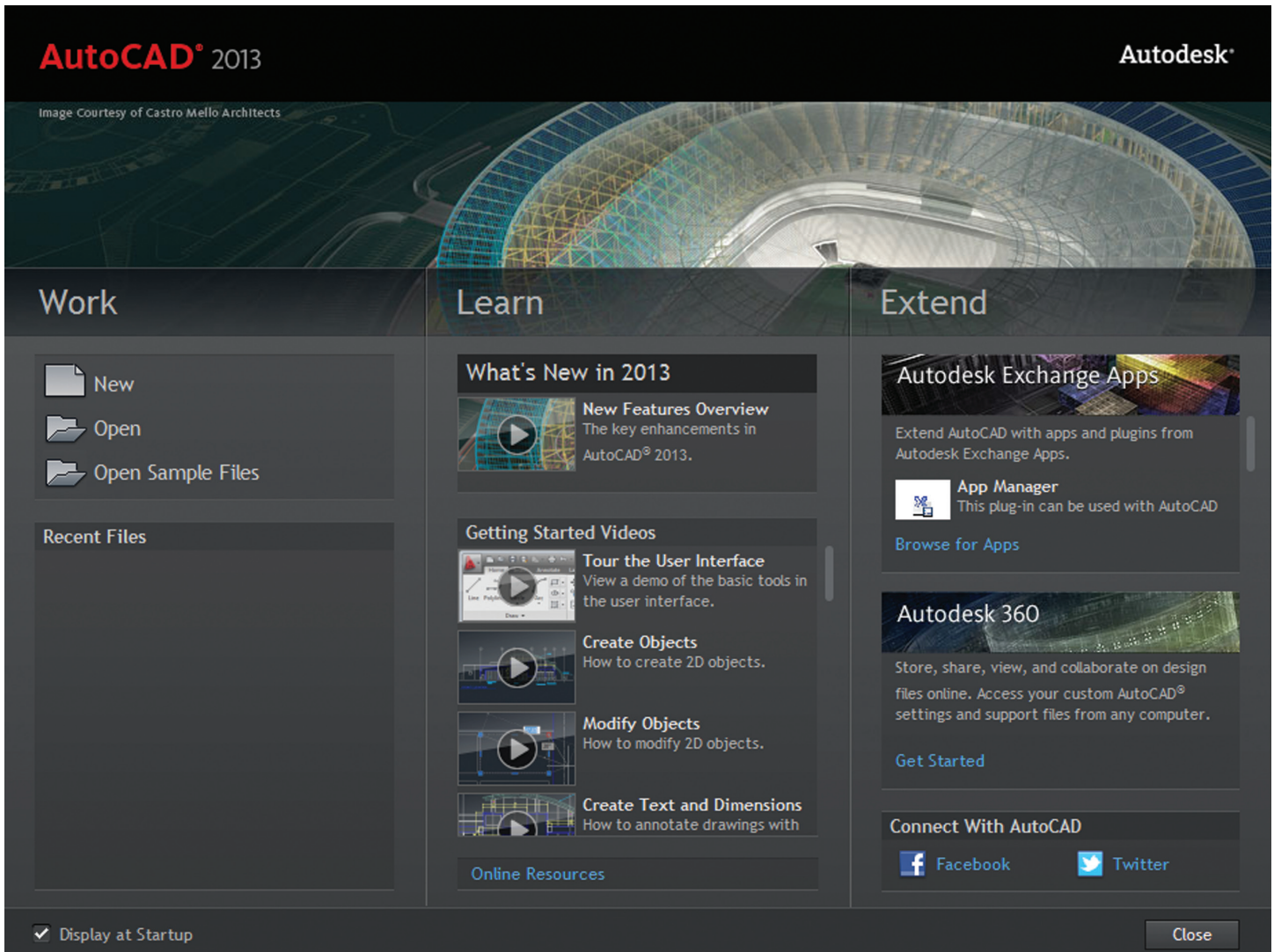
Figure 2: The Welcome screen provides direct access to the Autodesk Exchange App store, Autodesk 360, and AutoCAD Social Media.

When undocked, the command line is displayed as a single row of text with a semi-transparent history that can display up to 50 lines. You can still press the F2 key to show the text window. It won't be its own window, but will display the past history above the command line. When typing in a command (with dynamic input turned off) the autocomplete feature will display commands above the command line when it is not docked.

AutoCAD 2013 has in-canvas property preview enhancements. Changes to selected objects can be previewed before they are made.
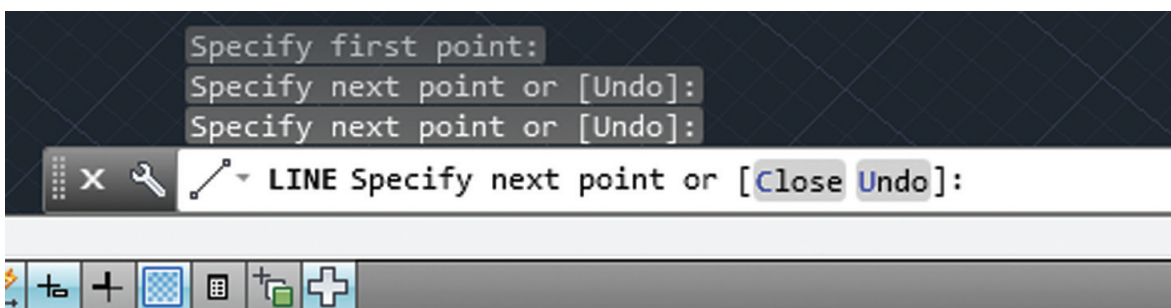
Figure 3: The command line has an updated visual display.

Select an object while the properties palette is opened. Use it to make a change in color. While you hover over the different color options the selected object will display the new color before the change is made. This feature can be turned on or off in the Options dialog window in the Selection tab.

AutoCAD 2012 gave us new array features and 2013 enhances those changes, thus making the array command easier to use. The three array types start with a standard arrangement of the selected object. Rectangular Array displays a 3 x 4 grid of the objects, Polar Array displays a six-object circle, and the Path array displays the objects evenly spaced along the path. Once started and displayed, you can enter in the values on the command line or use the grips on the block to make changes to row and column spacing,

AutoCAD 2013
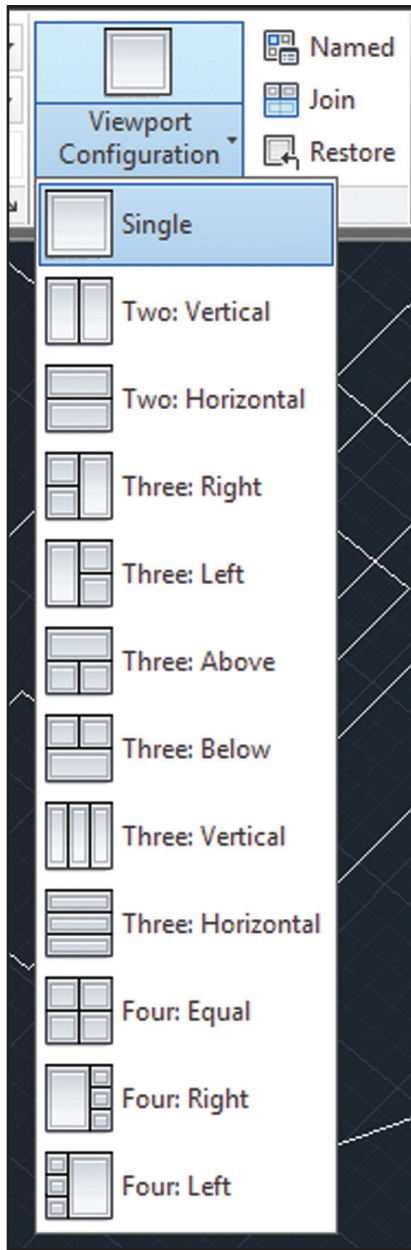
Figure 4: Working with Viewports is easier with ribbon-based controls.

number of items, radius, and so on. Its new visual display and arrangement make editing and creating your array much easier.

The Viewports Panel on the ribbon has been renamed and reworked into two panels, Model Viewports and Layout Viewports. These new panels provide a visual interface for creating the appropriate type of viewport.

Some other interface changes I'd like to mention do not change the functionality in a great way; rather, they are small things that make existing commands a bit better. One is in the Quick View Drawings thumbnail previews. The current view is now labeled with a larger, bold-face type, which makes identification of the current view easier.

The Hatch editor can now edit multiple hatch objects at one time. Again, not a huge deal, but a nice enhancement. Raster images that are inserted or referenced in a file will have a better display quality due to enhancements in the algorithm used. In the External Reference Manager, users can edit the Saved Path directly in the palette and the Found path is read-only. Also, referencing files as a Relative Path is now the default (unless it is not available). Legacy snap behavior (before AutoCAD 2012) of being able to enforce it during point acquisition has been restored.

MODEL INTERACTION

AutoCAD has turned into a powerful 3D modeling machine over the past several releases. This release has enhanced several of those tools. Point Cloud support is improved and more streamlined. There are more Point Cloud tools available on the new Point Cloud panel, which is found on the Insert tab of the ribbon. You can now attach and manage point cloud files similarly to working

with xrefs, images, and other externally referenced files. Selecting a referenced point cloud will display a box around the cloud showing you where it is. You can also adjust the point cloud density and color with the new tools. Users can also CLIP a point cloud as you would a referenced file. And the indexing of point cloud data files has been streamlined.

Working with 3D objects is a bit easier due to the enhanced Press-Pull command, which is more flexible than before. Use the Multiple option or press the Shift key to select more than one object to press/pull at the same time. You can now also select 2D and 3D curves and are no longer limited to clicking inside a bounded area. When extruding a face, the default behavior is to pull out, but press the CTRL key and you can offset the boundary of the area so the pulled are tapers.

The new Extract Isolines tool in the Curves panel of the Surface ribbon tab lets you extract iso lines from an existing surface or from the face of a solid. Options within the command let you change the direction of the isolines, select a chain of isolines, or draw a spline on the curved surface.

AutoCAD 2013 now allows you to import Autodesk Inventor® models directly into model space using the good old Import command.

DRAWING DOCUMENTATION

The major enhancements in AutoCAD 2013 come in the form of drawing documentation features. For example, the VIEWBASE or Base View command has been improved. Other new commands will help you use a VIEWBASE object to create cross sections and details of your model in seconds. The Base View tool is found in the Layout tab on the ribbon in the Create View panel. It can be started from either model space or paper space. You can create orthogonal views, in paper space without a viewport, of selected 3D objects or from an imported Inventor model.

The VIEWBASE command creates standard ortho views (front, top, side, iso) similarly to how it did in AutoCAD 2012. It is very quick and easy to do. Once your Base View has been created, you can use the new commands to make a cross section or detail view. Section Views are made by clicking the Section flyout button in the ribbon. You can create a full, half, offset, aligned, or from object type of a section view. The view is dynamic, meaning that if the model is updated the section will update. Create details in a similar fashion. These details are drawn at a different scale, zooming in to get a closer look at your model. Details are also dynamic, meaning that they will update if the model is updated. All views (sections and details) have annotation that is generated automatically when you create them. They can also be edited once created. I would love to go into more detail about how to use this new tool, but I am running out of space. It suffices to say this is a great tool that has been made better with its additions and new functionality. Making orthogonal view drawings, cross sections, and details has never been easier in AutoCAD!

Other little updates in AutoCAD 2013 functions are equally nice. One is an improvement to the Export Layout to Model tool. It
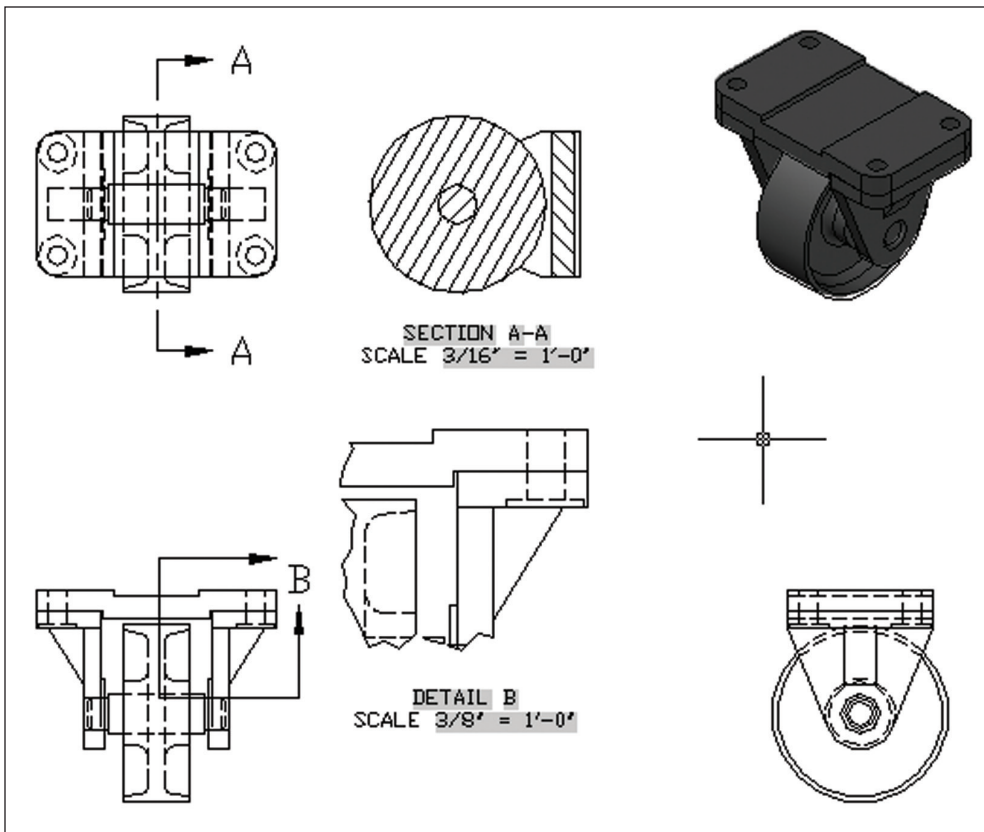
Figure 5: These views, projections, cross sections, and detail were created in seconds with the new Base View commands.

SECTION A-A
SCALE 3/16" = 1'-0'

DETAIL B
SCALE 3/8' = 1'-0'

file to your mobile device. Note that your device needs to be signed in to the AutoCAD WS mobile app. Upload Multiple lets you upload more than one file to the cloud at a time. The settings buttons manage your account settings. The Share Document button will send your file to another person. Collaborate Now will open the current file in AutoCAD WS and allow you to share your session with others.

The CAD Manager Control Utility has been updated to include controls for Autodesk Cloud tools. This allows CAD managers to control how their company's users will interact with these cloud-based tools.

AutoCAD 2013 also comes with built-in cloud rendering tools. That means if you have a large file to render, you can take advantage of the power of many computers to assist you.

The Stay Connected feature in the Info-Center makes it easier to stay up to date on your AutoCAD software and to remain connected to the online AutoCAD community. Login to the Subscription center and view AutoCAD Facebook and Twitter posts here.

The Content Explorer has been given new enhancements as well. For example, it has indexing support for file name, date created, etc. for many more file types than before. Any file that can be opened, imported, or attached using AutoCAD can be indexed.

will now export circles and arcs as circles or arcs instead of making them polylines. Multi-lined text, Mleaders, dimensions, and tables all have a new Strikethrough formatting style that will create a "strikethough" line in your text. The number of display rows for the font drop-down list has been increased in the Text Style dialog, the Text Editor ribbon tab, and the ArcAligned dialog box. Leaders are now included on the TextToFront tool. The MLeader text box has been updated with a margin between the text and the frame to provide a minimum width for the Mtext in order to prevent text overflow. Wipeouts now include the option to display, but not to plot the wipeout frame. Use WIPEOUTFRAME and set it to 2, just like in IMAGEFRAME. Now when using the OFFSET command you will get a preview of the offset once you have entered a distance and hover over an object.

CONNECTIVITY

Autodesk has been developing a cloud-based service for some time now. AutoCAD 2013 integrates with several of those cloud services. If you are on Autodesk subscription or have set up a free account, you can login to your Autodesk cloud account and store and share files online. Login to the Autodesk Cloud from the Infocenter toolbar. Not only can you store files in the cloud, but you also can store AutoCAD program specifics. You can sync your program appearance, profiles, workspaces, options, and support files across the Internet. Go to the ONLINE ribbon tab to get to many cloud-based settings. The Autodesk 360 button will give you access to the files you have stored online. The Online options button controls your settings. "Open on Mobile" sends your

CONCLUSION

AutoCAD 2013 is an interesting update in that many of the changes to it are enhancements to existing tools rather than brand new tools. It also includes many online or cloud-based tools and functionality. This native support makes using Autodesk's cloud services easier and more streamlined.

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The Real Deal

Can we count the improvements in the newest release of Autodesk's premier infrastructure design software for civil engineering and survey professionals, also known as AutoCAD® Civil 3D 2013? There are lots of them. We users aren't interested in the number count. We want the work done quicker and with less hassle in a piece (or suite) of robust software that includes the capabilities to tackle more real world problems. AutoCAD Civil 3D 2013 is the real deal.

Frankly, I was a bit surprised Autodesk decided to go with the "2013" moniker for the release. If Autodesk isn't superstitious, we shouldn't be either. Autodesk continues to follow the three-year dwg platform upgrade cycle. So yes, the AutoCAD 2013 release platform includes a new .dwg (drawing database) format change. The new dwg and display engine produces some significant performance boosts for us all inside AutoCAD Civil 3D 2013.

For Civil 3D users the dwg format change should hardly matter at all. We already live in the yearly release cycle world of the Civil 3D

Features. AutoCAD Civil 3D 2013 even has some new features of its own. Say "hello" to Pressure Pipe Networks and their kin.

PERFORMANCE

Your experience with the software's performance will vary based on whether or not you run in 64-bit and Windows 7. There will be a 32-bit version, but I recommend you walk away from 32-bit. Pay attention to the published requirements and recommendations. I
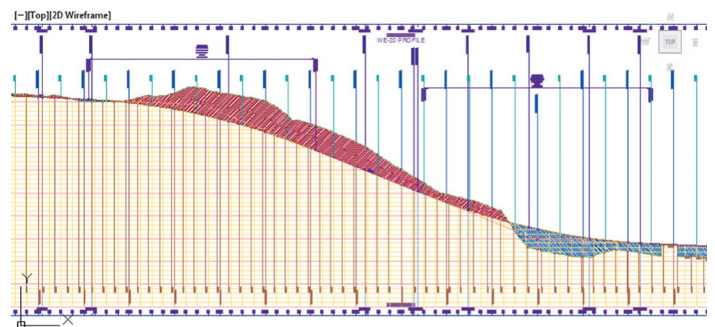
employed an older machine with generic video that met the bare minimum 64-bit hardware requirements to test and review betas of the software.

A BETTER DOWNLOAD AND INSTALL EXPERIENCE

Many of us will get the new software delivered via download. Autodesk improved on the download performance and the user experience of the "Download Manager." The 2013 platform download and install experience will be different. As of this writing, changes were still being ironed out. Read the instructions before punching any buttons to get and install your download. You should expect about 7GB of uncompressed installation files and a compressed download of around 40-50 percent of that. Installs and deployment creation were both faster processes.

Both Storm and Sanitary Analysis (SSA) and Sub Assembly Composer (SAC) can be optionally installed along with the latest Design Review for AutoCAD 2013. The installation and deployment configuration process isn't significantly different from 2012. Both are cleaner and easier to understand.

THE NEW PERFORMANCE EXPERIENCE

The new 64-bit release noticeably outperformed the 2012 release on the same machine with the same data everywhere. AutoCAD Civil 2013 is, in a word, "brisker." After you're all set up, you will notice the shorter load time. You'll have to find another time to take that trip to the coffee pot. Release 2013 makes it harder to find time for those little breaks during the day.
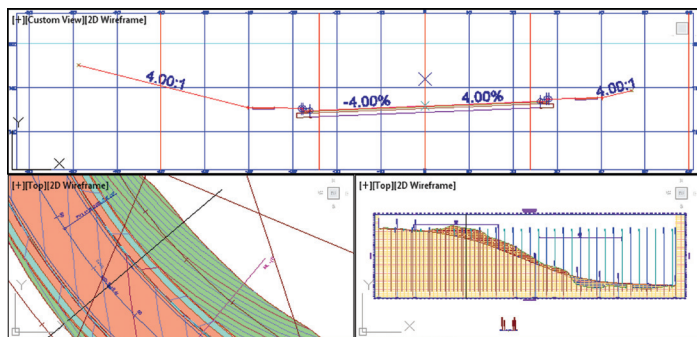
Figure 2

Civil 3D projects often have lots of interconnected drawings and Civil 3D features. That's what a managed Dynamic Model is all about. You'll notice that loads of Data Shortcuts and opens of any connected drawings will be faster. They sort of pop up all in a rush on drawing open instead of trickling in like they often do in Releases 2010 through 2012.

FASTER TO THE FEATURES

The core features of Surfaces, Alignments, Profiles, Corridors, and Pipe Networks load faster. We all know the "Displaying contours" routine for surfaces. In past releases, many of us ALWAYS turned off Automatic Rebuilds for Corridors and other features to shorten our initial drawing load times. The performance improvements

for the core features in 2013 may make this much less an issue on the same hardware. Are you smiling yet?

Another frequent Civil 3D user complaint has been in and out of data in text formats or other formats like LandXML. The data coming in was often painfully slow and an UNDO afterwards was equally painful. Both issues mostly go away thanks to 2013's faster native handling of object creation, storage, and display in the new dwg. Survey Imports into databases are faster too. Civil 3D 2013 includes Infrastructure Modeler (.IMX) import and export.

The AutoCAD 2013 display engine is noticeably faster. Visual Styles and screen rendering of almost all Civil 3D Feature Style representations (Plan, Profile, Section, and so on) are faster. You can think about looking at things from multiple new perspectives without the fear of time lost to regen. We also have more performance tuning capabilities and control inside Options in 2013. Are you grinning?
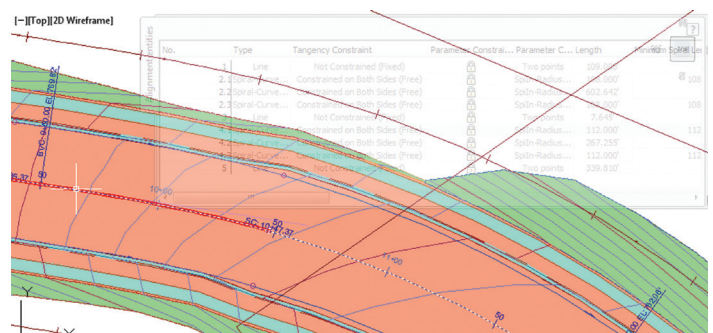
Figure 3

Civil 3D is notoriously "piggy" about screen real estate with its plethora of editing and informational palettes. One of my favorite AutoCAD interface tweaks remains palette rollover transparency. Rollover transparency allows you to have a palette almost visible and become more clearly visible only when you want it that way. You may undock the command line palette forever with the tweaks in this release. Be warned, not every Civil 3D command that wants a screen pick does well when crossing over the palettes. You learn to swoop around the barely visible.

CORRIDOR MUSCLES

Corridors are one of the software's design strengths. They benefit significantly from the new display engine that's under the hood in
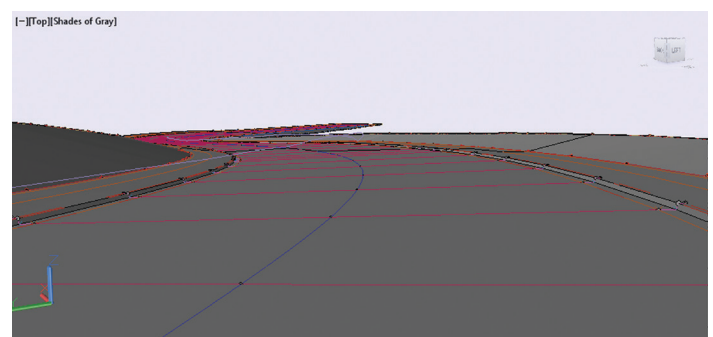
Figure 4

AutoCAD Civil 3D 2013

2013. Take a test drive and see for yourself. There are more creation and editing interface updates and more raw corridor performance fine tuning at work. The Section Editor interface introduced in 2012 is now smoother.

Assembly construction got a bit more intuitive with automatic lefts and rights being applied to subassemblies on insertion. That frustrating semi-automatic, subassembly "group by number" method gets replaced with more reasonable left and right default group names. Copying in a constructed assembly now doesn't include automatic renaming and renumbering of the subassemblies as part of the process either. That cuts down on subassembly renaming time, but won't save you from all the necessary maintenance work every time. The subassemblies inside the assembly groups are now editable, selectable, and displayable from the Toolspace. Finding the needle in the haystack within an array of assemblies gets easier with this release.

We get more control over how the Regions in Corridors are locked. By default, upgraded corridor regions are locked to the alignment stations. New corridor regions can now also be locked to alignment geometry instead. Yes, a "little" change can make a difference when you make major geometry changes to a complex corridor.

NEW THINGS TO RAIL ABOUT

The 2013 release introduces a Rail Alignment feature type and a new cant method of (superelevation) calculation for railway design. The rail alignment type and cant method were necessary to deal with the chord length mid-chord offset (MCO) definitions, Degree of Curvature (DoC), and acceleration requirements that are inherit to the imperial (US) railway geometry design standards.
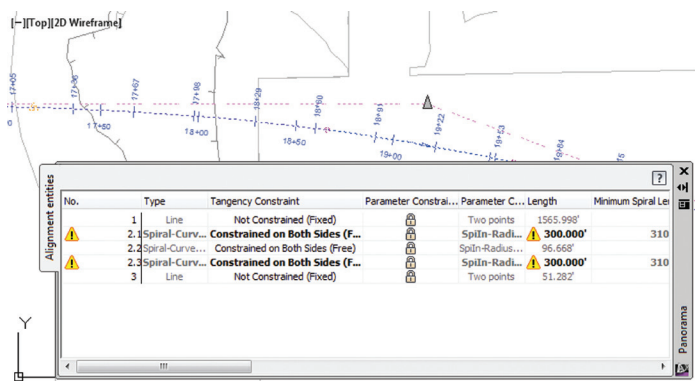
Figure 5

There are new DoC options presented as you add curves and spirals and curves to rail alignments. The DoC values are editable in both the Alignment Panorama and Segment editor. A new Track Width value is a property of rail type alignments as it and design speed affect the cant calculations.

Cant may be applied to rail alignments in a wizard interface (like the one used for Superelevation). Cant plays by the different railway rules and employs separate rail design criteria files (supplied in editable XML format). Multiple methods of cant calculation are
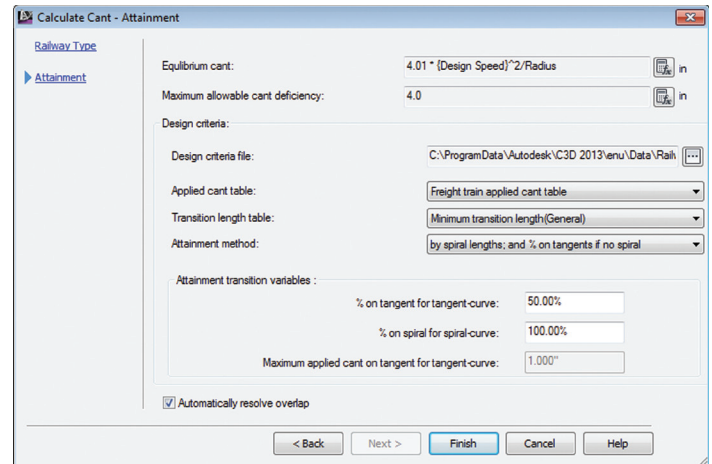
Figure 6

supported including multiple kinds of cant rotation and a variety of standard table lookup methods. A new Cant Critical Point Label style supplies annotative access to the calculated cant data for plan views.
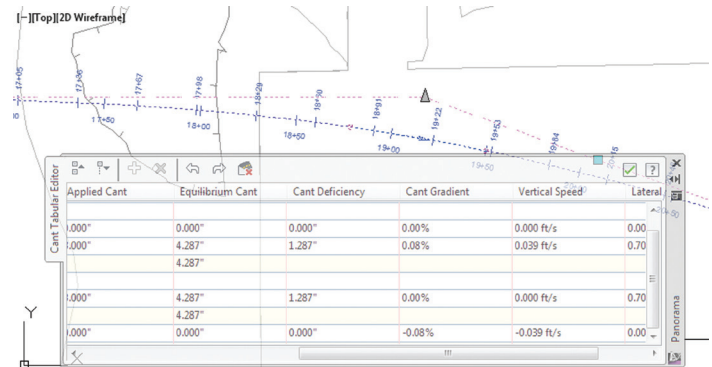
Figure 7

QUERIES ABOUT SURVEY AND SURFACES

No release of Civil 3D would be complete without some new surface creation and editing updates. How about the simple and useful tool that makes the boundary of one surface become the boundary on another? Let's call it "Surface Shrinkwap Boundary." You can employ one surface as the hide boundary for another so you spend less time and hassle getting to a cleaner version of a surface.

Surfaces in 2013 also have a new optional build property to automatically cut down on those extraneous triangles that form in convex areas on the edges of surveyed surfaces. The new "maximum angle" property employs "A maximum angle between adjacent TIN lines." The algorithm chews around the edges of a surface like Cookie Monster, removing TIN lines until satisfied.

The Volume Dashboard introduced in 2012 is now the default volumes interface in the ribbon. This dashboard includes a powerful bounded volumes capability to help you tune your grading solution to meet the need. That means you can scratch out polygons or employ figures, parcels, and so on to create closed areas to massage

and track both partial and total volume solutions all in one place. Reporting is also built right in. The old "Quick Volume" command (it doesn't require the construction of a volume surface) is still there from the command line.
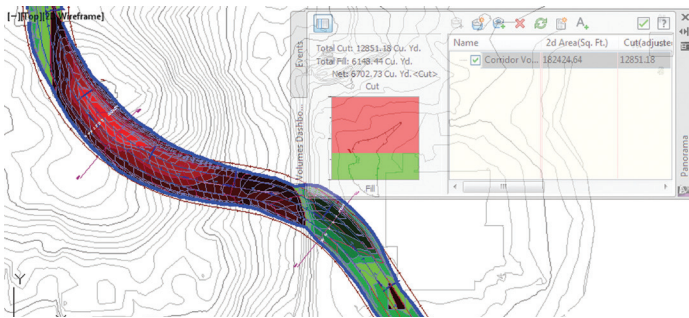
Figure 8

Surfaces can now be more dynamically connected to Survey data base data via the new user defined "Survey Queries." The survey query idea is simple. Create a query against your point and/or figure data and supply the results directly to a surface as a part of its definition. If the survey data is updated or new data now matches the query, the surface reflects the changes. You even get the choice whether or not to make the process dynamic.
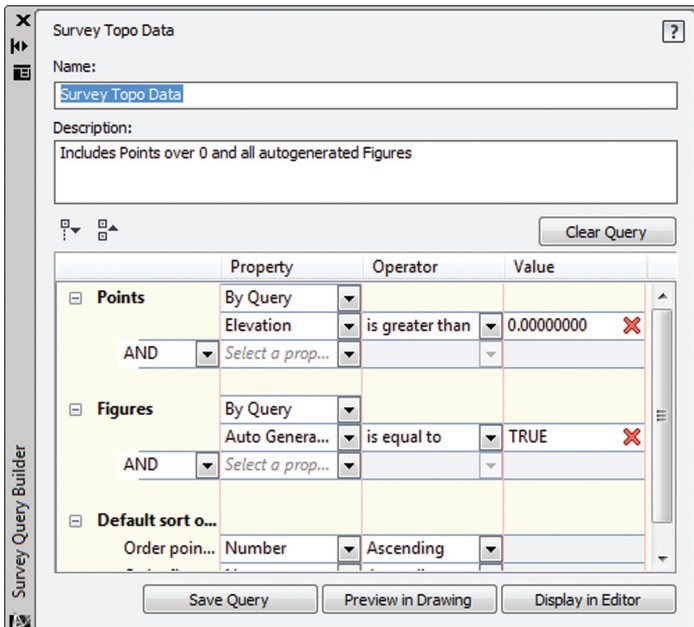
Figure 9

A dynamic connection (sans the point features and figures) is important. Civil 3D's Point Feature display still remains an uncommon, non-intuitive, and frustrating performance weakness in the software. Unfortunately, as of this writing, the 2013 release seems to provide little or no improvement when point features are on the drawing table. Ah well. At least it's now even easier to keep the point features in their own separate drawings.

If you haven't employed Survey in 2012 with SP 1 or above, don't neglect or underestimate the usefulness of survey in Civil 3D. Ma-

jor improvements were made to the interface that can make your day far more productive. Yes, it's different, but that isn't a bad thing.

PIPES UNDER PRESSURE

Over the last three releases of Civil 3D we've seen a major effort put to Pipe Networks and Storm and Sanitary Analysis. That's paid off in some useful tools.

Pressure pipe networks and their companion features are new for 2013. We now have pressure pipe networks, pressure pipe part lists, pressure pipes, and two different types of "structures"—Fittings and Appurtenances. Appurtenances are all the other "stuff" such as valves, regulators, etc. that may be part of the system aside from the connecting fittings between the pipes.
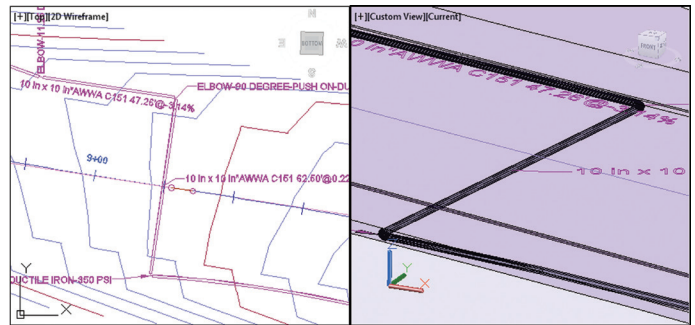
Figure 10

If you've used Civil 3D Pipes, the basic concepts, creation, and editing processes are about the same. Much of the new interface and the creation and maintenance of parts lists, and all the attendant styles should be familiar ground.

However, in Pressure Pipe Networks (PPN) things are a bit different for both discipline reasons and because Autodesk took a somewhat different approach to some of the technical aspects of pressure pipe networks as well. Simply put, more of what's going on is driven by your current pressure pipe part list and the back-end data base data catalogs than in the gravity pipes application.

According to Autodesk, they'll ship three Imperial Pressure Pipe Catalogs (PPC) based on the American Water Work Association (AWWA) standards and one Metric PPC. The AWWA PPCs include three classes of connection systems: Push On, Flanged, and Mechanical. The initial Metric PPC will include only a Push On connection system. The PPCs are editable datasets. They are not editable from inside the software. The release includes a command to build a complete pressure network parts list from the current PPC.

THE DESIGN INTERFACE

The PPN design interface works primarily in plan. You may reference a reference surface, an alignment, or both. A "cover" property locates the component's elevation (at the XY pick points) based on the current reference surface. You may construct pipes alone or pipes and bends together. You may also optionally place fittings and appurtenances and connect them with pipes after the fact.

AutoCAD Civil 3D 2013
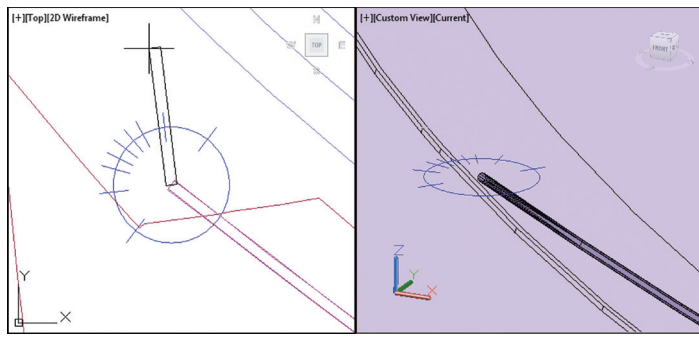
Figure 11

Pressure Pipes support both straight and "curved" pipes. The specifics of the allowed direction, pipe deflection tolerance, and allowed pipe curvature are driven by the current fitting and pipe values in the part list. Civil 3D generates an on-screen Compass tool when you construct pipes. The compass reflects angular possibilities of the fittings in the parts list. This helps you visualize and "snap to" an acceptable direction. Dynamic glyphs provide aid when you must make a connection or break a pipe.

The design interface initially takes some getting used to because of the "hidden" data-driven constraint system operating behind the scenes. AutoCAD® and Civil 3D transparent alignment commands (e.g., 'SO') do work, but you can get unexpected results based on the system. The PPN parts have intuitive grips to help you perform typical rearrangements and even construction tasks such as generate a new pipe from a part connection.

PRESSURE PIPE NETWORK ANALYSIS

Once you have your PPN built, there are analysis design checks for coverage and other design infractions created within the system. There is no interference checking. You can create an alignment feature from selected PPN parts and the alignment will stay connected to the changing system if you don't manually edit it. You can add selected PPN parts to a profile, edit them in profile, and annotate them.
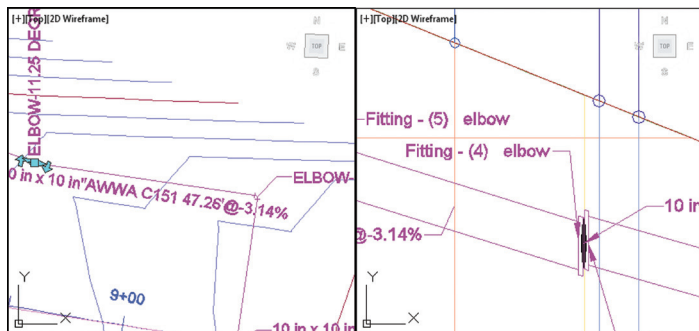
Figure 11

You can produce reasonable annotated plan and profile plans of your PPN with the tools and the associated styles. I constructed filled, double line, and single line representations without undue effort. Annotative label styles are more problematic because of the number of potential values you have to get your head around and the dearth and/or wealth of information in the Catalog. The pres-

sure pipe parts list didn't appear to currently expose everything that's in there (or not in there) to the user.

In this initial release don't expect all the bells and whistles that have evolved in pipes. There are only plan, profile, and model representations for pressure pipe networks. There is no display in sections. The beta catalogs I had access to were limited in materials, sizes, annotative detail, and types of appurtenances, in particular. However, when it's all said and done, the new pressure pipes feature still beats the heck out of tweaking a pipe network to do the job poorly.

GET CLOUD CONNECTED

You can also bet that your new Civil 3D will be better connected to the fast growing array of Autodesk Cloud Services. You'll get more manageable support options such as the Mosaic Community to help you get up to speed and stay that way.

IN THE END

You get a better performing AutoCAD Civil 3D that includes more useful and refined civil engineering design tools. Yes, I still have a big wish list (don't we all?).

My personal favorite new feature in the latest release? Style and Label Style stability to almost rock solid. That means if you have well-built, tested styles in your templates and project drawings, you'll have an easier time making the jump to 2013.

AutoCAD Civil 3D 2013 is indeed the real deal.

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Solid Improvements Speed Design
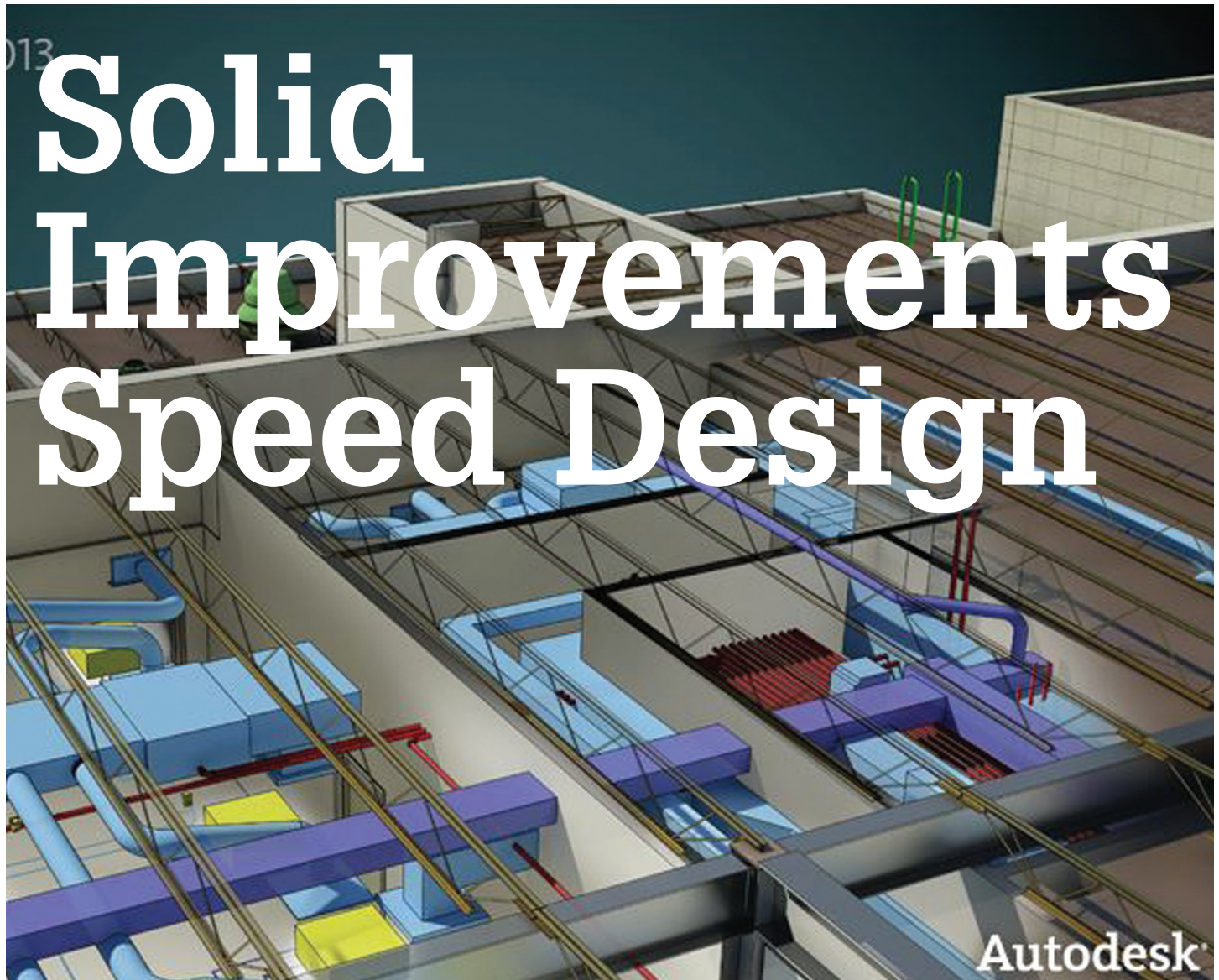
Image Courtesy of AECOM

Every year, Autodesk enthusiasts anxiously await the new release of their favorite product (which I hope is AutoCAD® MEP!). I think we can all agree that some years are "better" than others—some releases being the more substantial ones—but we are excited nonetheless.

This article serves a purpose whether you are a "4-yearer"—someone who waits every 3 to 4 years for AutoCAD's principal game-changing releases such as we saw in 2006 to the now ribbon-based 2010 version—or the more regimented user who upgrades every year with the subscription plan.

The new tools in AutoCAD MEP 2013 are beneficial even to people who do not intend to purchase 2013. At least knowing about them will help you stay ahead of the curve in the drafting world. What if you leave your job for a new one, your new firm is using AutoCAD 2020 and you're still on the obsolete 2016 version? God forbid you didn't know the tools!

In this article, I'll try to keep "vanilla" AutoCAD and AutoCAD MEP 2013 tools separate. Obviously, they will sometimes blend together because MEP runs on top of the AutoCAD platform. The new tools in AutoCAD will enhance typical commands and tricks in AutoCAD MEP. For that reason, I will be bringing up some new AutoCAD tools that benefit the new MEP tools as well.

UNIVERSAL PIPING CONNECTOR

The first new feature presented in AutoCAD MEP 2013 that will catch your eye is the 'Universal Connector' that is now found on all piping systems (piping, plumbing, electrical conduit, and so on). Adding this universal connector to the end of an open pipe allows for connection of any other Autodesk piping system to this run, not just another MEP pipe or conduit. This means if you want to send your preliminary model for additions by a civil contractor, that contractor could essentially finish up where you left off in AutoCAD MEP 2013, only he could use AutoCAD® Civil 3D® 2013, Plant3D, AutoCAD® Architecture, and so on. This is a great tool for design/build firms that work closely with other sub-

AutoCAD MEP 2013
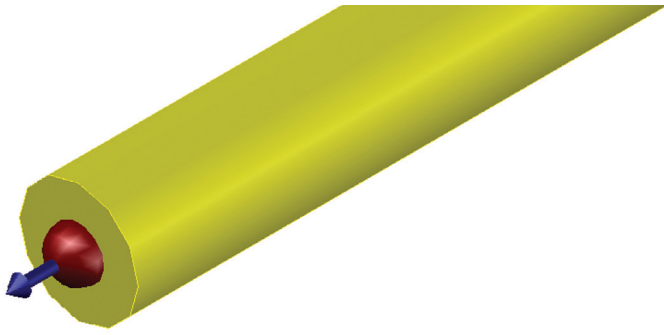
Figure 1
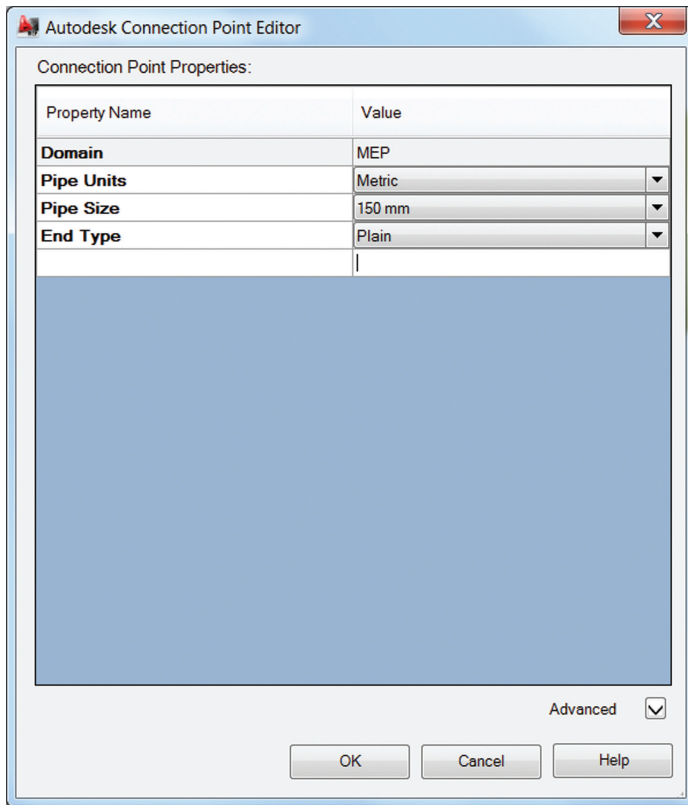
Figure 2

Figure 3

Figure 4

contractors with similar design backgrounds. This will make the drawing transfer process that much easier.

MVPART CREATION AND 'CONTENT BUILDER' CHANGES

My next highlighted feature is the use of multi-planes when creating symbols within MVParts. If you are a Multi-View Part"ist", you already know what I am talking about, and are excited. This is a tool that has been on AutoCAD MEP's wish list for years running. When AutoCAD first turned open-source, we immediately started creating our own routines and processes to make our life easier and to create intelligent drawings. When ABS introduced the MVPart, it took the 'programming' feel out of it and made it more user-friendly with the Content Builder. You can create a 3D block and decide what to show end users, depending on which
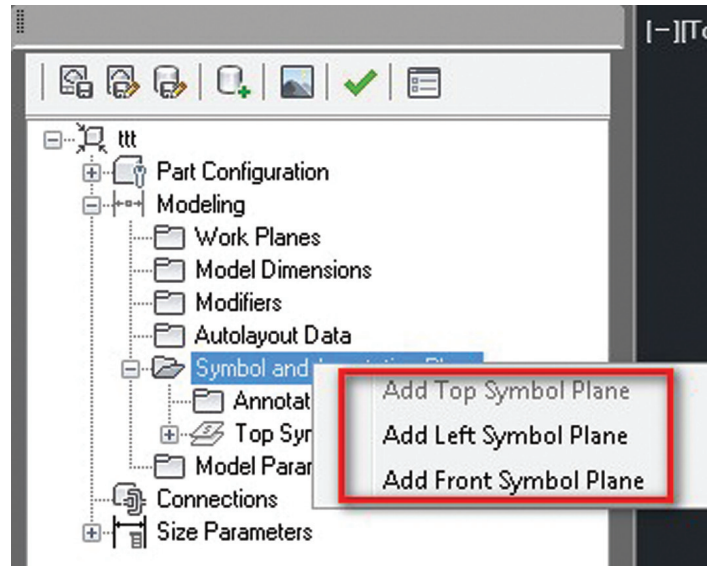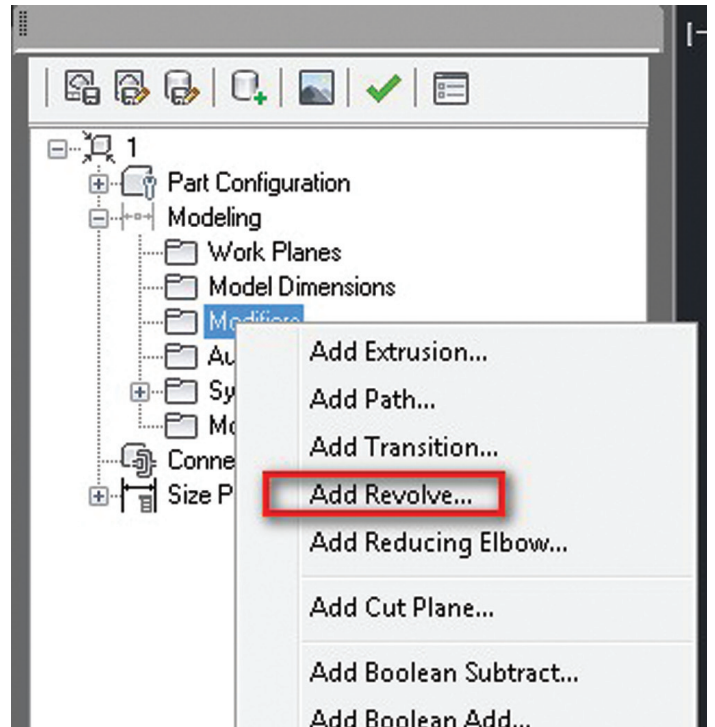
view they are in—the top (plan) view or the 3D Isometric view (the 3D block itself).

The 2013 release allows you to define the top, front, and left symbol separately in Content Builder. This will change the game up a bit for partists who use their MVPart catalog to populate areas that are being live sectioned. That was the first thing that I thought of when I played with this tool in the beta release. How would this look in a vertical live section? Turns out, it looks great and acts as an MVPart should. Speaking of "Content Builder," the MEP 2013 release also now let's you add "revolved" geometry in Content Builder.

MEP TOOLS AND PARTS

Replacing Multiple Fittings is another great new tool in AutoCAD MEP 2013. In 2012 and previous releases, if we wanted to replace fittings we would have to individually select each fitting, one by one, that we wanted to replace (there are no "filter" identifiers for MEP objects) and replace/edit them separately. If you accidentally create the wrong radius of a bend, or the wrong T-size on a pipe fitting numerous times on different systems, layers, sizes, etc., you now simply have to select the multiple adjoining segments for each system you want to redefine the fittings for, and run the "replace fitting" command. It will then go through each segment duo and confirm each replacement. This will simplify many tedious activities, I'm sure.
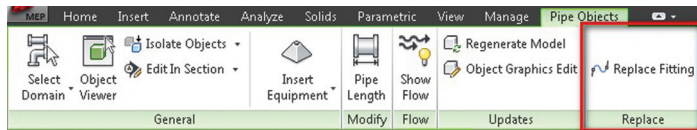
Figure 5
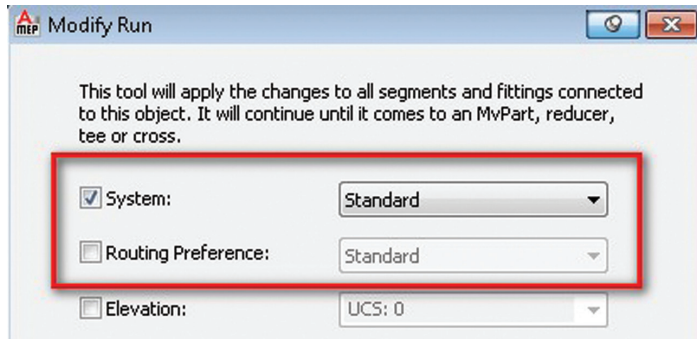
Figure 6
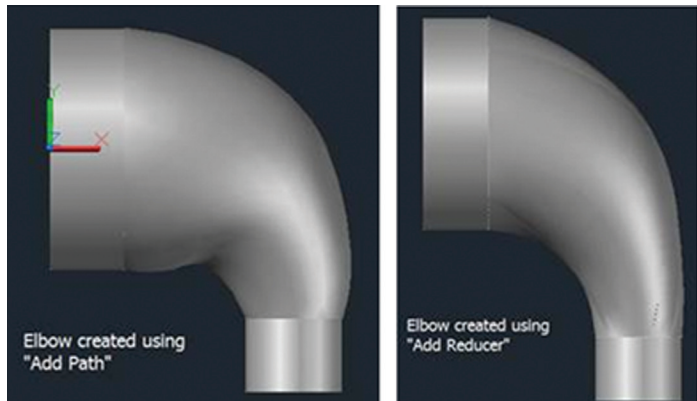
Figure 7

If you are deep into the MEP trades, you will be pleased to know that your object's Routing Preferences can now be linked to its system definitions. This means if you change the object within "properties," the routing preference can change along with it. This is a very cool, and for the MEP "routers," very time saving!

When you change the radius of an elbow within AutoCAD MEP 2010-2012, you will notice that it is aligned to center of pipe/duct. Now in 2013, it is aligned to the *inside* arc of the elbow. This should be noted as it will take some getting used to.
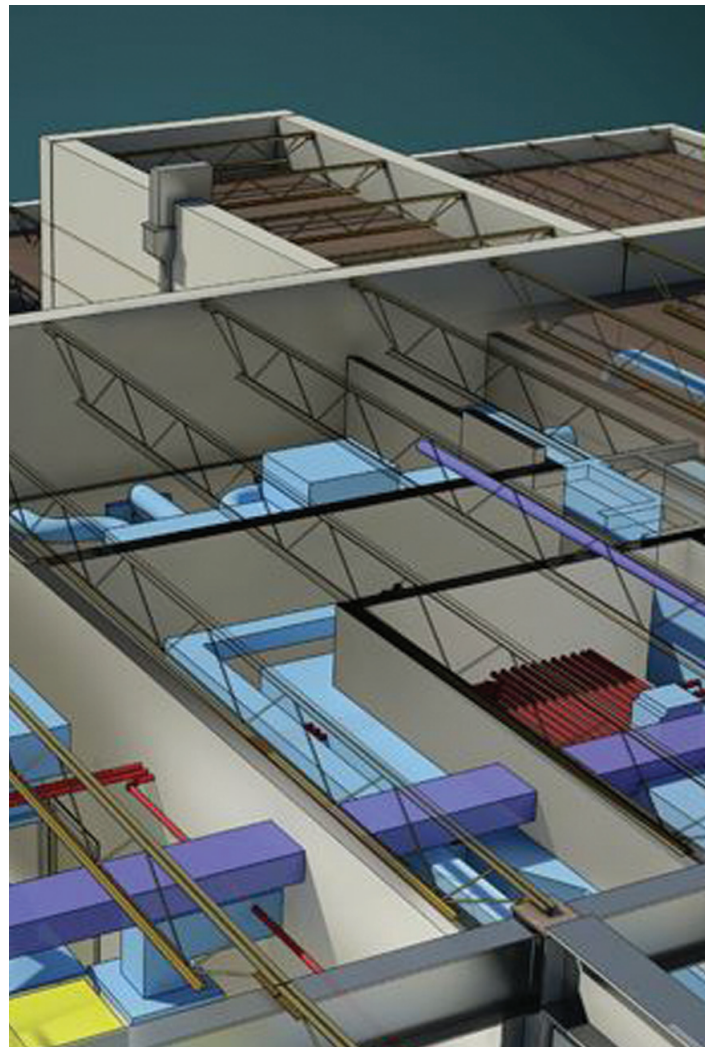
PROGRESSIVE UPDATING – REALTIME COMPUTING

In AutoCAD MEP 2013, you no longer need to wait! Okay, I take that back. You won't need to wait while you regenerate your drawing. This, to me, is one of the most important updates. Formerly, when refreshing or performing a regen of your data-packed large 3D intelligent model, you had to wait while your machine's processor and video card "thought" for a bit, then decided when it was safe to let you begin working again and show you all of the information at once.

Now, the new "Progressive Update" feature (SetValue=1 Commands are "setEnableGeometryShare" and "setEnableProgressiveUpdate", it shares geometry, not unlike Autodesk Navisworks' software. Why do you think you can fly around the same massive 3D model 100x faster and smoother in Autodesk® Navisworks Manage than you can in AutoCAD? It's because of how—and what—the software decides to show you. With this same computing process in mind, AutoCAD MEP 2013 will now use a new feature called "Geometry Sharing" to let you work on your model constantly while it regenerates. It knows the area of the drawing you are focusing on, and will work forward (or backward) accordingly.

AutoCAD MEP 2013

Figure 8

MIGRATE CUSTOM SETTINGS FROM PREVIOUS RELEASES

The last new tool that I think would be a good way to end this "highlight reel" is the new and improved Migrate Custom Settings tool. You can now migrate your profile, including tool palettes, catalogs, PGPs, etc. from previous releases, whereas before you could only import/export/migrate from the current release in 2012 and prior.

All in all, 2013 will be a good design year. Not only are these new features going to save you a lot of time and energy, but the economy is rising dramatically (could it really get any *worse?*) national pay rates are rising along with them, and there is more demand for 3D detailers in the AEC industry. It feels good to be a 3D MEP designer!
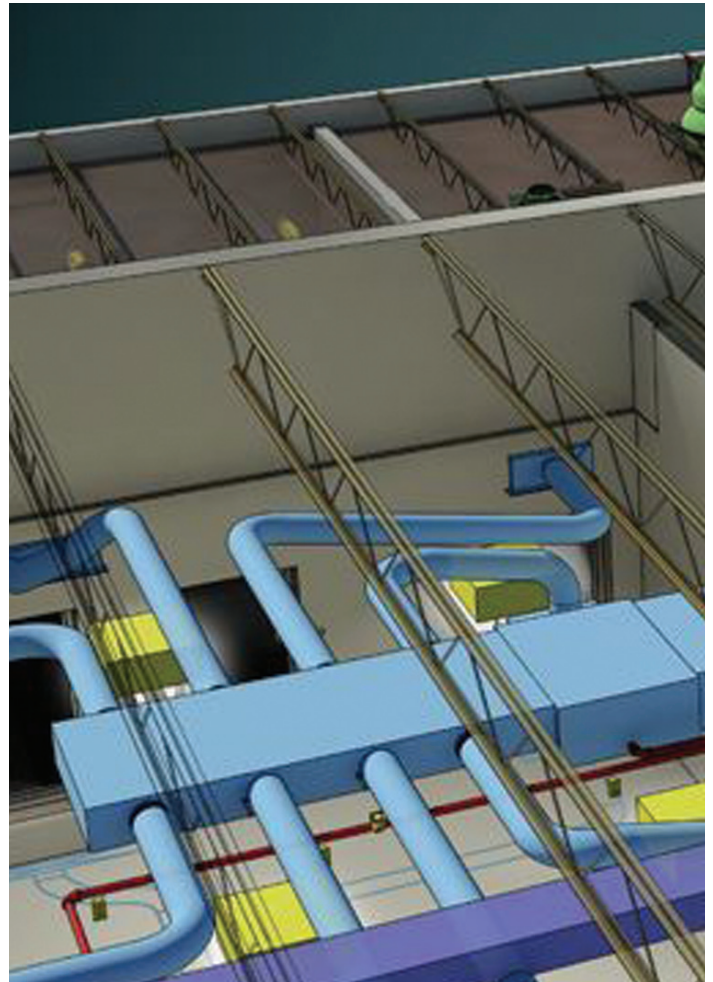
Bill Campbell lives in the San Francisco Bay Area, is an AutoCAD 2012 Certified Professional and works for a top engineering construction firm in San Jose, CA as 'BIM Lead'. He enjoys surfing and jogging the beach with his wife and dogs, snowboarding and traveling abroad. Bill previously owned and operated a 3D BIM firm in the Detroit area. He is quite adept to customizing and tweaking AutoCAD and other Autodesk products for ease of use & functionality, and actively beta-tests Autodesk's upcoming BIM-based software. He is currently working on standardizing BIM definitions within the AEC industry with his new project, "BIMkit".

Design Beyond the Desktop

In case you hadn't noticed, computers these days are far more than the large boxes collecting dust under your desk. Computers are getting faster, more powerful, and—most importantly—more portable than they've ever been before.

This new mobile computing environment provides boundless opportunities for architects, engineers, and the firms that employ them. Namely, the AutoCAD® WS web and mobile apps means that DWG files are no longer tied to a single desktop computer or even to a server environment. Instead, they can be accessed, viewed, edited, and shared from almost anywhere in the world via a web browser, smartphone, or tablet. Imagine the possibilities.

Getting started with AutoCAD WS is simple. Creating an account is fast, free, and easy, and it only takes a few clicks to download the apps from the App Store or Android Market. Log in, connect, and you're ready to take your designs to the cloud.

AUTODESK 360 AND THE POWER OF THE CLOUD

Autodesk® 360 is a new offering from Autodesk, a cloud computing platform that helps users dramatically improve the way they design, visualize, simulate, and share their work.

Two basic features of Autodesk 360 are file storage and collaboration—both of which are fully integrated with AutoCAD WS. All Autodesk 360 accounts get 3GB of storage space, which can hold just about any file type. Click on the actions menu for any uploaded DWG, and you'll see "Edit Online in AutoCAD WS."
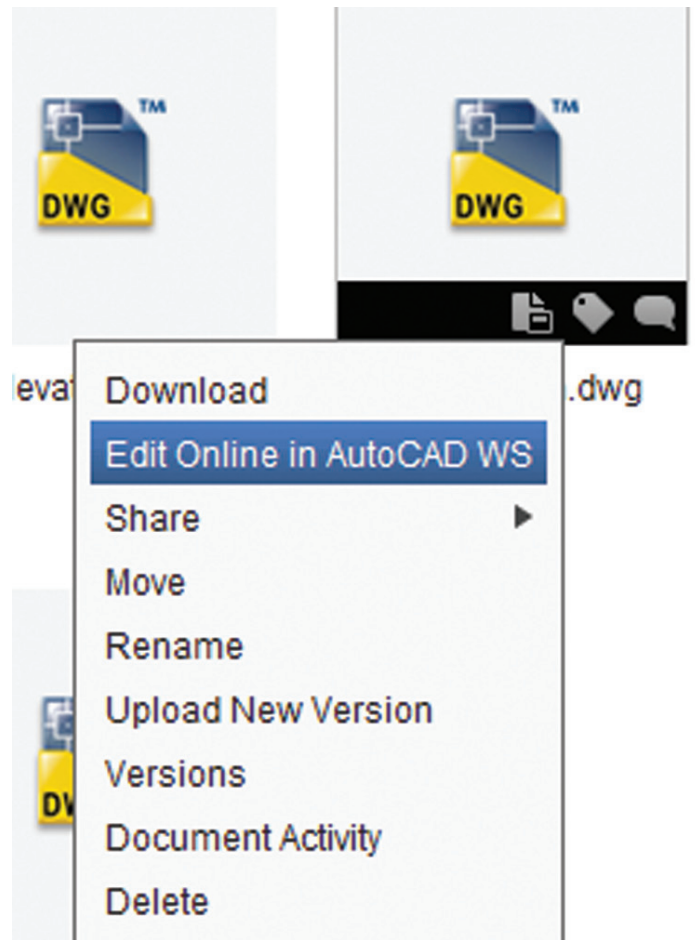
AutoCAD WS

Also, any files you upload to your Autodesk 360 account are automatically synced to your AutoCAD WS mobile app.

With Subscription, you can get even more out of Autodesk 360, including a whopping 25GB of storage per account, plus access to additional cloud services such as Autodesk 360 Rendering, Optimization for Inventor, and Structural Analysis and Energy Analysis for Revit, depending on what product or suite you have purchased. For more information, visit http://360.autodesk.com.

WHY EVERYONE SHOULD USE AUTOCAD WS

What if you still haven't convinced the boss to buy you a tablet to take on your site visits? Before we even get into the latest and greatest features of AutoCAD WS, here are five points you can use in your argument that mobile CAD should be part of your firm's toolbox.

1. Better Portability. With AutoCAD WS, your entire drawing set fits in the palm of your hand. No more heavy, bulky drawing rolls. No more searching for a pen that actually has ink. And no more chasing after drawings that blow away in the wind.

2. Secure File Storage. The servers that AutoCAD WS and Autodesk 360 use for drawing storage provides as much security as online banking, but if you still don't want to use it, that's okay, too. You can connect to your own infrastructure instead, accessing data stored in Autodesk Buzzsaw®, DropBox, MobileMe, Microsoft SharePoint, or even your own file servers via WebDav.

3. Real-time Collaboration. AutoCAD WS makes it easy to share drawings with clients or colleagues instead of sending PDFs or paper copies. And since edits and markups are synced with the cloud instantly, if someone else is viewing the drawing at the same time, they'll see the edits instantly, too. If you're both using a browser-based version, the screen display is also synced, so you see the exact same thing at the same time.

4. Online and Offline Editing. You don't have to have an Internet connection to use AutoCAD WS for iOS and Android. If you're out of cell tower or Wi-Fi range, your edits will be stored locally and synced the next time you go online.

5. Integration with AutoCAD. It almost goes without saying that AutoCAD WS uses native DWG™ technology, but I'll say it anyway: You can upload drawings to AutoCAD WS straight from within AutoCAD, and then open them seamlessly later.

And did I mention? AutoCAD WS is free. No charge. Gratis. Not only that, but if you already have an account to use the Autodesk Discussion Forums or Autodesk Labs, you don't even need to sign up again. Just use your current user name and password.

These reasons should be enough to convince almost everybody of the benefits of AutoCAD WS, but for those of you who want even more, the new features in 1.4 provide just that.

3D FILE VIEWING

AutoCAD WS 1.4 adds support for viewing 3D drawing files on your tablet or smartphone. (The browser-based version continues to support 2D elements only.)
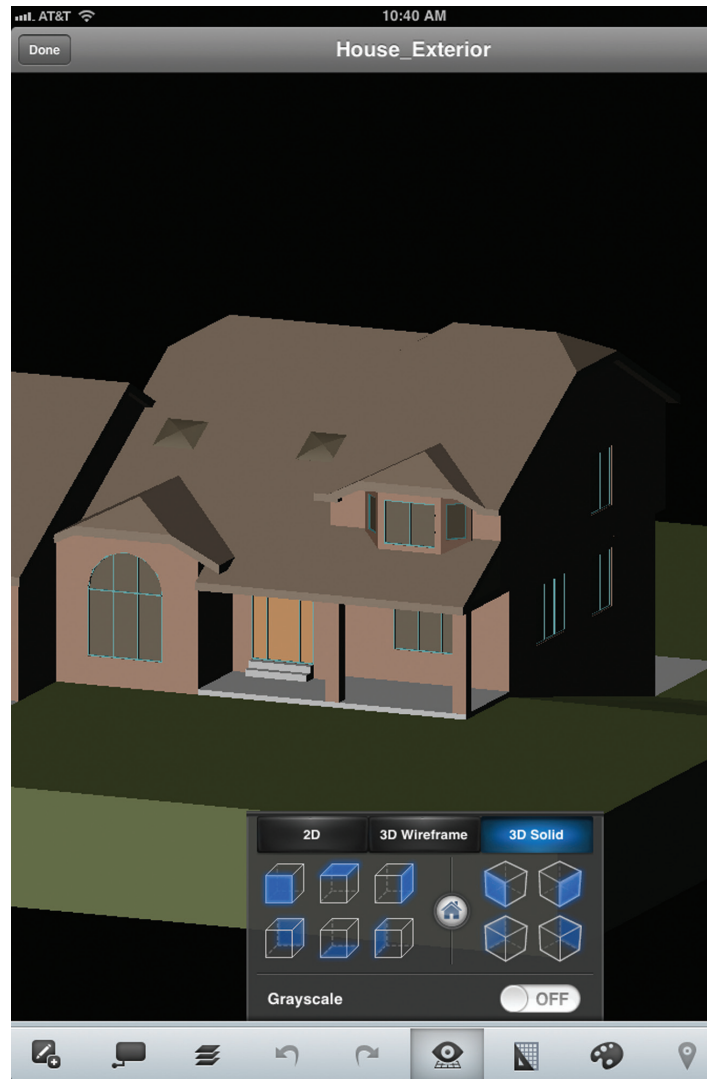
Figure 2: 3D Model and View toolbar

From the View toolbar, you can choose to display your model in 2D (i.e., a flat view), in 3D wireframe, or in 3D solid mode. You can also choose from 10 different preset viewing angles—six orthographic and four isometric—as well as the Home view, which restores the last saved view.

You can also use multi-touch gestures to navigate through a 3D model. Use a single-finger swipe to orbit the model around a fixed center point, or a two-finger swipe to pan. Pinching with two fingers also lets you zoom or rotate the model view.

GPS SUPPORT

The second new feature in AutoCAD WS 1.4 is GPS support, which enables you to identify your current position on a drawing and use it as the basis for marking locations as you move around the building or site.

(Side note: At some point after you upgrade your app version, you'll get a dialog with the message "AutoCAD WS would like to access your current location." You must choose "allow" in order to enable GPS positioning.)

The best part about this feature is that you don't need any geo-specific information in the drawing file before you get started. All you have to do is pull up the drawing on your mobile device, look for the Location toolbar, and choose "Set Location."
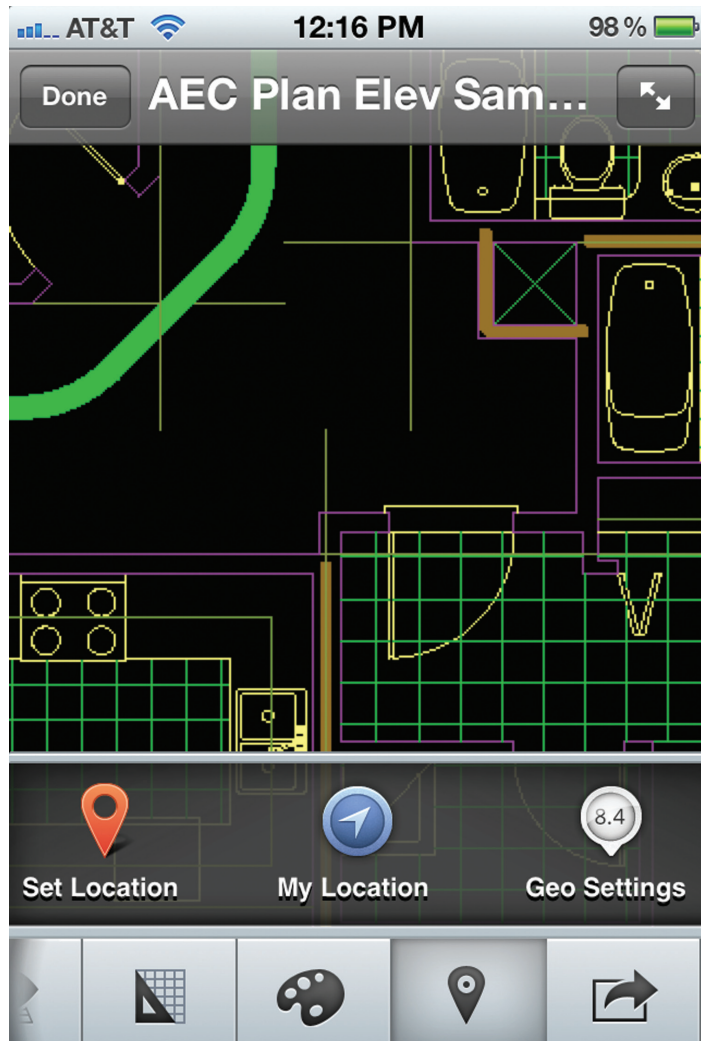
Figure 3: Location toolbar

Next, tap on the spot in the drawing that represents where you're standing. This puts a red pin on the drawing at your location and shows you the latitude, longitude, and altitude of your position. If you don't think the numbers are accurate, you can edit them yourself.

Once you've given AutoCAD WS one location, it will use that as the base point for your movements during the rest of the editing session. So if you walk to another room in the building and want to make a note about it, you can go back to the Location toolbar and choose "My Location."

Tap "Mark" to add a note, which will be placed on the drawing as a text object, along with two lines forming an X that identify where you were when you made the note.
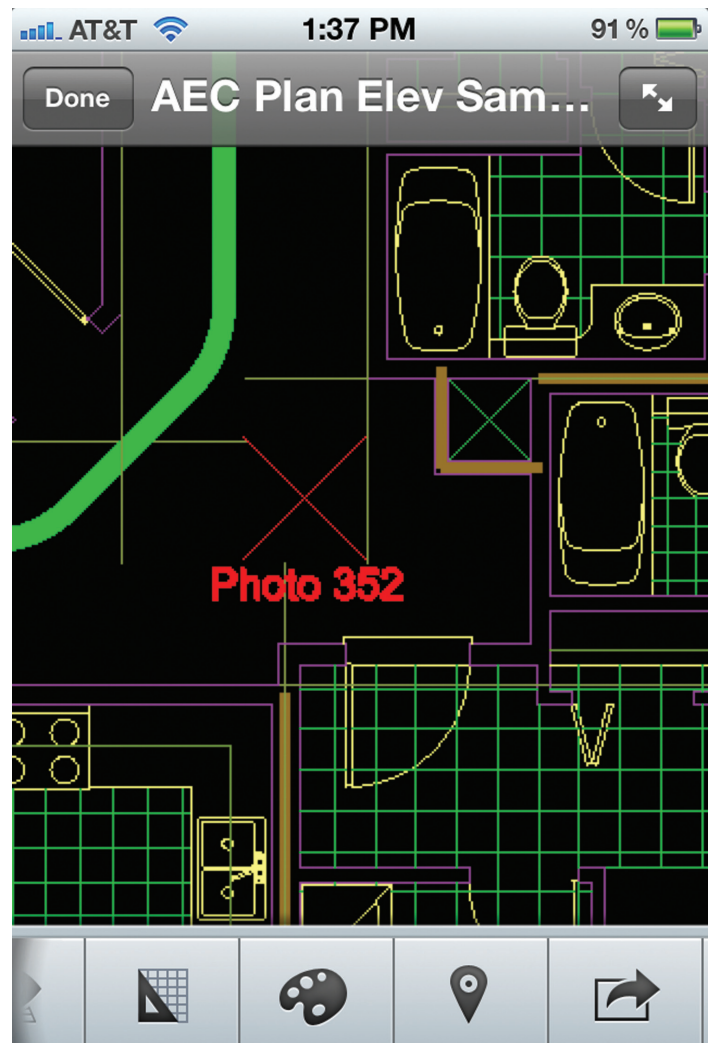
Figure 4: Result of marking location

If you don't want to keep setting your location in the app every time you access the drawing, you can use the Google Earth overlay feature in the browser version of AutoCAD WS. Once you've positioned your drawing there, the coordinates persist and you won't have to set them again.

PLOT TO PRINT
The last major feature in AutoCAD WS enables you to share your stored drawings with anyone, even if the person doesn't have an AutoCAD WS account.

When you go to the Output toolbar in AutoCAD WS 1.4, you'll notice a Plot icon in addition to the standard Share feature. This new icon brings up a dialog that has quite a bit in common with the standard AutoCAD plot dialog.

AutoCAD WS
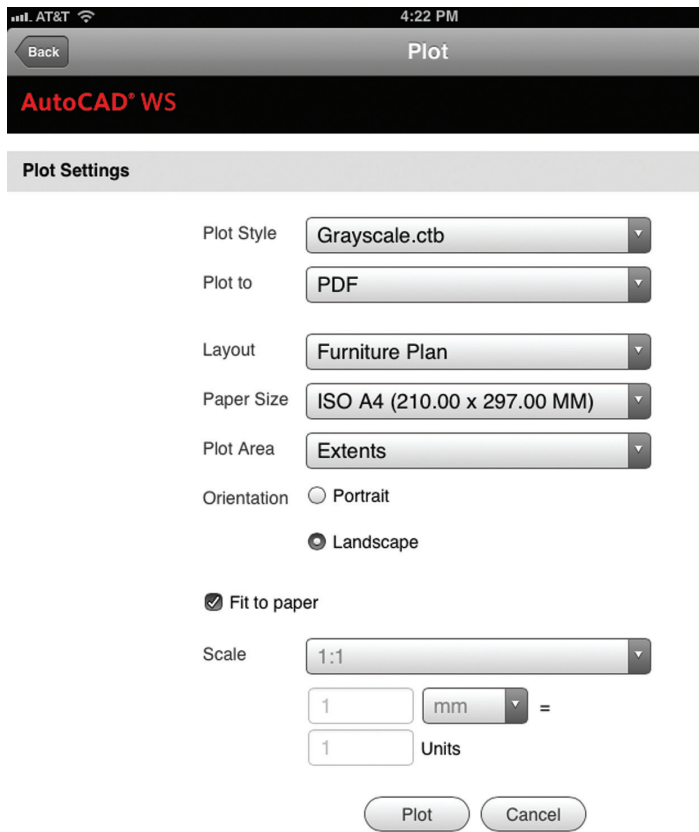
Figure 5: AutoCAD WS plot dialog

You can choose the plot style table, paper size, scale, and what to plot—one of your layouts or model space, drawing extents, or the current display. You can also select an output format—your choices are PDF, DWF, and "Add HP ePrinter" (more on that last option in a moment).

If you choose one of the electronic options (DWF or PDF), an email message is generated with the new file as an attachment. You could send it to yourself as a record copy, or to a client or colleague who needs to view the file.

HP EPRINT & SHARE

The last option in the "Plot to" menu is "Add HP ePrinter," and it's the result of an exciting partnership between Autodesk and HP. We've teamed up to enable you to create hard copy prints straight from AutoCAD WS—and completely wirelessly.

This is the only new feature in AutoCAD WS 1.4 that requires new hardware. For it to work, you must have one of HP's web-enabled ePrinters, like the large-format Designjet or the small-format Officejet, Laserjet, and Photosmart models. I did all my testing with a Photosmart 5510. (A Designjet won't fit in my office. Too bad.)

Setting up AutoCAD WS mobile printing was a three-step process.
1. Connect the ePrinter to my wireless network.
2. Create an ePrintCenter account to enable sharing on the printer.
3. Create an ePrint & Share account to enable printing from AutoCAD WS.

Step 1 couldn't have been easier. The Photosmart software came with an auto-connect feature that hooked the printer into my network with almost no effort on my part. (I love automated setups.)

Steps 2 and 3 were also quite simple, but remember that you do need to create both accounts. Setup is easiest if you use the same email account and password in both places, but it's not mandatory.

The other item worth noting is that for small-format printers, you must manually turn on Remote Printing from your ePrintCenter account. It's automatically turned on for Designjets, but not for desktop models such as my Photosmart.

Once you turn on remote printing, you're able not only to plot to your printer from your own mobile devices, but you can also give other people permission to plot to it as well. Be careful who you trust with your printer, though, or you might run out of paper very quickly!

Figure 6: HP ePrinter available for plotting

If a new plotter isn't in the cards for your office soon, you might also check with your local repro shop, to see if they have an ePrint-enabled Designjet you would be able to plot to.

If you're still keeping your files exclusively on one computer or server, it's time to look to the cloud.

It's worth restating that you do not need an HP printer to create and send PDF and DWF files from AutoCAD WS. But as of today, HP's ePrint & Share is the only way to get a hard copy from AutoCAD WS without any intermediate steps.
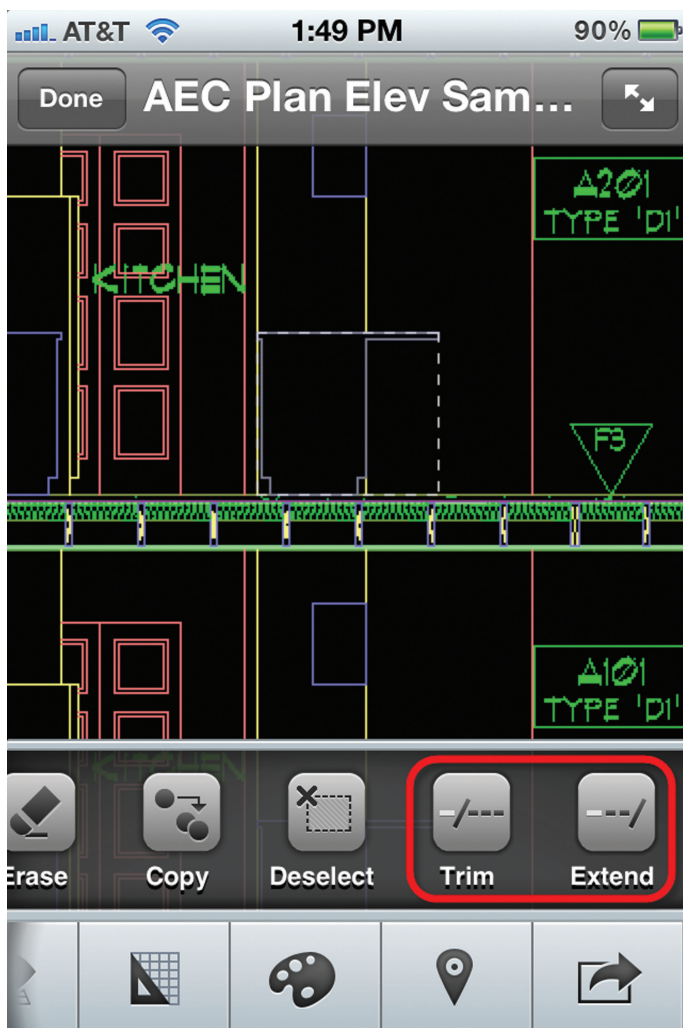
Figure 7: Trim & Extend in the Edit toolbar

BONUS FEATURES

AutoCAD WS continues to expand its 2D editing and mark-up capabilities with the addition of Trim and Extend to the Edit toolbar.

To use these features, first select the object or objects you want to uses as boundaries. Then choose the Trim or Extend command, and tap the object you want to modify.

CONCLUSION

In short, if you're still keeping your files exclusively on one computer or server, it's time to look to the cloud.

You won't find an easier way to get your feet wet with mobile CAD than AutoCAD WS, considering that it's free, reads native 2D and 3D DWG files, and is available in three versions that work on products you probably already own. (Or will own soon, if you use the logic in the first section of this article.)

Add in the new features available in this latest release, and the logic is practically unshakeable.

See you in the cloud!

Kate Morrical is a Technical Marketing Manager at Autodesk, focusing on AutoCAD, AutoCAD LT, and AutoCAD WS. She has over 10 years of experience with Autodesk products, beginning with AutoCAD R14, and worked as an engineer and CAD Manager prior to joining Autodesk. Kate can be reached by email at kate.morrical@autodesk.com, or on Twitter at @katemorrical.

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COLUMN

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

AUTODESK 2013 PRODUCTS

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

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

AUTOCAD® 2012

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

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

2011-Dec-08   Autodesk 2012 Content Explorer Service Hot Fix 2
http://goo.gl/RVIw6

2011-Sep-27   AutoCAD 2012 Service Pack 1
http://goo.gl/jM8kC

2011-Jul-13   AutoCAD 2012 Block Editor Save Corruption Hot Fix
http://goo.gl/U47H5

2011-Apr-01   Autodesk 2012 Content Explorer Service Hot Fix
http://goo.gl/6zU76

2011-Mar-23   Autodesk Material Library Medium Resolution Image Library 2012
http://goo.gl/cHnq3

AUTOCAD LT® 2012

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

2011-Dec-08   Autodesk 2012 Content Explorer Service Hot Fix 2
http://goo.gl/5WXMh

2011-Sep-27   AutoCAD LT 2012 Service Pack 1
http://goo.gl/WuDx4

AUTODESK® REVIT® ARCHITECTURE 2012

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

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

2011-Dec-13   Hotfix - Autodesk Revit Server 2012 - Improve stability when uploading to Revit Server
http://goo.gl/dCJCS

2011-Oct-11   Hotfix – Autodesk Revit 2012 – Apply material family parameters using the Paint tool
http://goo.gl/Oduwc

2011-Jul-13   Revit Architecture 2012 Deployment Utility
http://goo.gl/4UBPQ

2011-Jul-13   Hotfix - Incorrect Ribbon Icons
http://goo.gl/eR6IK

AUTODESK® INVENTOR® PROFESSIONAL 2013

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

2012-Mar-09   Mold Design Content Libraries for Autodesk Inventor Professional 2013
http://goo.gl/O9IaO

AUTODESK® INVENTOR® PROFESSIONAL 2012

2011-Dec-12   Hotfix - Multiple Issues Addressed (see Summary and readme file)
http://goo.gl/z33ow

2012-Feb-23   Hotfix - Unexpected exit when opening drawing file & drawing browser stability enhancements & Unable to use API to create GeometryIntent for curves
http://goo.gl/gDDK0

2012-Feb-16   Hotfix - Assembly created in Productstream Professional 2011 fails to open in Inventor 2012
http://goo.gl/hxTA8

2012-Feb-16   Hotfix - Poor performance in Tube and Pipe update
http://goo.gl/VYGi2

2012-Feb-03   Hotfix - ScreenUpdating property changes to True when another window gets the focus & stabilty issues (see Summary)
http://goo.gl/GdExi

2011-Nov-23   Hotfix - Task Scheduler Check-In corrupts BOM/Error 1200 on Item Assign & Cannot use the iLogic Add Rule
http://goo.gl/44F3b

2011-Nov-18   Hotfix - Projected edge will not select as a closed loop for offset
http://goo.gl/G6fk0

2011-Nov-29   Hotfix - Multiple Issues (see Summary and readme file)
http://goo.gl/O6BT7

AUTOCAD® ARCHITECTURE 2012

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

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

2011-Dec-13   AutoCAD and AutoCAD LT 2012 SP1 Ribbon Hotfix
http://goo.gl/6mfcE

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

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

2011-Sep-29 AutoCAD Architecture 2012 Service Pack 1
http://goo.gl/Qf2zm

2011-Aug-30 AutoCAD Architecture 2012 & AutoCAD MEP
2012 - Localization Hotfix: Corner Windows
http://goo.gl/cJmEU

AUTOCAD® CIVIL 3D® 2012

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

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

2011-Dec-08 AutoCAD Civil 3D 2012 Update 1
http://goo.gl/AkgDX

2011-Nov-14 AutoCAD 2012 Performance Slowdown Hotfix
(32/64 bit)
http://goo.gl/Ebi47

2011-Sep-07 Hotfix - Prospector Lock-up
http://goo.gl/T2mTx

2011-Jul-13 AutoCAD 2012 Block Editor Save Corruption Hot
Fix
http://goo.gl/G6hpz

2011-Jun-23 Autodesk Infrastructure Design Suite Network
License Hotfix
http://goo.gl/yJ54v

AUTOCAD® MAP 3D 2012

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

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

2011-Sep-14 Localized UI Hotfix
http://goo.gl/ER6Ek

2011-Aug-10 Autodesk® Infrastructure Administrator 2012 Feature
Rule "Check Perimeter" Hotfix (for AutoCAD Map
3D 2012)
http://goo.gl/2QlRN

AUTOCAD® MECHANICAL 2012

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

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

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

2011-May-11 Localization Hotfix for AutoCAD Mechanical 2012
Chinese Simplified, Chinese Traditional and Korean
32bit - Side-by-Side with AutoCAD Mechanical 2011
http://goo.gl/tZ1HH

AUTODESK® 3DS MAX® 2012

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

2011-Sep-29 Backburner 2012.1
http://goo.gl/yTVIV

2011-Sep-23 Hotfix 1 – Autodesk® 3ds Max® 2012
http://goo.gl/nzMVl

2011-Sep-23 Hotfix 2 – Autodesk® 3ds Max® 2012
http://goo.gl/HVJkx

AUTODESK® ALIAS® 2012

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

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

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

2011-Jun-17 Hotfix - Imported B-Spline surfaces from CATIA V5
are over extended with DirectConnect 2012
http://goo.gl/x9zCR

AUTODESK® MAYA® 2012

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

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

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

2011-Aug-12 Composite 2012 Hotfix
http://goo.gl/HTBfc

2011-Aug-03 Hotfix - Unable to open CATIA V5 R20 files with
DirectConnect 2012
http://goo.gl/o4YFy

2011-Aug-01 Autodesk Maya 2012 Hotfix 4
http://goo.gl/eKtZT

AUTODESK® NAVISWORKS® MANAGE 2012

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

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

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

AUTODESK® VAULT 2013

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

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

AUTODESK® VAULT 2012

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

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

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

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

2011-Sep-30 DWG UDP Update
http://goo.gl/1ljfP

by: Marcello Sgambelluri and Jay B. Zallan

Adapting to Mass Change: New Tools in Revit 2013

Spring is in the air, the time has been adjusted to save us daylight, and that can mean only one thing…well a lot of things, but for Autodesk® Revit® users this time of year means one thing in particular: New Releases!

In advance of the releases we are proud to bring you what we feel are the major upgrades and enhancements to Revit Architecture 2013. Enjoy!

PART 1: DIVIDE PATH AND REPEAT
By: Marcello Sgambelluri

SUMMARY
Divide Path and Repeat are brand new commands in Revit 2013. They both are used in the mass modeling environment and the adaptive component environment. These new features are beneficial to all users because they simplify the design and modeling process by allowing components to be repeated in a very controlled manner. This article will begin by explaining these and other new features and how to take full advantage of them.

THE DIVIDE PATH COMMAND
THE CONCEPT IS NOT THAT NEW
Divide Path allows the user to simply select lines, arcs, circles, partial ellipses, ellipses, splines, Hermite curves, and edges of forms and divide them into any desired amount of segments as shown in Figure 1.

Dividing an element in the mass or adaptive component environment is nothing new. Users always had the ability to divide a surface into a "grid" since the new massing tools were introduced in Revit 2010 (see Figure 2).

The Divide Path command is this same concept except instead of dividing surface

Figure 1: The Divided Path
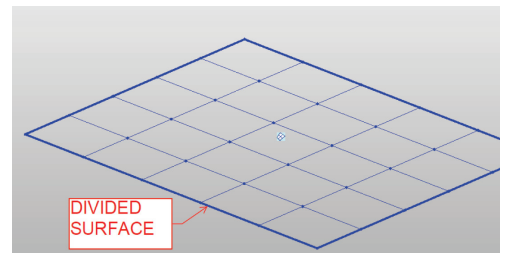
Figure 2: The Divided Surface

elements you are dividing line elements. Also, the divide surface element and the divided path element have the same properties including number of divisions, node visibilities, intersections, and the ability to host other elements at its nodes.

CREATING A DIVIDED PATH
Creating a divided path is extremely easy. Create any line in the mass family environment, adaptive component environment, or in-

Figure 3: The Divide Path command

place mass environment. Select the "curve" and click on the "Divide Path" command as shown in Figure 3.

A new element will be created called the "divided path" that hosts divided nodes along its length. It is important not the get the divided nodes confused with the reference points.

Figure 4: The Divided Path and its properties box

This new divided path element is completely separate from the curve that was used to create the divided path. This is the same concept as the divided surface element being independent of the mass surface that was used to create it.

The number of divided segments could be changed in the properties box or parameterized as shown in Figure 4. The divided path nodes could also be defined by none, fixed number, fixed distance, max distance, or min distance.

The divided path has options to toggle the path on or off or the divided nodes on or off. Nodes could also be added to the path via the Intersects command, as shown in Figure 5
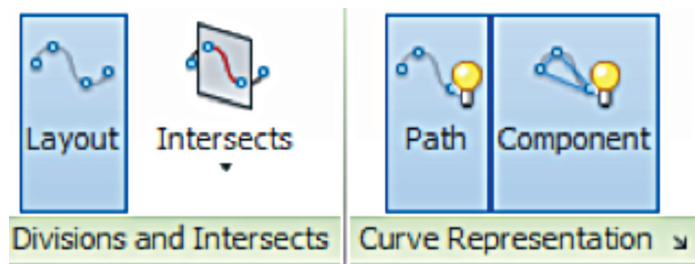
Figure 5: Curve representation and the Intersects commands

NEW REPEAT COMMAND
INTRO
A repeater is a separate element that is simply a collection of adaptive components repeated along a divided path or divided surface. Previously, if a user wanted to create repeating components he would have to copy them manually, but not any more. The repeat command takes the busy work out of copying multiple components.

CREATING REPEATERS
ONE COMPONENT ON A DIVIDED PATH
To create a repeater or to use the repeat command, the user must have a minimum of one divided path or divided surface and one adaptive component with one placement point. However, this is not the only combination of divides and adaptive components that creates a repeater. There are an endless number of combinations of these elements that create repeaters.

To explain the repeat command, let's focus on the simplest of repeaters that consists of one divided path and one adaptive component with one placement point. The following example will show how to use the repeat command to place multiple columns.

First, create a divided curve or curves as shown in Figure 6. Create an adaptive component that is made up of a simple cylinder to represent a column. This adaptive component contains only one placement point. Place or host the adaptive components placement point on the divided path's node as shown in Figure 6.

Figure 6: Placing a component on a Divided Path

Revit Architecture 2013

Select the adaptive component and select the repeat command shown in Figure 7.
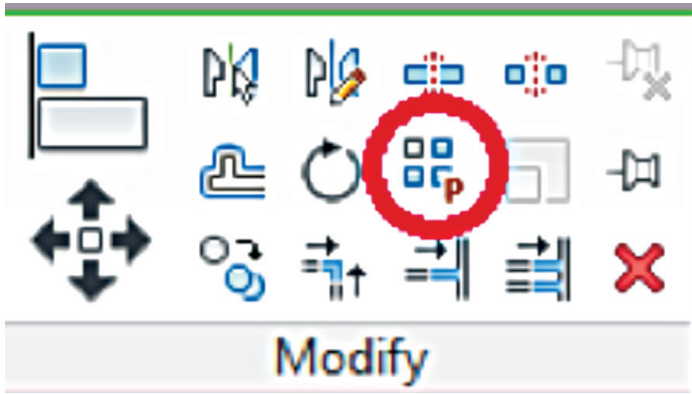
Figure 7: The Repeat command

Change the number of divided path nodes from 6 to 12 and the columns instantly update as shown in Figure 8.
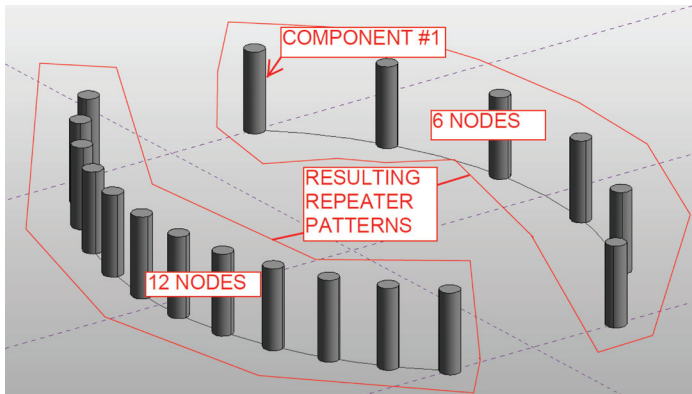
Figure 8: Repeater Pattern with 1 component on a Divided Path with varying modes

Note: The original adaptive component is "consumed" by the repeat command and in its place is a completely new element called the "repeater." The repeater consists of the repeating adaptive components, but the adaptive components properties are no longer available to the user.

TWO COMPONENTS ON A DIVIDED PATH

The above example covers one adaptive component; however, the user could elect to use two or more adaptive components to create a repeating pattern. To do this, simply follow the steps in the previous section and place two adaptive components as shown in Figure 9. When the repeater command is selected, Revit will "interpret" the intended repeater pattern and return a result as shown in Figure 9.
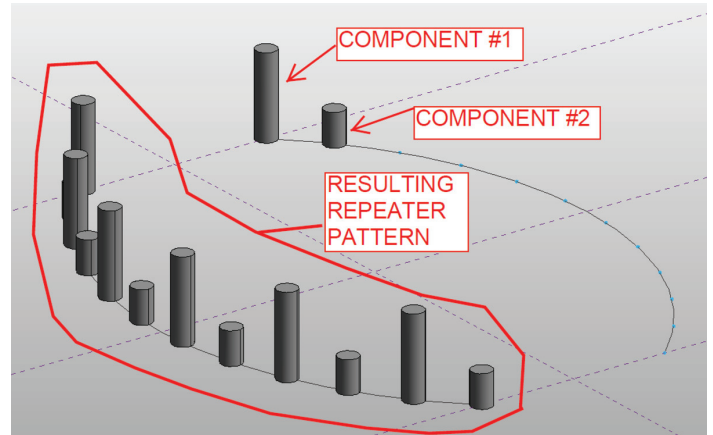
Figure 9: Repeater Pattern with 2 components on a Divided Path

TWO COMPONENTS ON A DIVIDED SURFACE

Repeaters are not limited to divided paths. The repeat command could be used to repeat components on a divided surface as well! Creating a repeater on a divided surface is similar to creating it on a divided path. First create a divided surface from a mass element, then turn on the nodes of the divided surface.

To turn on the nodes, click on the surface, click on the arrow next to the words "surface representation," and then toggle on the nodes in the dialog box as shown in Figure 10.

Once the surface nodes are turned on, place the same single placement point adaptive component as shown in Figure 6 on the divided surface shown in Figure 2 and follow steps 4 thru 8 in the previous section. The resulting repeater pattern is shown in Figure 11.
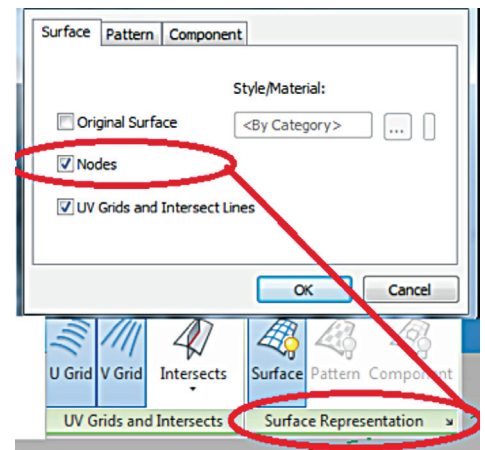
Figure 10: Turning on Surface nodes
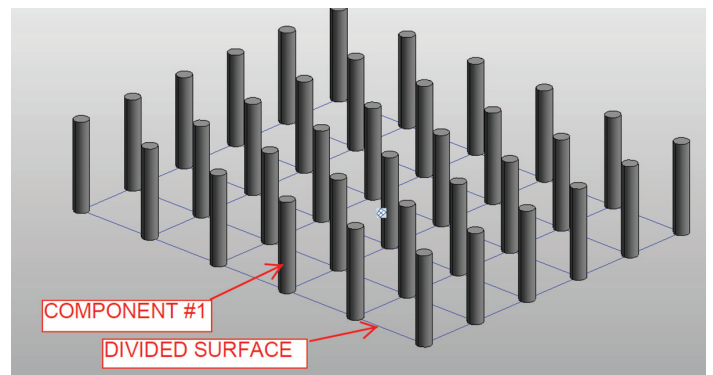
Figure 11: Repeater Pattern with 1 component on a Divided Surface

OTHER POSSIBLE COMBINATIONS TO CREATE A REPEATER

The examples above show only three simple types of repeaters that are created from combinations of divided elements and single placement point adaptive components. Figure 12 shows all possible repeaters that are results from the combination of a simple, single line, 2 placement point adaptive component and divided elements.

Note: The repeater element also could be created from using 3 or more placement point adaptive components. The combinations are endless; however, this article will only show the 2 point case.
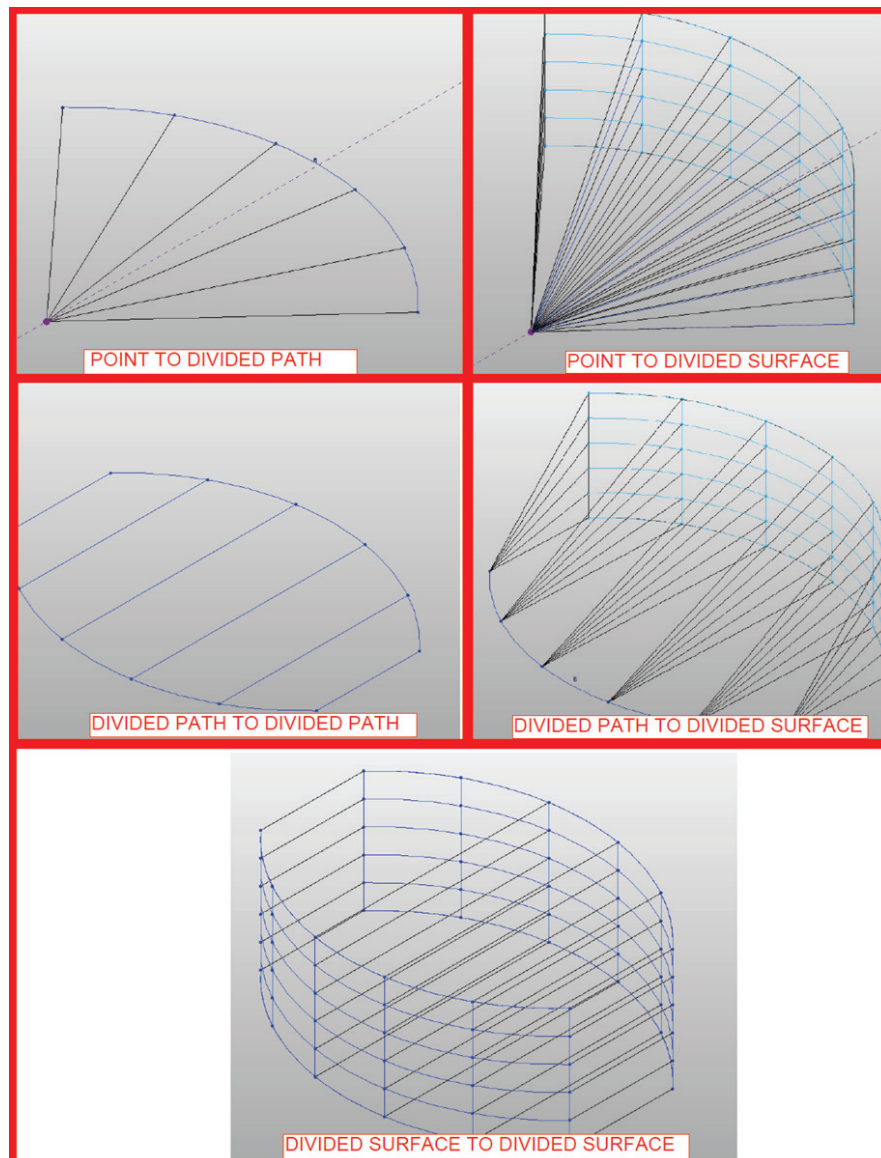
Figure 12: Repeater Patterns resulting from 2 placement point adaptive components

MASS/ADAPTIVE CLOSING REMARKS
THE DIVIDE PATH COMMAND

The divide path command creates nodes at discrete locations along a curve and can host adaptive components that could be used to create a repeater element.

Don't forget that the divide path command has other uses. For example, it could be used as an in-place mass line that is divided into equal segments to help aid in modeling beams, walls, or floors that need to be spaced at equal segments.

THE REPEAT COMMAND

The repeat command removes the "busy work" from the user by creating multiple copies of adaptive components on a uniformly divided path or surface. A "repeater" element is the result. This repeater element is only a visual representation of multiple copies of an adaptive component and is limiting.

Once the repeater is created the individual properties of the original adaptive component cannot be modified, changed, scheduled, etc. by selecting the repeater. If you wanted to adjust the adaptive components properties, you would have to first edit the original component then "reload" the component back into the host repeater.

After reading this article it should be clear how to use the divide path and repeat commands. I am excited to see what the Revit community does with these new tools. Be creative, take full advantage of these new commands, and remember: they do not have to be used only for their intended purposes. Good luck.

ADAPTING TO MASS CHANGE PART 2: ARCHITECTURE TOOLS
By: Jay B. Zallan

SUMMARY

There are many new enhancements as with all new releases, and Revit 2013 is no exception. This portion of the article will focus on a few big changes: One Box, Materials, and Stairs. While we will mention many other smaller additions, tweaks, updates, and functionalities, we will focus on those three big ones.

THE ONE BOX PRINCIPLE

Concept: One Box
Result: One Box

All flavors of Revit are now available in (you guessed it) One "Box" (or "One File" if you download). You can still use more boxes, but why would you? One Box is the way to work, moving forward.

Interoperability and coordination are mainstays in the outlook and marketing for Autodesk products and now having Revit as "One Box" brings BIM teams and tools more in line with that vision. Perhaps the biggest beneficiaries will be contractors and integrated teams most of all. A positive step for AEC for certain!

Revit Architecture 2013

GENERAL UPDATES: PLATFORM

REVIT.INI HAS NEW INSTALL SETTINGS TO HELP PROPOGATE SETTINGS TO MULTIPLE USERS

UI changes include Category "Filter List."
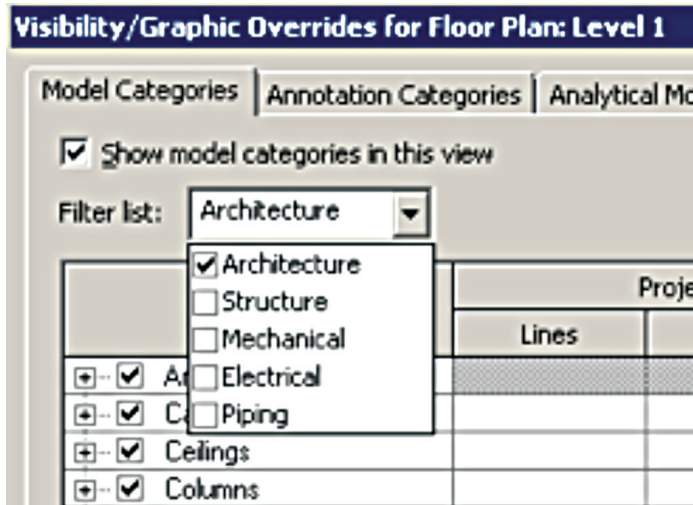
Figure 13: "Filter List"

Project Template files' Library support.
Selection Sets (formerly only in RST).
Command Name realignments.

GENERAL UPDATES: ONE BOX AND ALL

+ All tools and functionality available.
+ Separation of Mechanical, Electrical, and Plumbing tools via UI options.
+ Views automatically update when VTs are changed.
+ View Template (VT) assignment via View Properties.
+ VT property is schedulable and available in Browser Organizations.
+ View Creation discipline options are added.
+ Underlay orientations are available in View Templates.
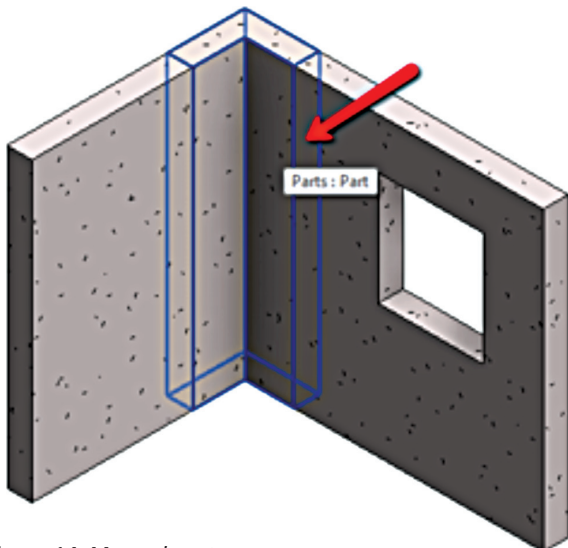
Figure 14: Merged parts

+ RCP Underlay Orientation defaults to "Reflected Ceiling Plan" if not controlled explicitly by a VT.
+ Color schemes are available in View Templates.
+ Workset "Global Visibility Settings" control.
+ Merging Parts (Figure 14 depicts two parts merged).
+ Exclude Parts from assemblies.
+ Shape Editing: All faces can be modified.
+ Divided Parts with Gap properties are enhanced.
+ Divided Parts with custom "Division Profiles" added (Edge Match, too).
+ Divided Parts parameters propogate.
+ Parts export to IFC enhanced.
+ Assembly Views and Editing improved.
+ Origin exposed.
+ File Import & Export enhanced.
+ "Correct lines that are slightly off axis" checkbox added during Import dialog.
+ Materials have been enhanced (explained later in this article).
+ Surface Transparency replaces Ghost Surfaces. Slider now gives from 0-100 by element, category, filter, and view.
+ Visual Styles enhanced (ray trace added, too).
+ RPC appearance in "Realistic Views." Can you say immediately better presentations from non-rendered views? (Just don't "work" in ray trace mode.)
+ Lighting and Photographic Exposer added to Realistic views.
+ Repeat & Divide (discussed in previous segment by Marcello Sgambelluri).
+ Worksharing and editing request enhancements. (What: New in Central? YES).
+ Cut with Unattached Family Void Instance enhanced to casework, furniture, and furniture systems.
+ Split Linear Dimension Strings.
+ Dimension Equality Text (and Formula). See Figure 15.
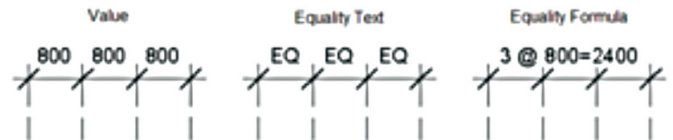
Figure 15

+ Multi-segment gridlines.
+ Double-click Zoom to Fit.
+ Type Duplication in Edit Group mode.
+ On-the-fly pattern definition.
+ Guide Grid dialog enhancement.
+ Stairs and Railings have been enhanced (explained later in this article).
+ Text editing enhanced (a bit).

That covers the majority of Revit Architecture 2013 enhancements and additions. Whether you are a contractor, architect, engineer, or fabricator you will surely have a lot of new power readily available. Next up: The two big things in Revit Architecture 2013.

Revit Architecture 2013

MATERIALS

A BRAVE NEW (OLD) WORLD

The materials in Revit have a whole new look and feel, not to mention enhanced functionality! More 'I' for BIM is available, as well as more 'V' for Visualization. (Also more #'s for Twitter.) If you have used other rendering tools you will notice a nice dovetailing of the new Revit Schema.
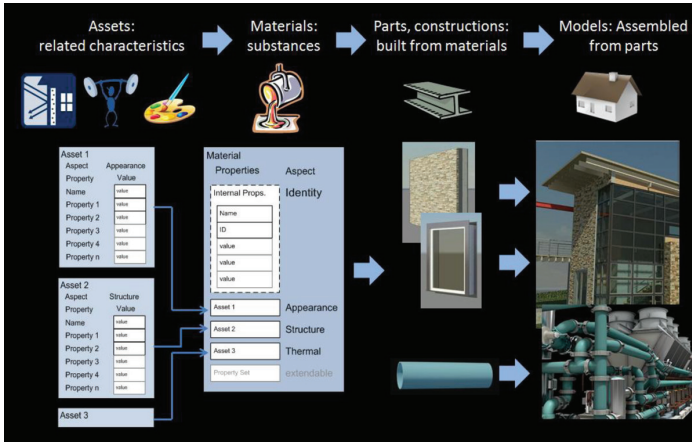
Figure 16: New Material Data Model schema

NEW MATERIALS DATA MODEL

The new schema allows much more information be carried throughout AEC BIM projects, via inter-related characteristics of assets, materials, assemblages, and models.

These characteristics include Appearance, Structural + Thermal Performance, and Substance Properties.

NEW MATERIAL USER INTERFACE

The three main components of the materials process are the Material Browser, the Material Editor, and the Asset Browser.
1. Autodesk Material Library
   a. This holds the main material definition as well as the individual asset information.
   b. Uses the .adsklib file extension.
2. AEC Material library
   a. A subset of the larger Autodesk library.
3. Materials found in the current Revit Project
4. Add to Project button
5. Add to Project and Edit
   a. Clicking this button will add the selected material to the project, make it active, and open the material editor for further manipulation or investigation.
6. Edit
   a. Clicking this button will open the Material editor where assets assignment and editing can happen.
7. Asset Browser
   a. The button at the bottom of the material dialog launches the Asset Browser where you can see all assets.
   b. The button on the individual asset 'tabs' also launches the Asset Browser. However, the list will be filtered by asset (i.e., thermal, physical, or appearance).
8. Assets that appear in the current project

9. Autodesk-installed "Favorites" Library
   a. Same as the library in the Material Browser, only filtered for assets.
10. Asset list
11. Appearance graphics for Assets. Thermal and Structural Assets don't have graphical representations so there will be nothing in this column when filtered on those assets
12. Click this button to assign this asset to the current material
13. Library controls (awesome)
    a. Create a new library.
    b. Remove a library.
    c. Rename a library.
    d. Add categories, etc.
14. Create new Material
    a. When you click on this from the Material Browser, you get a blank Revit Material—fresh for you to start adding assets.
    b. When you click on this from the Material Editor, you have the option of creating a new material or duplicating the current one.
15. Custom Parameters accessed via dialogs

The new material schema are aligning several Autodesk product workflows and brings a consistency that we have long requested. Now we just need to realign our internal processes so as not to destroy materials while we learn and devise our own new methods.

Remember your #BIMandments: "If you make type changes to objects, then duplicate them first." This applies to materials, too.

HOW DETAILED?

To get the conversation going about Materials workflow, I offer this up: How detailed do you need (not just want) to get? 12.0 ksi Concrete? Well yes, it's high strength and it knows such.

The physical assets get us more 'I' for our BIM Models (sorry, fluffy kittens, #BimModelingFluffyKittenKillas are at it again). Now we simply must plan in what level of development we want or need these different assets included.

The underpinnings and perhaps hidden truth of the new Materials environment is its logical progression: Asset>Material>Assemblage>Model.

Combine the Materials environment and interface with the knowledge that underneath (way underneath) a material's surface appearance is the ability (if not necessity) to place very granular information and behavior, and you will be well on your way to getting much more bang for your BIM bucks and better presentations as well.

STAIRS, RAMPS, RAILS
THE GOOD

The stair tools are getting good attention from The Factory, including more visibility control and riser annotations (yes, numbers).

Spiral/Helical and Overlapping Stair runs can now be done as one object each. YAAY!!! This is a major upgrade in functionality and

we look forward to the further development and completed implementation of these tools.

Figure 17: The new stairs

Figure 18: Sketch Mode of overlapping, custom stair (69 risers if you were wondering). All clicks were overlapping, yet gave no issues with the stairs themselves.

The stairs available now are:
+ Full-Step Spirals
+ Center-Ends Spiral
+ L-Shaped Winders
+ U- Shaped Winders, and of course
+ Straight
+ Create Sketch

Use the Straight tool to get custom stairs with landings, similar to previous releases. This time, though, you can *I repeat 'can'* overlap the runs, treads, and risers (see Figure 18). Revit can now figure these 'overlapping' stairs out; unfortunately, rails have issues with this new functionality.

THE BAD AND THE UGLY

In certain situations a lot of errors are generated in the attached railing objects to some types of stairs and designs (the dreaded sketch lines overlapping warnings). While there is cause to celebrate the stair enhancements as wonderful, it is tempered by incomplete implementation and lack of clean functionality in Railings.

THE FUTURE LOOKS BRIGHT

The upgrades to the entire line of the Revit family will surely bring benefit to all BIM team players, even with the small inconveniences and anomolies that one may find with new tools. I am confident that most, if not all, issues will surely be temporary.

In addition to reading the rest of this issue of *AUGIWorld*, please consult the "What's New" feature and documentation in Revit 2013 for all of the Final Release features and share that with your team.

Marcello Sgambelluri is the BIM Director at John A. Martin & Associates Structural Engineers in Los Angeles, CA. He has been using Autodesk products for over 15 years including AutoCAD, 3ds Max, and Revit Structure. He is a member of the ASCE-SEI BIM committee and continually speaks at structural professional conferences across the country. Marcello teaches classes regularly at Autodesk University that focuses on free form modeling in Revit and he beta tests the yearly releases of Revit. He has worked on many projects that incorporated complex geometry including the Walt Disney Concert Hall in Los Angeles, CA, the Stata Center at MIT, and the Tom Bradley International Terminal Expansion at LAX. Marcello received B.S. and M.S. degrees in Civil Engineering and is a licensed Civil and Structural Engineer.

Jay B Zallan is Director of BIM at Perkowitz+Ruth Architects & Studio-111, Jay brings unique & qualified insights into the business & creative processes of Architecture with proven strategies for production & growth. Mr. Zallan has over 20 years of Architectural experience and enjoys a varied & diverse portfolio of Architecture and Art. He is currently the President of the Los Angeles Revit Users Group, AUGIworld magazine Revit Architecture Content Manager, BIM Advisory Board member for Graphic Standards and he is a frequent lecturer on Creativity, BIM and Virtual Design & Construction. He can also be found presenting at Autodesk University, Revit Technology Conference and as a guest lecturer at the University of Southern California, LACMA, as well as many other industry & AIA events.

by: David Mills

AUGI Talks with Alice Palmer

Marketing Manager, Professional Customer Engagement Team

What's your role at Autodesk, Alice?

What's your role at Autodesk, Alice? I am part of the newly formed Professional Customer Engagement team, whose mission is to find ways to better engage with and support Autodesk's small business customers. Over the years, Autodesk has developed expertise at serving enterprise and larger SMB customers, and we want to extend that same focus to the growing number of small businesses in the design and entertainment industries. Our team is reaching out and talking to these professionals—from architectural designers to video editors—to better understand their needs. We will then develop strategies for Autodesk to address these needs through various products and services. If you work for a small company, feel free to give me a shout!

How long have you been with Autodesk and doing this? Any other roles?

I've worked at Autodesk for four years. I started in the Media & Entertainment division as a Marketing Manager for the Education team. Education was a fun place to work because I was interacting with tomorrow's designers and digital artists. There was no limit to their creativity—or their energy!

I then moved on to product marketing roles where I worked on Autodesk® 3ds Max®, the AutoCAD® Design Suite, and the AutoCAD® family of products. Although I've been a part of several different product and industry groups within the company, marketing has been the common thread. I've been a part of the Professional Customer Engagement team for about six weeks.

Tell us a little about your background and how you came to be doing what you do now.

I completed my undergraduate degree at Duke (Go Blue Devils!). I was in the pre-med program studying Chemistry and Public Policy. Odd combination? Yes. Wildly intriguing? Yes. After graduating, I decided to put med school plans on hiatus to follow a new interest (Media & Entertainment) and never turned back.

I've spent the majority of my career in the Media & Entertainment world and have been fortunate enough to interact with some of Hollywood's top talent. Prior to Autodesk, I worked in PR and Marketing at Avid Technology. I have a deep knowledge of video editing, special effects, and animation products, but I've loved the time spent learning about Autodesk's design software over the past few years.

Two years ago, I completed my MBA at Babson College and was valedictorian of my class. My MBA program was a great training ground for looking at business challenges cross-functionally, rather than just from a marketing perspective. It also taught me that you can still be an entrepreneur within a large organization!

What does a typical day look like at your desk?

Right now, I'm spending the majority of my time researching and learning about small businesses in the various industries Autodesk serves. That means talking to customers and prospects, managing research projects, combing through existing data, and even piloting some new ideas. I work on a virtual team that is distributed around

the US. I spend a lot of time on the phone and get out on the road as often as possible. Visiting with customers and understanding what success means to them is the most rewarding part of my job.

What kind of challenges do you and those you work with face?

Virtual teams have their pluses and minuses. It's great that we can recruit top talent, and location has a small (or non-existent) barrier. However, using the phone as a primary communication mechanism means that we lose our ability to use non-verbal communication. Luckily, video chat is helping with that!

As marketers, we are facing a rapidly evolving world of social media and mobile technology for reaching our customers. This presents both opportunity and challenge. We need to embrace change, stay on top of the trends, and be flexible enough to try new things—even when they're less proven.

Can you say how many people work with you or perhaps how the work you do is shared?

My team comprises three people, each of whom bring unique industry and marketing experience to the table. Since we're a new team, we have yet to formally delineate our individual responsibilities. At Autodesk, we often default to product, suite, or industry segments. Our team is using caution to do all the homework before drawing those organizational lines. It's a lot of fun to be part of a new team, and, at this point, we're all learning everything we can!

Do you have a role at Autodesk University or other events?

I take advantage of events like AU and National Association of Broadcasters Conference (NAB) by organizing focus groups and other customer- oriented interviews. It's hard to pass up opportunities when so many of our customers are in one place.

I've participated in other large Autodesk events, too. For example, I've delivered presentations at One Team Conference, hosted customer gatherings at Siggraph, and for the past four years have served as the National Technical Committee chair for the 3D Visualization and Animation competition at Skills USA, a competition for high school and college students.

What sort of things do you do for distraction, hobbies, travel?

If you asked me this question a year ago, I would've said food, wine, and travel! My husband and I author a blog together about those topics. My favorite spot in the US is Momofuko in New York City. There are a couple of different Momofuko restaurants in NYC, my favorite is Ko. The restaurant seats about a dozen people who watch the preparation of 15 courses—for lunch! The combinations and pairings are things that are much less than obvious, which only adds to the experience. The restaurant is very intimate. There's always an interesting conversation to be had. Last time we were there, we sat next to truffle farmers!

However… I'm a new mom, and my latest distraction and hobby is my beautiful baby girl, Annabelle Maye.

What would we be most surprised to know about you?

I've written a number of screenplays. In fact, I wrote a spec script for CSI. It wasn't ever produced…but it won an award at a screenwriting competition! My husband and I met because of our common interest in writing and production. We developed a web-based interactive television show, produced it, and shopped it around to a number of studios. Unfortunately, the concept was before its time, but I'm happy to say that I have been able to follow my passions throughout my life.

Where is your favorite place in the world?

Tough to say… In North America, my favorite spot is Nantucket, MA. We love the atmosphere, the food, the ocean air, and we can bring our dog. My husband and I escape to Nantucket at least once a year; usually around our anniversary. If you're in town, be sure to stop in and grab dinner at our two favorite places: American Seasons or Company of the Cauldron.

In Europe, my favorite country is Italy with Greece a close second. We really enjoyed Florence and Capri. Greece gets an honorable mention because Santorini's volcanic landscape is like nowhere else. My husband proposed to me in Buenos Aires so that gets my vote for South America. We had a blast in Morocco. When we visited Chaing Mai in Thailand, we were elephant 'owners' for a day. So many places, so little time – and still so much to see! :-)

Revit Platform 2013   by: Lonnie Cumpton

The All-in-One Revit
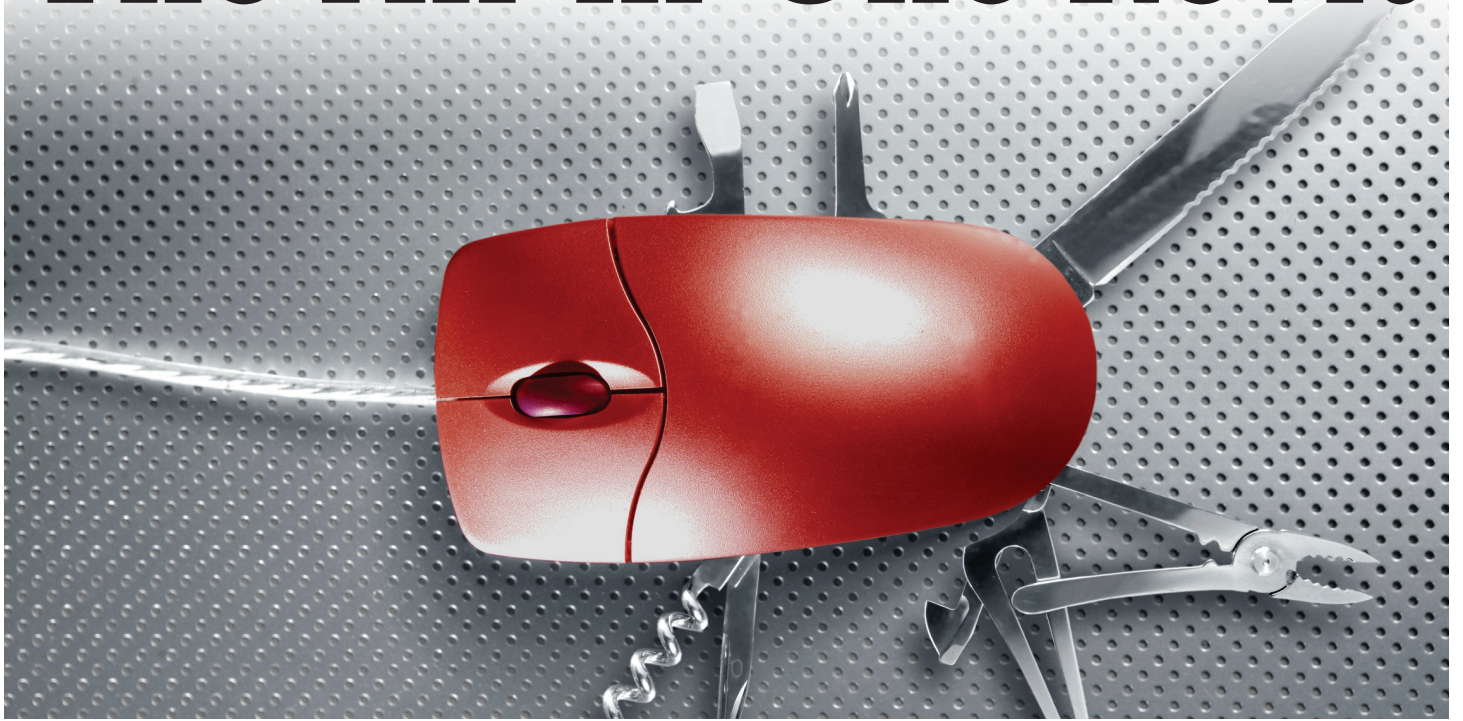
ast year Autodesk answered the call from many Autodesk® Revit® users to provide access to all the flavors of Revit without the requirement of buying each product individually. This came in the form of the Autodesk Building Design Suites. Some complained that the added expense of the suites meant we were still paying for the oth-er products, but if you look at the price point of the suites versus the products you get, the value is pretty clear. This year Autodesk is taking the Building Design Suite one step further by combin-ing Revit Structure, Revit MEP, and Revit Architecture into one product. The Revit community has been asking for this for years and now it is here. The first three ribbons, shown below, contain the industry-specific information.

Architectural
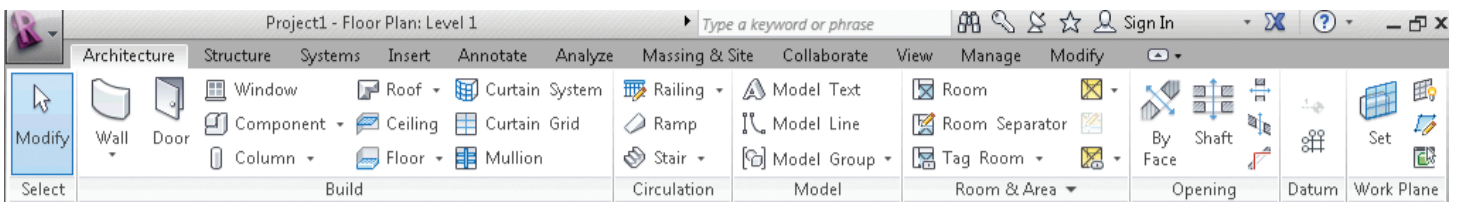
Structural
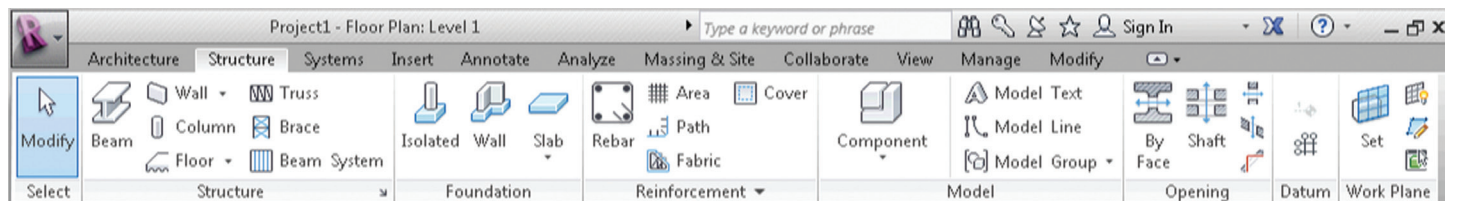
Systems – MEP
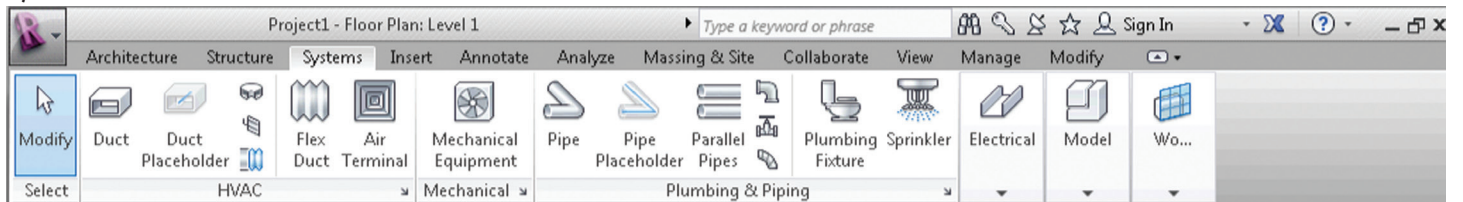
If you want a different ribbon order you can simply Ctrl-drag them into the order you want and Revit will remember this order when you restart.

The all-in-one Revit is available as part of the Building Design Suites. You can still get the industry-specific versions of Revit as individual products if you wish.

There are a few tools unique to the all-in-one Revit. For example, if you want to control what discipline tools are visible, you have a User Interface (UI) tool in the options area. Here you can select what you want to see.
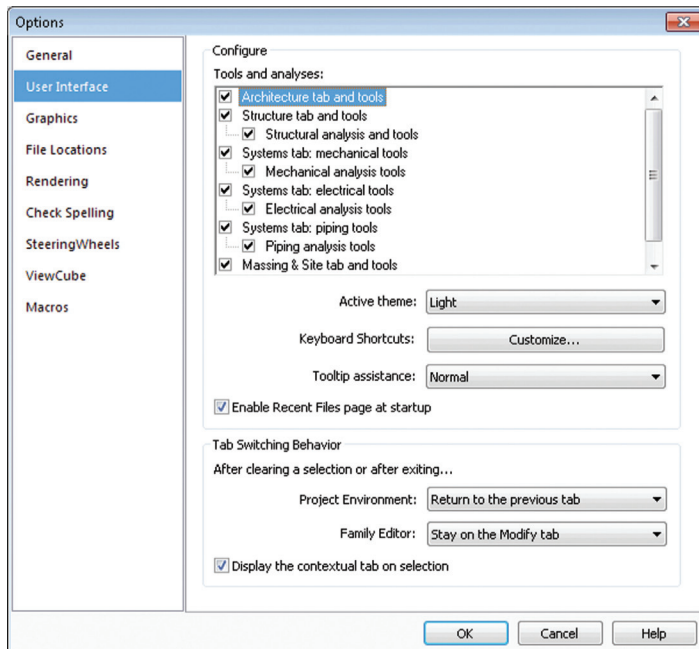
You can also preconfigure the discipline during the installation. For many companies this is a key element, allowing you to create deployments for the different UI configurations.

Most organizations will want to take a little time and consider this new all-in-one Revit before they start deploying this year. We now have several new variations that will help us support our users' needs. Workflows can now help us define how we deploy the product and what tools the different users need.

Although Revit has this all-in-one version now we still find that the product has four primary parts. You will find articles that focus on the Architectural, Structural, and MEP areas of the product. In this article we will focus on platform tools or tools that relate to all disciplines of the product.

CONSTRUCTION MODELING

Construction Modeling was introduced last year. It gives us several new tools and introduces us to the concept of Assembly drawings. To say that the concept of Assembly drawings was a success would be a major understatement. The challenge, as always, was that we wanted the tools to do more than they originally were designed to

do. In Revit 2013, Autodesk made several improvements in this area.

Merging parts: This tool allows you to take two or more parts and merge them into a single part. The key to this is that the parts must be overlapping and of the same materials. This is key in developing Assemblies. If you have a cast-in-place wall system you can now show the different castings even if they turn a corner. This tool also comes with add and remove functionality when it comes time to editing the merged objects later.

Shape Handles when editing parts: Now when you are editing a part you can enable Shape Handles by selecting the Show Shape Handles in the properties palette. This lets you do a quick, on-the-fly visual edit of parts. If you make an error when editing your parts you now have a Reset Shape tool that shows up in the Contextual ribbon.
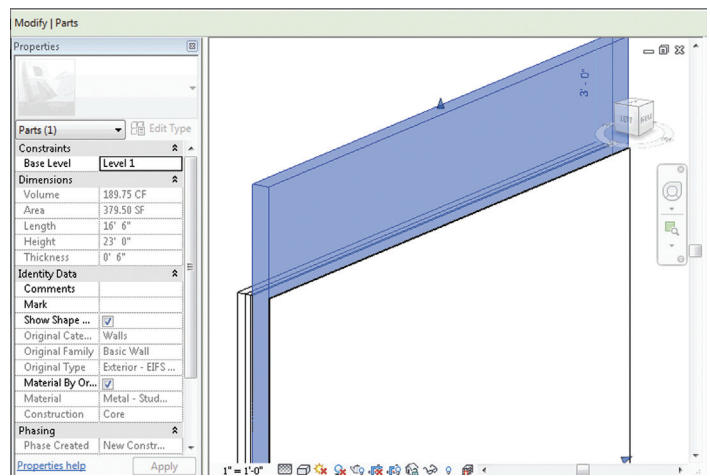
Divide Part with gap: This is very much like the "Split with Gap" tool that has been in Revit for years. The Divide Part tool now has "Divider Gap" option in the properties palette that lets you set a gap when dividing a part.

Divide parts with a custom profile: This is a new Profile Family type called Division Profiles. This allows you to specify a profile when you divide your parts. This functionality is critical when you are showing how parts fit together.
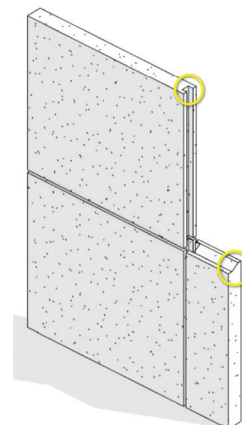
Revit Platform 2013

Parameter propagation: Parts will now automatically inherit parameter values from their source. This is key to keeping your assembly drawing coordinated with the rest of your documentation. This was a critical element missing in the first versions of the assembly and part tools.

IFC support for parts: If your current view has parts in it, the IFC Export tool will export the parts instead of the original element geometry. This has been an issue for organizations that use the Export IFC tool to communicate with members of the team who are not using Revit.

Assemblies: The creation of assemblies was available in last year's release. Unfortunately, some of the limitations of assemblies and their views caused many organizations to choose not to embed assemblies into their typical documentation process. This year the functionality of assemblies and their views have been improved in a number of ways to make them very usable as part of your documentation process.

+ The Create Assembly Views dialog box has several new options. Once you select the options, Revit will remember those options and the next time you use the tool it will be set the same way.
+ You can now use assembly views on non-assembly sheets and assembly sheets can now host non-assembly views.
+ You can now rotate assembly views to match your documentation needs.
+ Acquire Views is a new tool that allows you to transfer views from one assembly to another.
+ Assembly Origin is now visible and editable for each assembly. This allows you to build your views based on the geometry in the assembly as opposed to the project orientation.
+ Change Assembly types is new functionality that allows you to use the type selector to change the type of your assembly.
+ IFC Export of assemblies results in an ifcElementAssembly category.

Although several companies started using the "Construction Modeling" tools in Revit 2012, many never used them because of the name. Don't let the name fool you—these tools are great for creating assembly documentation that helps you organize your deliverables in ways that greatly improve them.

USER INTERFACE CHANGES

You will find that several small changes have been made to the UI of all the products to help make them more cohesive with each other. Part of this is to make the all-in-one product more fluid, but much of this was to make working in the individual products better.

Tool availability: Several tools that were available only in one product are now available in all. For example, the save and load selection tools from Structural are now available in Architecture and MEP. The site tools are no longer missing in the MEP product.

Consistent command naming and location: You will find that Tab naming and layout of tabs and tools are more consistent across all products. Also, the flow of tools seems to be more consistent in each of the products, making it easier to move from one to the other.

Category filter: In the Visibility Graphics dialog you will see that the checkbox for "show categories from all disciplines" is gone and a new filter tool is available. This allows you to quickly show one or many disciplines.
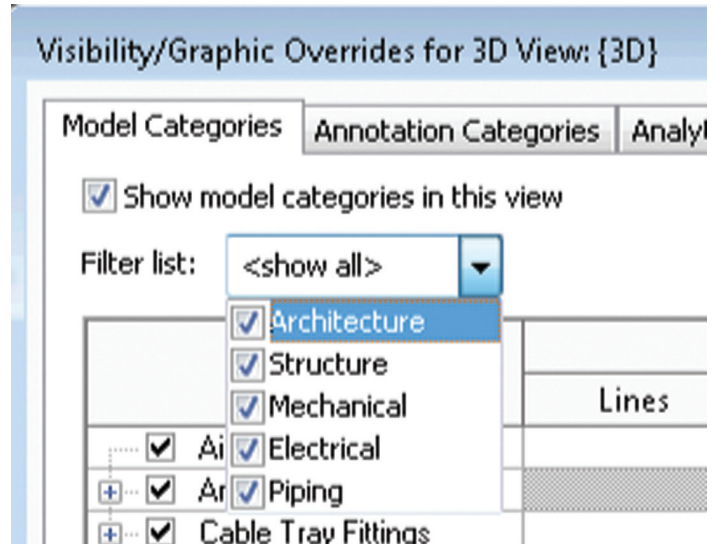
Revit options has a new look: When you open the options dialog in Revit you will see a completely new layout. Many of the tools are the same, but the flow of the new dialog is easier to navigate. One new option under file locations is "Project Template Files." As you customize these locations you will find that they also update the template links found on the Recent Files Page. This functionality is limited to the first five, but this is a great tool when setting up Revit for your office. You can also set these up in your deployment by using the Revit.ini file.
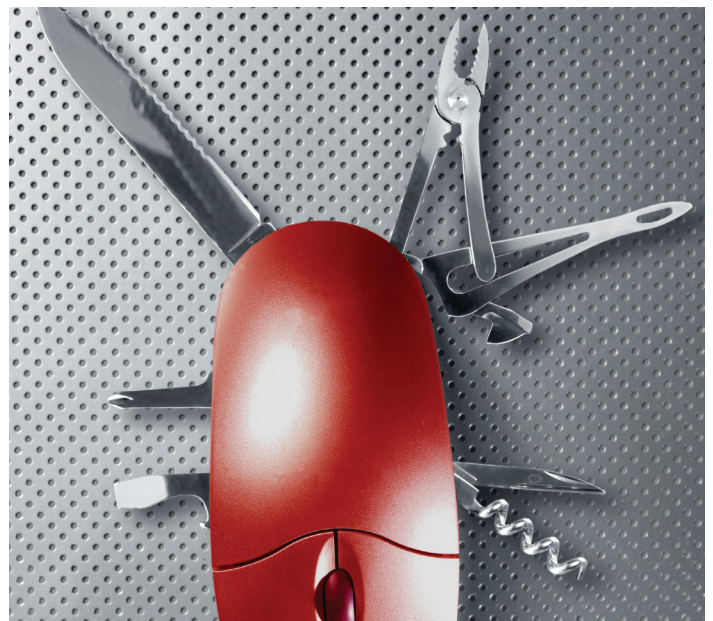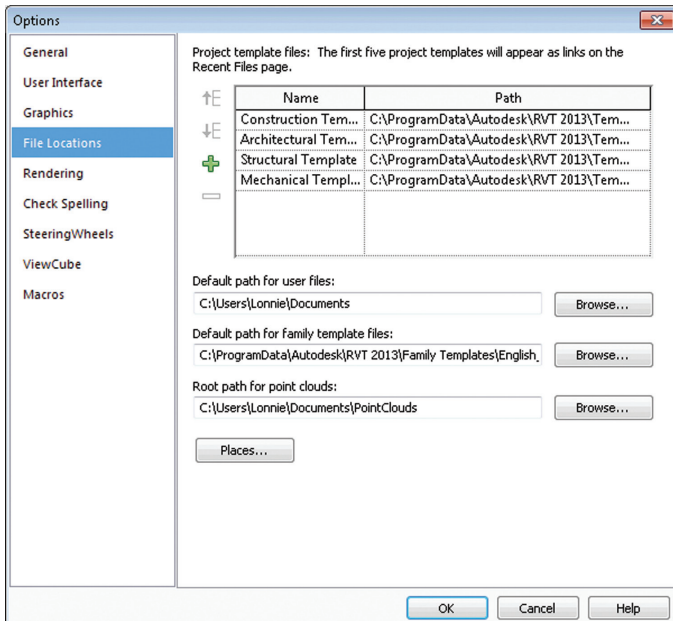
Selection sets: Something the structural product users have had for some time now is the ability to save, open, and edit selection sets. This functionality is now available in all versions of the product. This is very useful when working on a group of elements over and over again and you do not want to put them into a group.

DGN import/export: Several improvements have been made to support DGN file formats.

Export

* Support for V8 MicroStation file format.
* The V7 MicroStation file format algorithm has been updated.
* The DGN export UI has been updated to match the DWG export tool.
* Functionality to support mapping of levels, lines, line weights, pattern, and text/fonts have been added to the export DGN workflow.
* You can now save export setups for DGN like you can with DWGs. These can be transferred from project to project using the Transfer Project Standards tool.

Import

* Support for V8 MicroStation file format.
* The V7 MicroStation file format algorithm has been updated.
* Added support for import of design model.

DWG import/export: Several improvements have been made to support DGN file formats.

Export

* Revit Text is now assigned to a single text style in AutoCAD®.
* Images will no longer report as an unreferenced error for the image path in AutoCAD.
* Export of custom patterns has been improved.
* Export of underlined text elements has been improved.
* Exporting of blocks has been improved.
* Exporting of filled regions has been improved.

* Transparency value set on a Revit object is exported as an AutoCAD property on the object.
* Options for hiding scope boxes, reference planes, and unreferenced view tags have been added to the general tab.
* Export solids in 3D as AutoCAD Architecture objects are only available by enabling a switch in the Revit.ini file.

Import

* Correct lines that are slightly off axis toggle.
* Improved DWG block importing. This addresses an issue with blocks that used the MINSERT command in AutoCAD.
* DWG files using "Center to Center" positioning will now be based on the center of the view on the X, Y plane.

In general, the DWG import/export tools continue to be updated to support what seems like an endless number of AutoCAD settings. For us, the one major improvement is in the way the coordinate systems are supported. This has been an issue for years and Autodesk has improved it a great deal.

DWF export: Export DWF file now supports phasing information. You can also use the manual naming option when multiple views or sheets are exported to the same DWF file.

REPEAT AND DIVIDE

For those who have been waiting for a tool that will let you divide a path and distribute objects based on those divisions, your wait is over. Available in the conceptual massing and the in-place massing tools is a new Divide Path tool. This allows you to divide a path in several different ways and then you can repeat things based on this divided path.

Many of us have been waiting for this type of tool for a long time so it is very exciting to see the first version of it. You can create divisions based on Fixed Number, Fixed Distance, Minimum Distance, and Maximum Distance layouts. Added to the standard layout forms you can also use an intersecting tool that will build a division based on the curve's intersections with a reference plane or levels. You can repeat Adaptive Components on a single reference or on multiple references. The ways in which this tool can be used seems endless; it will be very exciting to see the ways all you Revit users end up using this tool. We are planning an article around just this tool in a future issue of *AUGIWorld*.

WORKSHARING ENHANCEMENTS

Each year Autodesk improves the work-sharing tools in Revit. For those of you who do not use worksets and central files these may not seem as important, but for those of us who work with large teams these improvements are critical to our everyday efforts.

Highlighting elements based on notification: When you move the cursor over an edit request notification, the corresponding element highlights. This gives you that flash-like functionality by moving the cursor on and off the notification. In the past you had to click on the show button to get the element to highlight.

Grant and deny from the notification window: When the notification window comes up you will find grant and deny but-

Revit Platform 2013

tons right in the notification window. In previous versions you had to open the Edit Requests dialog box to get to the grant and deny option.

Deleted and new-in-central elements shown in edit requests: This is one of those odd situations where another user has requested to edit something that is already deleted or new in the central file. In the past this made Revit go a little goofy because it did not always know what to do. This has been addressed in 2013.

Warning when you delete a requested element: If you delete an element that someone has requested to edit, Revit will give you a quick warning so you can coordinate with that user.

GENERAL IMPROVEMENTS

Every release includes improvements to major categories in Revit and the others are little things that fall under a general category. The following are great improvements that make Revit better all around.

Split linear dimension chains: One of the most frustrating things about Dimensions in the past was that if you had a dimension chain and you wanted to simply delete one of the chains in the middle you had to delete the chain and then recreate the dimensions without the one you did not want. Now you can simply tab to the dimension you do not want and delete.

Dimension diameter: This is one of those things that Revit did not do in previous releases. Now we have a Diameter dimension tool that allows you to provide Diameter dimension.

Dimension equality text: Have you ever wanted to have a string of equal dimensions read 5 @ 2'-6" = 12'-6"? In 2013, equal dimensions can display their value, equality text, or equality formulas.

Project browser search: If you have been working on large projects in Revit this one will make you jump for joy. It is a simple, right-click option in the project browser that lets you type in what you want to search for and then works like a find tool, moving through the project browser highlighting the options as you click next and previous.

Multi segmented gridline: Sometime column grids are not straight or curved. Sometimes they start straight and then curve then go straight again. That is what the Multi Segmented Gridline does. Now you can create those crazy gridlines that do not fit any of the traditional grid definitions.

Double click zoom to fit: Some of the simplest things make people happy. Double-click the middle mouse button and boom your active view zooms to fit.

Guide grid dialog enhancement: When you select the Guide Grid tool, a new dialog pops up that makes it easy to see what you have already created. It also makes it easy to create new. To assign guide grids to your sheet, you still use the element properties of the view.
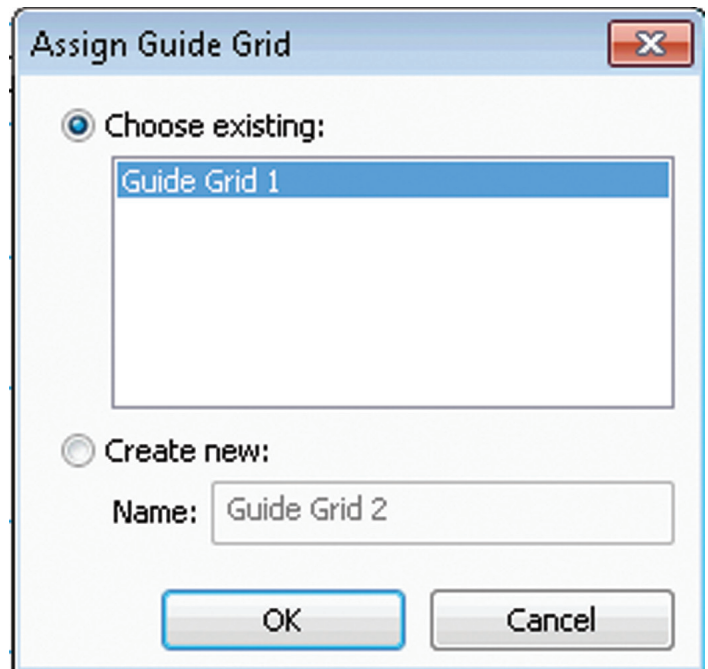
Revit.ini install settings for deployments: If you have always wanted to modify some of the Revit.ini file settings for deployment, Autodesk has added several new tools to help in this process.

Overall we found the platform updates to have significant impact to the use of Revit this year. Although the all-in-one product is clearly the biggest change, the smaller modifications will have a positive impact on your everyday use of the product. Don't forget to review the discipline-specific articles that cover the details of each discipline upgrade.

Lonnie Cumpton has over 20 years of experience in consulting, implementing, training and corporate management at local and regional levels into the AEC community. He has a comprehensive understanding of building design and construction methods currently specializing in Private BIM clouds. Lonnie is drawing on his experience with assessing needs, defining requirements and resolving challenges to deliver the optimized BIM9 solution to gain the benefits of cloud computing as it relates to BIM. His unique BIM9 strategy provides secure access to all your design data and applications from your office to mobile users around the world. You can find Lonnie on LinkedIn at BIM9.com and via email Lonnie@bim9.com

REVIT RTC TECHNOLOGY CONFERENCE

RTC is hosting three events this year!

RTC AUSTRALASIA
Novotel Wollongong
NSW, Australia
24 - 26 May 2012

www.revitconference.com/rtc2012au

RTC VISDAY
Novotel Wollongong
NSW, Australia
23 May 2012

www.revitconference.com/rtc2012auvis

RTC NORTH AMERICA
Evergreen Marriott
Georgia, USA
28 - 30 June 2012

www.revitconference.com/rtc2012us

What makes RTC special is not just the opportunity for learning, it's the interaction between you and your peers and fostering your goals and dreams. RTC is an event, a movement for sharing and encouraging your passion. Consider that the most valuable thing people usually take away from their college life are their interactions with great minds (great professors or fellow students) and things apart from class that help define them as people.

RTC will recharge your batteries if you are feeling drained. RTC will assure you that you are indeed on the right path. RTC will give you a platform to help reach your goals. RTC will invigorate you and your firm.

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Background Image: RTC 2011 Australasia Innovation Winner - Gianni Zandel, Woodhead

Inside Track

by: Mark Kiker & Bill Adams

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Autodesk® Alias® Automotive design software provides a comprehensive set of visualization and analysis tools for the entire shape-definition process, from concept sketches through Class-A surfacing.
http://goo.gl/QP19k

AUGIWorld brings you recent developments in Autodesk and related software items

AUTODESK ALIAS DESIGN

Autodesk® Alias® Design industrial design software offers a complete toolset for developing and communicating consumer product designs. Also available in a version designed specifically for users of Autodesk® Inventor® software.
http://goo.gl/QP19k

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http://goo.gl/QP19k

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http://goo.gl/doHQp

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Autodesk® Smoke® software is a comprehensive solution for online editing and creative finishing for television, long-form, and film.
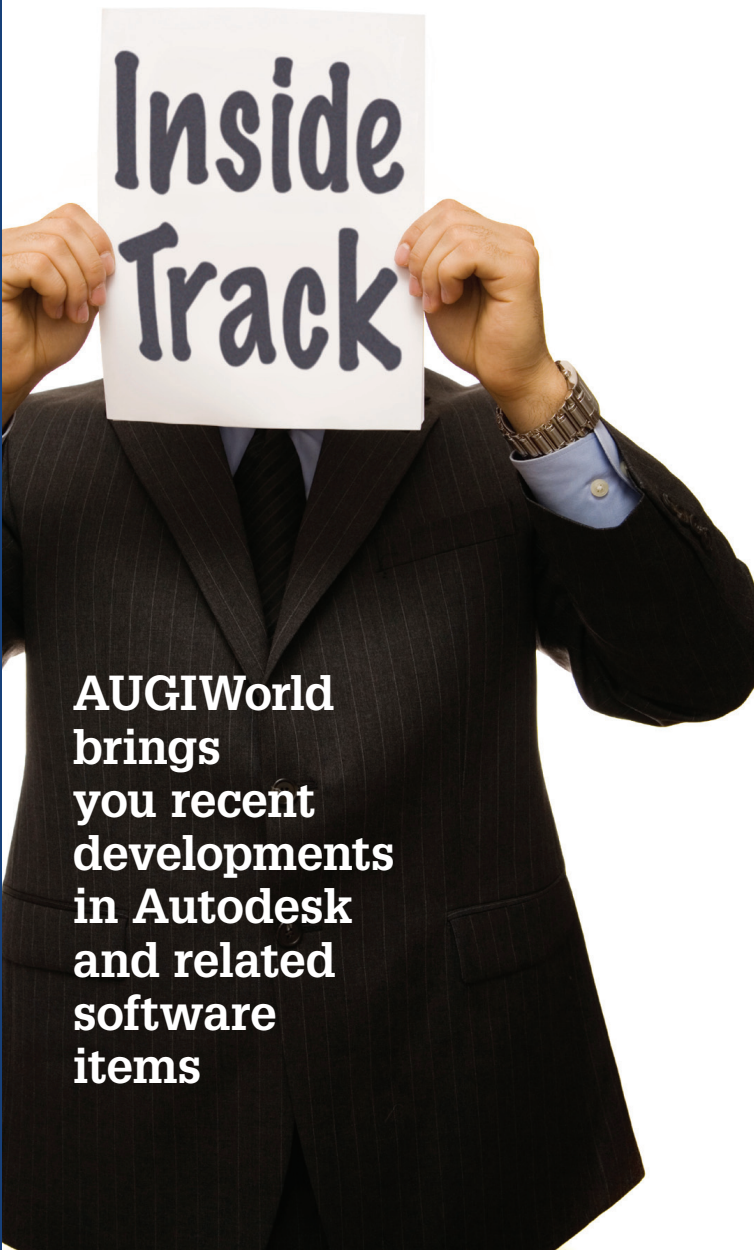http://goo.gl/SBT0B

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Autodesk® Mudbox™ software is a highly intuitive 3D digital sculpting and texture painting solution.
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mental ray® Standalone 3D software enables studios to produce high-volume, high-quality renderings for complex film, television, and design visualization productions.
http://goo.gl/mr6RN

MORE FREE (OR LOW COST) APPS FOR MAC OSX

Not an App but an extremely useful website wiki to check compatibility for Mac OSX Lion and iOS 5 . http://roaringapps.com

CYBERDUCK

Cyberduck is a robust FTP/FTP-TLS/SFTP browser for the Mac whose lack of visual clutter and cleverly intuitive features make it easy to use. Support for external editors and system technologies such as Spotlight, Bonjour, Keychain and AppleScript are built-in. http://cyberduck.ch/

EVERNOTE (FREE & PREMIUM OPTIONS)

Evernote helps millions worldwide remember anything and everything that happens in their lives. Use Evernote to take notes, save interesting web pages, create to-dos and shopping lists, attach images and PDFs, and so much more. Then, watch as it all instantly synchronizes from your Mac to your smartphone, tablet, and the Web, allowing you to find your memories at any time from anywhere. http://www.evernote.com/

THE LITTLE APP FACTORY

Media utilities and applications for Mac (low cost). http://thelittleappfactory.com/

SWITCH

Switch is one of the most stable and comprehensive multi-format audio file converters available, is very easy to use, and is completely free. http://www.nch.com.au/switch/index.html

VLC

VLC is an application that lets you view any type of video file without hassle. Features such as handling subtitles, DVDs, CDs, and web streams make VLC a powerful media player. http://www.videolan.org/

GROWL

Growl is a notification system for Mac that lets supported applications send you notices in an unobtrusive way. http://growl.info/

CLAMXAV

Macs are not prone to getting infected with viruses, but that doesn't mean they can't transmit viruses to a machine that is susceptible. ClamXAV is a free virus scanner that checks for files that can infect other operating systems as well. http://www.clamxav.com/

ADIUM

Adium is a free instant messaging application for Mac OS X that can connect to AIM, MSN, Jabber, Yahoo, and more. http://adium.im/

ONYX

OnyX is a multi-function utility for Mac OS X that allows you to verify the Startup Disk and the structure of its System files, to run misc tasks of system maintenance, to configure some hidden parameters of the Finder, Dock, QuickTime, Safari, Mail, iTunes, Login window, Spotlight, and many Apple's applications, to delete caches, to remove a certain number of files and folders that may become cumbersome, and more. http://www.titanium.free.fr/

TIME MACHINE EDITOR

TimeMachineEditor is software that lets you change the default one-hour backup interval of Time Machine. You can change the interval or create more sophisticated scheduling. This is useful if you don't need to backup every hour and don't want the performance penalty. This is also especially useful if you manipulate lots of data within one hour, as you would spend the whole day backing up. http://timesoftware.free.fr/timemachineeditor/

APPCLEANER

AppCleaner is a small application that allows you to thoroughly uninstall unwanted apps. Installing an application distributes many files throughout your system, using unnecessary hard drive space. AppCleaner finds all these small files and safely deletes them. http://freemacsoft.net/

GRAB

Grab is a utility that lets you take a quick screen shot and drop it into an email or a TextEdit document. It resides in your Applications > Utilities folder

by: Michael N. Smith

PRODUCT FOCUS

Support for Revit Comes to Navisworks

The dream has become reality; Autodesk® Navisworks now allows a Revit file to be opened natively. From the open dialog box, you can select the Revit file type from the drop-down and browse for your Revit file.

When a Revit file is loaded, much like dwg files, Navisworks will create an nwc file in the same directory as the Revit file. To ensure you obtain the information you are looking for, the Navisworks team added the Revit File Reader to the Options Editor. In this editor, you can easily define the information you wish the nwc to contain. This option is the same as the options you could originally bring up in Revit when exporting an nwc. Keep in mind if you select the checkbox next to Convert Element Properties, the nwc will take significantly longer to create.

Along with the ability to import Revit files directly into Navisworks is the enhancement to the Revit hierarchy. The new hierarchy better reflects Revit organization. That is the elements in a Revit file are now organized by Category, Family, Type, and Instance. This is a major advantage to navigating the Revit file through the selection tree. Additionally, all sub-parts are listed by their Revit Material.

REVIT GRIDLINES

A common problem in Navisworks is knowing where you are in relation to the
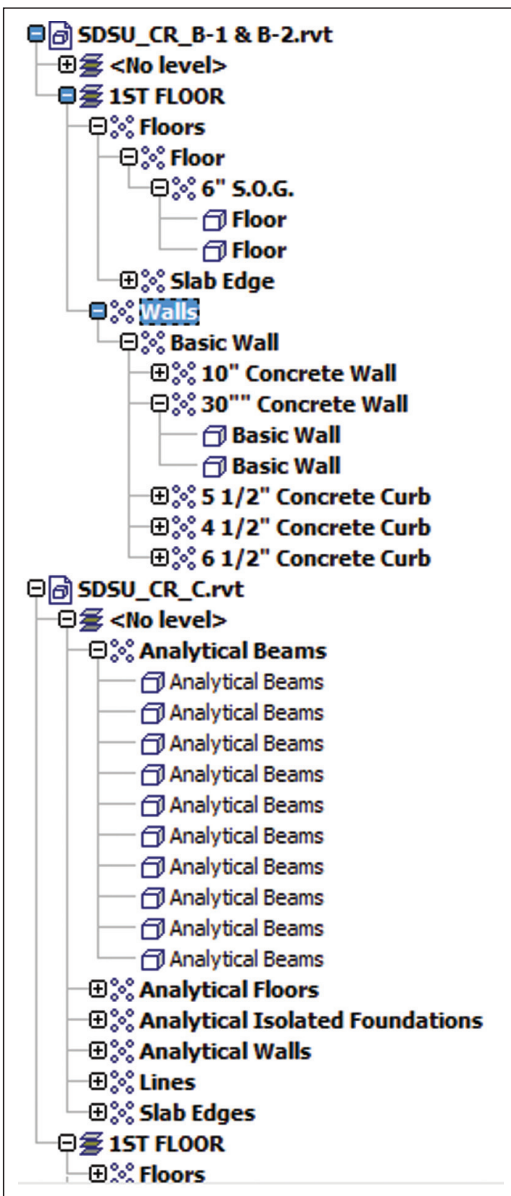
Figure 1

model. Navisworks 2013 provides a solution to this problem by creating dynamic gridlines from Revit files.

When a Revit file is loaded into Navisworks 2013, every level that is defined in that Revit model will also have an associated dynamic grid that is also imported. The dynamic aspect of these gridlines is that as you navigate through the model, the heading of the gridlines will move with you. This is important because you can always quickly obtain a visual representation of where you are in the model from the gridlines at all times. To change the grids level, simply select the level you wish to display from the View tab of the ribbon, Gridlines panel, Level. In addition, you can fix the level you wish to place the grid on by selecting the level from the drop-down on the Grids and Levels panel.

Besides being able to choose the level you display, the Gridline mode tool allows you to configure how the gridlines will be displayed. If you desire, you can turn all grids on or off. I suggest sticking to just one level as multi-level gridlines tend to clutter up the scene view.

In keeping true with the Navisworks interface, each of these grids colors are customizable. To change the color configuration, click the Application button, expand Interface, and click Grids. In the options dialog you can choose the colors you desire for the configuration.

Figure 2: Revit gridlines

TIME IS MONEY

Timeliner has been upgraded in 2013 to incorporate costs with activities. You can now link or manually add Material, Labor, Equipment, and Sub-Contractor costs. A Total column will also appear and sum all the costs together for the activity.

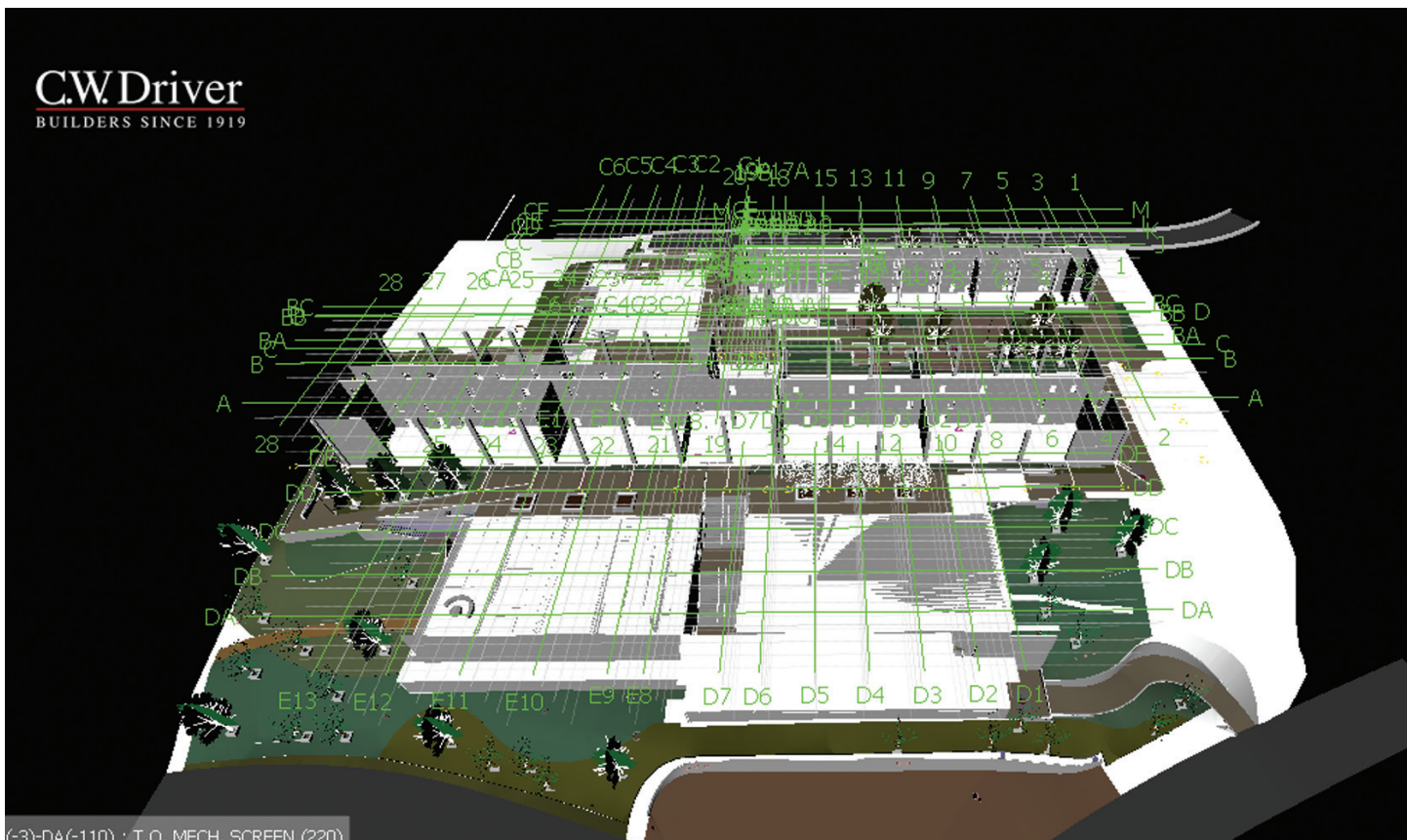The new cost data can be entered manually in Timeliner. To view the cost columns, first open Timeliner. In the Timeliner window set your Columns to Extended. This will reveal all the new cost columns. To add the cost to the activity, click in the cell and input the amount that the task requires. Notice that the Total column automatically updates to reflect costs as they change.

Another method of adding cost to the schedule is by adding a link to Timeliner and mapping the cost data from that schedule to Timeliner. To add the link, click the Data Source tab in Timeliner, click the Add button, select the source of your choice, and in the Field Selector window, map the Material, Labor Equipment, and

Sub-Contractor Costs to Corresponding costs in the linked schedule. These costs now carry over.

To visually show these costs to the project, click the Simulate tab in Timeliner, then click the setting button. Navisworks 2013 added the cost button and allows you to customize how your costs will be displayed. Insert all the different costs in the manner you wish to display during your playback simulation. Keep in mind that text overlay is displayed only when Open GL is the renderer; Presenter will not render text.

OTHER TIMELINER UPGRADES

Another new feature in Timeliner is the ability to drag and drop selected activities and add them to the schedule. This enhancement allows for quick selection and addition to tasks. Simply select all the objects you wish to add to a task in the selection tree from the scene view, then drag and drop the selection onto the activity. Remember, however, this is not a best practice because linking to

Figure 3: Timeliner costs

a specific selection makes the objects static. The best practice of linking is still to link a search set to the task.

Timeliner now supports xml exports. Many applications are able to read xml data and incorporate it into full schedules. Navisworks 2013 allows the schedule to be expored in csv and xml. The hierarchy of the xml works seamlessly with Microsoft Project.

CLASH DETECTIVE MAKEOVER

The Clash Detective interface has been changed significantly. No longer is there a Batch tab; in fact, batches are now documented as tests. So when you look at the Clash Detective you might be wondering what happened to the Batch tab. It can be found by clicking the down arrow at the top of the Clash Detective to reveal all the different Clash Tests.
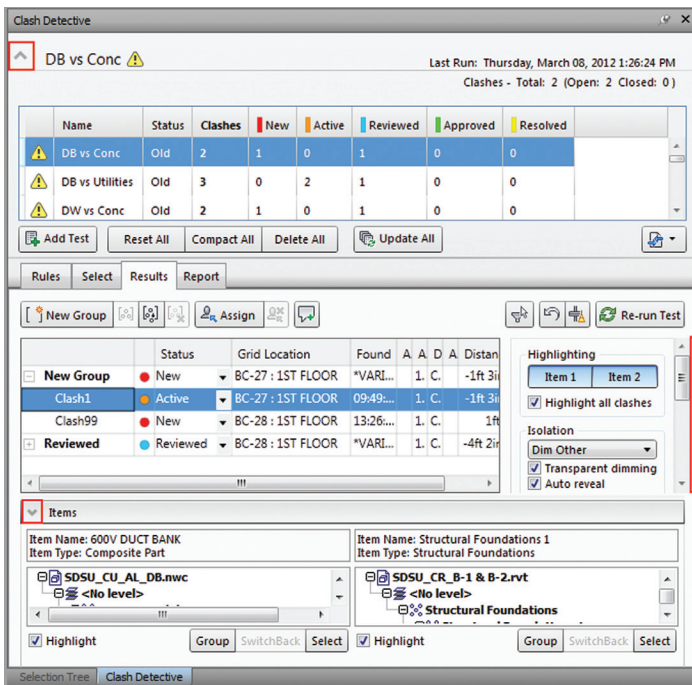

Figure 4: Clash Detective new look

To add a test, click the Add Task button. The old buttons, clean and clear, all have been renamed to better reflect what they actually do. That is: Reset All and Delete All, respectively. Compact All and Update All work the same as the previous Compact and Update buttons did in the 2012 release.

You can easily import and export your clashes now in the Clash Detective by clicking the Import/Export Clashes button. Once you are done configuring your tests, collapse the section by clicking the up arrow.

The Rules tab has not been changed and the Select tab has had only minor icon changes. The Results tab, however, has had a major upgrade. First, notice the column entitled Grid Location. Navisworks now pinpoints all the different clashes and references their grid location as well.

You might be wondering what happened to the Display Section of the Results tab. Never fear—it still exists. To view the display information, click the arrow on the docked Display Settings located on the right of the Clash Detective window. The Highlight items options are now located in the Display Settings instead of being displayed in the items section. The Dim and Hide isolation settings have been consolidated into a drop-down box. All other choices remain the same. When you have configured the Display Settings to your desire, you can hide the section by clicking the arrow again.

We have now found the test information, formally the Batch tab, the Display Settings information, but where is the old Item information? The Item information is located at the bottom of the Clash Detective and can be revealed by clicking the up arrow. The information displayed is the same as it was in former versions. Collapse the window by clicking the arrow when done.

The Report tab has an added feature to export Grid Location. All other features remain the same.

NEW BUTTONS AND THE POWER OF UNDO

You may also notice, in the main section of the Results tab in the Clash Detective, that clicking the headings of the columns does not automatically sort the fields. To sort by a column, right- click the column and select Sort Ascending or Descending.

The top bar of the Clash Detective has buttons to manage groups, add comments, and make assignments. Let's talk about the second set of buttons. The filter button works exactly the same as the Select Filter checkbox did in the Display field of the old Clash Detective.

The next icon that looks like an undo icon resets the test—all test results will be erased. The difference between this Reset and the Test Reset All is that this Reset will only reset the current test, not all the tests. Similarly, the next button, Compact, will Compact only the current test, rather than all the tests.

Navisworks now supports undo for the Clash Detective. If you wish to undo an action, simply click the regular undo button from the Quick Access Toolbar or use the keyboard shortcut ctrl + z.

INTRODUCING THE SELECTION INSPECTOR

Navisworks has introduced a new tool called the Selection Inspector, which can be found on the Home tab in the Select and Search panel. Selection Inspector allows you to view the properties of all the items selected. The properties displayed are defined the same way as quick properties.

Let's look at how this can be used. In the Selection Inspector, click Options to open the Quick Properties definitions. Here, you can define the information you wish to display for all the selected items.
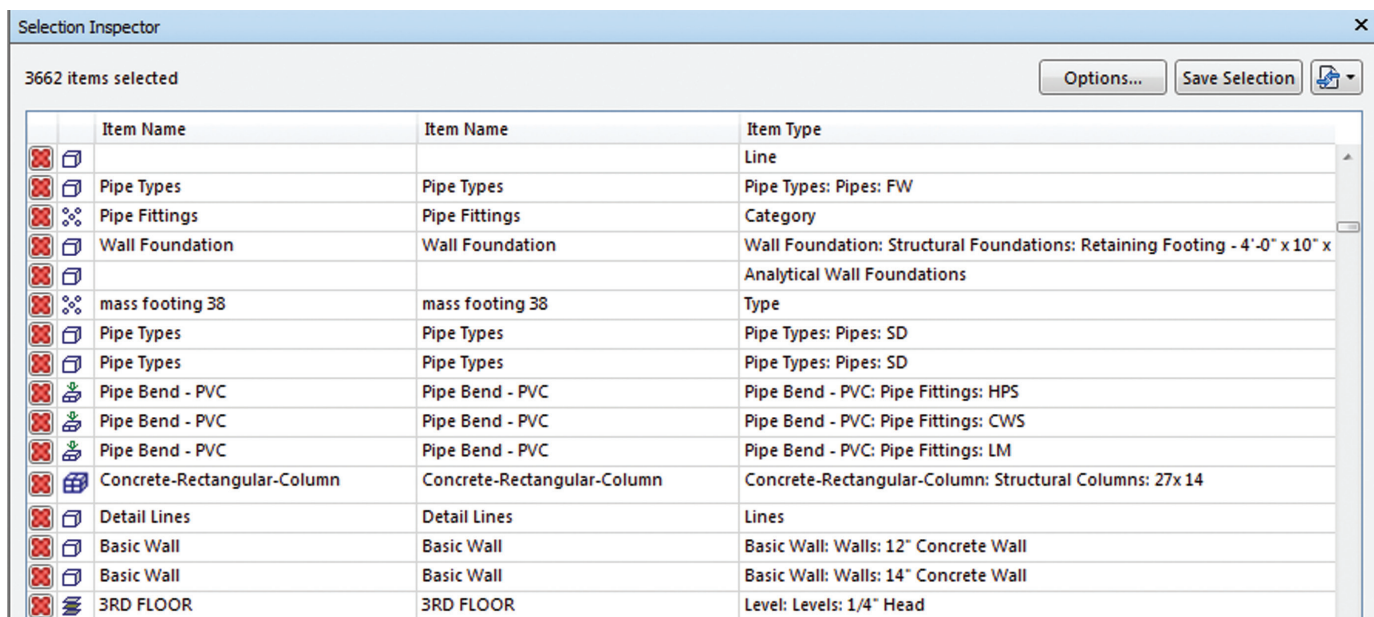
Figure 5: Selection Inspector

Once the information is displayed as you desire, Navisworks allows you to export that information to a csv file. Simply click the Export/Import button and select "export to csv." This data, if you choose, can easily be leveraged to create links to data bases or other materials.

ADDITIONAL ENHANCEMENTS

One of my personal favorite enhancements is the spring-loaded Select Box shortcuts. With the select tool selected, if you hold down the spacebar, the Select tool will act as the Select Box tool. This allows for a quick selection of multiple objects without having to click the ribbon for the Select Box tool.

Navisworks now has Vault integration as Part of Autodesk's 360 BIM solution. If Vault is installed on your computer, an additional tab called Vault will appear on the ribbon.

Another enhancement is the ability to use the Autodesk Renderer. In the past, Navisworks supported only Open GL and Presenter. This resulted in a number of materials from Autodesk products and others not rendering according to the original specified material. If you use Presenter materials you should always render with Presenter; however, if you are using materials from an FBX file or materials that were created with Autodesk Consistent materials, then you should use the Autodesk renderer.

FREEDOM UPGRADES

An important release to Navisworks Freedom is the ability to section. This incredible feature can now be leveraged by all parties and allows saved Clash Viewpoints to better represent the intention of the Clash saved image.

NEW GLITCHES

Well, now that you know the good, let's talk a little bit about the ugly. When Revit models are brought into Navisworks you will probably notice that they do not align with your gridlines. This is because their file units and transforms take on the translation and rotation of the original while the gridlines do not. To solve this problem, simply change all the units and transforms to 0.

The Clash Detective has the unfortunate habit of expanding all your folder groupings every time you select an object or use filters. This is problematic because it makes controlling your Clash environment challenging.

The Selection inspector is a powerful tool, but it seems to suffer from a lack of inheritance. Geometry-based items will not recognize high-level information such as Source File Name, making the information you can actually acquire from the Selection Inspector limited. Even so, it is still a great tool.

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Lucky 13

I am sure there will be plenty of references to the unlucky nature of the number 13, but with the combined improvements in the base product and the Autodesk® Revit® MEP features, my feeling is the 2013 version of Revit MEP may turn out to be quite lucky indeed. This version has some little tweaks that have been long awaited, some nice upgrades that make life much easier, and some major updates that will change the way we work. Chances are you want to hear the big news first, but keep reading—even the small changes will be meaningful to the way you work every day

MAJOR UPDATES

Materials Now Have Thermal Properties

The ability to specify thermal properties to materials is my number one feature for Revit MEP 2013, even though it is technically a platform addition. This addition sets the stage to leap forward and use existing architectural data for HVAC load calculations. Until now MEP engineers have had to input their own data. Now the material used by the architect can be assigned thermal properties that can preloaded into the HVAC dataset and updates as the model changes. I am pretty sure that was the whole idea of BIM in a nutshell.
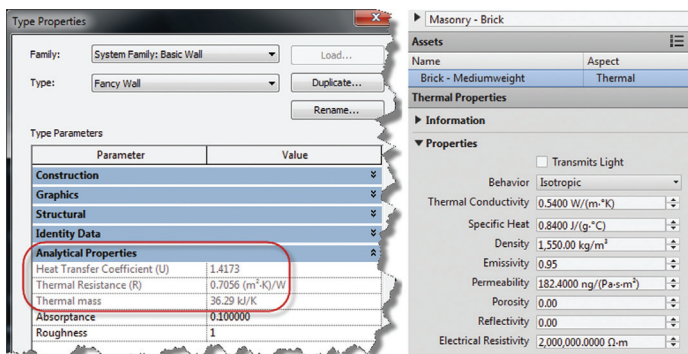

Figure 1

Revit will treat assemblies different than component walls. Component walls set R and U values, Solar Heat Gain coefficient, and Visible light transmittance from a list of analytic constructions. Assemblies allow the user to set each element type an Absorptance and Roughness. R and U Values along with Thermal Mass are calculated based off the material of each layer in the assembly and its thickness.

This data can be used for analysis inside Revit MEP or exported to GBxml. Just check the "Include Thermal Properties" box when exporting to GBxml to derive thermal data from the model.

Pipe Segments

The size lists found in the Mechanical settings under Pipe is now Pipe Segments. This allows pipes of the same system and differing materials to exist and connect. The Segments and Sizes portion of the Mechanical Setting dialog allows the user to pick the segment type, change the roughness, add a description, and specify a default connection. Sizes can be added from here specifying inside and outside diameters and if the size is included in size lists or used in sizing routines. New segment types can be created in this dialog by selecting the "Create New Pipe Segment" tool. New types must be specified by material, schedule/type, or both. The materials browser can be launched from the new Segment dialog, meaning pipes can be made out of anything.

System Inspector on Duct and Pipe Created with Taps

Duct and pipe created with taps now calculate separately for each segment. This can be viewed with the system inspector on systems that are set up properly. The system inspector will show the flow, static pressure, and pressure loss in a duct segment when selected.

Color Fills on Duct and Pipe Created with Taps

Color fills also now work on duct and pipe where taps have been used by segment. View by using the Duct legend or Pipe legend tools on the Analyze tab of the ribbon. This is a great tool to quickly review velocities, flows, and to look for trouble spots.

Duct and Pipe Routing Preferences

A "Routing Preference" tool has been added in the type parameters for duct and pipe under the fittings category. In this dialog the preferred fittings can be listed. The duct routing preferences show the preferred fittings and junction type. The Pipe routing preferences also shows minimum and maximum sizes, giving the ability to specify fitting types by size. Instead of a size, the word "None" can be used to ensure the fitting will never be used during a layout, or the word "All" can be used to require that fitting is used every layout. Otherwise, the layout will respect the size constraints in the type.
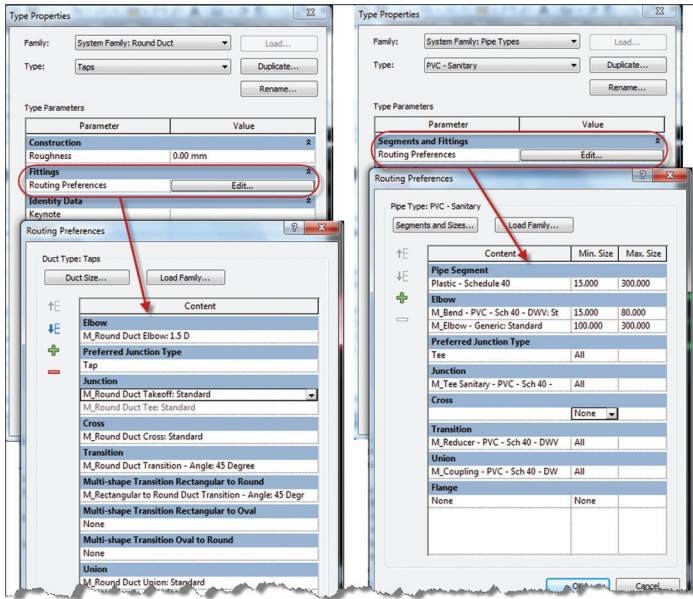
Figure 2

An added bonus to using "None" is that when switching fitting types, there is now a "Constrain to routing preferences" checkbox in the type selector that will limit the fittings listed in the type selector to only those specified in routing preferences. In the case below, there is only one fitting to look at. That makes picking it real easy.
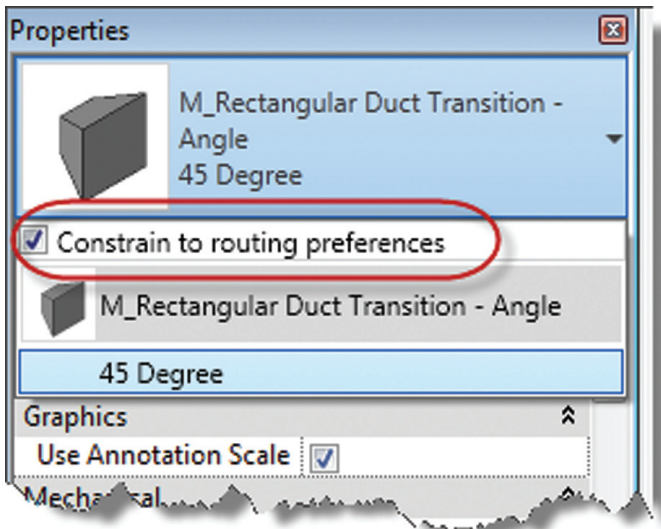
Figure 3

Reapply Type

A Reapply Type tool has been added to allow the user to make changes to the routing preferences and then apply those changes to duct or pipe that has already been modeled. This can be a quicker way to update a layout with different fittings.
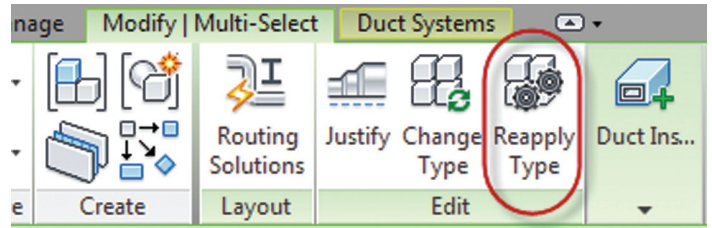
Figure 4

Pressure Loss Reports
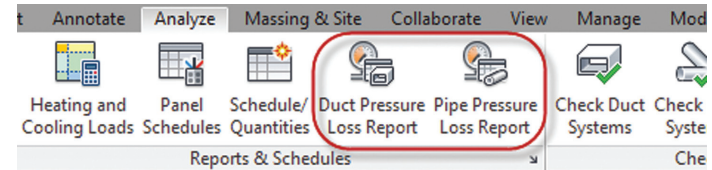
Figure 5

Pressure loss reports can be generated as CSV or HTML files using the tools on the Analyze tab for duct or pipe. This will take the user to a system selection dialog. This step can be skipped by right-clicking on a system in the System Browser and selecting the appropriate pressure loss report tool there. The pressure loss report lets the user specify available fields much like building a schedule. Pressure loss reports can only be generated if the systems calculation method is set to "All." See Figure 6 for a typical pressure loss report.

Figure 6

Revit MEP 2013

NICE UPGRADES

Centerlines on Round Elements

Revit MEP can now generate centerlines for round elements such as duct, pipe, and conduit. Revit will show centerlines in plan and elevations views when hidden line is on. Centerlines will not be visible in 3D views. When perpendicular to the plane of view, the centerline will show up as a cross hair. Centerlines in objects passing under other elements will not show up. Centerlines in fittings only show up if a profile is found. A centerline can be added to a fitting family by adding the centerline category and changing the appropriate model line to a centerline.
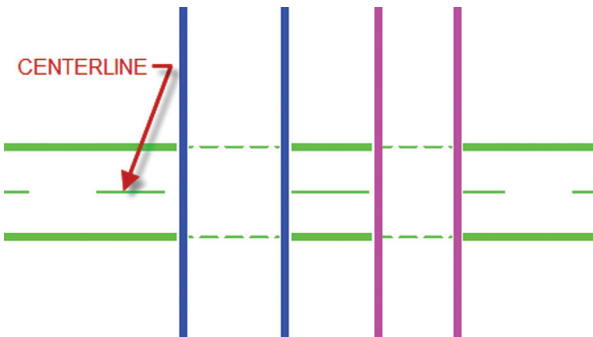
Figure 7

Specify Rooms or Spaces

Now when exporting to GBxml, the user has the option to specify rooms or spaces. Depending on the information required, one may work better than the other.

ASHRAE Database Update

The ASHRAE duct fitting data base has been updated to version (5.00.00). Seventy-eight out of 235 tables were updated and the coverage of pressure loss data in fittings has increased.

Room Calculation Point
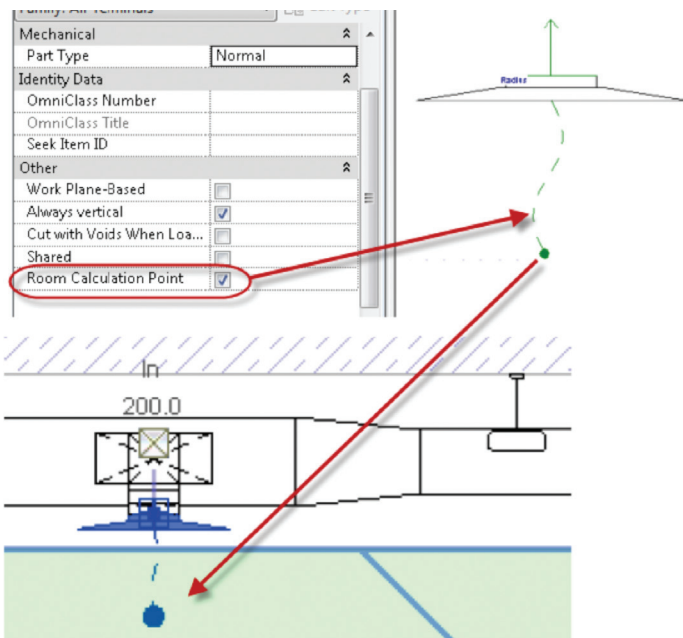
Figure 8

Air terminals now have a toggle to turn on a room calculation point. This will allow the air terminal to connect to a room space when they do not occupy the same space. This fixes the problem of room objects that are lower than the diffusers not communicating the assigned CFM. The user can turn on the calculation point and then move that point in a section view to connect it to the room.

LITTLE TWEAKS

Systems Tab

The Home tab is now called Systems. Catchy, but not as good as three separate tabs that say Mechanical, Electrical, and Plumbing, or the dimension tool that doesn't ask if we prefer wall centers or faces.
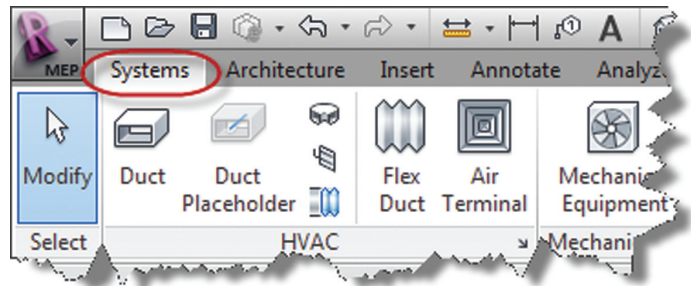
Figure 8

Plumbing Discipline

If you can remember the very first version of Revit Systems and you are a plumber, you'll recall that there was no plumbing back in the day. Well, plumbers, rejoice because plumbing now has its own view discipline to go along with all the pipes, fittings, and fixtures we acquired over the years.
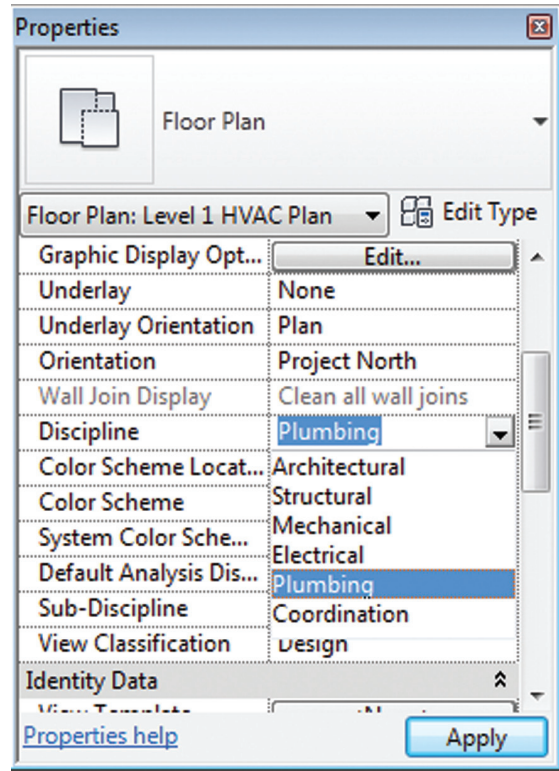
Figure 10

Site Tools

I guess you never know when you might want to mass something up or throw down a toposurface. If that is the case, there is nothing stopping a MEP user now. The Massing & Site tab found in Revit Architecture is now in Revit MEP.
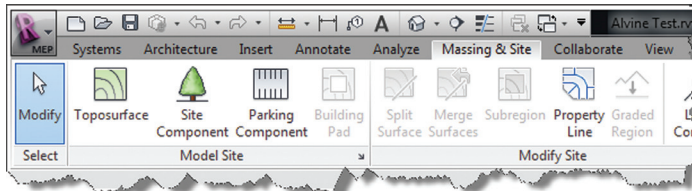
Figure 11

Category Filtering

This is another one of those platform changes that really feels like a gift to MEP users. Now when in Visibility Graphic Overrides there is a filter list that includes Architecture, Structure, Mechanical, Electrical, and Piping. This is an improvement (even though Piping should be Plumbing).

Figure 12

Underlay Orientation for RCPs

An incredibly annoying thing of the past was creating a new ceiling plan and having to go back and change the underlay orientation to reflected ceiling plan in order to see the ceiling grids. Now the underlay orientation of new ceiling plans is RCP by default. That is one less thing to do and something I don't have to explain ever again, I hope.
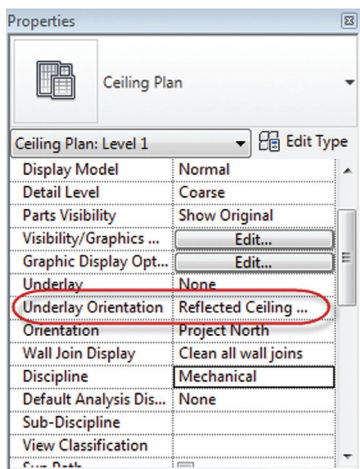
Figure 13

Double Click Scroll to Zoom All

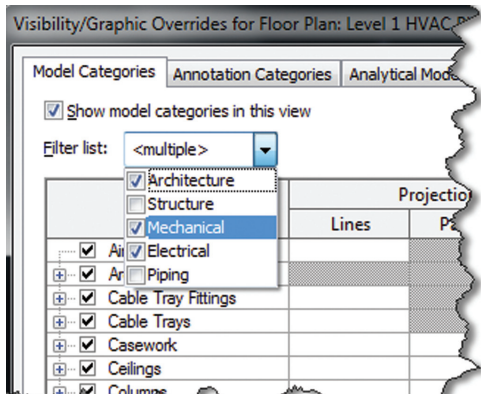One of the things Revit got right very quickly was aligning the view controls in the mouse with good ol' AutoCAD. With one notable exception, double click the scroll wheel to zoom all. If you are like me, you double click the scroll wheel constantly, waiting in vain for Revit to react. Now those days are over. A small change, but it makes me very happy.

Diameter Prefix

The Diameter symbol can now be specified as a prefix. This is another behavior that the entire MEP world has had to work around for six versions. Thank goodness it's over.

Rise and Drop Symbology

There are rise and drop graphics for rectangular and oval-shaped duct. This helps a lot since duct tends to go up and down as well as side to side.

Figure 14

Loop Leader

I have actually begged for this. I asked Santa Claus, I offered $20 to a programmer, and I spent hours trying to crack the API to make my own loop leader. Until now my efforts were for nothing. At long last we have the choice of a loop leader for arrow styles. By far, my favorite little tweak and very long awaited.
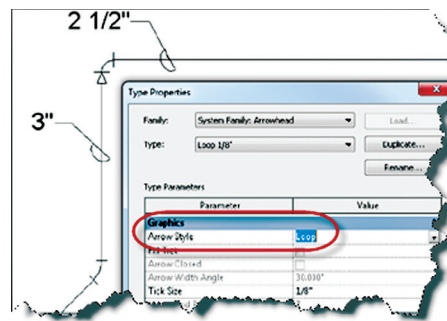
Figure 15

This release has plenty to offer. The program itself is evolving before our eyes into a much more complex engineering tool while improvements to its base ability to draft are still being added and modified.

As I suggested in the opening paragraph, this release is well worth the upgrade. Not just for compatibility with architectural project files, but also to exploit the engineering capability it offers. No doubt the longer one waits to use Revit to its fullest, the farther one will fall behind those who throw caution to the wind and dive in. The water is fine and the time is right for Revit MEP 2013.

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Enhanced Support For Work Loads

Over the years Autodesk® Revit® Structure has matured into a structural modeling and detailing package that provides for the backbone of your designs. As the product's sophistication progresses, we are getting closer to having the ability to design our structures from concept to fabrication and facility management—all in the same package. We'll explore some of the new enhancements related to modeling, documentation, and analysis. Some of the features won't be platform-specific, but nevertheless have a decent impact. Don't become static with your old habits. Adopt the new features and reap the benefits.

REALLY BIG SMALL ENHANCEMENTS

What Autodesk refers to as "Small Feature Enhancements" can often be the most useful for speeding up day-to-day production. Don't underestimate the power of these minor improvements.

Multi-Segmented Gridlines: You can now draw funky-shaped gridlines instead of just straight lines or arcs. The tool will take you into sketch mode to accomplish the task. It might just be some crazy scheme that rarely occurs, and I won't argue here why this might be good or bad, but in any case this is no longer a limitation in the software.
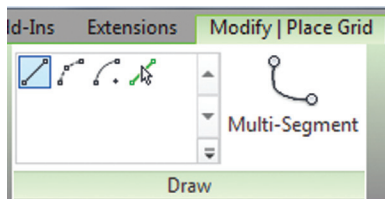
Figure 1: Multi-segment gridlines

Dimensioning: Some nice little enhancements include a "Diameter" tool to complement radiuses, splitting dimension chains into multiple strings, and new equality text features. Within the dimension type properties, equality text can be customized and then users can choose which kind of equality text they wish to use for each dimension instance. This will be great for all of those equally spaced beams on floor framing plans.
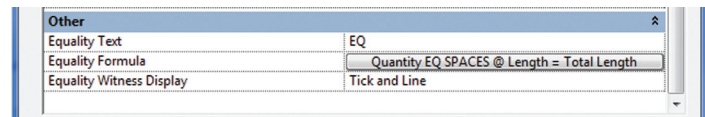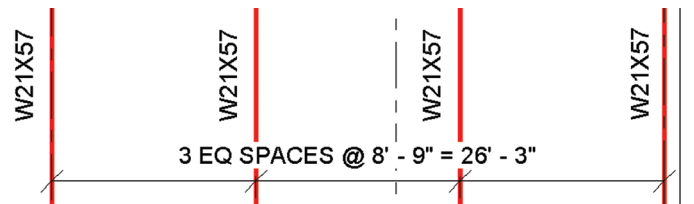
Figure 2: Equality dimensioning

Materials: Autodesk is making a major overhaul of the materials library, extending assets to include appearance plus thermal and structural properties. This involves a new user interface that will take some getting used to. You will want to check over the material assets, especially if you've customized materials in previous templates. Beam and column materials now have a consistent "Structural Material" name, which allows the structural material to be scheduled. This will facilitate better interoperability with analysis software.
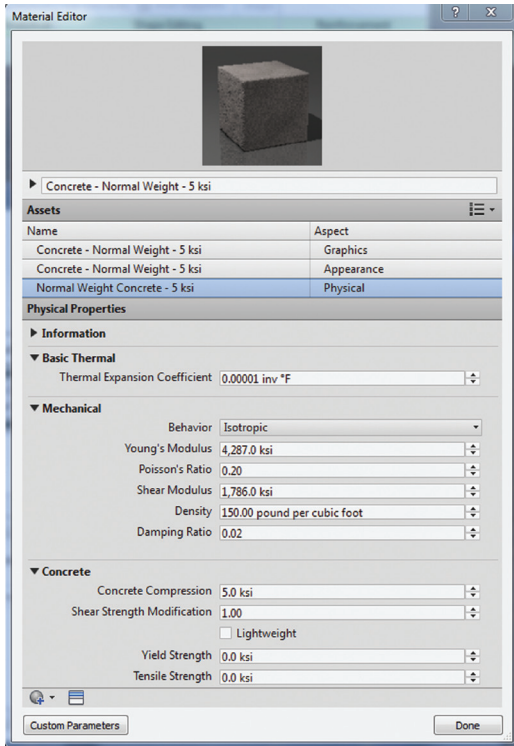
Figure 3: Physical material properties
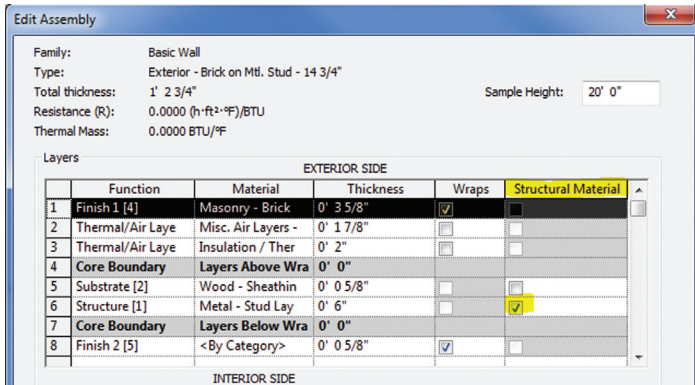
Figure 4: Wall assembly properties

Wall and Floor Structural Materials: Walls and floors can now be refined within one of the structural layers in the core boundary to define the "Structural Material." This will enable the analytical object to take on the physical material assets of that layer, enabling us to utilize multi-layered walls and floors for analysis.

PARTS AND ASSEMBLIES

While we saw the introduction of parts and assemblies in Revit 2012, it has been difficult to put these tools to good use. The biggest improvements are focused on the design-to-fabrication workflow of precast concrete. The idea is that a designer can focus on the overall design by using continuous walls and columns, then split those objects into constructible parts, and finally combine those parts into assemblies and shop drawings at the appropriate stages of the project.

Parts: Parts can be merged and excluded, then later restored. Since we often don't know the final solution, it can take many trials to get the splitting of parts correct. Being able to manipulate these without going back to "square one" is a much-needed improvement.
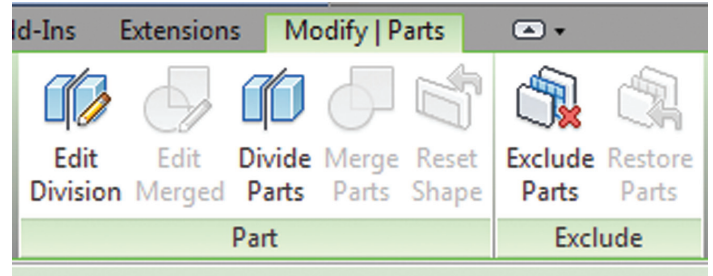
Figure 5: Modify parts

An additional feature is the ability to divide parts with a gap and a custom profile. A perfect example of this is precast concrete wall panels. Now we can maintain the original construction of a wall—as well as the parts it is made of—with proper construction joints.
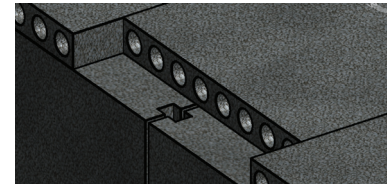
Figure 6

Assembly Drawings: The next step towards facilitating fabrication is the workflow to create shop drawings. Assemblies are a great fit to do this. Once an assembly is defined, six new view options have been added for creating detail section views around the outside of the assembly. Assembly views can now be placed on project sheets and project views placed on assembly sheets. Element creation tools are now available in edit assembly mode. Assemblies will have an origin, allowing the assembly type to be changed for an assembly instance, and provide a local coordinate system, which can be used to determine how the assembly geometry is displayed in views on a sheet.
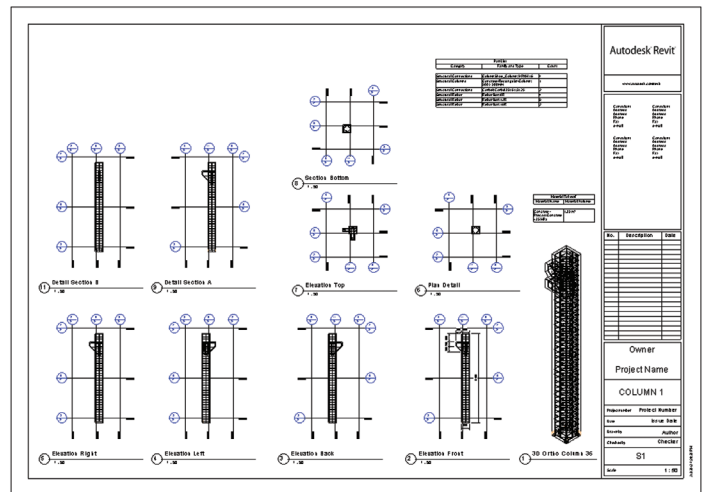
Figure 7: Automated precast column assembly shop drawing

Revit Structure 2013

STRUCTURAL REINFORCEMENT

Fabric: Structural Fabric Reinforcement is a new element that can be hosted in structural floors, foundation slabs, and structural walls. This is an item that was typically covered in detailing, but can now be accounted for in the model. The layout functions are easy and intuitive, which can help builders get a quick and accurate estimate of how many sheets of wire fabric they'll need on the job. I can imagine similar tools surfacing later for such things as metal decking.
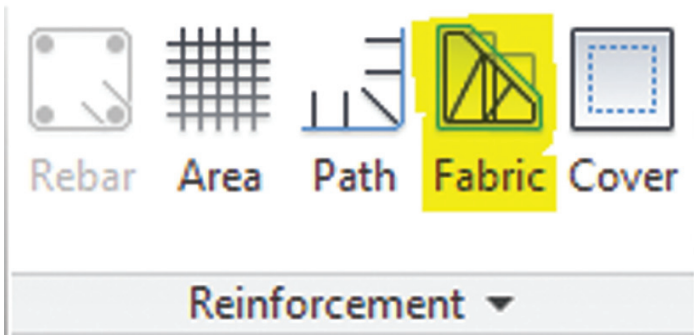
Figure 8 – Reinforcement Panel
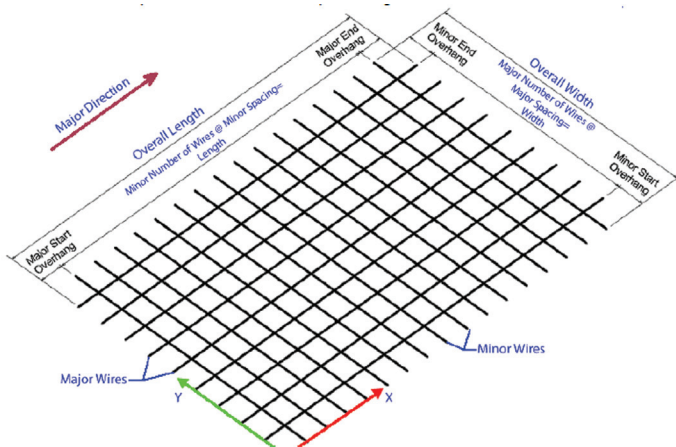
Figure 9: Fabric reinforcement

Host a Rebar: Area and Path reinforcement can now host a rebar. This new behavior makes these elements containers for hosting structural rebar in a manner similar to how beam systems and trusses host structural framing. The prior behaviors have been maintained and the user can control which behavior is used in the Reinforcement Settings dialog on the Reinforcement panel of the ribbon. Layout rules such as a fixed number or maximum spacing for Area and Path reinforcement have been updated to follow Rebar Sets.

You can now display rebar elements in floors, walls, or foundation slabs; schedule rebar; and remove the area or path system to expose the individual rebar elements. Units have also been added for structural rebar: Reinforcement Area and Reinforcement Area per Unit Length.

Rebar Snapping: Another good rebar improvement attends to snapping and alignment to fillets and hooks. It is now easier to avoid interferences and collisions with other rebar while placing a rebar/rebar set in the fillet or hook.
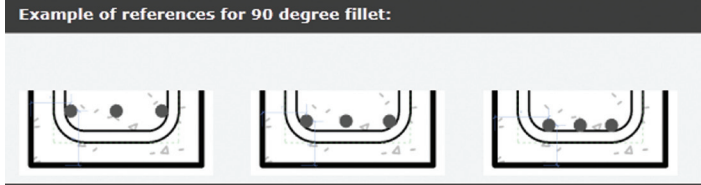
Figure 10 – Rebar Snapping

All of these new features are getting us very close to a complete rebar detailing package that can be leveraged by multiple parties from design to fabrication. Since most rebar detailing packages are 2D, this model-centric workflow may very well turn heads in the industry.

STRUCTURAL ANALYSIS

Anybody who has attempted to round-trip a structural design from Revit Structure to analysis software knows that the process isn't exactly straightforward. There is typically some preparation before doing so. Now that structural analysis is becoming embedded into the product and cloud analysis is on the brink of reality, tools are needed to bring the documentation model even closer to the analytical model. That's where a string of new features comes into play.

Manual Adjust: When setting up analytical floors, edges need to be aligned with analytical supports such as beams or walls. To do this task, one would select the "auto-detect" alignment method. If that didn't succeed in automatically detecting the closest support, than one could align them using grid lines or manually placed reference planes in every location.

When you look at the process with a holistic mindset I think you'll agree that there isn't a better solution out there than Revit.
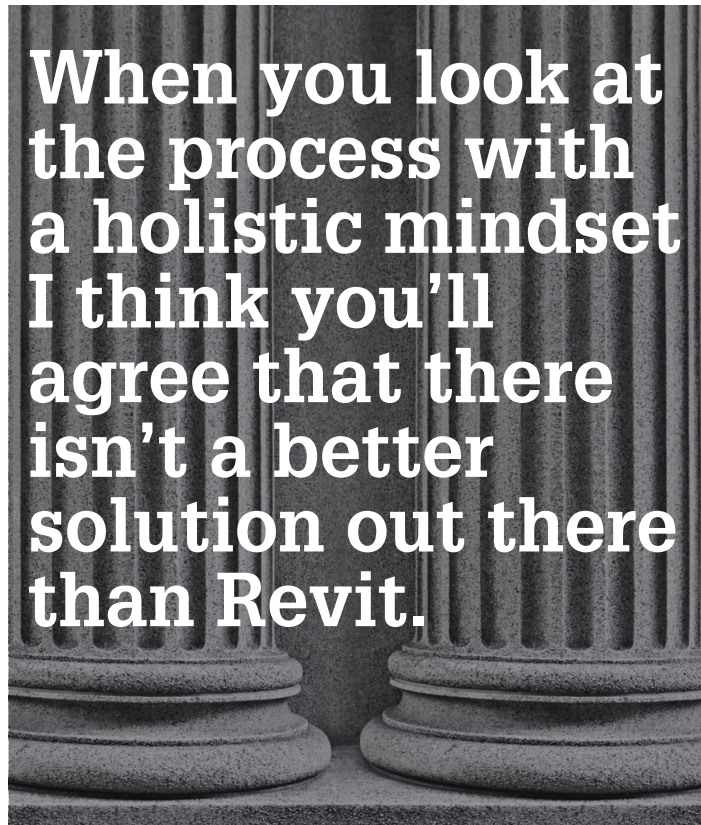
While this was achievable, it was a daunting task for complex projects. To address this, Revit Structure 2013 now allows direct manipulation of slab edges and corners (see Figure 12). In addition, new instance properties of analytical elements have been added to facilitate identification of analytical elements such as Member Number, Surface Number, Foundation Number, Node Number (Analytical Nodes), and Comments.

Openings: Floor openings can now be ignored on a case-by-case basis. Each opening in an analytical model will have a checkbox when performing an "Analytical Adjust" (with the floor selected and the Openings tool selected) that can be simply unchecked when the user wants to remove the analytical opening but keep it in the physical model (see Figure 11). That'll be handy when simplifying the analytical model from all of those small openings.

Links: Where analytical beams and columns don't quite come together, we need to set rigid links between them. This was previously done by turning on automatic Rigid Links. An update has been implemented that renames these to "Analytical Links" and distinguishes the links to be either manual or automatic. These links have types that allow the user to configure link release conditions (see Figure 13).

These improvements will greatly simplify the task of prepping the model for structural analysis.

Figure 12: Manual manipulation of analytical floors
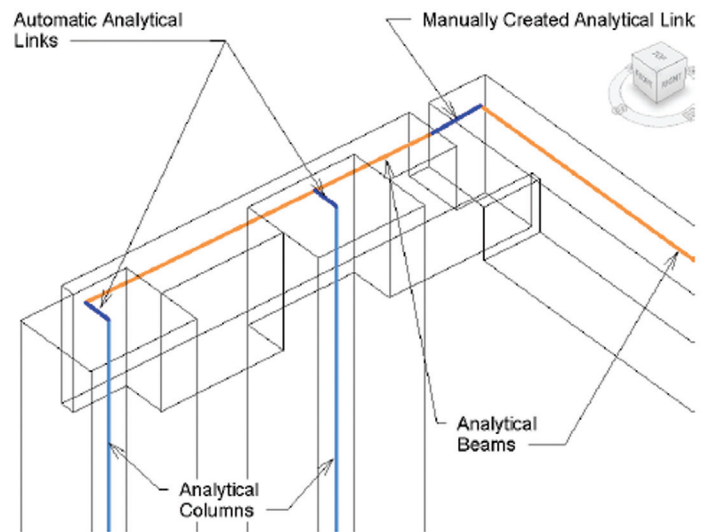
Figure 13: Analytical links

Figure 11: Ignore slab openings in the analytical model

WHAT DOES IT ALL MEAN?

Someday, in a perfect world, we'll be able to design and document our structural projects in a single platform. I don't think that day has come yet, but when you look at the process with a holistic mindset I think you'll agree that there isn't a better solution out there than Revit. This updated version gets us many steps closer to that utopia by expanding the virtual model to more users. So don't take the little stuff lightly and don't ignore the new features, because they will undoubtedly save you time and money. Keep learning and keep developing your efficiency with the tools available.

Greg Hale is a BIM Manager with SWBR Architecture, Engineering & Landscape Architecture. His main focus is on the implementation and practice of Building Information Modeling. Now specializing in Revit and Navisworks, he provides training, implementation strategies, product optimization, and best practice to designers, building owners, contractors, and educators. Greg is a licensed professional engineer, a regional leader in BIM and VDC, and has spoken at many professional events. In addition, Greg is co-founder of the RocCity Revit User Group, PSMA Design Technology Group, co-chair of the NCS Wave Task Team, and an active member of NCS and NBIMS. He brings a passion to design and the progression of integrated practice.

BUILT

by: James Salmon

Wicked Financial Solutions for Infrastructure

This article continues the Wicked Series begun in September 2011 with the Wicked Primer. Last month we looked at Wicked Procurement Programs and this month we explore Wicked Financial Solutions for Infrastructure. Projects are financed in myriad ways, but there is room for improvement. Innovation related financing, insuring, and bonding infrastructure projects present opportunities for improvement and, as with other innovations, those who seize the day will find success.

Finance, insurance, and bonding represent three large pieces of the financial puzzle the BUILT industry needs to leverage more effectively. Project finance, dominated by traditional commercial lending offices in big banks, represents the most visible piece of the financial puzzle on any project. Without financing, no project moves forward. Accordingly, convincing the lender the project is poised for success ought to be a priority for the entire team. After all, if financing fails, the project typically fails. Few self-finance, but those who do should seriously consider integrated project delivery (IPD), the use of building information modeling (BIM) and the use of lean business processes that support the use of those innovative tools. Likewise, commercial lenders should consider use of these tools on the projects they finance.

Insurance is the next most visible piece of the puzzle. More insurance carriers recognize the need to accommodate the BIM-enabled professionals they insure, but very few carriers know, or even care, why those BUILT industry professionals need accommodation and fewer still actively investigate the creation of new-generation insurance products to serve BUILT industry owners and professionals who procure and deliver BIM-enabled infrastructure. New products and a new mindset loom on the horizon. Those who prepare for success will have success.

The bonding of projects, from bid bonds to performance and payment bonds, deserves attention as well. Entities that write surety bonds typically join the project party too late to demand an IPD and BIM-enabled process, but if they see value in reducing risks related to default by those they bond, IPD and BIM solutions should top their list of priorities.

Traditional IPD contemplates the crafting, negotiation, and implementation of a multi-party agreement with the owner, contractor, and designer as members of the core team. A robust and effective IPD Procurement Program—of the kind discussed in my article in the March 2012 issue of *AUGIWorld*—entails a substantive and early conversation with the financial stakeholders as well. Next month we will explore the mechanisms for involving suppli-

ers, specialty designers, and trade contractors in the conversation early, but this article focuses on the need to engage lenders, insurers, and sureties early.

WICKED FINANCE

New provisions in commercial lending instruments rewarding the use of IPD and BIM solutions would trigger widespread adoption of IPD and BIM solutions. Smart lenders, who already pay millions of dollars to watchers hired to watch watchers on complex commercial projects, can quickly leverage BIM to receive real-time, high-quality reports of project progress. Typically, lenders hire a third-party architect to track project progress, receiving cumbersome written reports after mistakes have been made. Sometimes the mistakes are highlighted, sometimes they are not. Too often, the reports are filed away, unread, until the lawyers demand them during a full-blown construction dispute. BIM-enabled construction progress reports would be cheaper and better.

If lenders recognize the value of BIM-enabled construction progress reports, why wait until construction starts? Why not demand—or at least reward—an IPD and BIM-enabled process from the outset?

Again, smart lenders see value in financing BIM-enabled projects. As the value of "Googlizing Infrastructure" becomes more clear, more lending institutions, real estate investment trusts (REITs), and similar entities will demand IPD and BIM solutions earlier and earlier.

Lenders, and the lawyers that represent them, are notoriously risk averse. Accordingly, motivating the decision makers within those organizations to request and draft new lending instruments that support, enable, and reward the use of IPD and BIM solutions represents a challenge. The first step is to educate these stakeholders regarding the value of IPD and BIM to their bottom line.

Owners, developers, and other BUILT industry professionals with contacts in the financial industry need to engage decision makers in a substantive conversation regarding the use of IPD and BIM to reduce and mitigate risks associated with complex infrastructure projects. The best forum in which to discuss the merits of these innovative solutions is a collaborative workshop where key decision makers learn more about the use of IPD and BIM and wrestle with the real-world application of those tools in a small group environment.

WICKED INSURANCE

Collaborative Construction advocates the use of Collaboratively Controlled Insurance Programs. Insurance carriers are ignoring enormous market opportunities by clinging to the traditional pieces of the pie. Bold steps are needed and will be rewarded.

Planners, designers, and to a lesser extent, constructors and trade contractors need BIM riders for traditional insurance policies that clarify the scope and nature of the coverage available to BUILT industry professionals under traditional insurance policies when those BUILT industry professionals are asked to deliver BIM

services. Owners, demanding BIM deliverables, likewise need the protection of a BIM rider on their traditional policies. The quality, scope, and nature of these BIM riders need to be hammered out through consultation with those seeking protection under these new products.

Engaging the BUILT industry in a substantive and intelligent conversation about what a BIM rider ought to cover and why provides insurance carriers with a perfect enter mechanism into this new market. Carriers that recognize and exploit this opportunity will gain market share. Those that do not will lose market share.

Characteristics of a Wicked Problem

1. Evolving definitions. The definition of a wicked problem evolves, triggering solutions which, in turn, change the definition of the problem.

2. Continuous solution cycle. Because the definition of the problem continues to evolve, solutions emerge continuously, concluding when problem solvers run out of time, energy, money, or some other limiting resource.

3. Perfect solutions prove elusive. Objective solutions elude wicked problem solvers with most ranging from best to worst or acceptable to unacceptable.

4. "One off" problems. No two projects are alike and, thus, no two wicked problems are the same.

5. One-shot solutions. Wicked problems feature one-shot solutions as every solution impacts the problem and everything the problem touches.

6. Creativity and judgment drive solutions. Pursuit and implementation of wicked solutions depends on the creativity and judgment of the stakeholders.

BUILT

Similarly, a need for project insurance exists. An insurance product that provides coverage to an integrated team engaged to deliver BIM-enabled infrastructure, while complex, represents a tremendous opportunity for carriers willing to provide such a product. Carriers typically balk at the idea of offering new products, preferring instead to rely on language vetted in the court system and complaining there is no claims history associated with IPD and little associated with BIM. The lack of precedence in the court system and lack of claims history present challenges, but those challenges must be viewed as opportunities and not barriers.

Swiss Re, Zurich, Lexington, and other carriers have experience insuring projects completed under novel delivery models, including Design-Build, Construction Manager at Risk, and Public Private Partnerships (P3). Extending the protection offered under such project policies to IPD and BIM-enabled projects is simply not that complex. Taking the coverage to the next level and creating a collaboratively controlled insurance program will require more effort, but the rewards far exceed the risks.

Finally, existing insurance products may need to be adjusted over time as BIM deliverables are mainstreamed. The BIM riders mentioned above may serve as precursors to such revisions in existing policies. Professional liability policies, general commercial liability policies, property and casualty policies, and builder's risk policies all likely need adjustments.

Advocates of IPD and BIM solutions need to engage the risk management professionals inside and outside their firms in a conversation related to insuring IPD and BIM-enabled projects, drafting BIM riders and adjusting existing policies as necessary. Again, a collaborative workshop setting likely provides the most productive forum in which to discuss these issues.

WICKED BONDING

Sureties need to step up their game as well.

Bond provisions rewarding the use of IPD and BIM solutions would motivate every entity in the construction bond market to learn more about IPD and BIM. Sureties invest most of their time and energy in vetting the financial health of the entities to which they issue bonds. This is because most sureties have little interest in paying on the bond and instead expect the entity that purchases the bond to be capable, in most instances, of stepping to the plate. A business model that looks over the horizon and leverages the value of IPD and BIM processes will allow certain sureties to capture more market share without incurring additional risk.

Sureties typically issue three types of bonds on large infrastructure projects, bid bonds, performance bonds, and payment bonds. A bid bond ensures entities will honor bids and sign all necessary contracts if awarded the project. If an entity operating under such a bond fails to comply with the bid terms, surety may be responsible for the costs of choosing a new contractor. Of course, the entity will seek indemnity from the bidder. A modified version of this process could support the delivery of bids on IPD and BIM-enabled projects from integrated teams.

A performance bond assures the company offering the project the bonded entity will complete the job in accordance with specifications of the contract, including, generally, the stated price, schedule, and other specific terms. If an entity fails to complete the project in accordance with such these terms, the surety is responsible for hiring another contractor to finish the job. Again, the surety will seek indemnity from the bonded entity. The cost of bringing a new contractor on board because an entity responsible for some portion of the project fails to deliver (and this happens on the best projects from time to time for various reasons) will be reduced if the project is an IPD and BIM-enabled project.

Payment bonds, put in place to protect suppliers and subcontractors from non-payment, are very similar to performance bonds. The risks associated with such bonds can be reduced by increasing the potential of success for the overall project by deploying IPD and BIM-enabled processes early. Integrated teams operating in an IPD and BIM-enabled environment enjoy success at greater rates than adversarial teams on traditional projects and sureties who bond work for such teams will experience lower failure rates than those who issue bonds on traditional projects.

CONCLUSION

Financing, insurance, and bonding are critical to every project. Stakeholders in the financial sector with an interest in your project should be invited to join the conversation early and substantively. Reach out to the lenders, insurers, insurance agents, sureties, and others you know in the financial industry and invite them to attend a collaborative workshop with you. Leveraging IPD and BIM solutions requires input from all quarters, and the stakeholders in those three quarters are particularly important.

The challenge of extending IPD and BIM-enabled processes to non-core stakeholders will be the topic of next month's BUILT – BIM to FM article. We will explore Wicked Joining Mechanisms in that article, including joining agreements, flow through provisions, strategic supply chain agreements, and strategic alliance agreements generally.

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What's New: Technology Advancements in the AEC/O Industry

To consider advancement, one must first reflect on where we are defining our advance.

First, I am going to attempt to give a poor man's version of the history of architectural/construction advancement. It will be the kind of history one might see at death: flashes of major movements, parts and pieces of a whole understanding. Then I'm going to help you recognize the importance of today's advancements, and introduce advancements of the future so we can be aware and prepared to ride the crest.

ARCHITECTURAL/ENGINEERING/CONSTRUCTION ADVANCEMENTS

Architects were born from builders—men and women whose hands were so familiar with a technique and material that they pushed its limits and innovated to make their surroundings a little bit better. Some of those innovations or advancements changed the face of human history:

+ Flexible materials that could be implemented in different environments were used the world over to form geometric spaces that protected, which allowed socialization and migration of culture and thought.

+ Concrete and aggregate allowed burgeoning cultures to construct smooth and strong elements that were used to defend communities, build on permeable ground, and create permanent structures that we still can marvel at hundreds of years later.

+ Steel was used to span distances that were considered impossible to spatially cross before. It also allowed great heights to be achieved, which resulted in sociological density.
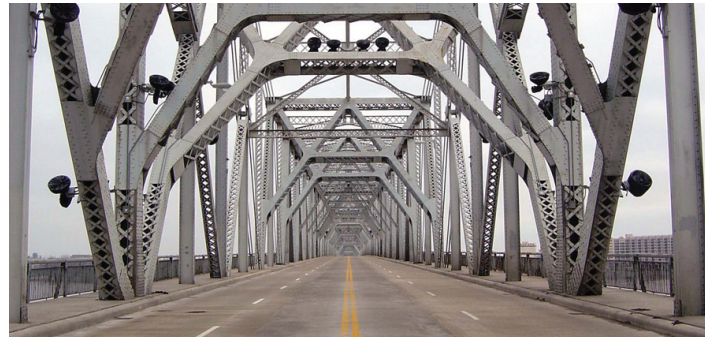
While these may be material advancements, the only way they were executed was by careful planning, calculation, and design. Our forefathers and foremothers used everything they had to convey these ideas and document them. They used rock walls, mud, tanned skins, papyrus, created special measuring tools, manufactured paper, and now we have computers. A fact I want to point out is that I don't think the vast majority of them would have had access to paper and measuring tools, yet decided to use a tanned skin and bear grease instead.

CURATORS OF LIFE

We, as curators of life, are responsible for continually educating ourselves in how our ever-changing audience moves through and is harbored by geometry, light, and space. We are also responsible for educating ourselves in the new tools and materials made

attainable to us today, then use those advancements to design, construct, and, most importantly, make associated better, more informative decisions.

Wikipedia, a well-used, open source of digital information, states:

"Architecture is both the process and product of planning, designing and construction. Architectural works, in the material form of buildings, are often perceived as cultural and political symbols and as works of art. Historical civilizations are often identified with their surviving architectural achievements.

In relation to buildings, architecture has to do with the planning, designing and constructing form, space and ambience that reflect functional, technical, social, environmental, and aesthetic considerations. It requires the creative manipulation and coordination of material, technology, light and shadow. Architecture also encompasses the pragmatic aspects of realizing buildings and structures, including scheduling, cost estimating and construction administration. As documentation produced by architects, typically drawings, plans and technical specifications, architecture defines the structure and/or behavior of a building or any other kind of system that is to be or has been constructed."

I love this excerpt. I wouldn't place such a long excerpt in an article if I didn't think more people in our industry needed to read it. This is our face to the rest of the world. How we are perceived affects our definition in our industry. If not, it should. The inhabitants are our end users, are they not?

Our face to the world is truly inspiring. We are some serious ninjas and need to live up to that status. We all know how architecture/engineering/construction advancements changed the world, so we can understand society's perception. Yet, awareness is a process
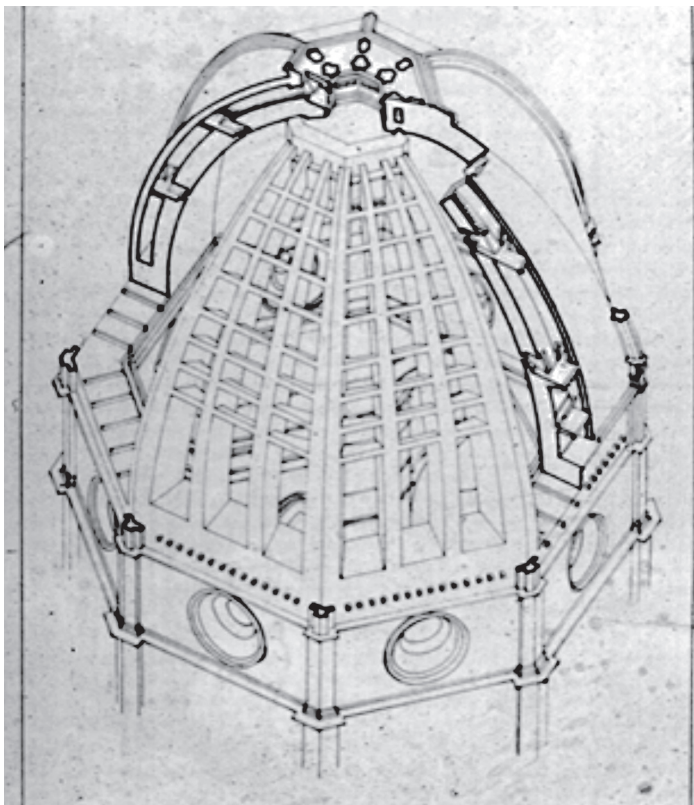
of evolution and we are authors of it. We should be using every technology we have available to change and move forward in our ninja status.

EVOLUTION OF DESIGN AND CONSTRUCTION

Drawings were originally created for two purposes, to be used as a reference from which experienced craftsmen could construct, and to portray intent of design. This hasn't changed in our industry. For the past several years we have continued to use 2D drawings made from, at first, hand drawings then digital lines created on a computer. As the hardware and software became more advanced, we as technology users became faster and more efficient. We were able to quickly review all the pieces and parts of a design in a singular format.

In reality though, not many of the users creating these lines analyzed the totality of what the lines represented. We have had specialty people who solely worked on details of walls, reflected ceiling plans, placement of casework, or who have drawn symbolic design intent lines to be translated into other lines. Activities related to geometries and construction has been isolated in thoughts of separate individuals. Information didn't freely move from one sector to another. This is, in part, because there was not an efficient way to convey it and partly because the workflow didn't call for it. By and by, master architects, engineers, and builders have gone to the wayside, but we now have a way to fix that.

Today's AEC/O industry and information technology has completely revolutionized. We can use the new technologies of BIM, environmental simulations, logistics virtual scheduling, and construction software to fully realize a building's lifecycle. We can build before we build. We can communicate details and ideas across oceans in seconds. We can document and share conditions in real time. BIM takes CAD a step further by introducing collaboration, coordination, space planning, estimation, clash detection, and detailing. It also does four-dimensional (4D) modeling (which is 3D with time added) and 5D (which is 4D plus cost estimation). The technology of today is a paradigm shift because it is changing processes in addition to tools.

A line is not just a line. A group of lines is a wall that contains a certain volume of this material and a certain number of that material. We can see that wall in an elevation, section, broken into parts, visualize how it absorbs heat, test its strength, and do that all in real time as it's being drawn. There will be several people in reality that will touch that wall. Who are they? What do they know? Can I get information from them that will make this wall better? These are the questions that are made answerable in today's culture of design.

If we, as an AEC/O collective, can pursue advancements and innovation in technologies, implement them, and make use of all they offer, we can once again become the master architects, engineers, and builders of the past. We only have to reach out and grab what is in front of us and own those workflows and tools like a ninja.
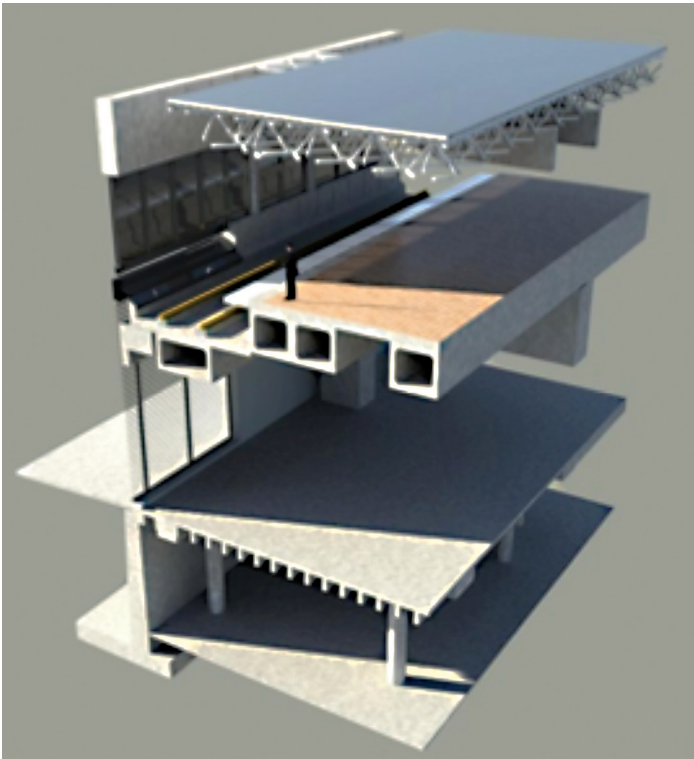
WHAT IS ON THE HORIZON?

As building construction requires more global collaboration, pressure to use these new advancements has never been greater. Moreover, regulatory standards have become more stringent. We must, as a collective, integrate our existing process management with cutting edge tools for design, engineering, analysis, and construction planning so that all stakeholders in the construction process can effectively collaborate and, most importantly, create better space.

Three of the biggest advancements that will impact us in the near future are:

+ Social Virtual Cloud Environments
+ Mobile Hardware
+ Imaging and Visualization
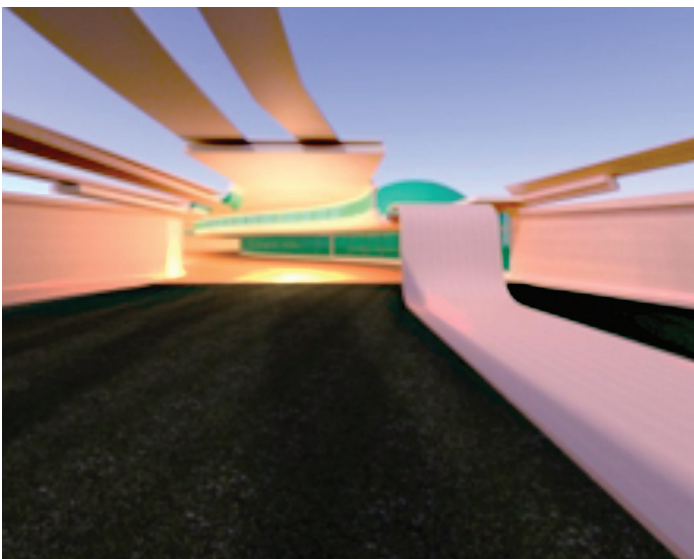
We all have started hearing about "cloud" technologies. A way we will be able to use the cloud is in the way we manage, store and share information. We will be syncing our work into secure cloud servers so our data can be updated in real-time on several job sites around the world. We can also place large files in a cloud and access them without slowing down our personal computers.

Using mobile devices such as smartphones and tablets, we can also access cloud information on the move. We can take pictures of construction and load them into a model, then have the software calculate if it matches per schedule/phase/plan, if the construction is on time or being done correctly. We can use a tablet to walk around a model of a building IN the building, make a ceiling transparent, and spot the probable source of a leak.

Visualization of space is essential to understanding. We now have tools that can allow us to virtually walk through a space WHILE standing. We can PRINT 3D models of our designs. We can render our data rich models dynamically in a photorealistic manner using the latest GPU hardware and software.

I can't tell you how much of a game changer all of that is. It is like nothing that we have experienced before as curators. Sure, we can walk around in Autodesk® Navisworks, Autodesk® 3D Max®, and Autodesk® Revit® while sitting at our desktops, but what we see is still a cartoon representative of the materials and elements to be constructed. We all too often fake lighting conditions and objects to get an accurate sense of our intent. Then it takes hours, if not days, to push out one image, which still might not be right.

The ability to dynamically design and construct is staggering. It is a leap over the chasm of being chained to a state of inertia. I have experienced this first hand, and let me tell you that there is no looking back. It is what the hearts and minds of true master builders, architects, and engineers have yearned for since they had their hands shaping stone.

In summary, we come from a history rich in innovation and advancement. Our ancestors used every bit of technology available to them to change the worlds around them, which in turn changed social and cultural dynamics. We have that power if we only reach out for it and wield it like a ninja.

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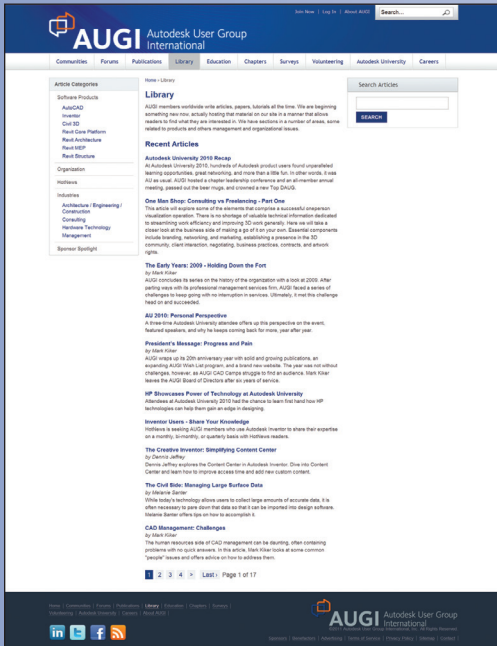
Been to the Library?

If you've visited www.AUGI.com recently, then you've seen a highly visible improvement in AUGI's member interface. But one of the most exciting features is still flying under the radar and that is the Library. The Library is the home for articles and whitepapers that the membership contribute to the organization. There is a tremendous amount of material generated by members and until now that content 'shelf life' was pretty short. Since magazines come out monthly, an article's time in the spotlight is brief. Well, no longer! As issues of , are replaced by new ones, the staff at AUGI will be posting article content on the website in HTML. The magazine PDFs will stay, of course. Consider the AUGI Library a new area to read some great content. Finding articles from past issues is a breeze, because searching and categorization can now be applied to these articles. In addition, the Library is the real home for , an email-based monthly publication.

Are you ready to write?

AUGI, through the contributions of members, produces monthly magazines such as *AUGIWorld*. Well the articles in these magazines don't grow on trees! The content comes from members willing to contribute. If you are an AUGI member, you probably use an Autodesk product. Do you know your product pretty well? Have you ever sat down with someone else to explain how Paper Space works, or how to explode polylines, or customize the CUI? These messages you share casually with others are the same messages that others outside of your area need to hear. Just imagine… even though you have been using AutoCAD since R9, today, somewhere in the world, someone started using AutoCAD for the first time. And that expert level change you made to your CUI to work better with your PGP today? Tomorrow someone else will begin that exercise as well and you could save them some time with your insight. So, get out there and join the fun – contribute to your magazines and your fellow members. Share your knowledge and expertise with beginners and advanced users alike. People are ready to hear what you have to say. For more details contact david.harrington@augi.com