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The Official Publication of Autodesk User Group International
April 2014

Introducing Autodesk 2015

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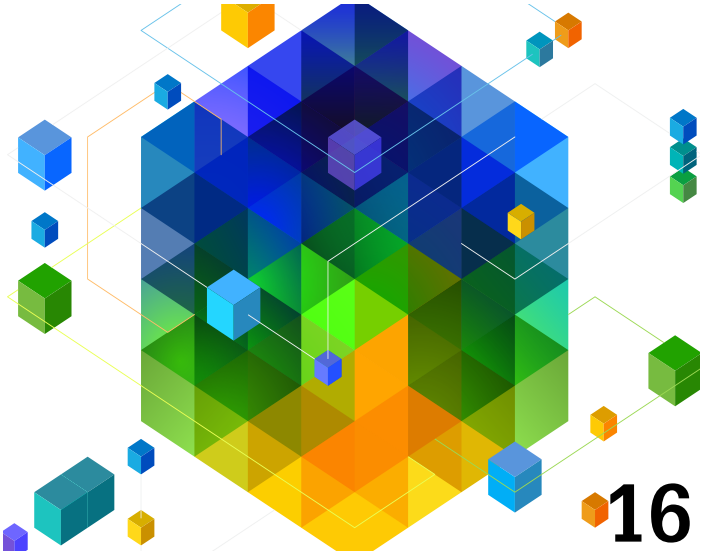

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Editor's Note

Hello, *AUGIWorld* Reader!

If it is April, you know what that means! New, shiny, software! Once again we take a peek behind the scenes as Autodesk prepares for the 2015 product launch. We are releasing *AUGIWorld* this month a week after the Autodesk press embargo on 2015 software. So that means our authors have had their little paws on these tools for a good while. Anyone interested in what is coming? I know I am very excited!

Perennial manager Mark Kiker speaks to what is new with you in this month's CAD Manager column. Our first 2015 peek is by Michael Smith, and he adds up the new strengths in Navisworks Manage 2015. Next we have Jay Zallan, aka Revitdamus, who takes an accounting of the new features and enhancements in the Revit 2015 platform. Depending on your needs, there are some real gems. And then CASE brings another Tech Insight for us in determining the optimum performance hardware for Revit.

Shifting gears a bit, Melinda Heavrin stays current in her article about spaces in AutoCAD Architecture 2014. But that doesn't last long as Chris Fugitt again gets fresh with a breakdown of usability enhancements in AutoCAD Civil 3D 2015. And Todd Shackelford discusses wishes granted in the latest version of Revit MEP.

Moving onto more graphic subjects, Brian Chapman shows us the performance and productivity increases contained in 3ds Max 2015. And once again winning the "biggest article of the month" award, John Evans tells us there is something new for everyone in Inventor 2015! But not to be outdone, Brian Benton runs down the new stuff in AutoCAD 2015.

And then Phil Russo picks up with his report on the new reinforcement and analytical model controls in Revit Structure 2015. And finally, if you are a returning reader to *AUGIWorld* you will be interested in our monthly report from Lee Ambrosius and his Inside Track article. Lee highlights products by VirturalGrid, Proplanner, and Autodesk Labs.

All in all, a fine release of a magazine with lots of information for you, the Autodesk user, to consume. You may see more of what's new in 2015 in the near future, but this issue should put you well on the path of knowing what is in store in your favorite applications.

Until next month, keep on reading!

David Harrington

AUGIWorld

www.augiworld. com

Editors

Editor-in-Chief
David Harrington - david.harrington@augi.com

Copy Editor
Marilyn Law - marilyn.law@augi.com

Layout Editor
Tim Varnau - tim.varnau@augi.com

Content Managers

3ds Max - Brian Chapman
AutoCAD - Curt Moreno
AutoCAD Architecture - Melinda Heavrin
AutoCAD Civil 3D - Christopher Fugitt
AutoCAD MEP - William Campbell
CAD Manager - Mark Kiker
Column: Inside Track - Lee Ambrosius
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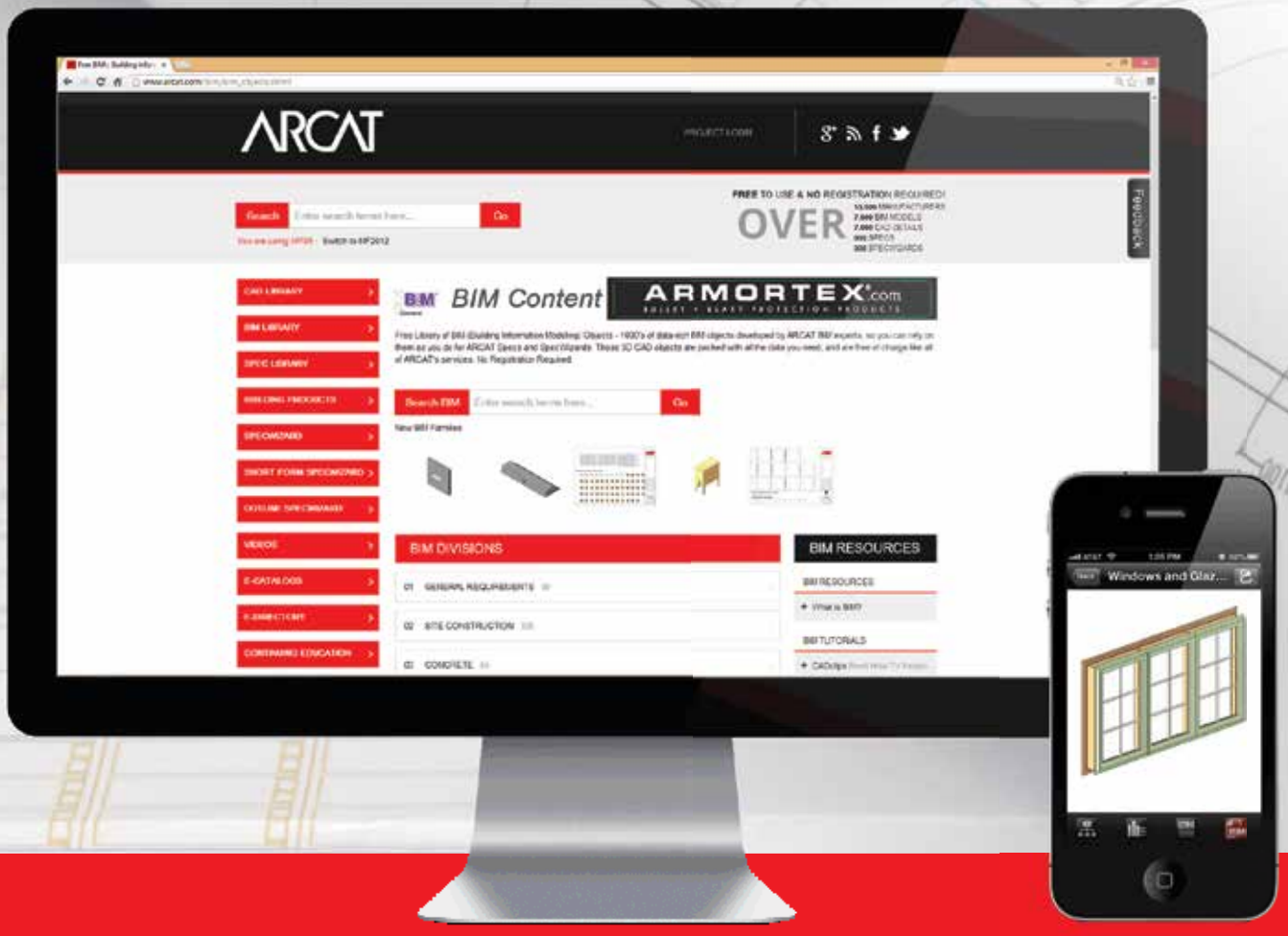
BIM Library

ARCAT has the most comprehensive collection of BIM objects you will find, available free of charge and without registration.



The ARCAT BIM Library is also accessible in the ARCAT app, with editing capabilities in the AutoCAD 360 app.

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by: Mark Kiker

What's New With You?

We all anxiously look forward to new software releases. We like hearing about the new features and fixes that might help us become more productive. We like reading the articles and the perspectives of others. We like to think about how we might implement these new features and share them with others.

While getting software upgrades is great and moving forward with new releases of your favorite tools is exciting, what about an upgrade for you? You may ask, "What do you mean an upgrade for me?" I mean, what have you upgraded in your work life recently? What new approach have you been trying? What updated process have you rolled out? What have you upgraded about yourself?

Think about it… every year software developers are offering upgrades. New tools are coming along that can supplement the software on which you depend. Everyone is trying to grab a piece of your mind to wedge in the possibility that their tool can make your job easier, better, faster, cheaper, or whatever. They have been thinking about this release for probably many years back. Now it is your turn to think.

You can think about the software and processes you use. You can think about the people around you and how they go about getting their jobs done. You can think about where your firm is headed. You can think about how much work it is going to take just getting the new software in place.

The list may seem endless when it comes to what needs to be done at work. But do you ever think about you? How much

time do you spend reviewing what you have done? What kind of time should you put into planning your future? What's new with you?

Being introspective is a lost art. Think about it… but wait, no one thinks about much any more… at least not very often. I have sat in waiting rooms, airport terminals, restaurants, and other places where I notice that most people's free time is filled up with using a device to check email, connect with others, or play a game. Don't get me wrong. I do that, too. I grab my device and check on the latest. I look to see if anyone is trying to contact me, or if they have posted something that I really do not want to miss.

I wish that more people (including myself) would take time to think about things rather than look for more information to push into their heads or fill the time with meaningless activities.

According to the US Bureau of Labor Statistics website, "The American Time Use Survey collects information about the activities people do during the day and how much time they spend doing them. For example, on an average day in 2012, Americans age 15 and over slept about 8.7 hours, spent 5.4 hours doing leisure and sports activities, worked for 3.5 hours, and spent 1.7 hours doing household activities. The remaining 4.7 hours were spent in a variety of other activities, including eating and drinking, attending school, and shopping."

I am not sure why there are only 3.5 hours working. Those totals must take in the weekends and the unemployed.

But how much time was spent just thinking? How about 17 minutes during the average 24-hour day. That is what the above survey uncovered. And that is down from 2003. Take a look—http://www.bls.gov/tus/charts/leisure.htm. I realize that people think all the time, but what is reflected in this survey is the time spent devoted to thinking. And this data is mixed with relaxing, which is often spent napping or just not thinking about anything. This data reflects the US population. What might the time be for other areas of the world?

So what do you think about during your 17 minutes? Here are some suggestions.

1. Think about your career. Where are you headed? Do you have a plan or even an idea of how to get there? When will you start? What would you do if you wanted to look for a new job, or if you lost the job you have? How far can you move up the ladder at your present firm? How will you move up?
2. Think about how you can make yourself more valued at work. How can you add to your expertise? How can you get others to recognize your value?
3. Think about your education. What are you doing to expand your knowledge in the CAD or BIM world? What formal and informal goals do you have for moving yourself forward? What kind of time is set aside for training and education? The average—per the survey—is 30 minutes per day. A half an hour per day spent taking in new knowledge or in educational pursuits.
4. Think about how you can improve your management and leadership skills. What new book will you read? What podcast should you start listening to? Who might you want to approach as a mentor? What one management trick might you put into place this month?
5. Think about service projects in which you might become involved. There are so many ways to help others. There is so much need. It might be getting involved in an effort that your employer supports. It might be setting aside some time to get your entire family involved in a community service effort.
6. Think about ways to connect with your family and friends. Work is not the main thing that should take up your time. Relationships are vital to a balanced life. You are the only mom or dad your kids have. You may be the best friend that others need right now. You should make the time for others rather than hope that it magically appears.
7. Think about what you will do this week for you. Not what you will do for others or your firm, but what you will do for you. It might include job tasks or activities with friends and family, but map out what you hope to gain from each event or task. It might include some time to yourself. It might include more time with the family.

What are you doing to expand your knowledge in the CAD or BIM world? What formal and informal goals do you have for moving yourself forward?

By just taking a little time to think, you might uncover some area that is out of balance or needs a little more focus. Making progress starts with the thinking process. It's time to develop something new in you.

Mark Kiker has more than 25 years of hands-on experience with technology. He is fully versed in every area of management from deployment planning, installation, and configuration to training and strategic planning. As an internationally known speaker and writer, he is a returning speaker at Autodesk University since 1996. Mark is currently serving as Director of IT for SIATech, a non-profit public charter high school focused on dropout recovery. He maintains two blog sites, www.caddmanager.com and www.bimmanager.com.

by: Michael N. Smith

Quantification Gains Strength

Navisworks® 2015 introduces significant enhancements to Quantification, cloud rendering, and markups. These upgrades allow for a more seamless workflow.

3D MODEL TAKEOFF ENHANCEMENTS

3D quantity takeoff in Navisworks is now enhanced by the use of parent takeoffs. In the past, to take off an item in Navisworks you had to select the model geometry node in the selection tree and perform the takeoff. This became very tedious and difficult to perform. In the new version of Navisworks, you can select the parent group and take off all the children elements with a single click. This will simplify the takeoff practice and accuracy of 3D model takeoffs.

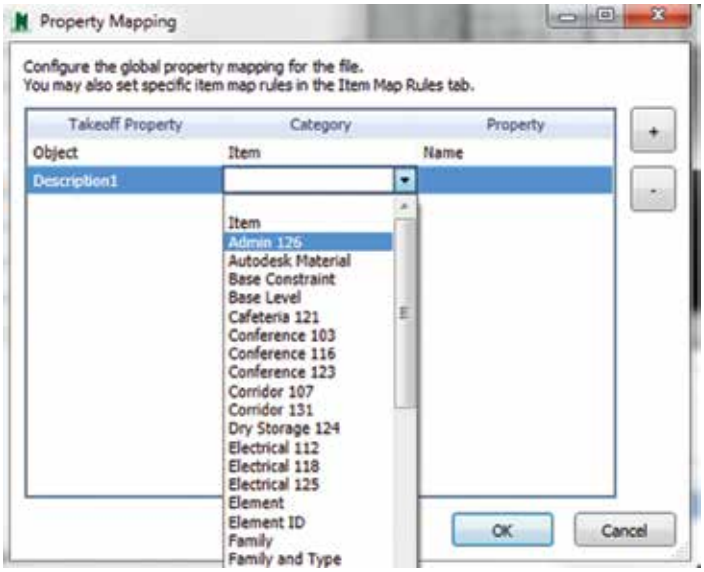


Figure 1: Model mapping

Navisworks 2015 also introduces Property Mapping. This tool allows you to discretely specify which Takeoff Properties will be matched to model properties. This saves you time when you perform the takeoff and gives you the confidence that your mappings have been set correctly.

2D MODEL TAKEOFFS

While the world of 3D is not new to Navisworks, the second dimension is relatively new. Navisworks 2015 brings quantification to 2D drawings and allows for integration to 3D model objects via the use of dwf/dwfx drawings.

Let's take a look at the 2D enhancements first. Model takeoffs can now be done in 3D and 2D views. What is truly remarkable about these takeoffs is that they are integrated together. When you do a model takeoff in 2D, the corresponding 3D elements will be taken off as well. The 3D model does not have to be a dwf/dwfx file for this relationship to exist.

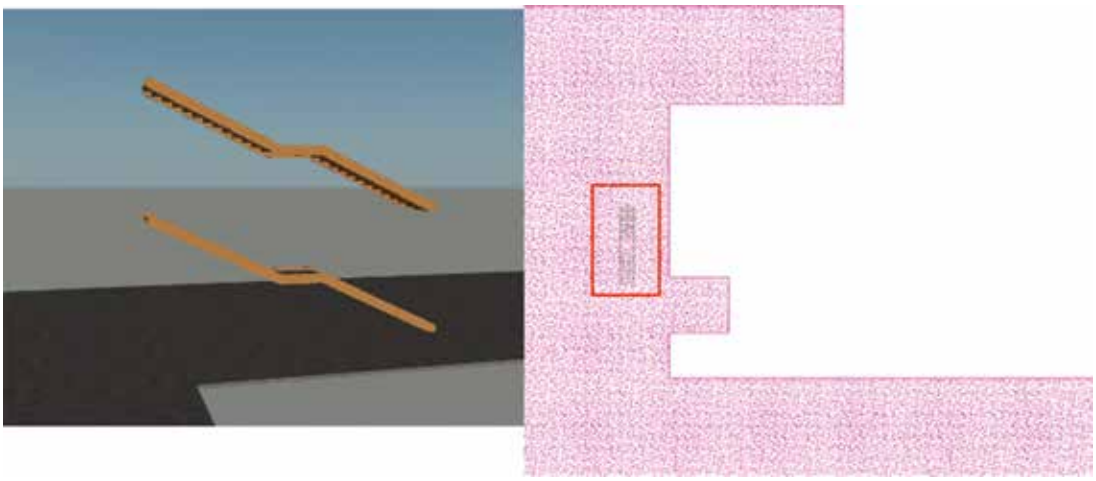


Figure 2: Revit NWC with DWF showing the same takeoff

You can perform a 2D model takeoff using the same operation you use for 3D takeoff. Simply select the object you wish to take off, right-click and select the item to which you wish to take off the object. In addition, you can drag and drop elements.

2D MODEL TAKEOFF TOOLS FOR NON-MODELED COMPONENTS

One of the most obvious changes to Quantification is the new 2D takeoff bar. This bar contains a number of essential tools necessary to accurately perform takeoffs on your 2D documents that are missing model geometry.

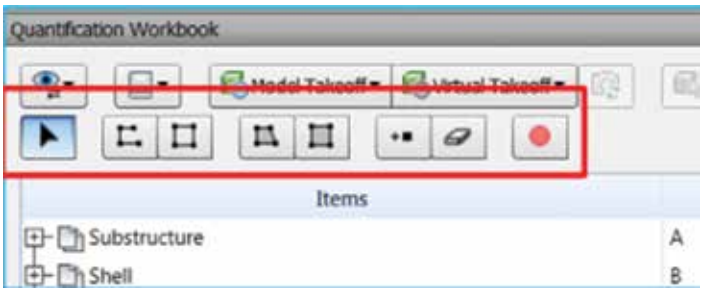


Figure 3: 2D Takeoff Toolbar

The first tool is the Polyline tool. This tool acts the same way that polylines work in other Autodesk products. You are able to construct a line and change its course by clicking and adding vertices. At any time you can modify a vertex by using the Select Markup tool. If there are additional vertices you wish to add, you can use the Add Vertex tool to create a vertex at any place in the existing line segment. This gives you the flexibility to make changes quickly.

If you want to make perfect rectangles, you can toggle the Polyline tool to use Rectangular Polyline. This allows you to quickly get the perimeter of rectangular shapes.

The next tool is the Quickline tool, which gives you the ability to click on model segments and automatically generate a line. This is particularly useful if some components are modeled and you simply need to add a non-modeled components detail. Simply select the lines constructed from the modeled object and create the path you need to perform your takeoff. For example, quickly create line segments for crown molding that follow the perimeter of the ceiling.

The Area tool gives you the ability to accurately determine the area on 2D documents. You can draw any shape and modify the area perimeter using the Markup tool and the Add Vertex tool. When you need to back out area you can use the Backout tool. This tool creates a void in an area allowing you to take advantage of mass area tools and simply back out the exceptions.

Like the Polyline tool, you can toggle the area tool between regular area and rectangular area. The rectangular area will allow you to create a rectangular area region to takeoff.

The next tool is the Bucket Fill. This unique tool allows you to select an area and have the area automatically shaded in and bounded for you. If you click the area again, the perimeter binding the selected area will be selected. Whether you are looking to get area or perimeter, this tool helps you takeoff the data you are after.

The Quickbox tool allows you to select a group of objects by drawing a rectangle. Once selected, you can choose the mode of selection you desire for your takeoff. A flyout appears to help you decide the method of your selection. This tool rapidly increases your ability to select model items in a specified location on 2D plane.

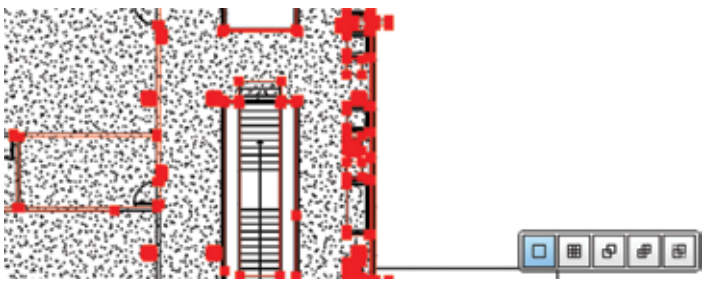


Figure 4: Quickbox

Navisworks Manage 2015

The last takeoff tool is the Count tool, which allows you to place markers that keep track of the number of markers you have placed. You can quickly place markers on the plans and get accurate counts of the 2D objects.

The 2D world contains a couple of other useful tools. The Hide Background and Annotation tool allows you to toggle on and off annotations, gridlines, keynotes, and other non-building components. This allows you to perform takeoffs in non-cluttered areas.

The Filter Markup tool is another method of cleaning up your drawing as you are preforming your takeoff. You can toggle on and off all the markups you have made.

2D takeoffs still take advantage of the 3D takeoff object toggle tools. You can use the Show Takeoff tool to show all the objects that have been taken off and hide all the rest. Additionally, you can use the Hide Takeoff tool to hide all elements that have been taken off and show only objects that have not yet been taken off.

Because the 2D sheets you are working with are not always to the scale you want them to be, Navisworks gives you the Custom Scale tool. This tool allows you to define the scale on the sheet. You can set the scale by measuring a given segment and defining the distance of the measurement. This tool is found in View > Windows > Set Scale By Measurement.

Figure 5: 360 rendering

By combining the toggle tools, catalogs, and 2D tools, you can accurately takeoff 2D and 3D elements in Navisworks.

CLOUD RENDERING

This new release of Navisworks has furthered the integration with BIM 360. You now have the ability to perform cloud renderings (Figure 5).

Cloud rendering allows you to take advantage of Autodesk 360. Simply click the Render Tab > and Select Render in Cloud. The rendering options appear and you can select the type of rendering you wish to perform. When you are ready to render the image, click Start Rendering.

All your renderings are stored in the Render Gallery. You can access them on any machine by logging into the 360 site.

OTHER RENDERING ENHANCEMENTS

Ray Trace has been upgraded to include different quality settings. From Low Quality to Coffee Break Rendering to Overnight Rendering, you can now select the rendering that best supports your needs.

Another enhancement essential to creating quality renderings is the ability to drag and drop Autodesk Consistent Materials onto the model. No longer do you have to select a model and click Apply Material.

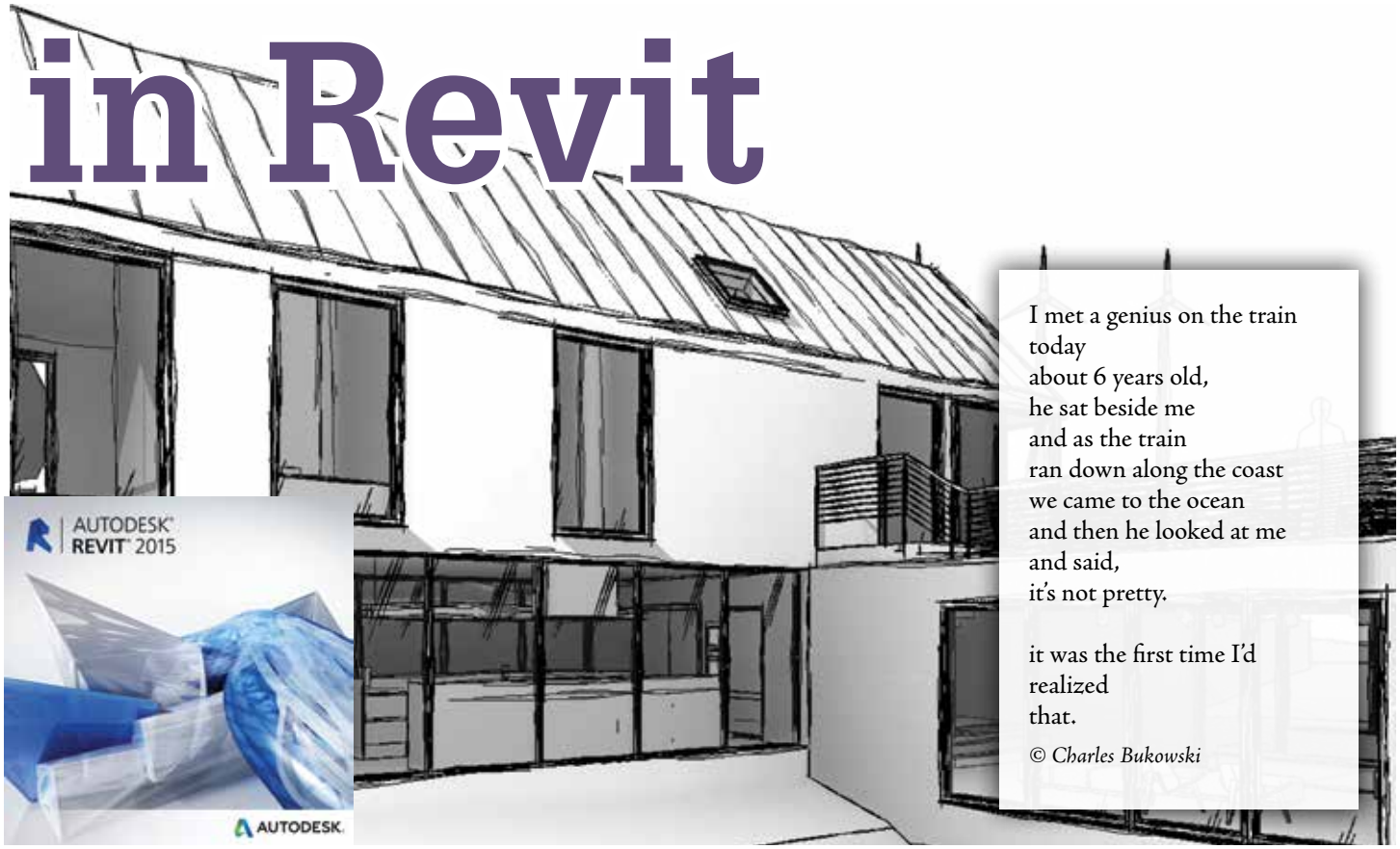
CONCLUSION

Navisworks 2015 is packed with new estimating tools to make Quantification work for you. If you set up the right materials and items, Quantification can be a great way to get model values quickly for your estimates. With the feature now present in 2D, you will be able to accurately assess and account for the elements that were not modeled in 3D.

The upgrade to the rendering engine dramatically enhances your ability to create photorealistic designs. It also furthers the integration with Autodesk 360.

Michael N. Smith is the co-founder of Keystyle Data Solutions, and works to simplify construction business workflows with intelligent, data-driven workflows. With the Keystyle team, he also provides BIM consulting services for coordination, 4D, and 6D projects. With five years of BIM industry experience, Michael has contributed to the BIM community as Technical Editor and Guest Author of Mastering Navisworks 2013, *as well as the* CAD Learning Instructor for Navisworks 2014.

What's New in Revit



I met a genius on the train
today
about 6 years old,
he sat beside me
and as the train
ran down along the coast
we came to the ocean
and then he looked at me
and said,
it's not pretty.

it was the first time I'd
realized
that.

© *Charles Bukowski*

Revitdamus, seer-of-seers, sees a new feature or two in Revit 2015. Add in a typical amount of tool fixes. Fade to black. Thus, Revitdamus will dispense with editorializing and just list them out...until l'extrémité. The following content (up to "Final Notes") is © and written by Autodesk.

ARCHITECTURAL ENHANCEMENTS

Sketchy Lines

Apply a hand-sketched graphic style to the current view, or define the settings in a view template to apply the style to multiple views.

PLATFORM ENHANCEMENTS

The following enhancements would apply to all editions of the Revit software.

Anti-Aliasing

In the Options dialog, the Use Anti-Aliasing option has been changed to Smooth lines with anti-aliasing, and the functionality has been enhanced to support the Sketchy Lines feature. You now have the ability to enable anti-aliasing for all views in the project or for selected views. Corresponding settings in Revit.ini allow you to predefine these options for users.

Formulas

exp(x)

In formulas, in prior releases the software evaluated exp(x) as 10^x. Starting with this release, the software evaluates exp(x) as e^x.

ln(x)

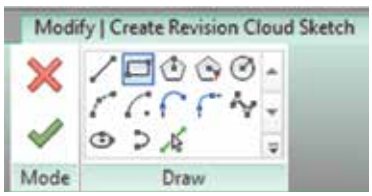
Starting with this release, you can represent natural logarithm (Logarithm base e) in formulas as ln(x).

Family Browser

The Families node of the Project Browser has been moved to its own dockable window. Use the new Family Browser to explore families loaded in the current project.

Revision Clouds

Use standard draw tools, such as a line or rectangle, to sketch the revision cloud



shape. Spacebar flips the arc direction in the cloud shape. Specify the minimum arc length for revisions clouds in a project on the Sheet Issues/Revisions dialog.

Schedules/Material Takeoffs
The following parameters can now be included in a wall schedule or material takeoff:

- Base constraint
- Base offset
- Top constraint
- Top offset
- Unconnected height

You can specify custom text to display for the Grand totals title in the Custom grand total title field on the Sorting/Grouping tab of the Schedule Properties dialog.

Duplicate View Default Name Enhancement
When you duplicate a view, the default name for the copy is <view name> Copy 1. When you duplicate a view as a dependent, the default name for the copy is <view name> - Dependent 1. The copied view has focus in the Project Browser (so you can easily rename the view) and the copy of the view is open in the drawing area.

View References
You can now change the referenced view after a view reference has been created. You can also change the view reference in reference callouts, reference sections, and reference elevations after the reference has been created, as needed.

Trim/Extend Multiple Elements
You can now use a selection box to select multiple elements to trim or extend to a boundary defined by another element. You can also still click to select individual elements to trim or extend.

Add Link from Manage Links Dialog
Using the Add button on the Manage Links dialog, you can now link Revit models and CAD files to the project without having to exit the dialog and select another tool.

Keynoting Settings
This tool is now available on the Annotate tab directly from the Keynote drop-down, rather than from the Tag panel drop-down. The keynote file can be located on a local or remote server. Icons display in the Keynoting Settings dialog to indicate whether the keynote table is loaded or needs to be reloaded.

Family Parameter Order Adjustment
When creating or modifying a family you can now control the order of the family parameters in the Family Types dialog. In the family editor, open a family, and open the Family Types dialog. Select a parameter and use the Move Up and Move Down buttons to change the order of the parameters within a group. This parameter order will be maintained in the Properties palette (instance parameters) and Type Properties dialog (type parameters) for the family when it is loaded into a project.

Tag Leader Elbow Behavior
When you move a tagged element or drag the tag head, the tag leader and elbow adjustment behavior is now consistent with that of text leaders. When you move or adjust the tag, the portion of the leader from the element to the elbow is flexible, while the portion from the elbow to the tag remains fixed.

Temporary View Properties
In temporary view mode (a temporary view template is applied), you can now modify any instance property for the view, not only the properties included in templates and visibility/graphics overrides.

Pinned Element Behavior
To avoid cases where you could accidentally delete elements without realizing they are pinned, the warning messages when you attempt to delete pinned elements have been updated. Instead of permitting the deletion and providing a warning, Revit will now warn you that the element is pinned and instruct you to unpin the element before using Delete. If you select multiple elements (some pinned and some not pinned) for deletion, Revit deletes the elements that are not pinned and warns that you must unpin the pinned elements before deleting them.

Pinned Objects' Pin Visibility
To support a simplified view, Revit will display only up to 250 pins in a view. If more than 250 pins would be visible, then no pins display for that view. Even when the pins do not display, the commands related to pinning still function as expected.

View Title Family Enhancement
When creating a label for a view title family, you can now use any parameters from the View category; you are not limited to parameters in the Viewport category. You can also add shared parameters to the label if you want to display custom information.

Attached Detail Groups
Attached detail groups now behave as clipped instead of pinned. When you select an attached detail group, a paper clip icon displays. Because these groups are not pinned, they can be deleted and they can be selected even if the "Select pinned elements" option is turned off. The only case where the attached group cannot be selected when "Select pinned elements" is turned off is if the model group that the detail group is attached to is pinned.

PERFORMANCE ENHANCEMENTS

Faster Drawing of Elements in Views
Revit now consolidates the drawing process such that many elements are drawn in larger batches to improve performance. For example, when drawing 100 walls, Revit would previously require 200 drawing calls. In this release, Revit can now draw the same walls using only two drawing calls. As a result, views are redrawn more quickly, making view navigation faster.

Faster Selection Graphics
When you select a large number of elements in the model, Revit uses a new process for displaying the selected elements so that software performance is improved.

STRUCTURAL ENGINEERING ENHANCEMENTS

The following enhancements apply to Autodesk® Revit® Structure and Autodesk® Revit®.

Reinforcement

You can now add rebar to concrete parts generated from surface elements such as walls and floors. Like whole concrete elements, concrete parts possess rebar cover and will host rebar, rebar sets, area reinforcement, path reinforcement, and fabric reinforcement.

You can now place single fabric reinforcement sheets to foundation slabs, structural walls, and structural floors. The sheet will respect and snap to cover, host openings, and existing lap-splicing. You can now reduce a structural fabric area to individual fabric reinforcement sheets.

Rebar and fabric reinforcement now have number sequencing that match like types, size, and shapes. The numbers can be scheduled and applied to tags in documentation.

You can now assign rebar, rebar sets, and fabric sheets into different numbering partitions to better facilitate logical design, fabrication, delivery, and placement at a site. Rebar numbering and partitioning modifications are available for specific presentation and documentation needs.

Structural Analytical Model

Improvements to the analytical model including the Local Coordinate System (LCS) for Columns is now consistent with the LCS for beams and braces, where:
x = longitudinal axis
y = transversal, section - horizontal, strong axis
z = transversal, section - vertical, weak axis

Analytical Link Improvements

Analytical links will now be created in any direction, including vertically. The tolerance for analytical links only calculates between analytical elements. The physical model is disregarded. The tolerance for analytical links is calculated as a distance in 3D space, not along a global axis.

Hosted loads can now be oriented to the Project or the Host Local Coordinate System.

Boundary Conditions can now be oriented to the Project or the Host Local Coordinate System.

MECHANICAL, ELECTRICAL, AND PIPING ENGINEERING ENHANCEMENTS

Improved Performance in MEP Views

The underlying technologies used to display MEP elements in views have been enhanced, improving performance when opening and manipulating views that involve large numbers of MEP elements.

Improved Behavior

When a duct or pipe has multiple sections, tags on the element will show the actual values for parameters that display as Multiple Values.

When you copy an MEP element that is assigned to a system, the system type of the copied element is set to Undefined.

When you import point clouds into a project and open an MEP discipline view, the point clouds now display as model elements instead of underlay elements. As a result, the point cloud-based elements do not obscure the MEP elements in the view.

FINAL NOTES

Neither Revitdamus, *AUGIWorld*, nor Autodesk can at this time promise that these features will be implemented or that there won't be more or even less of them...that's the nature of seeing the future.

There is much looking forward in the early spring by many, beyond the usual fare. In BIM many of us ponder what's new in Revit. This year those expectations are no different...

But oh, dear reader, I fear there is a genius on the train and they are pondering this year's What's New in Revit.

Jay B. Zallan is a designer, artist, and an AECO strategist. He is currently the VDC Director of BIM at Perkowitz+Ruth Architects & Studio-111. Jay is President of the Los Angeles Revit Users Group (LARUG), developing an expanding reach of BIM expertise and support with a Consortium of BIM leaders encompassing (at present) Los Angeles, Orange County, and San Francisco California; Cleveland. Ohio; and the Netherlands. He is also AUGIWorld *magazine's Revit Content Manager and sits as a Graphic Standards' BIM Advisory Board Member. Jay often lectures on Creativity, BIM and Virtual Design & Construction at Autodesk University, Revit Technology Conference and institutions such as the University of Southern California, LACMA and other AECO industry, AIA & CSI events. He is the author of the Fear & Loathing in a CAD vs BIM World blog and the LARUG blog. Links and more can be found at: http://about.me/JayZallan Or tweet Jay up: @JayZallan*

case

Optimum performance: Hardware for Revit

Software updates from Autodesk inevitably place more demands on your computer's hardware. Year after year, these updates ratchet up the requirements, asking more from computers that are themselves getting faster each year. So an update to the Autodesk suite might also involve a corresponding update of your computer's hardware.

Configuring a computer can be overwhelming. Even for something as simple as a hard drive, there are a multitude of speeds, sizes, manufacturers, and prices to consider. The seemingly endless array of options makes it hard to understand the tradeoffs in selecting an individual component. This choice becomes even more vexing when you have to consider how the performance of any single component works in tandem with other components and, ultimately, how they collectively interact with the software. To help make this configuration process easier, we have assembled some general rules of thumb for configuring hardware components to run Revit, as well as some solutions to guarantee every component interacts smoothly and error free. We'll begin by looking at the four major parts of a computer: RAM, storage, processor, and graphics.

RAM

RAM is Revit's oxygen. If Revit runs out of RAM, it slows to a suffocated crawl and performance drops almost vertically. Therefore, it is critical to keep Revit stoked with enough RAM to avoid this performance cliff. As a general rule, Revit requires 20 times the RAM of the loaded Revit (RVT) project file. So a 200MB RVT file requires approximately 4GB[1] of RAM to open. Add to this the RAM needed to run the operating system and to keep other applications like a web browser open. To be safe, a 200MB RVT file requires at least 8GB of RAM, while a 1GB file requires roughly 32GB. To work out how much RAM you require, look back through your past projects and extrapolate the expected maximum size over the next few years. Remember that if you are linking RVT files, you need to add their size together to get the total size and then multiply by 20. Also, while RAM may stave off the performance cliff, unused RAM does nothing other than sit idle, so try not to oversize the RAM unnecessarily.

Make sure you are getting the most from your RAM by correctly setting the paging size. This can be done using a tool like HP Performance Advisor (www.hp.com/go/performanceadvisor). Note that Revit's rendering engine now operates in a separate process; therefore, it can access RAM beyond that defined by the paging size.

STORAGE

The hard drive is typically the biggest bottleneck when booting, starting applications, and opening and saving files. Solid state drives perform all of these tasks noticeably faster when compared to standard hard disk drives. This is especially critical when working with point-cloud data or when saving and opening large Revit files. Benchmarks demonstrate that solid state drives complete these tasks two to three times faster. The major downside to solid state drives is the cost, which is still significantly more expensive on a per gigabyte basis. One solution is to use two drives: a solid state drive containing the operating system, Revit, virtual memory, and your active files; and a regular hard disk drive with an archive of lesser used files. Whether you use this dual drive setup or just purchase one large solid state drive, the investment is generally worthwhile since it is perhaps the single most noticeable change you can make to a computer.

PROCESSOR

For the most part, Revit only utilizes a single processing core at a time. This is a major consideration when selecting a processor since multi-core chips are not used to their full capacity by Revit. Even if Revit is given an eight core multiprocessor chip, it will generally only use one core to its full capacity, while a second core will work with the operating system and input/output requests. This leaves the other six cores idling largely unoccupied. For this

reason, Revit's current performance is largely determined by the speed of the chip rather than the number of cores.

There are, however, a number of tasks Revit will execute on multiple cores, including printing, joining walls, loading files and elements, using a point-cloud overlay, opening and changing views, rendering, and ray tracing. A full list of these tasks can be found at http://wikihelp.autodesk.com/Revit/enu/Community/Tips_and_Tricks/Performance/Multithreaded_Processes_in_Revit. In these circumstances, it is not just the processor's speed, but also the processor's core count that determines the overall performance. Additional speed can be attained using Hyper Threading[2] with Intel® Xeon® processors[3], which effectively doubles the number of cores available to an application like Revit. Intel® Xeon® processors also have the advantage of using a Smart Cache, which shares a common cache amongst the cores. This means if certain cores are not accessing the cache, then other cores can use more of it. Since Revit performance is sensitive to the size of the L3 cache, particularly in computationally intensive operations like model regeneration, having more cache available is a good thing.

GRAPHICS

The graphics card (GPU) produces what you see in real time on screen. To produce on-screen graphics, Revit generally requires a mid-range professional graphics card—although you should increase the performance if you are working with large models or models with lots of environmental effects. In Revit, this includes realistic mode, ambient occlusion, surface transparency, and anti-aliasing. To get the most from your GPU, make sure hardware acceleration is turned on in Revit.

The biggest concern in selecting a GPU is ensuring compatibility between Revit and the GPU. Revit can be somewhat temperamental with regards to which GPU it works with. Autodesk recommends a certified professional graphics card for Revit, including NVIDIA Quadro and AMD FirePro. Be careful when selecting a GPU, as you may encounter driver issues with GPUs that have not been certified for Revit. For a list of certified graphics cards by application, you can consult: www.hp.com/go/mcadcertification

Using a certified professional graphics card and keeping the drivers up to date with HP Performance Advisor is the best way to minimize any incompatibility issues.

MAKING SURE EVERYTHING WORKS

The GPU is not the only component that can suffer from incompatibility. The RAM, storage, processor, and motherboard must all work together cohesively in order to achieve optimum performance. One way of ensuring this cohesion is to purchase a workstation that has been certified to run Revit. HP works closely with Autodesk to ensure HP Z Workstations with Intel® Xeon® and Intel® Core™ processors run Revit and other Autodesk software flawlessly. A list of recommended workstations can be found at www.hp.com/go/autodesk.

Another way to ensure all components in a computer are reaching their optimum performance is to make sure the workstation, operating system, and settings are set up properly for Revit. This might include installing the latest certified drivers, as well as making performance tweaks to the BIOS and operating system. While these tweaks normally require extensive expert knowledge, HP Performance Advisor can optimize settings for Revit automatically. Additional information about HP Performance Advisor is available at www.hp.com/go/performanceadvisor.

ABOUT HP

HP helps you stay ahead of the curve with professional desktop and mobile workstations designed for large and complex datasets, dispersed teams, and tight deadlines. HP Z Workstations with Intel® Xeon® processors deliver the innovation, high performance, expandability, and extreme reliability you need to deliver your 3D CAD projects in less time. For more information, visit the HP Workstations and Autodesk page on the HP website (www.hp.com/go/autodeskmanufacturing).

ABOUT CASE

CASE exists where building and technology intersect. We combine our experience as architects, engineers, project managers, software developers, and educators with a passion for technology to improve the way buildings are designed, realized, and operated. CASE is a building information modeling (BIM) and integrated-practice consultancy. We provide strategic advising to building design professionals, contractors, and owners seeking to supplant traditional project delivery methods through technology-driven process innovation.

[1] Maximum memory capacities assume Windows 64-bit operating systems or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

[2] Intel HT Technology (HT) is designed to improve performance of compatible multi-threaded software products and requires an HT-enabled chipset, BIOS and OS. Not all customers or software applications will benefit from the use of HT. See http://www.intel.com/info/hyperthreading for more information.

[3] Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing system required. Performance will vary depending on your hardware and software configurations.

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by: Melinda Heavrin

Spaces in ACA

Spaces are 2-dimensional or 3-dimensional style-based architectural objects that contain spatial information about a building, including floor area, wall area, volume, and surface information. Spaces have a multitude of uses, spanning the conceptual design through construction documents phases of a project. Among other things, spaces can begin to define the layout of a building's internal rooms and areas. They can also define rooms and areas for scheduling purposes and for area calculations and evaluations.

OVERVIEW OF SPACE TYPES

Both associative and non-associative spaces can be modeled in AutoCAD® Architecture. Associative spaces are generated from boundary objects. When the boundary objects change, the space updates accordingly. In addition to associative spaces, you can also create non-associative spaces with user-defined geometry. A non-associative space can stand alone in the drawing, but you can use it to generate calculations just like you would use an associative space. Non-associative spaces can be connected to boundary objects after their creation; similarly, associative spaces can be disconnected from their boundary objects.

2D spaces display spatial information in two plan dimensions. The Z direction is by default set to 0 and ignored during creating, editing, and scheduling the space. 2D spaces can be rectangular or polygonal and they can be either non-associative or associative. A 2D space can be bounded by 3D objects and linework. 2D spaces are typically used for plan views where 3D information is not needed.

An extruded 3D space is similar to a 2D space, but has a user-defined extrusion height. Extruded spaces are useful for regularly shaped 3D spaces such as uniform-height rooms in a building. Extruded spaces can have floor and ceiling components and space above the ceiling and below the floor. The space above the ceiling is often used to place ductwork, cables, and electrical installations in a room. Extruded 3D spaces can be associative to 3D objects and linework, but they are bounded only in the X and Y directions. The Z direction is defined by the extrusion height. If you need a space that is fully bounded by objects in all three spatial dimensions, you need to generate a 3D freeform space. 3D freeform spaces are generated from boundary objects such as walls and slabs, and are associative to them. Associative 3D freeform spaces must be bounded in all directions to form a valid boundary shape. A 3D freeform space is a complex 3D geometry with any number of surfaces needed to generate the space shape.

SPACE STYLES

A space style is a set of parameters that determines the appearance and other characteristics of the space object to which it is assigned. Depending on the scope of the drawing, you may want to create different space styles to represent different types of spaces, such as different room types in an office building.

You can use styles for controlling the following aspects of spaces:

- Boundary offsets – You can specify the distance that a space's net, usable, and gross boundaries will be offset from its base boundary. Each boundary has its own display components that you can set according to your needs.
- Name lists – You can select a list of allowed names for spaces of a particular style. This helps you to maintain consistent naming schemes across a building project.
- Target dimensions – You can define a target area, length, and width for spaces inserted with a specific style. This is helpful when you have upper and lower space limits for a type of room you want to insert.
- Displaying different space types – You can draw construction spaces, demolition spaces, and traffic spaces with different display properties. For example, you might draw all construction areas in green and hatched, and the traffic areas in blue with a solid fill.
- Displaying different decomposition methods – You can specify how spaces are decomposed (trapezoid or triangular). If you are not working with space decomposition extensively, you will probably set it up in the drawing default.

Spaces can have a "name" property assigned. These are derived from a List Definition. The list definition should be assigned to the style so you have a valid list of names to select from when establishing the space object's properties. Space style names should be indicative of the type of room or area that the space style is meant to address. Space styles should have materials assigned to their "floor" and "ceiling" components.

To create a space style, begin by clicking the Manage tab on the ribbon, select the Style & Display panel, and then select Style Manager (see Figure 1). The Style Manager will display with the current drawing expanded in the tree view. Expand Architectural

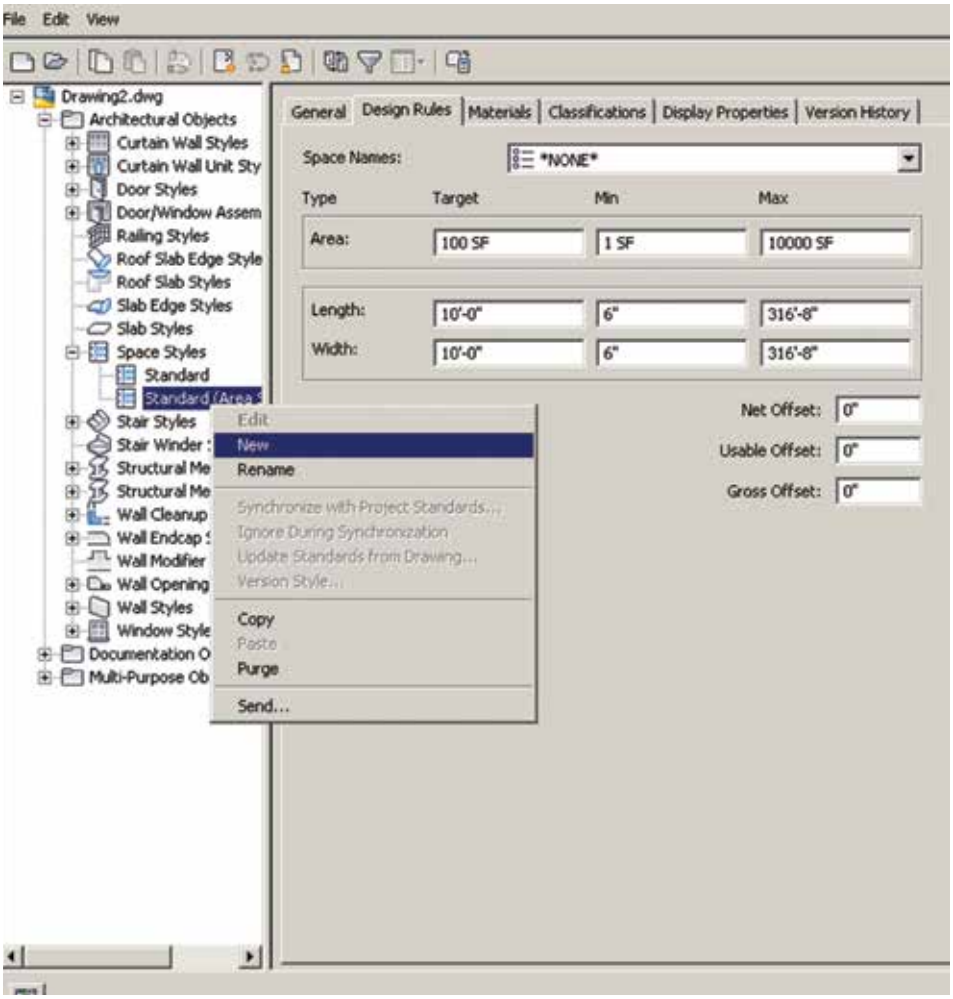

Figure 2: Style Manager

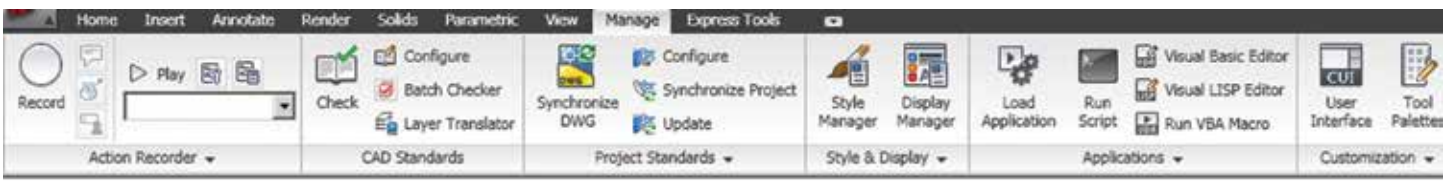

Figure 1: Ribbon

AutoCAD Architecture 2014

Objects and then expand Space Styles. You can create a new space style by right-clicking on Space Styles and selecting New (see Figure 2). You can also create a space style from an existing style by right-clicking the space style you want to copy and selecting Copy. Next you will right-click and select Paste. Enter a name for the new space style and hit Enter. Now you will need to edit the new space style according to how the space should appear, its size, and so on. Once finished, you can add the new space style to your tool palette for easy access.

SPACE EVALUATION

The space evaluation is a documentation feature that calculates and evaluates the space information of your finished floor plan. This information is stored in a separate file that you can export to a spreadsheet or word processing application. Evaluation templates ensure that the information is formatted and arranged in a consistent, structured way.

Architects need the space evaluation feature for submitting floor plans to the building plan approval authorities and to customers. Space evaluation can also be used for performing cost estimates, assigning jobs to contractors, or organizing facility management. Evaluations can be created for selected spaces in the current drawing, selected spaces from multiple open drawings, all spaces in a drawing, and all spaces from all open drawings. Spaces can also be evaluated from external references.

In previous versions of the software, areas and area groups could be evaluated with the area evaluation feature. Areas are now converted to spaces, area groups to zones, and the area evaluation has been converted to the space evaluation. If you attempt to use a legacy tool or run a legacy command to start the area evaluation, the following message will appear: "The command AreaEvaluation is no longer supported" (see Figure 3). If you click Run Space Evaluation, the space evaluation will be started instead. You should remove area evaluation tools from your palettes and exchange area evaluation commands for space evaluation commands in your scripts.

SPACE BOUNDARIES

Spaces have four different boundaries: base, net, usable, and gross. You can use them to display, edit, and schedule different aspects of the space. You can choose that these boundaries are not offset from each other and lie on top of each other. If you do not need different boundaries, you can even turn off the display components for the additional boundaries. Here are some typical use cases for using individual boundaries:

- Base boundary – Normally representing the inner area of a room covered by a space. This is the area generated by boundary objects in an associative space. In most cases, the base boundary is identical to the net boundary, except in some area calculation standards like the Swedish SIS standard.
- Net boundary – This boundary can be used for planning and detailed design. For example, if you need to determine the hiring of cleaning personnel for an office, you would use the net area as the calculation basis. The net boundary can also be used for special applications when the calculated area of a space is smaller than the base boundary.
- Usable boundary – This boundary is, in many area calculation standards, used for planning and detailed design, renting calculations, tax and other duty calculations, statistical calculations, maintenance, pricing, and more. The usable boundaries typically extend from the inside of the exterior walls to the middle of the interior walls (or a specified distance into the interior walls).
- Gross boundary – The gross boundary can be used in connection with cost calculation, price estimation, calculation of tax and other duties, key numbers for the building or a specific floor, and more. Normally, the gross boundary is measured from the outside of the exterior walls to the middle of the interior walls.

There are different ways to determine how the boundaries should be offset from each other and calculated. These are Manual, By Style, and By Area Calculation Standard. It is important to note that in previous versions of the software, objects that were invisible due to a frozen or hidden layer were never included in the generation or update of associative spaces. Beginning with this version, frozen and hidden objects are included in the space generation and update if they are set as boundary objects.

CREATING SPACES IN YOUR DRAWING

AutoCAD Architecture provides tools that allow you to quickly place spaces by selecting a space tool with a specific space style as well as other predefined properties. You can use the tool as is with its default settings or you can change any of the properties that are not controlled by the style. You can also use space tools to apply tool properties to existing objects to create new spaces. Space tools can be found on the Space tab of the tool palette. To begin creating spaces in your drawing, drag and drop the desired space from the tool palette to your drawing and begin. You can also find space tools in the Stock Tool Catalog, the Sample Palette Catalog, and the Design Tool Catalog. Once you are in the Space command, the Space tab will appear in the ribbon (see Figure 4).

Figure 3: Space Evaluation

Figure 4: Space tab

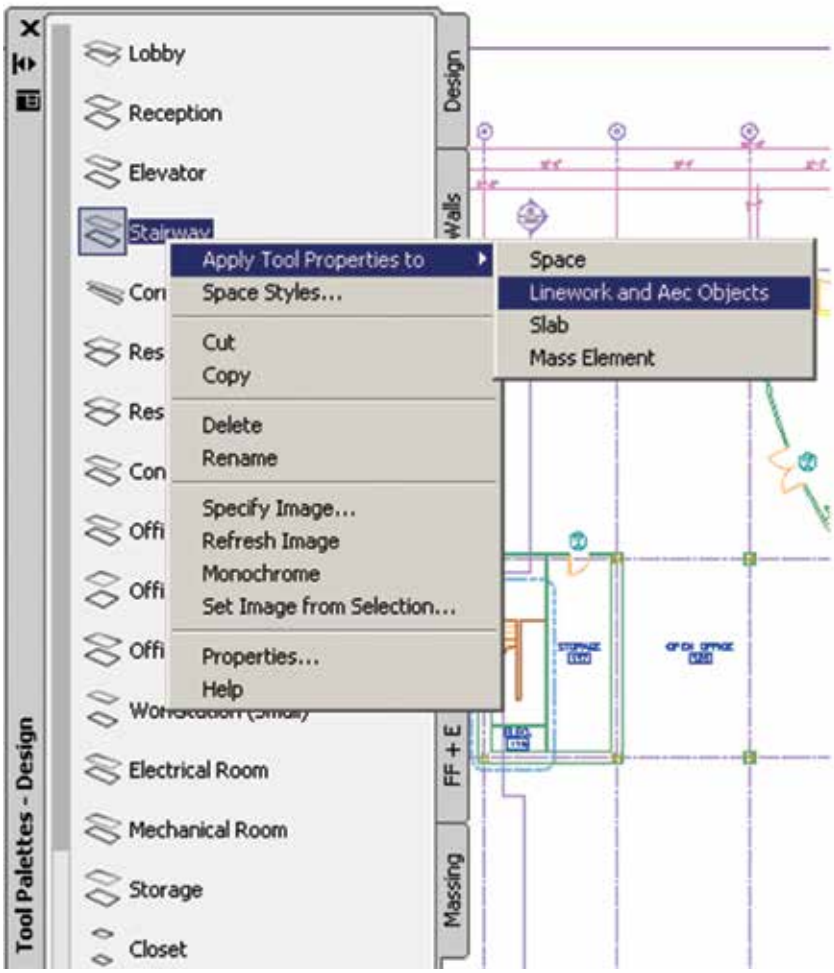

Figure 5: Apply tool properties

You can also create spaces in your drawing by converting polylines, object outlines, and profiles to spaces. Simply open the Space tool palette and right-click on the Space tool you wish to use. Next, select Apply Tool Properties To and then select Linework and AEC Objects (see Figure 5). Select the objects and/or polylines you wish to convert and hit Enter. Under Cut Plane Height on the Convert to Space worksheet, enter the height at which the object should be cut to generate the profile of the new space. Select OK.

Another way to generate an associative space in your drawing is to begin by verifying that all necessary boundary objects have their Bound Spaces property set to Yes. Open the tool palette that contains the space tool you want to use and select it. For Offset boundaries, select how the four space boundaries (base, net, usable, and gross boundary) are calculated:

- Manual – The net, usable, and gross boundaries can be manually edited with grips.
- By style – The net, usable, and gross boundaries are offset from the base boundary by a value defined in the space style.
- By standard <Standard Name> – The net, usable, and gross boundaries are defined by the area calculation standard listed.

On the Properties palette, for Create type, select Generate. It is important to note that the Associative property is interlinked with the Create type. If the Create type is Generate, the Associative setting defaults to Yes. If the Create type is Insert, Rectangle, or Polygon, the Associative setting defaults to No and becomes read-only. Select Yes for Allow Overlapping Spaces if you want to be able to generate spaces from boundaries that already contain a space. This could be useful if you want to generate spaces from an xref drawing that already contains spaces, but you need to generate spaces with different settings. For Geometry type, select 2D, Extrusion, or Freeform. In the drawing, generate the spaces. If you want to generate a 3D freeform space, enter "G" (generate all). If you want to generate a 2D or extruded 3D space, you can either enter "G" (generate all) to generate spaces for all visible boundaries or you can pick inside closed boundaries in order to generate spaces for them.

CONCLUSION

Spaces are an essential part of the AutoCAD Architecture software. They help you extract data contained in the drawing for use in scheduling, tagging, and analysis. Spaces are essential to enhancing your productivity for facility management as well as in the working drawing phase of your project. I encourage you to explore the possibilities with spaces and see how far you can go!

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

by: Christopher Fugitt

Usability Enhancements

A new year means a new version of AutoCAD® Civil 3D®. Since AutoCAD doesn't include a file format change, continuing to use the AutoCAD 2013 file format, Autodesk is claiming the ability to open drawings created in Civil 3D 2015 all the way back to Civil 3D 2013. A word of caution, though, as I have experienced crashes in Civil 3D 2013 when opening drawings from Civil 3D 2014.

CORE AUTOCAD CHANGES

I'm not quite sure what UI modernization means. I'm beginning to think it's just a fancy way to say the fad of the moment has been incorporated into the product. Civil 3D 2015 continues to ship with an option for two color schemes, dark and light.

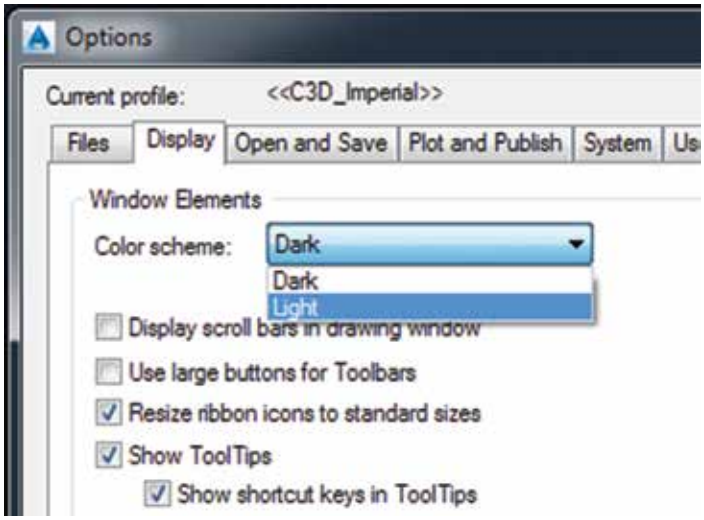

Figure 1: Color changes

A UI change I dislike is no longer being able to not use icons to show the various items at the bottom of the screen showing oSnap, Polar, OrthoMode, and other items. I must be deficient in figuring out what exactly the icons represent. I'm also going to miss the light bulb indicating whether or not objects are isolated. The new icon is hard to read and not as clear as the light bulb. It almost feels like change for the sake of change. The new icon seems counterintuitive to the purpose of what the icon is supposed to convey to the user, which is whether or not an object is isolated.

That said, I do like the addition of the Model and Layout tabs being turned on by default. Looks like I'll no longer have to dig through the options to turn the usable feature back on. The Quick View Layouts has been moved to above those tabs. I find that does make the product more usable.

PROFILE LAYOUT

A variety of profile layout changes have been made. The ability to select a profile entity that is floating and extend the segment to the end of the profile view extents appears to help in extending a profile to the end of a profile view to make sure it makes it to the end of an alignment. Take note that it doesn't extend the segment, but creates an extension line.

Another addition is the ability to create a Free Curve with a Passthrough point as a parameter in addition to curve length, radius, and K value. This would be helpful to avoid objects at a given point. It is also possible to now change the parameter constraint for a selected point.

LOCKING PROFILES TO ALIGNMENT GEOMETRY

The big addition to this release, in my opinion, is the ability to lock profile PVIs to alignment geometry. This way any changes in the horizontal alignment will be reflected in the profile. There are two options. One is to have the PVI to anchor to the alignment's geometry. The other option is to have the affected entities deleted. When I use this feature I'll be using the first option.

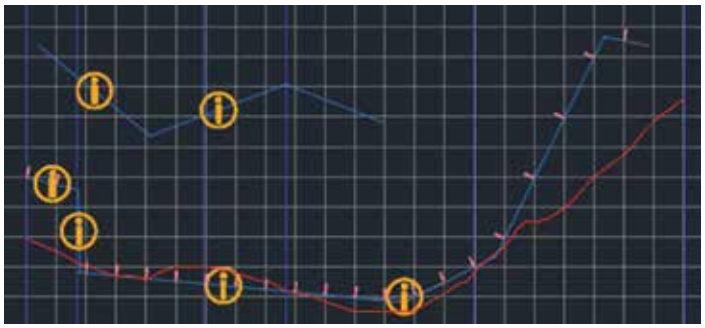

Figure 2: Profile Locking

In addition to moving the profile, optional temporary graphics are placed on the profile, indicating ones that have been modified from their original location in relation to the alignment. This feature has long been a wish of mine and I'm glad to see it has made it into the product. With this, implemented changes to the alignment will no longer require modifying the entire length of a profile if the beginning of an alignment has been lengthened or shortened.

CORRIDOR TARGETING

Enhancements to corridor targeting is once again a new feature. For this year's release—the ability to add corridor sections along target curves. The targets may be set "At an increment" or "By curvature" and the appropriate parameters set for each type. This will provide accurate models where targets curve. One such location where this would be useful is for driveways. Currently if you wanted additional sections, you would either need to create a region for the driveway and then put a tighter corridor frequency or ignore the issue and chance a corridor section being placed along the curve in a frequency needed for an accurate model.

Frequency to Apply Assemblies

Property	Value
⊞ Corridor Information	
⊞ Alignment	
⊞ Profile	
⊟ Offset Target	
At offset target geometry points	No
Adjacent to offset target start/end	No
Along offset target curves	At an increment
Curve increment	25.000m
Mid-ordinate distance to define curvature	0.100m

Figure 3: Corridor frequency

REASSOCIATE LABELS

If you have ever had to replace a surface, you will love this feature. The ability to associate a label to a different object then originally labeled is now possible. No longer will you have to re-label a drawing just because the alignment or surface has changed. The labeled object is now a property and may be changed in AutoCAD Properties. Label types included in this new feature are alignment station labels, surface slope labels, surface spot elevation labels, and surface contour labels. This will save countless hours of pointless re-labeling in a drawing.

SLICED SOLIDS

Solids may now be sliced and placed on profile views. This feature is similar to last year's sliced solids for sections in Civil 3D 2014. This will provide a way to show solids in a profile view such as walls created from solids or other objects.

SUBASSEMBLY COMPOSER

Subassembly composer has quite a few improvements. The ability to have holes in shapes is one example of this. It is now possible to use subassembly composer to have shapes that represent objects such as box girder bridges. With the offset operations it will make it fairly easy to create the shapes.

Another subassembly composer operation is an offset operation. This takes a link or series of links and "automagically" adds the points and links to get the offset values. It does this by creating a sequence and putting the appropriate points and links inside of this. This allows for one to modify the point and link codes of the offset. This will make creating line type objects a whole lot easier than having to create each offset from scratch.

New to this release is the ability to use rail cant in a subassembly. It is now possible to set the various cant values and then utilize them in a subassembly made with subassembly composer, as shown in Figure 4. Both left and right rail can be specified.

Cant

Cant Parameter	Preview Value
CantPivotType	CenterLine
LeftRail	
LeftRailDeltaElevation	0
RightRail	
RightRailDeltaElevation	0

Figure 4: Cant options

Superelevation improvements are not limited to rail cant. It is now also possible to apply Axis of Rotation to a link. The feature is implemented as a check box in a point geometry. There is also the ability to show if a condition is yes or no to validate a subassembly.

Civil 3D 2015 has a variety of usability improvements. Similar to last year, there are smaller improvements to the product as opposed to big changes. Many features such as pipes, structures, and fittings haven't been enhanced. The feature that would make me move to Civil 3D 2015 is the profile locking to an alignment.

Christopher Fugitt is a civil engineer who has worked in both design and construction. He is the owner and blogger at Civil 3D Reminders and currently provides civil engineering-related services through his company, Civil Reminders.

by: Todd Shackelford

One Small Step

I am always excited for the new version of Autodesk® Revit®. It's kind of like it's your birthday and you know you are going to get something. The hard part is you can influence the gift giver, but you cannot force them to buy exactly what you want. As an MEP user, I have high expectations and I am detailed in the way I use the software.

WISHES GRANTED

Looking at the AUGI Wish List for Revit MEP, we did get some wishes we were looking for. In particular we got the revision cloud functionality expanded. Before this version, we spent quite a bit of time clicking and clicking around to create clouds that did not turn out as neat as engineers would like. Now, when in the cloud tool, rectangle and polygon tools are available to draw the shape you want to be converted to a cloud. Multiple arcs will be placed on any sketched line to accommodate.

The result is a much cleaner looking cloud in a lot fewer clicks. There is also an arc length control in the sheet revisions dialog to give the user some control over the size of the arcs. Setting the size of the arc length to a large number will enable the arc tool to function as it did in previous versions.

Figure 1

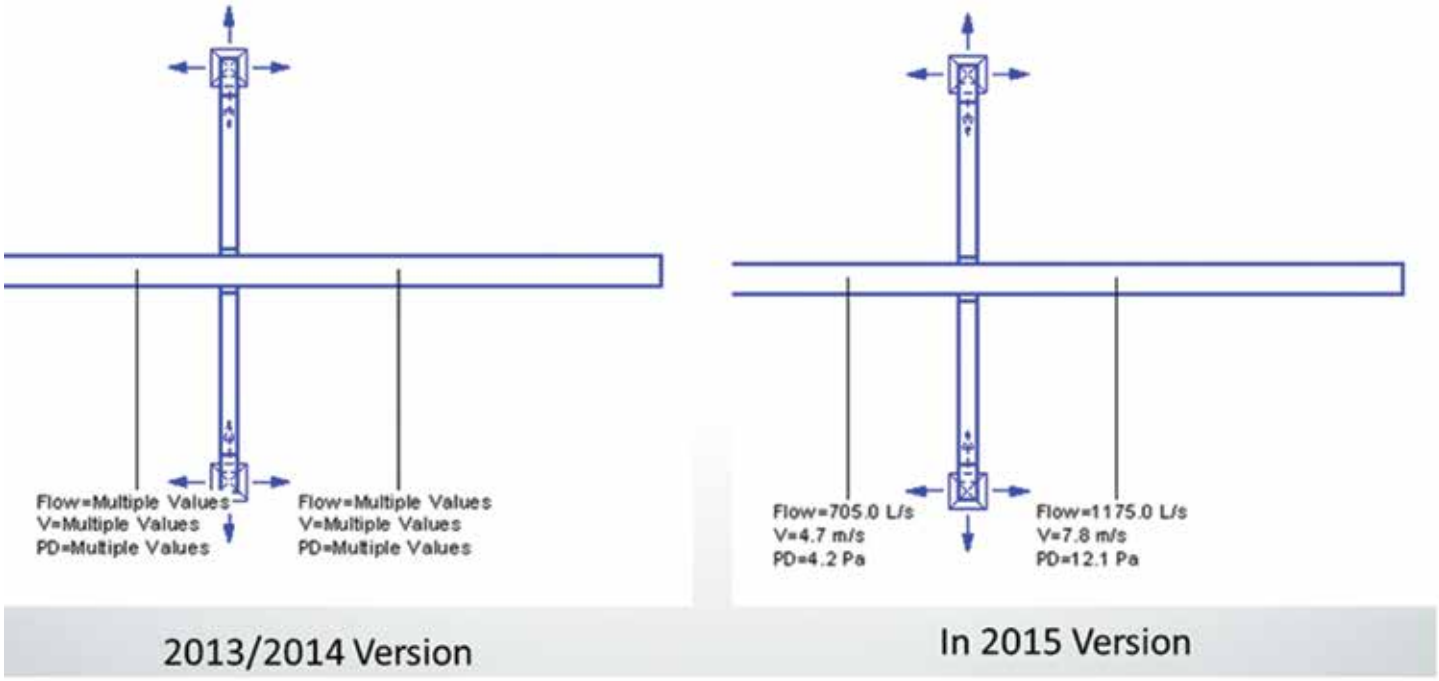

Figure 2

The revision cloud enhancements addressed a couple of wishes in the Wish List. Unfortunately, it was the only direct hit. We did get some improvements that we may not have known we wanted.

Previously, tapped duct and pipe reported "Multiple Values" when asked for something like flow. You can now tag the duct or pipe and get the actual flow. The properties for the duct or pipe length will still report "Multiple Values," but that makes sense for the length of the duct or pipe.

BIM SUPPORT

Working for a consulting engineering firm makes it hard to get excited about the following added functionality—it is all to enhance Revit's ability to go from design to fabrication. It makes a lot of sense when you consider that the BIM process spans the life cycle of a building and does not end at design. So for those of you struggling to use Revit to prep your fabrication drawing, I present the following enhancements.

Pipe part dimensioning allows users to dimension to the centerlines of pipes, fittings, and connectors. Pipe edges are not yet up for grabs, just the centerlines. On the upside, you can dimension in coarse view even though the centerlines are not visible.

The MEP Content Convert To tool allows users to freely convert to and from pipe placeholders, pipe content, and pipe fabrication parts. This functionality allows users to tweak a design model for use in a construction model. Converting a pipe to a placeholder enhances the user's ability to modify routes and allows the user to easily try differing routing solutions before converting to fabrication.

Fabricated parts can also be swapped out for differing parts, allowing users to refine the systems on the fly. Selecting a fabrication part will display a new icon that will open the Fabrication Parts Browser. Currently this is limited to piping.

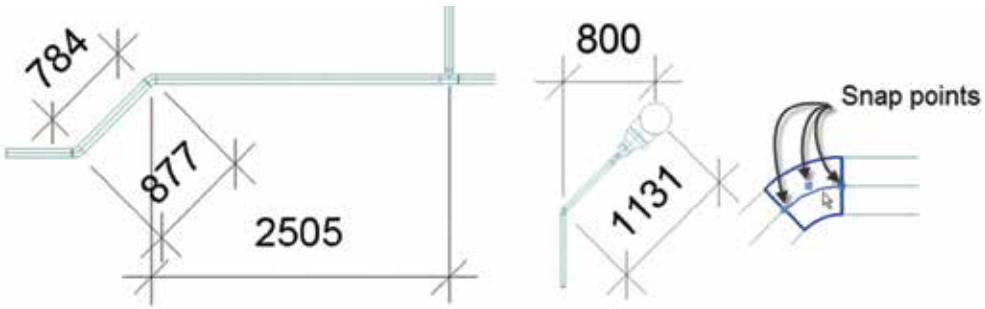

Figure 3

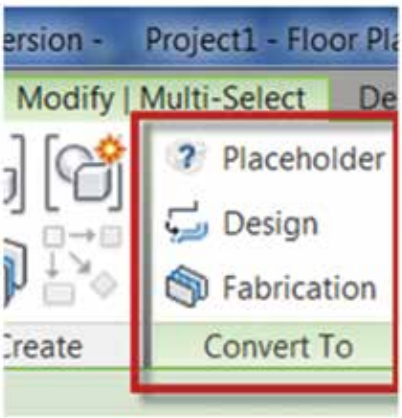

Figure 4

REVIT RTC TECHNOLOGY CONFERENCE

RTC's 2014 events are filling fast, get yourself registered now!

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Pullman Albert Park,
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Renaissance Schaumburg,
Chicago
19 – 21 June 2014
www.rtcevents.com.au/rtc2014na

EUROPE 2014
Dublin Castle,
Dublin
30 Oct – 1 Nov 2014
www.rtcevents.com.au/rtc2014eu

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RTC will recharge your batteries if you are feeling drained, give you a platform to help reach your goals and will invigorate you and your firm.

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- 8GB-DDR3-1600 or 1600ECC	- 8GB DDR3 1600MHz to 32GB	- 16GB DDR3-1600 ECC to128G
- NVIDIA®Quadro® K600 1GB 2H	- NVIDIA®Quadro® K2100/4100M	- NVIDIA®Quadro® K2000 2GB
- 500GB Seagate® 7200 16MB C.	- 500GB SATA6 Hybrid 8GB SSD	- 250GB Samsung® EVO™SSD
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Revit MEP 2015

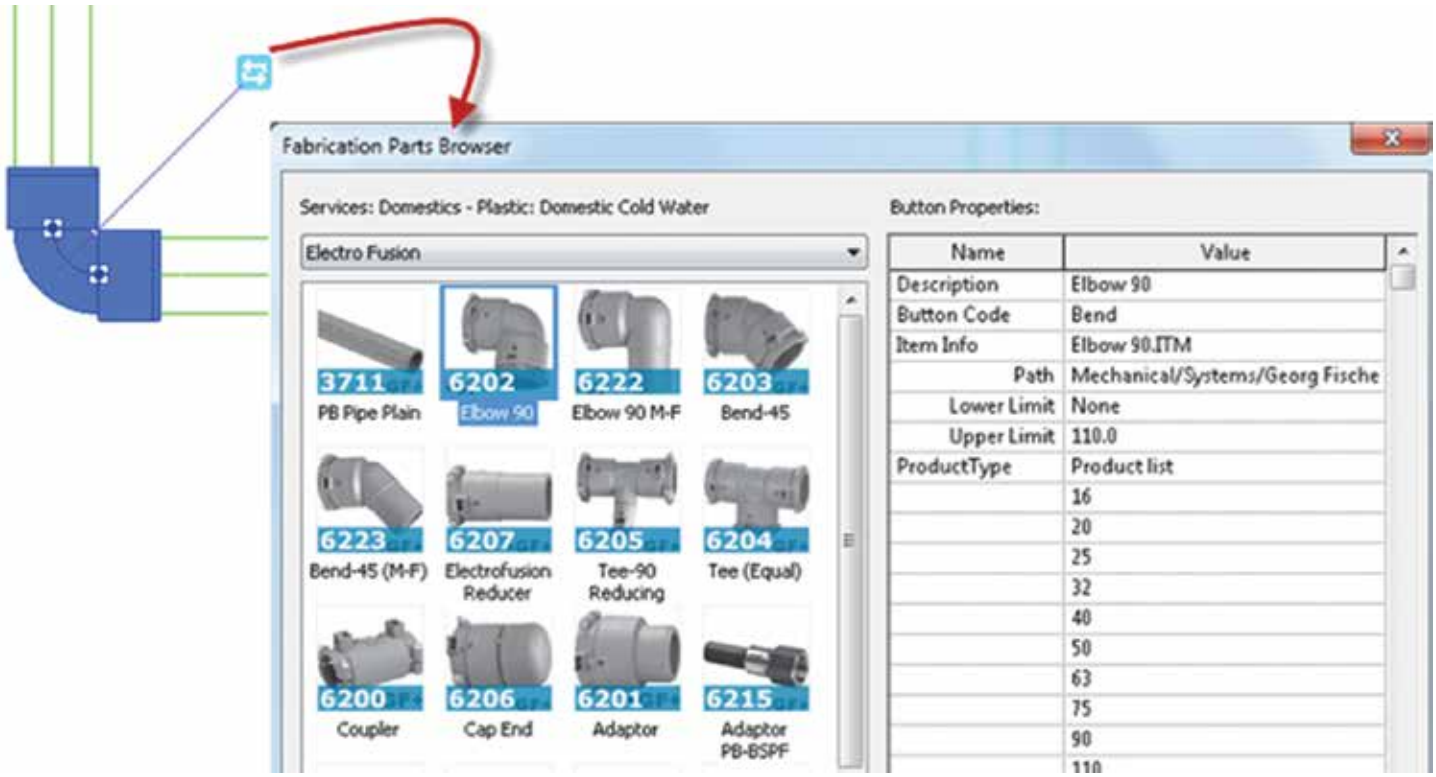


Figure 5

REVIT PLATFORM CHANGES BENEFIT MEP USERS

As usual, the base platform changes are having a bigger impact on our day-to-day lives than the individual MEP upgrades. Of the platform changes, the ones listed below will help out MEP users the most.

The Project Browser has shed the heading of families, and the Family Browser has been introduced. For those of you who are tired of scrolling and scrolling through the Project browser attempting to locate families and then scrolling back to navigate views, this is an elegant solution. With families in their own browser, dual screen users can optimize their workspace and everyone can simply get where they need to go faster. Expanding and collapsing the tree structure is greatly appreciated, and the search box at the top of the browser makes finding what you need a snap. There is also "Add to Favorites" in a right-click menu to help users keep track of their favorite families in a folder. As someone who administrates Revit families, I am not jazzed about a way to save families separate from the standard families. This is a good step forward, although it does not go the distance Kiwi Codes went years ago. It would be nice see a palette-based tool like this that calls families from a server location, allowing template files or starter projects to not be jam packed with all conceivable families.

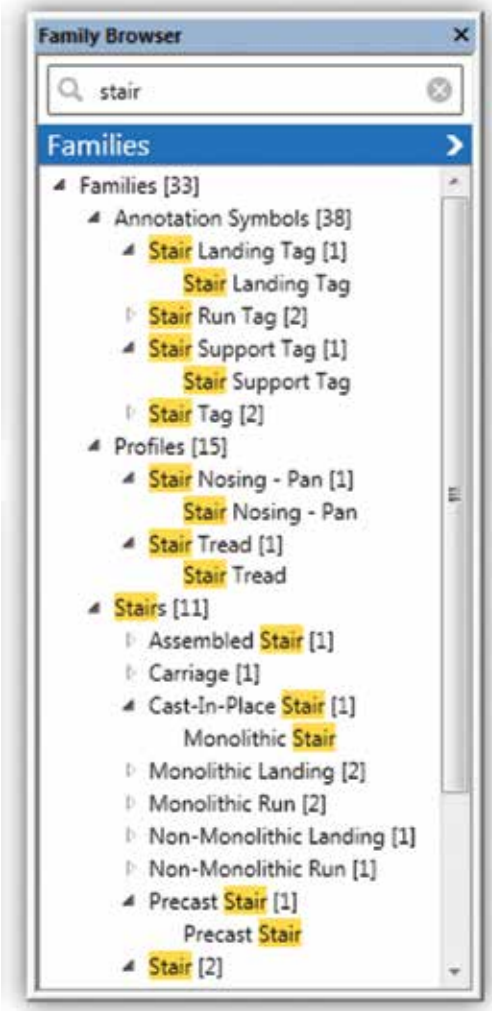


Figure 6

Images in schedules. Revit will now allow users to associate images with family types. On the MEP side of things, I have seen plumbing fixture schedules include images of the fixtures to help the architect and owner truly understand what the faucets, toilets, and sinks will look like. This can now be done by opening the "Family Types" dialog in family editor, clicking the "Type Image" parameter and opening "Manage Images" dialog. Add the image

you want to associate with the fixture family and close "Manage Images" dialog.

Load the fixture family back into project and overwrite existing family and parameters. Create a "Plumbing Fixture Schedule" with fields "Family and Type" and "Type Image."

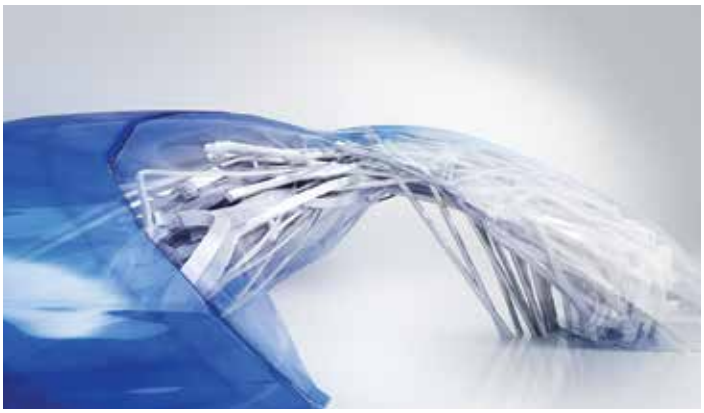
At the time of press, there were still some limitations that may or may not be resolved before the final version is released.

- The associated images can only be shown in the schedule graphics in a sheet view; they cannot be shown in any other view.
- Inability to reference image as Link. Currently the images are directly imported into Revit and this might increase the model file size and impact performance.
- Inability to control the image size directly in schedule view.
- Inability to control the row height in schedule grid view.
- Inability to associate any preset view directly with family type image and show it in schedule.
- Inability to assign an image to each family type through type catalog.
- Revit doesn't use the Preview Image as the default Type Image.

THE LITTLE THINGS

There are plenty of seemingly little things that might just make our lives a lot better. In no particular order, here they are.

- The ability to delete a revision. Yeah, stone cold delete a revision. A delete button has been added to the Sheet Issues/ Revisions dialog. You will get a dialog indicating that you are about to delete a revision; click "OK" and it's gone.
- Now it's much harder to delete a pinned element. Before, Revit would tell you that you just deleted a pinned element. Since we have all been trained to ignore warning dialogs, a lot of us miss things like that. Now the warning dialog says (and I am paraphrasing here): "Revit did not delete the pinned element. Unpin first if you want it gone." If you have selected pinned and unpinned objects, the unpinned get deleted and the pinned objects will remain.
- It is now way easier to change a referenced view after creation of something like a section. Just go to the Options bar and pick a different qualifying view.
- You can now use a fence to select objects to trim or extend instead of having to individually select each element. Curved cutting elements can produce unexpected results, but this is still something that has worked in AutoCAD® for years. It's nice to see it in Revit now.
- View titles now have the option of referring to a shared parameter. We have all run into the problem of not being able to use the same view name twice or having other view naming issues that have ended up with us creating a dummy tag. With this change, the tags can remain smart.
- The Manage Links dialog now has an "Add" button. What's this? The ability to add a link right there in the manage links dialog? Yes, it is.
- By default, when duplicating views the new view will be suffixed with "Copy" instead of prefixed. What does this really do? It just keeps the duplicates next to the originals



in the project browser instead of grouping them all together alphabetically under "C" for copy.

- Last, we now have the ability to change the order of parameters under Family types with the addition of handy "Move Up" and "Move Down" buttons.

WHAT'S MISSING?

Just in case someone is not reading the AUGI Wish List for Revit MEP, here is what we want next year.

- We need to model Cabletray in any orientation
- Can we please duplicate sheets… please?
- Coordinated single line diagrams
- Can the callout tool be any shape?
- Make design options work with all MEP elements
- Make plan regions work with all MEP elements
- We want to calculate the length of MEP elements
- Is asking for the default for linking Revit models = origin to origin too much to ask?
- Connector across linked models
- Pipe up and down is broken! Give us an override
- More stable
- Faster
- Easier

We got a lot of great gifts from Revit this year, and while there are some things on the list we still haven't received, I am excited to dig into the new goodies.

Todd Shackelford is the BIM Manager for Alvine and Associates, the president of the BIM Board of Omaha, a University of Nebraska instructor and a fequent speaker at Autodesk University. He authors two Blogs; CAD Shack and The Lazy Drafter. A Revit 2013 Certified Expert. Todd looks for his missing socks when not otherwise committed. Tweet Todd @ ShackelfordTodd or email Todd at tshackelford@alvine.com

by: Brian Chapman

Performance, Productivity Increases

The team at Autodesk presents us with 3ds Max® 2015 and a wide range of modifications, improvements, and new features designed to increase performance and productivity. Noteworthy are the new placement tools and several improvements to the Populate feature, an extremely powerful tool for populating scenes with animated characters. I'm most excited, though, to introduce two features I believe will become users' favorites.

SHADERFX

First I'd like to mention ShaderFX and its node-based visual editor. ShaderFX was first introduced to Autodesk MayaLT users in early 2014. The ShaderFX editor allows us to create networks by connecting nodes together for building complicated shader effects—all while utilizing the familiar click-drag-connect action we've adopted using similar features in Max (the material slate, for example). Ultimately, ShaderFX allows us to export complicated shader effects to a various number of configurations including HLSL, GLSL, and CGFX. In short, we can create incredibly complicated shaders without code and see the results live on screen.

The interface is simple. When using the Nitrous DirectX 11 driver, the material browser will allow users to select and apply the DirectX Shader. Once created, users can simply select "Open ShaderFX" to access the visual editor where two nodes appear: "Material" and "TraditionalGameSurfaceShader." By selecting "Material," the properties window will populate, letting users choose a shader language and save the code out to edit and work with various engines. By simply right-clicking in the shader editor window, we can access various nodes we'd like to add to our shader network as well as toggle to advance mode where more node options become available.

QUAD CHAMFER MODIFIER

Also introduced with 3ds Max 2015 is the Quad Chamfer modifier. This modifier allows us to quickly create standard or quad-based chamfers with proper triangulation using various options including amount, segments, and tension. Among other options, users have the ability to open the chamfer to reveal remaining faces or invert the selection, leaving only the chamfered faces behind. This will definitely speed things along a bit.

ADDITIONAL IMPROVEMENTS

Some additional items included with this release are render output naming options, nested layers, a new scene explorer, and more. As a BIM enthusiast, I was especially excited to see Civil View installed in the default menu set with objects located in the drop-down on the Create panel.

Brian Chapman is creator of pro-cad.net and Senior Designer for Slater Hanifan Group. Slater Hanifan Group is a civil engineering and planning firm dedicated to superior client service with locations in Las Vegas, Nevada and Phoenix, Arizona. Brian can be reached at procadman@pro-cad.net.

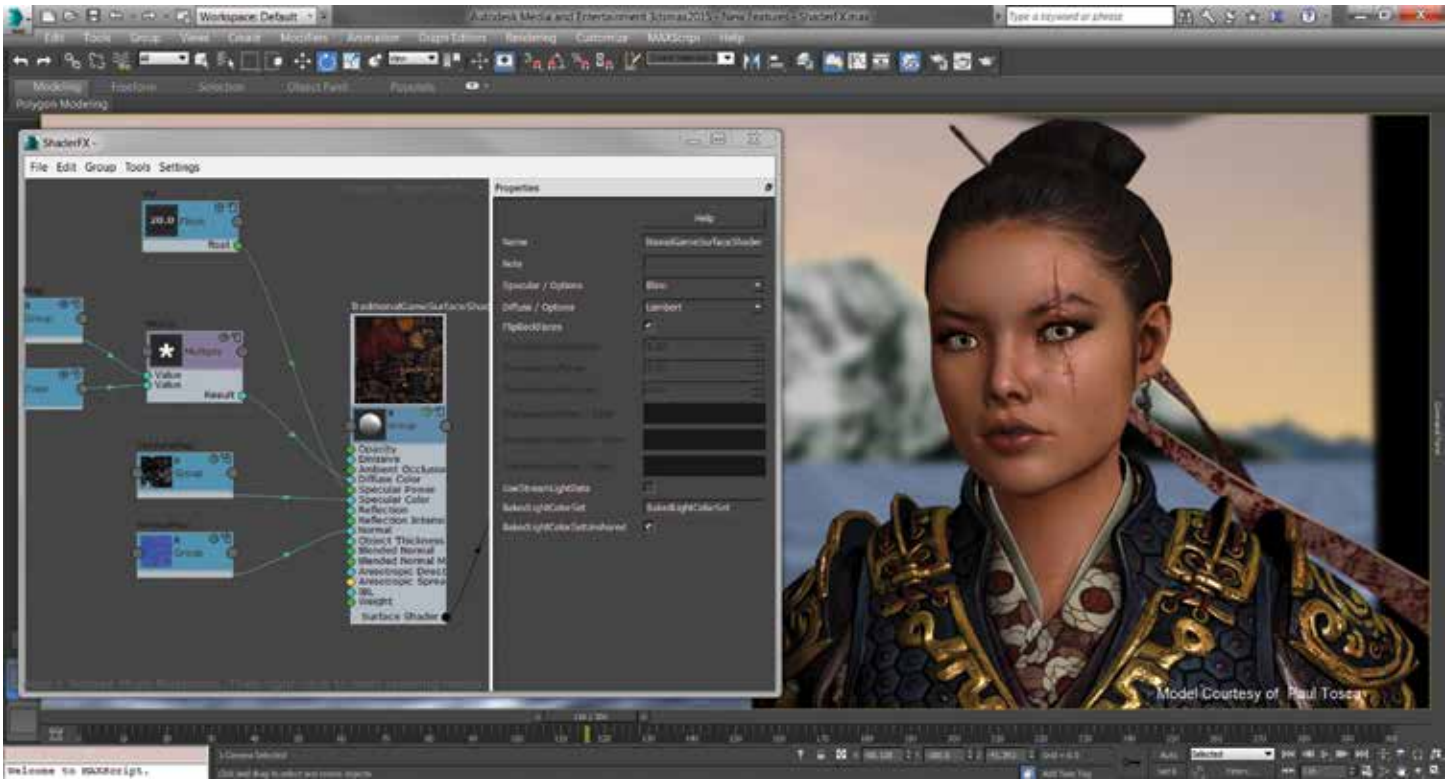


Figure 1: ShaderFX

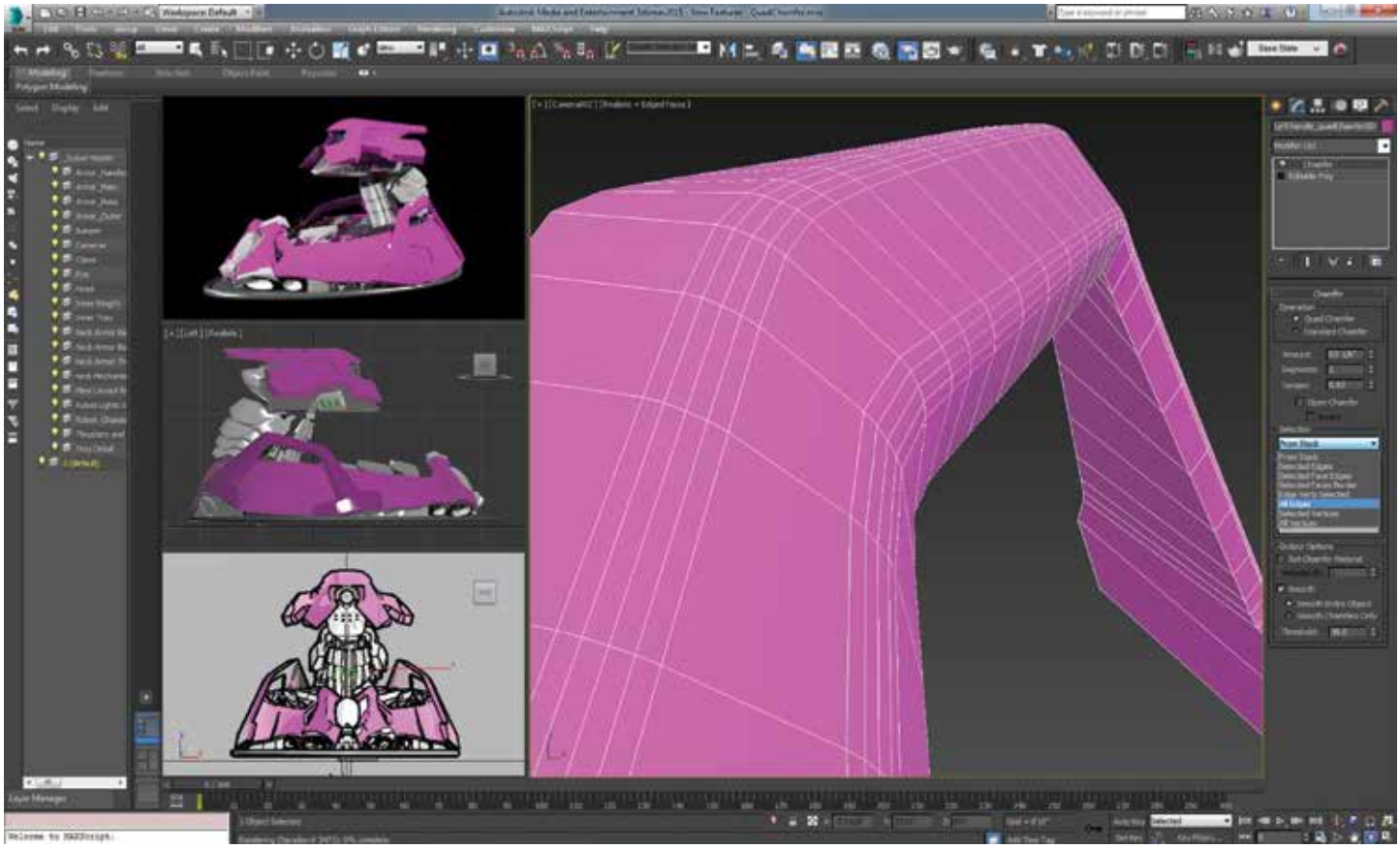


Figure 2: Quad Chamfer Modifier

by: John Evans

Something New for Everyone

This year, Autodesk has applied an equal helping of new technologies and customer requests. The new Freeform editor, 2D Sketch enhancements, and Frame Member Reuse are all welcome additions to Autodesk Inventor®. These alone make this release a worthy upgrade, but there is much more.

CONTENTS

- User Interface
- Sketch
- Parts
- Assembly
- Drawings
- Interoperability
- CAD Administration
- Other Enhancements

USER INTERFACE

- Application Options dialog box is now resizable by selecting any corner

NEW STARTUP DASHBOARD

A new startup environment has been added when Inventor is loaded. This is intended to provide a centralized point for learning the product as well as creating components.

The new dashboard includes the following tabbed pages:

- Inventor Home – functions as a single, central, in-product location for quickly starting new files and opening recent project data. Customizable and allows file pinning.

Figure 1:New Home tab on the dashboard

Figure 2: The Inventor Learning Path

- Team Web – provides URL-based team location for company-oriented content such as standards, templates, and useful information. This is configurable in the Application Settings.
- Help – contains links to essential skills videos, as well as various Inventor topics.

Improved Search
The Help page contains an improved search system. Content previews are improved and Autodesk has collected all its content into the search parameters including Commands, Help articles, Support content, Discussion groups, YouTube videos, and Blog posts.

Learning Page
This page provides a Tutorial Learning Path that provides a visual layout of common workflows to guide new users. New interactive tutorials are provided to help develop a foundation in basic Inventor skills. New challenge exercises are also provided to help solidify understanding of the content.

RIBBON ENHANCEMENTS
The ribbon has been simplified in order to remove clutter and easily access most common commands.
- 3D Model and Sketch panels streamlined by moving more items to the drop down lists.
- More panels hidden by default.
- Sketch tab now always available on the ribbon in Part, Assembly, and Drawing files.
- Draw panel renamed to Create while in Sketch mode in a Part file.

Access Hidden Panels Easily
Users can access hidden panels on the ribbon using the new Show Panel icon on any ribbon tab that is current.

New Button Resize Option
Right-click a command in the ribbon to access Button resize, where you can set the large or small version to be displayed.

Ribbon Customization Help
Pressing F1 as you hover the cursor over the new Show Panels icon will open a help dialog for customizing the ribbon using the new features.

NEW HARDWARE SETTINGS IN APPLICATION OPTIONS
The Compatibility setting in the Hardware tab of the Application Options has been replaced by the Conservative setting. This provides throttled-down performance in the Quality and Performance settings.

AUTODESK APPLICATION MANAGER KEEPS YOU CURRENT
Application Manager monitors service packs and related software packages and alerts when these become available. The manager handles complete downloading and installation of the files. More information is available by opening the Windows taskbar in the lower right corner, selecting open from the right-click menu. Select Help in the Applications Manager dialog.

SKETCH
NEW CONSTRAINT TOOLS AND SETTINGS
These are one of the best enhancements to Inventor sketching I have seen in a long time.
- Display Constraints on Creation setting – visual indication of sketch constraints in the form of sharp-colored glyphs appear as you create and constrain geometry.

Show Constraints for Selected Objects
This setting highlights constraints with similar glyphs for geometry

that users select in the graphics window. Once visible, each glyph permits deletion.

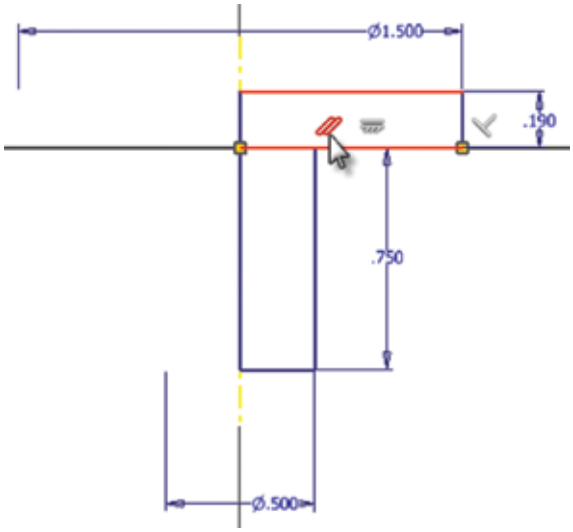


Figure 3: Show constraints for selected objects

My favorite part is that as users hover over each glyph, the respective geometry that is shared in the constraint highlights as well.

New Relax Mode
This handy new feature allows modification to constrained geometries like a toggle.

While Relax Mode is turned ON, conflicting constraints are removed as you add new constraints or dimensions. You can modify constraints of an existing model by dragging the selected sketch geometry freely.

You can also remove all conflicting constraints (except Coincident, Smooth, Tangent, Symmetry, Pattern, and Project) by adding new dimensions or constraints.

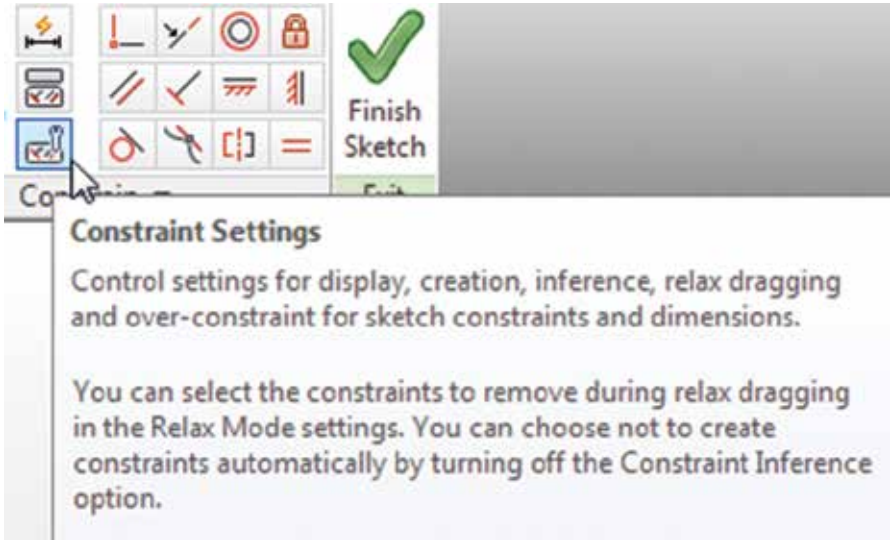


Figure 4: Combined constraints settings

Improved Access to 2D Sketch Constraints Settings
All settings related to configuring 2D sketch constraints have been organized into a centralized location accessible from the Constraint Settings button on the Constraints panel.

Delete Constraints Command
The new Delete Constraints command is available on a respective context menu, and will remove all constraints from selected geometry (with the exception of Coincident constraints). Coincident constraints are removed with the new Delete Coincident Constraint command.

SKETCH PRODUCTIVITY AND BEHAVIOR IMPROVEMENTS

- Geometry creation is accomplished on the mouse down-click action instead of the mouse release. This is intended to make connecting endpoints easier.
- Sketch text style on creation allows you to select from a list of available text styles while creating sketch text.

Sketch Offset Improvements
When you create sketch geometry using the offset command, resulting zero-length line, arc, and ellipse segments are automatically removed. No degenerated geometry is developed now, and wider intervals can be achieved.

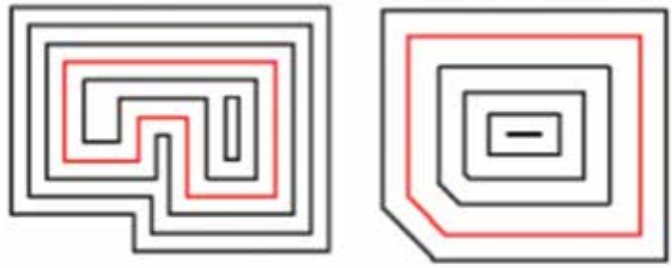


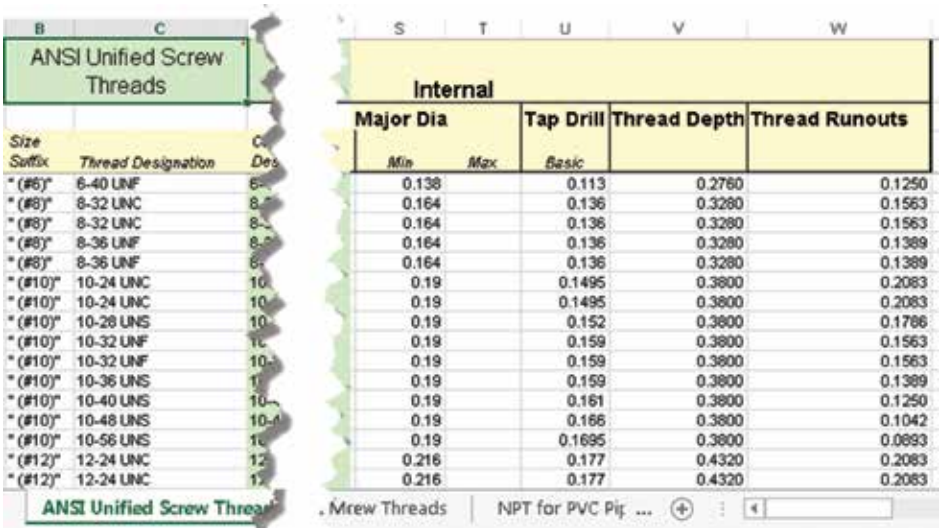
Figure 5: Improved Offset command

Create Point at Virtual Intersection of Two Sketch Elements
You can now capture the virtual intersection between two elements in 2D sketch, and auto-capture the virtual On Curve inference in a 2D sketch. The existing constraint inference for real intersect elements can be applied to virtual intersections as well.

Look at Behavior Enhancements
Perform Minimum Rotation Option – rotates the view to look at the nearest (least rotation needed) view angle to view the sketch normal and sketch's X axis being horizontal or vertical.

Align with Local Coordinate System – orients the sketch's X axis horizontally and the Y axis vertically, maintaining + up and right.

These new settings are added to the Application Options/Display tab.



ANSI Unified Screw Threads

Size Suffix	Thread Designation	Internal Major Dia Min	Internal Major Dia Max	Tap Drill Basic	Thread Depth	Thread Runouts
" (#6)"	6-40 UNF	0.138		0.113	0.2760	0.1250
" (#8)"	8-32 UNC	0.164		0.136	0.3280	0.1563
" (#8)"	8-32 UNC	0.164		0.136	0.3280	0.1563
" (#8)"	8-36 UNF	0.164		0.136	0.3280	0.1389
" (#8)"	8-36 UNF	0.164		0.136	0.3280	0.1389
" (#10)"	10-24 UNC	0.19		0.1495	0.3800	0.2083
" (#10)"	10-24 UNC	0.19		0.1495	0.3800	0.2083
" (#10)"	10-28 UNS	0.19		0.152	0.3800	0.1786
" (#10)"	10-32 UNF	0.19		0.159	0.3800	0.1563
" (#10)"	10-32 UNF	0.19		0.159	0.3800	0.1563
" (#10)"	10-36 UNS	0.19		0.159	0.3800	0.1389
" (#10)"	10-40 UNS	0.19		0.161	0.3800	0.1250
" (#10)"	10-48 UNS	0.19		0.166	0.3800	0.1042
" (#10)"	10-56 UNS	0.19		0.1695	0.3800	0.0893
" (#12)"	12-24 UNC	0.216		0.177	0.4320	0.2083
" (#12)"	12-24 UNC	0.216		0.177	0.4320	0.2083

ANSI Unified Screw Thread | Mrew Threads | NPT for PVC Pi

Figure 6: Thread.XLS changes

- Default Thread and Hole Depth – Hole and thread depths are controlled by standards associated to newly created Thread Depth and Runout columns in the thread.xls file (Figure 6).

Workplane Improvements

- Rename the workplane in the browser.
- Workplane Name now displays in the graphics window.
- Create midplane workplanes from parallel or non-parallel faces in Parts and Assemblies.

Wrap to Surface/Face Performance Improvements

Wrap to surface of Project Curve to Surface, and Wrap to Face of Emboss tool have been enhanced. (Beta team reported 50X faster performance and 7X smaller file size in specific applications.)

PARTS

GENERAL MODELING IMPROVEMENTS

- Shell and Tapered Extrusion handle more complicated geometries including tapered angles up to 90°.
- Twist angle controls rotation in Sweep feature dialog.
- Purge All Unused Parameters – Purge Unused button at bottom of the Parameters Editor dialog allows selective purging of parameters that are not in use. Parameters used by other documents default to the No option
- View Entire Parameter Names – width of the Parameters dialog expands to accommodate display of the longest parameter name.

Figure 7: Workplanes enhancements

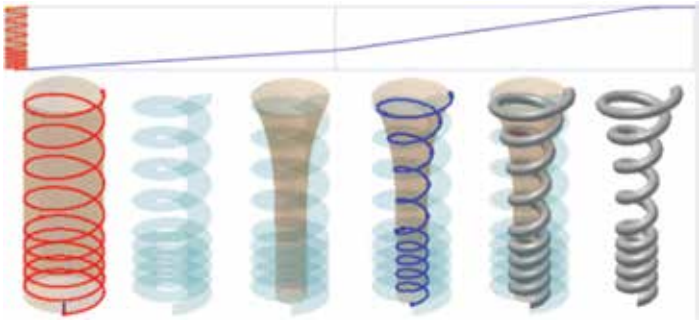


Figure 8: Project Curve to Surface enhancements

Inventor 2015

14 New Freeform Tools

The 14 new Freeform tools provide an alternate modeling approach to explore and create freeform shaped models using direct manipulation. Basic freeform shapes start the process and are available on the ribbon (Box, Sphere, Cylinder, Torus, or Quad ball). Further refinement can be performed by using the Freeform edit tools.

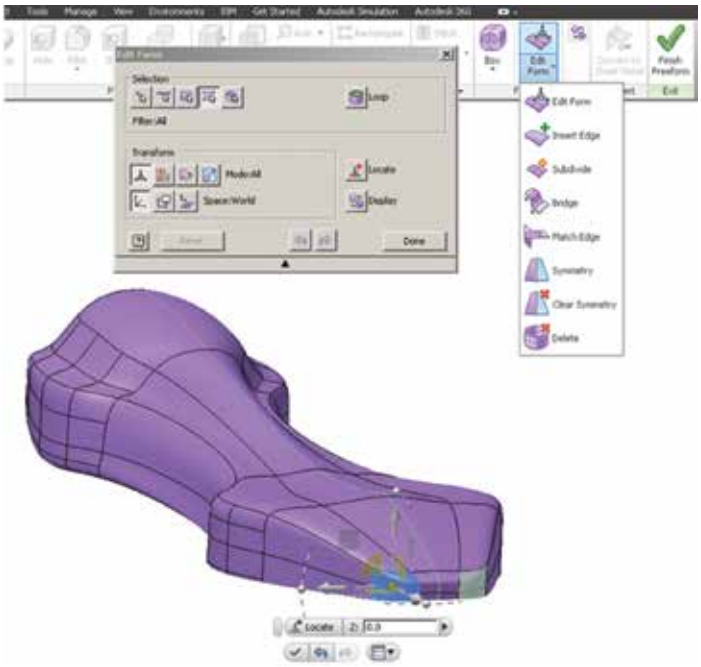


Figure 9: Freeform Editor is awesome!

Freeform includes powerful refinement tools to use while the model is being built. The multi-functional triad tool allows scaling, rotation, and translation of any surface or edge selected. The surfaces can also be subdivided as desired. The pinewood derby car example above was made with x-axis symmetry activated, allowing one to concentrate edits to one side, but visualize the results on the entire model. Notice the light grey centerline indicating the plane of symmetry.

The form populated the model browser's history and can be used in conjunction with parametric modeling. Freeform includes a Match Edge Command that allows users to form the freeform body to existing features and sketch geometries as well.

Better Direct Edit Functionality

Direct Edit Mode is well put together and makes fast changes to parts easily. This can be performed on Inventor models as well as any shape that has been imported with or without history definitions.

The tools available include:

- Move
- Rotate
- Size
- Delete

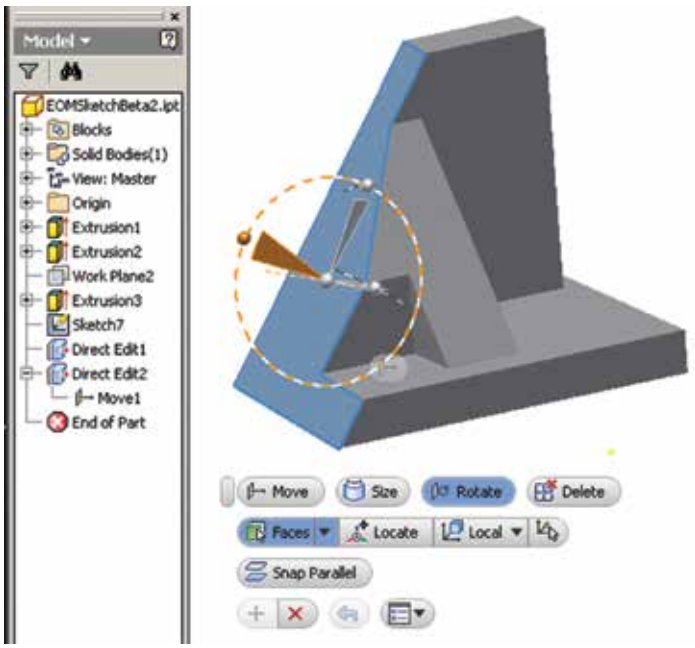


Figure 10: New Direct Edit interface

There is also a very handy snap parallel option included.
Once in Direct Edit Mode, you can move and select features to edit without having to leave the mode. This is quite convenient while performing numerous edits.

These operations are stored in the model browser history as 'Direct Edit'. Picking these highlights respective edits in the graphics window; double-clicking them activates the Direct Edit Mode again and shows each feature edit type delineated as a sub-member.

See Enhanced Highlighting of Selections in iPart Table

Selections in an iPart table highlight in other reference fields, as well in the graphics window.

The object (such as feature, parameter, and property) that you select in the iPart editor highlights within associated table fields and in the graphics window (when applicable).

Highlighting works for:

- Parts and assembly features (including sheet metal), suppressed or unsuppressed.
- Work features, visible and invisible.
- iMates and iFeatures.
- Column or cell, including columns that can be mapped back to a feature, work feature, or iMate.
- The source pane and destination pane in the iPart and iAssembly Author dialog boxes.
- Edit in place (not for Edit in Place Create iPart).

SHEET METAL

- Window selection of multiple points to place a punch.
- Flat Pattern conversion prompts are more accurate.
- Folded parts in the browser show EOF (End of Flat) instead of EOP.

- Apply sheet metal punch features across bends.
- Bend Edit dialog automatically expands to accommodate longest property name.
- Flat Pattern dialog now includes an orientation rotation angle.

Use Cut Normal in the Cut Dialog Box

The Cut Normal option is added to the Cut dialog. This option projects selected profiles onto the sheet surface and then cuts perpendicular thereto.

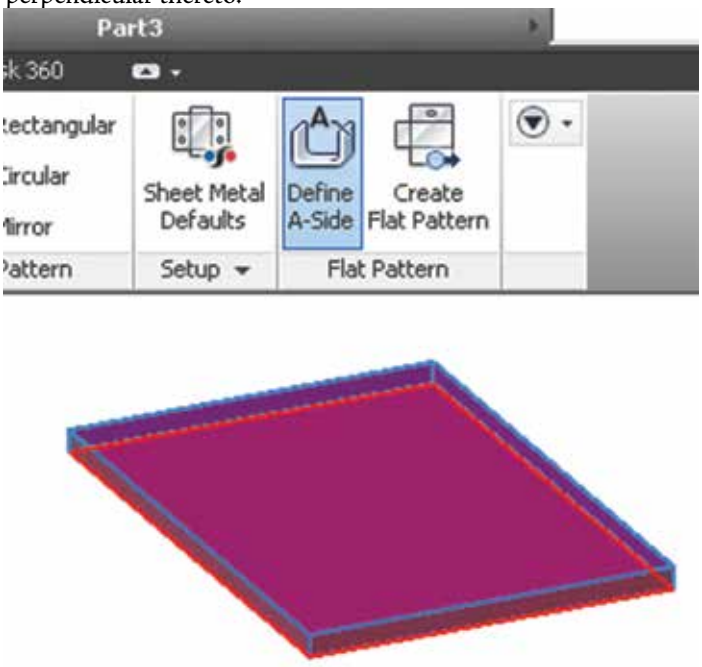


Figure 11: Define A-Side for sheet metal

A-Side Definition Command Added to the Flat Pattern Panel

The A-Side of a sheet metal part can be indicated with the new command. This allows the sheet metal component to control the punch direction (if you do not select an A-Side before using the Flat Pattern tool, Inventor will select one for you).

Unfold/Refold Imported Sheet Metal Part with Zero Radius Bend

Unfold/Refold command allows selection of zero radius bends and flatten zero radius bends when a flat pattern is created.

A new face is added to accommodate the Unfold operation based on the user defined K-Factor. After Refolding, these references remain.

ASSEMBLY

EXPRESS MODE IMPROVEMENTS

- Edit parts and sub-assemblies in place without opening them in separate window.
- Express data now makes drawing views much faster.

The following are more commands that are enabled in Express mode:

- Create Component (in place)
- Section View command
- Create/Edit Work features
- Create/Edit Sketches
- Pattern Component
- Copy/Mirror Component
- Assemble
- Point Cloud commands

JOINTS

Create Joints using the following new context menu options:

- Between Two Faces – select a virtual midpoint between two selected faces.
- Offset Origin – Pick reference geometry for alignment and drag manipulators to change origin location.

FRAME GENERATOR

- Double mitered frame members' lengths are automatically calculated correctly.

Reuse Frame Members

Reuse and Change Reuse commands have been added to the Frame panel on the ribbon's Design tab. These tools will be a welcome addition and have been requested by frame users for a long time.

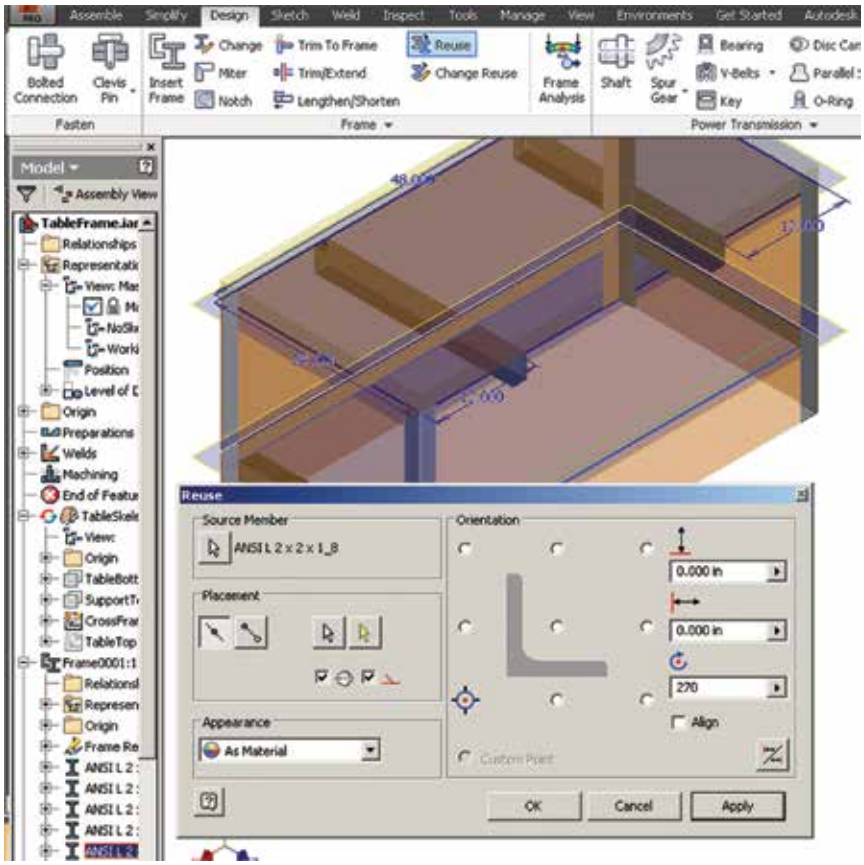


Figure 12: Long-awaited Frame Reuse. Here, the blue highlighted member is being reused at the green highlighted frame

Inventor 2015

Reuse allows users to select an existing frame member (straight only) to use in other areas in order to reduce the number of identical files. Multiple frame members can be selected.

- Reused member removal is handled by a context menu option titled Break Reuse Member.
- Flip Member Direction reverses the frame member orientation.

The Change Reuse command allows reused frame members to be switched, as well as different geometry definitions to be selected.

As reused frame members are identical, end treatments are as well. Adjusting end treatments to the original member before selecting for reuse ensures the copies are properly set up.

TUBE & PIPE

Honor Application Options for Transparency

This new option is available in the Tube & Pipe Settings dialog and adjusts the component opacity in an assembly. When activated, the transparency option settings in the Application Options dialog box are adhered to. When deactivated, the entire assembly displays as opaque, avoiding the visual confusion that can occur with transparency.

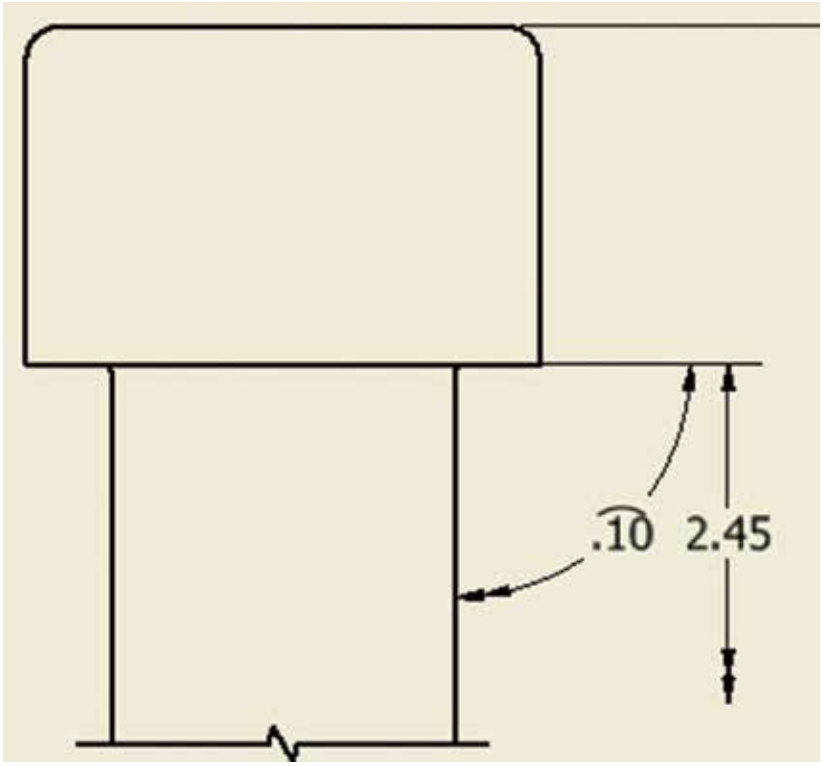


Figure 13: Foreshortened dimensions

DRAWINGS

- Fast Open Option – open drawing files quickly by ignoring file references. Edits can be saved.
- Double-click anywhere on a balloon to edit.
- Use browser tree to move split drawing tables to another sheet.

Fast Drawing Views for Large Assemblies

Assembly's Express mode data is utilized to generate faster preview and view placement for both precise and raster views. Consequently, raster views of very large assemblies generate in a fraction of the time. Performance gains are subject to file size and require all components to be properly migrated to 2015.

Foreshortened Dimensions

Create linear, angular, or arc length foreshortened dimensions by selecting the foreshortened dimension type in the context menu.

Auto-Sort Parts List

Auto-Sort on Update is a new option that persists with any Parts List to which it has been applied. Once set, Parts Lists automatically sort.

View Labels Update When on Different Sheets

View Label properties now include PARENT SHEET NAME and PARENT SHEET INDEX, which automatically update when parent view is moved to a different sheet.

The property is added to the default view label in the Style and Standard Editor – standard View Preferences display.

INTEROPERABILITY

- Add the BIM Simplify Panel to the Assemble and 3D model tab on the ribbon.

POINT CLOUD ENHANCEMENTS

In an assembly file, access the Point Cloud commands on the Point Cloud panel of the ribbon's Manage tab.

New Point Cloud commands and functions include:

- Navigator – Navigate to and adjust the visibility of scan regions and scan locations in a point cloud.
- Cloud Plane – Create construction plane based on selection set of points in the cloud.
- Adjust Point Cloud Density and max loaded points in the Attach Point Cloud dialog.
- Measure distances from Point Cloud to a Point Cloud plane and other geometry.

INVENTOR ADD-INS

Mockup 360 Add-in

Mockup 360 add-in is automatically installed with Inventor 2015 and allows insertion on Inventor models to new or existing Mockup 360 files. (Requires installation of Mockup 360 which is downloaded from your Autodesk 360 log-in.)

Configurator 360 Add-in

Configurator 360 add-in is an option available in the Inventor 2015 installation process. It permits users to upload designs directly from Inventor to Configurator 360. Once installed it appears on the Autodesk 360 tab on the ribbon. Configurator 360 will also install to Inventor 2014 if found during the installation process.

AutoCAD Electrical Catalog Browser Add-In
AutoCAD Electrical add-in adds the modeless Catalog Browser, which permits insertion of 3D parts into Inventor from the Electrical Catalog database. The add-in includes a small sample set of 3D electrical parts. Once installed, files are available to be placed into normal assemblies as well as the Cable and Harness Environment.

Vendor part models as well as your own electric components can be associated with a catalog value. The add-In installation is handled through the AutoCAD Electrical 2015 installation package as an option.

Translators
Import support for the following file versions is added:
- CATIA V5 version R6 through V5-6R2013
- Parasolid version up to 26.0
- JT version 7.0 through 10.0
- SolidWorks version 2001 plus - 2014

Export support for the following versions is added.
- CATIA V5 version R10 through V5-6R2013
- Parasolid version 9.0 to 26.0
- JT version 7.0 through 10.0

CAD ADMINISTRATOR TOOLS

MATERIAL OPTIONS
- New default Texture path field in Application Options/ Files tab.
- Cutout texture now displays under shaded visual style and behaves similarly in both the shaded and realistic visual styles.
- Migrate Color Styles to Generic option is added to the Material Styles Migration dialog box. It creates a generic appearance for color styles in the appearance of the Inventor 2012 shaded view color style.

Enhancements for Task Scheduler
In Task Scheduler, in both the Migration task and the Update Design task, you can update materials and appearances in batches, instead of opening the files manually. The option Update Local Materials and Appearances is added to both the Migration Options dialog box and the Update Design Options dialog box. When you select the option, all local materials and appearances are updated automatically to the styles in the library in the active project.

Batch-Convert All Drawing Views to Precise Views
You can convert a batch of raster drawings to precise drawings using Task Scheduler. The option to Make All Raster Drawing Views Precise has been added in the Update Design Options dialog during the Update Design task and the Migrate Files task. Please note that Skip migrated file and Skip unresolved references will filter these conditions out of the task.

OTHER ENHANCEMENTS

- Specify whether the Help system is viewed from Local or Online references (new Help options in the Application Options/ General tab).
- Autodesk 360 is now an option during installation.

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

by: Brian Benton

The New Stuff

Autodesk is continuing with its annual release cycle in the first quarter of the year. That means the media will be full of "What's New" articles, like this one.

WHAT'S NEW? THE SHORT LIST

AutoCAD® 2015 has several small changes or enhancements to already existing tools, but not so many brand new features. The Welcome screen is replaced with the New tab, text bullets are now automatic, there is a new lasso selection tool, maps are now printable (YAY!!), and we now have crosshair badges and ribbon Galleries. You can now collaborate with Design Feed within your company without uploading to Autodesk 360 exclusively, and model space viewports are extremely easy to work with.

UI AND VISUAL CHANGES

You Might Not Notice What's Missing

One of the changes is something that is no longer there. The Welcome screen is no longer available! You know, that screen that pops up the first time you start AutoCAD and you promptly set to never turn on again? In its place is the New tab. The New tab displays when you launch AutoCAD, have no files open, or start a new tab. The New tab is made up of two content areas—Learn and Create. Each content area provides access to different tools.

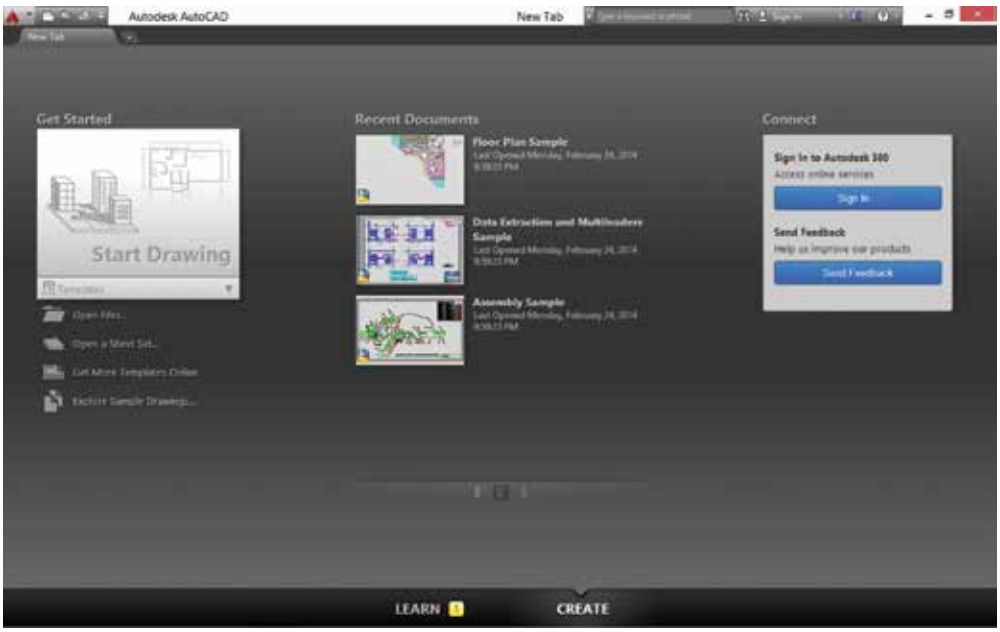


Figure 1: The New tab replaces the Welcome screen

New Tab: Create

The Create page has three main columns: Get Started, Recent Documents, and Get Connected. These categories are fairly obvious as to what they do or contain. When a New tab is created, you will be brought to the Create Page by default. The Get Started column provides tools for starting a new file, opening an existing file, accessing your templates, and it can also take you to

Figure 2: The View tab includes UI tools

sample files. The Recent Documents lists your most recently opened files and the Get Connected column provides a place to log in to your Autodesk 360 account or to create a new account if you don't have one.

New Tab: Learn

The Learn page of the New tab provides users access to the "What's New" videos, the "Getting Started" videos, tips, and Online Resources.

UI Color Changes

AutoCAD 2015 has a new color theme. It is said to be a "modern" dark theme. These color changes include the ribbon, status bar, and palettes. It does minimize the contrast between the drawing space and the tools around the workspace. This color change hopes to lessen the strain on users' eyes. You can change this color scheme in the Display tab in the Options dialog.

The Workspace drop-down is turned off by default in the Quick Access Toolbar. It is still there and can be turned back on. Also note that the "Classic" workspace has been removed. If you want a more "classic" look to your user interface, you will have to manually set it up.

The ribbon tab View has been altered to include tools that control the visibility of several User Interface elements. There you can find controls for the UCS Icon, ViewCube, Navigation Bar, and Layout tabs. There is also a new BIM 360 ribbon tab that provides quick and easy access to your BIM 360 Glue account.

Layout tabs now have a plus sign (+) button to aid in the creation of new paper space tabs. You can always right-click the tabs to gain access to several new layout tabs creation tools. If you have so many tabs they can't be shown, there is a new overflow menu that will list the remaining tabs in a column. There are new color controls for layout tabs in the Display tab of the Options dialog.

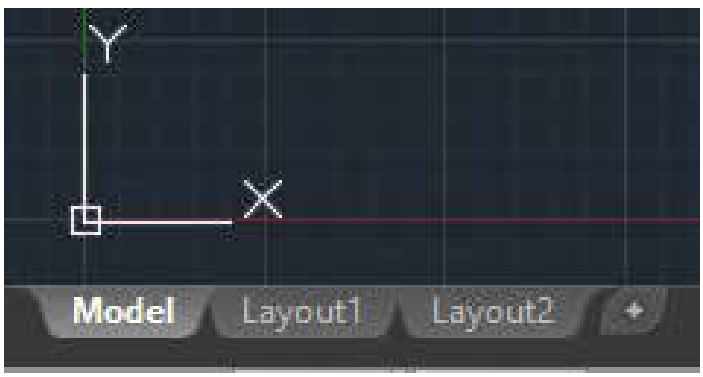


Figure 3: The new plus sign in Layout tabs makes creating them easier

Improved Graphics During and After Object Creation

There is a variable called LINESMOOTHING that allows users to toggle on/off anti-aliasing in viewports when the 2D wireframe visual style is active. This does not affect printing—only on the screen visual display of 2D objects such as lines, arcs, circles and drawing aids (like grid lines). These controls are found in the Graphics Performance dialog box.

The new system variable COMPLEXLTPREVIEW provides controls for more visual feedback when creating and editing objects. For example, the move command will display the selected objects in their original position, but with a faded deletion effect. Also, complex line types are displayed as you draw, move, copy, or rotate them. AutoCAD 2015 will also display the color, linetype, and lineweight of lines and polylines as you draw them.

AutoCAD 2015 provides visual feedback when you preselect and select objects in a few ways. When your cursor hovers over an object, the geometry will appear thicker and either darker or lighter depending on the color of your background. If you have hardware acceleration turned on and you select an object, that object will remain highlighted (thicker and darker/lighter) and its color will change to make identifying it visually easier. The Trim, Extend, Lengthen, Match Properties, and Break tools now all have command preview functionality.

AutoCAD 2015 has a new selection tool called Lasso Selection. To start a Lasso Selection, click your cursor in a blank area of the drawing area and drag the cursor around an object/objects. The

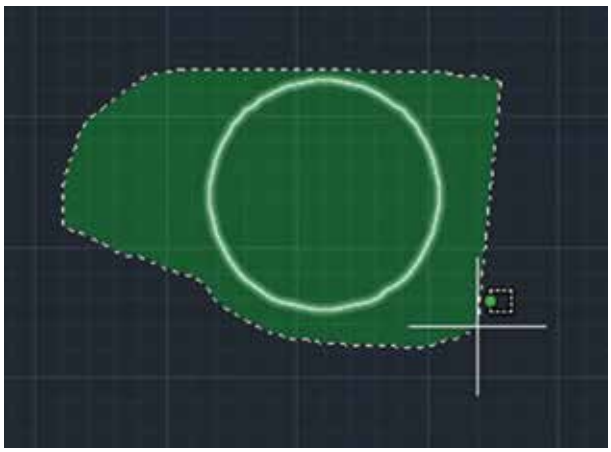


Figure 4: Click, hold, and drag to execute a Lasso Selection

"old fashioned" window and crossing window selections are still available; simply click in a blank area and release the mouse button. Click and hold the mouse button to start a lasso selection. This selection tool's availability can be turned on or off in the Selection tab of the Options dialog.

Crosshair Badges

The AutoCAD 2015 cursor has had a few changes to it. The crosshairs have been removed from within the pick-box area to help you see what you are selecting. Autodesk has added Badges to the crosshairs. These new badges will appear on your crosshairs relevant to specific commands. Most of them look similar to the command icon they represent. There are badges for making a Selection, Copy, Move, Scale, Zoom, Erase/Delete, Rotate, and several "inspection" tools such as Distance, Radius, Angle, Area, Volume, List, and ID. The inspection badge looks like a question mark. The Rotation badge looks like the rotate icon and also indicates the angle of rotation (this will be a nice visual cue).

Ribbon Galleries

There is a new tool to help when inserting blocks that are already in the current file. When you use the INSERT command from the ribbon and there are already blocks in the file, a panel window pops up below, providing a visual representation of the blocks that are available. There are also galleries for styles including dimensions, multi-leaders, text, tables, and table cells.

Figure 5: The New Galleries feature creates a visual library of existing items in the file

Model Space Viewport Controls

Model Space Viewports are now much easier to control. Create a few model space viewports as you normally would (use the command viewports). The active viewport has a very visible blue border around it. Click and drag the edges of any viewport to move its border. This allows for quick changes to the size of the viewport. Along the viewport borders you will see a Plus (+) sign as shown in Figure 6 below. Click and drag this icon to split a view port, creating a new viewport. Drag the cursor left/right or up/down to split the viewport horizontally or vertically. You can also press and hold the CTRL key while dragging the cursor on the viewport border to split it. Drag a border to one side to collapse it, joining the two viewports together.

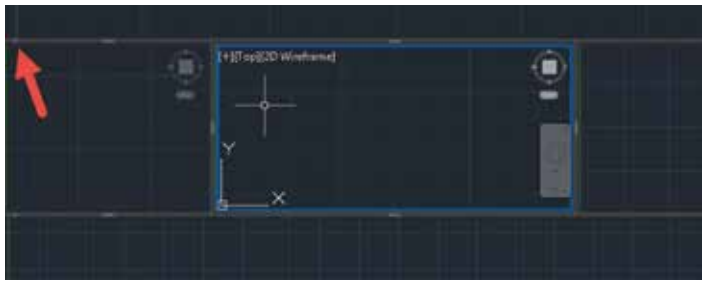


Figure 6: The red arrow indicates the plus (+) sign where you click to create new viewports

The status bar now has a new tool that allows for Isometric environmental controls. It provides one-click access to turn on an isometric drafting state and to change isoplane settings. Click on the Iso options and a flyout will appear, providing a new menu where you can choose between Isoplane Left, Isoplane Top, or Isoplane Right. Click the icon to toggle the setting on or off; click the arrow to access the flyout controls.

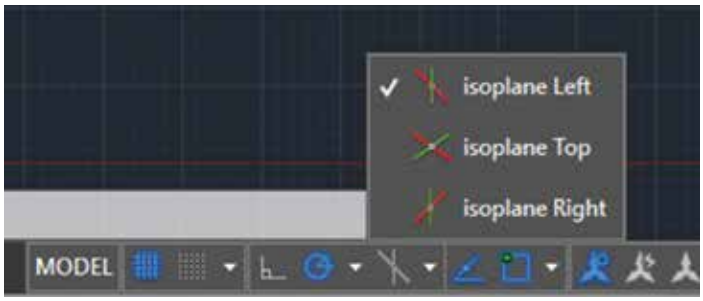


Figure 7: Toggle the Isoplane settings from the status bar

MULTI-LINE TEXT & TEXT EDITOR ENHANCEMENTS

AutoCAD 2015 has several small enhancements to the way multi-line text works. Some of these enhancements are new while others make existing functionality a little bit better. If you have hardware acceleration turned on, then the mtext editor will be transparent, meaning that if there is geometry behind the editor you will be able to see it. This is nice if you are annotating your linework and want to be able to see how your text will look around the linework. Columns now have a corner resize, which allows you to resize their width and height more easily. Pass the cursor over the bottom or right edge of the editor, then you can change either just the height or

just the width accordingly. Autostacking now produces a clickable icon that gives you instant control over how your stacked text will be displayed. Paragraph tabs in the editor now have tooltips, making controlling and setting them much easier than before. The text editor has a match properties button so you can match properties inside a text object. The new TEXTALIGN command will enable quick alignment of text objects. Start the command, select the text objects you want to align (single line, multi-line, or attributed text), then select the text object you want to align them with. You can also select two points creating a line to align with. There are also spacing controls available.

Auto Bulleting

AutoCAD Mtext now has auto bullets and numbering. If you have to create numbered lists or notes on a regular basis you will like this feature. Of course, this feature can be turned off or on. Open the Mtext editor (edit some text to do this) go to the Bullets and Numbering panel on the Mtext Editor contextual ribbon that appears, and click the arrow. Click to turn off the "Allow Auto Bullets and Numbering" option. It will have a check next to it if it is on. To use this feature, type a number or letter that you will use for your bullet. You can also use a symbol. Then follow it with one of these characters:

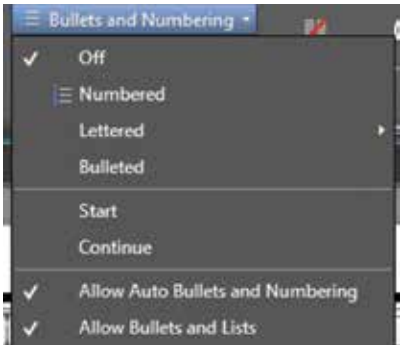


Figure 8: Turn on/off the Auto Bullet & Numbering feature in the bullet pull-down in the Text Editor ribbon tab

.
)
>
}
,
]

Follow those characters with either a space or a tab and the auto bullets will begin. If the auto bullet feature is activated, a symbol icon will appear. That icon is clickable and will provide further controls for the bullets.

Caps Lock

AutoCAD Mtext has had an all caps or all lower caps setting for a while now. Now there is also an Autocorrect cAPS Lock feature. It is on by default, but you can turn it off by right-clicking within the text editor and clicking the option. This new feature works when you press the SHIFT key to type the first letter of a word and then release the SHIFT key for the remainder of the text that you type in. AutoCAD will autocorrect the capitalization by capitalizing the first letter and changing the remaining letters to lower case and then turn off the caps lock. This feature will work wherever there is text as in tables, leaders, and dimensions.

Figure 9: Access the Autocorrect cAPS Lock button by right-clicking inside the text editor

GEOGRAPHIC LOCATION AND MAPS

AutoCAD 2015 has greatly improved the Geographic Location tools and maps. Setting your file location has been streamlined. Don't forget, to use the maps you must be logged in to your Autodesk 360 account. Otherwise you can only set your location via latitude and longitude coordinates. When you have set your location and coordinate system, you can display an aerial map. The resolution of the map changes as you zoom in and out, trying to balance image quality and computer performance. Now you can actually use the map shown in your drawing.

Before, all you could do with the map was see it while you were working in AutoCAD, but now you can capture the map for printing. The map is then embedded into the drawing, increasing the file size, of course, but this means the map goes with your file. The map image is grip editable so you can move, resize, and rotate it just like any other image. Also note that there are three versions of the map: road, aerial, or hybrid. Even if you embed a map image, you can always change the map type later on. Slidebars on the Map Image ribbon tab let you change the brightness, contrast, and fading of the map image. The map image is only updated if you choose to reload the image; otherwise it stays as it was inserted.

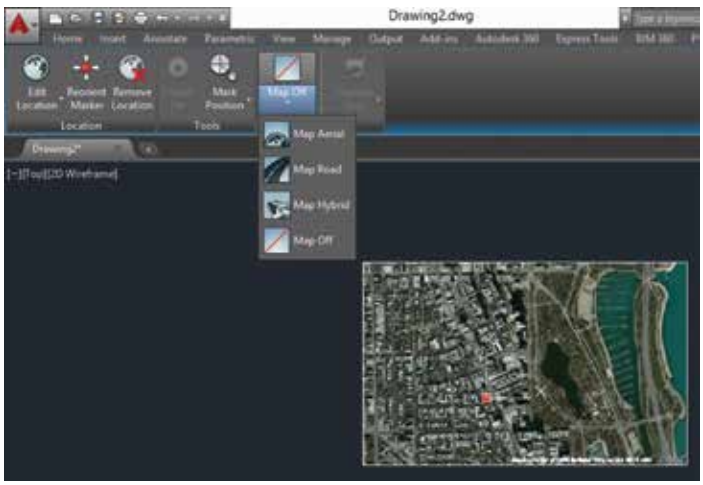


Figure 10: Map Location tools have greatly increased and now the map is printable

AUTODESK RECAP AND REALITY CAPTURE

How AutoCAD uses point clouds is a bit different now. All the hard work is done in Autodesk ReCap. AutoCAD no longer supports PCG and ISD files, nor can it create them. Now AutoCAD uses ReCap point cloud files or RCP and RCS files. ReCap can handle PCG and ISD files, as well as a long list of other point cloud file types. Process the data in ReCap (which comes free with AutoCAD), create an RCP or RCS file, and use that in AutoCAD. Once you have attached a ReCap file to AutoCAD, you have many more visual controls available than before—even geographic location. You can control point size, level of detail, maximum

number of points per file, colorization, color mapping, lighting tools, and you can crop the points to display a specific area. There is also a new Point Cloud Manager that allows for multiple point cloud files to be attached to your file. There is now also a Point Cloud Object Snap control that allows you to "snap" to point cloud data. The 3D Orbit command now allows you to snap to a cloud point and use it as the focus of your orbit.

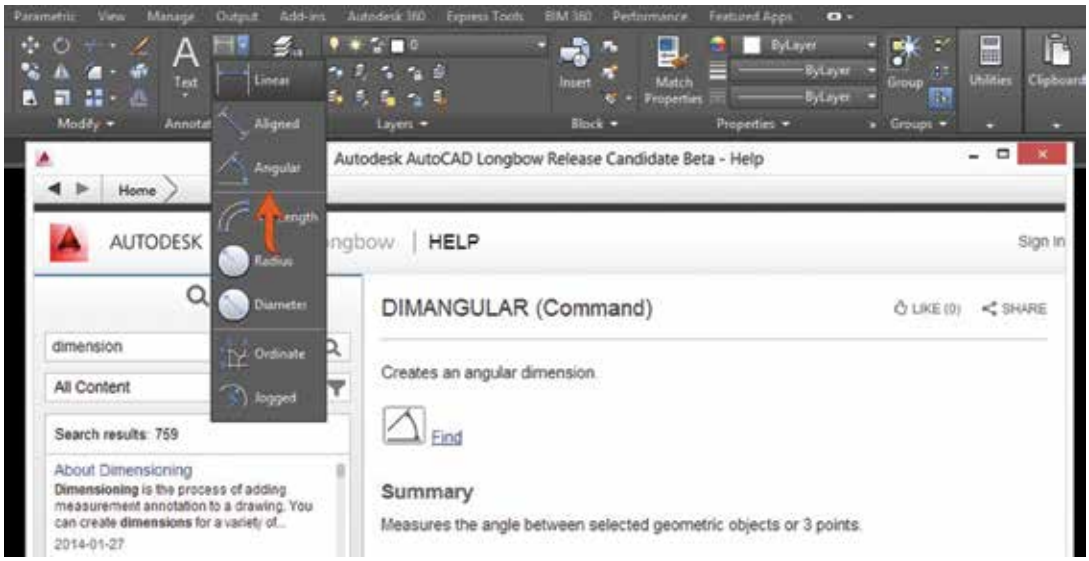


Figure 11: Help can "help" you find your commands

CHANGES TO DESIGN FEED

Design Feed is a collaboration tool built into AutoCAD. This release of AutoCAD streamlines the way Design Feed works. One of the complaints about Design Feed was that the file had to be uploaded to an Autodesk 360 account to able to use the tool. Now users can save the file to their company's server and still use Design Feed. Note that only users with access to the company server can access the Design Feed data. This should be fine if you are collaborating only with coworkers. To share Design Feed data with third parties, you will still have to upload the file to Autodesk 360. Now when you etransmit files with Design Feed data you can opt to have that information removed when creating the etransmit files.

MISCELLANEOUS CHANGES

Changes to Help

AutoCAD's Help has a new feature called Find. This new feature will help you find the command in the ribbon. While Help is open and if the command is visible in the current ribbon, nothing will be displayed. If the command is not visible, then a link that says FIND will be visible next to the command listing in the help window. Click this link and an animated arrow (see Figure 11) will appear, pointing you to the tool. If the tool is not accessible from your current workspace or is in a hidden or contextual ribbon tab or panel, a tooltip will appear, providing instructions on where to find the command.

The Little Things

It is now possible to filet arc segments that are polylines. When creating a polyline arc, you can press the CTRL key to draw the arc in the opposite direction.

When creating dimensions, AutoCAD 2015 will now ignore existing dimension extensions lines to keep you from accidentally snapping to them instead of the object you want to dimension. You can turn this on or off in the Drafting tab of the Options dialog. Also, when you create a continuous baseline dimension (with the DIMCONTINUEMODE system variable set to 1), your new dimension will inherit the style of the dimensions from which you are continuing.

AutoCAD now uses Autodesk's new ATF (Autodesk Translation Framework) to import model data from other file formats. It supports importing meshes, curves, object colors, and layers. Now you can also purge orphaned DGN data. Thank you, Autodesk.

The Autodesk BIM 360 add-in is now included as an option to install with AutoCAD.

You can configure AutoCAD for either hardware or software display rendering modeling to take advantage of the new Performance and Visual tuner tools.

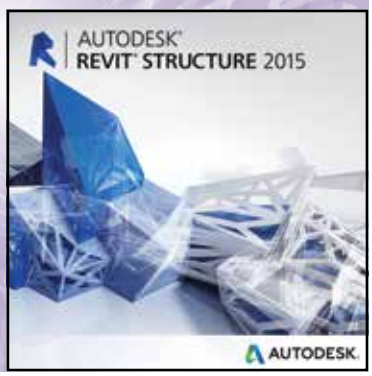
PNG (Portable Network Graphics) files are now supported for button image use.

The Application Manager is integrated into AutoCAD 2015. From it you can access and manage your installed Autodesk applications.

AutoCAD 2015 provides new tools to help you analyze and troubleshoot performance problems with your hardware.

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

Enhanced Reinforcement and Analytical Model Control



As with the last release of Autodesk® Revit® Structure, the newest release also concentrates on reinforcement and analytical enhancements. This article will look only at new features that pertain to Revit Structure and will not include any of the Revit platform enhancements that have been included in this release.

REINFORCEMENT SETTINGS

Figure 1 below shows a new presentation setting for reinforcement. This controls how the rebar is shown in plan and in section; this does not affect 3D views.

Figure 1: Reinforcement settings

Revit Structure 2015

Below, Figure 2 displays the three settings that are available for both plan and section views. These are: Show all, Show middle, and show first and last.

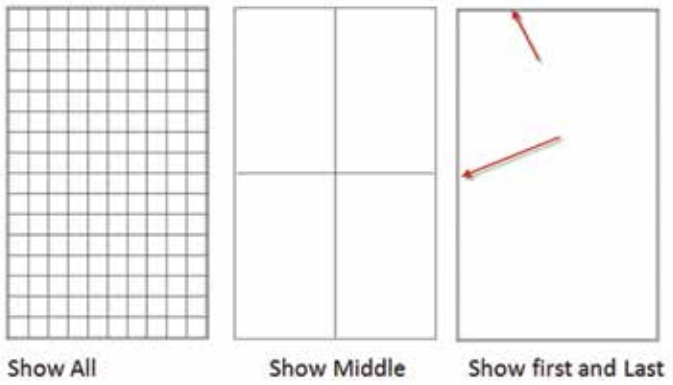


Figure 2: Reinforcement settings—results

REINFORCEMENT NUMBERS

Revit now allows you to number rebar with different numbering sequences. These sequences are called partitions, and they can be named as well. Figure 3 shows where to access the reinforcement numbers dialog box.

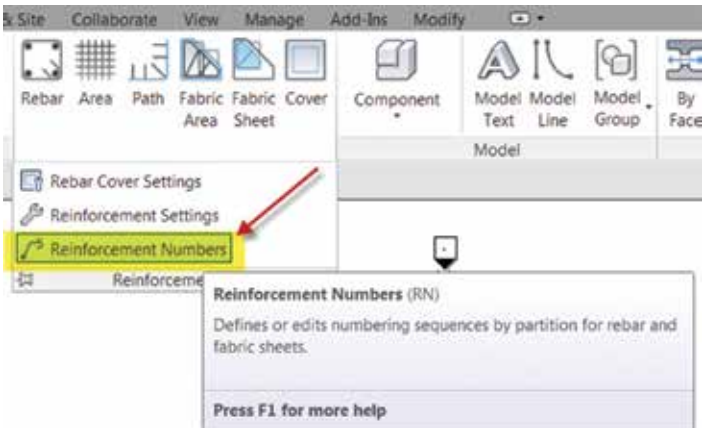


Figure 3: Reinforcement numbers

Once you place reinforcement in your model it will appear in the reinforcement numbers dialog, allowing you to assign a partition number as well as rebar number sequence. Any changes made will be automatically reflected in the properties of the rebar placed in your model.

Fabric reinforcement is numbered separately from rebar numbers, so you can effectively have rebar and fabric numbers starting with 101. At the top of the dialog you will see that you can control the minimum number of digits for reinforcement numbers.

The numbers for the rebar will automatically match for the rebar/fabric of the same type/size/shape placed in your model.

The Remove Gaps function all the way to the right side of the Reinforcement Numbers dialog box is used to close the gaps in the numbering. For example if you have Partition P1 which has rebar numbers 1,2,3,4,5, and 6, then you delete rebar types 2 and 4, Revit can close the numbering gap and make the numbering sequence read 1,2,3,4. This change would automatically update rebar properties in the model.

FABRIC SHEET PLACEMENT

Fabric sheets have been added to reinforce sections of concrete for walls, floors, or slab foundations. Place fabric sheets on floors in a plan view and on walls in elevation view.

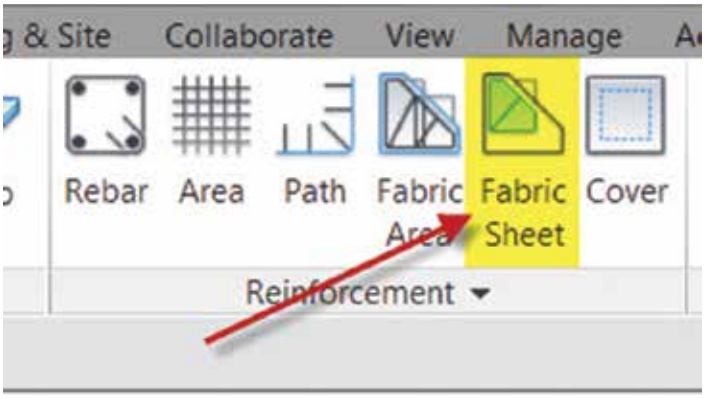


Figure 5: Fabric sheets

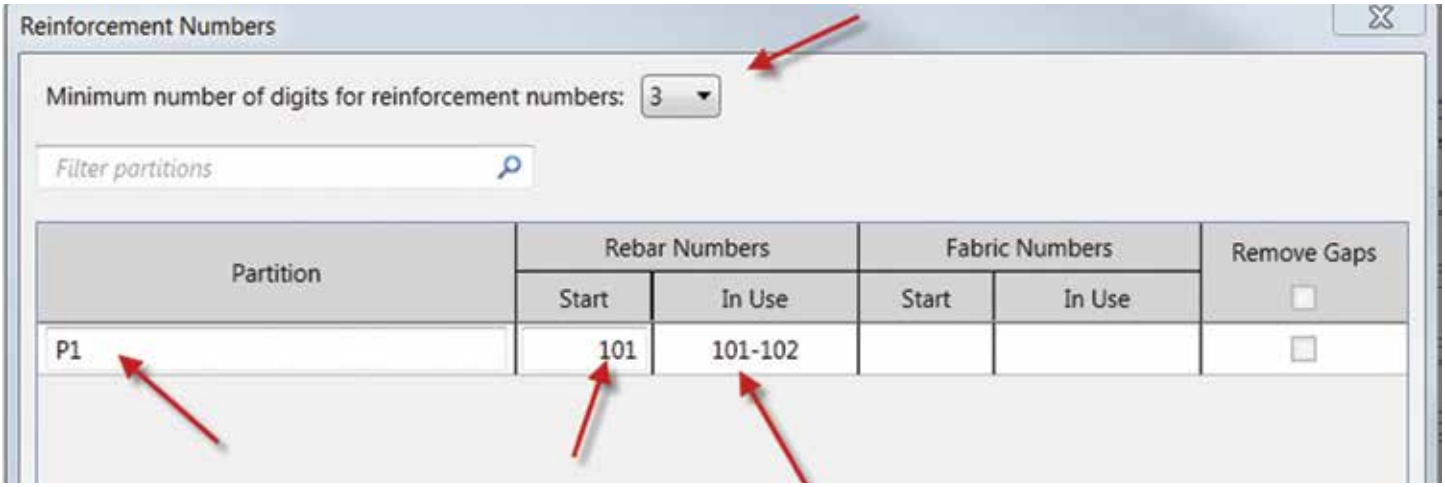


Figure 4: Reinforcement Partitions and Numbers

When you place a fabric sheet it will automatically snap to the rebar cover settings of the host object. If there is already another fabric sheet on the host when you place another fabric cover, it will snap to the edges of other fabric sheets, lap splice, or midpoint of other fabric sheets.

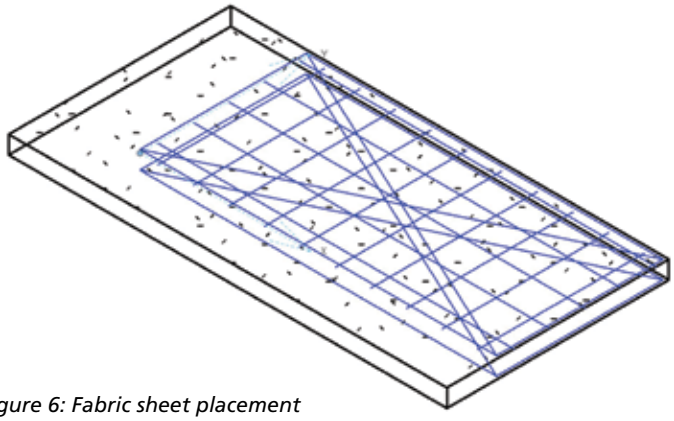


Figure 6: Fabric sheet placement

There is a grip on the fabric sheet that allows you to change the origin point. You cannot rotate the sheet once it is placed; however, if the host rotates, so will the fabric sheet. Figure 7 below shows the type properties of a placed fabric sheet that allow you to control reinforcement spacing and fabric sheet size.

Layers	
Overall Length	12' 6"
Length	11' 0"
Major Start Overhang	0' 6"
Major End Overhang	1' 0"
Major Layout Pattern	Actual Spacing
Major Number of Wires	8
Major Spacing	1' 0"
Overall Width	8' 0"
Width	7' 0"
Minor Start Overhang	0' 6"
Minor End Overhang	0' 6"
Minor Layout Pattern	Actual Spacing
Minor Number of Wires	12
Minor Spacing	1' 0"
Identity Data	

Figure 7: Fabric sheet type properties

TOP OF FOUNDATION ELEVATION PARAMETER

Structural Foundations now have a new parameter that allows you to tag the top elevation of footings and foundations.

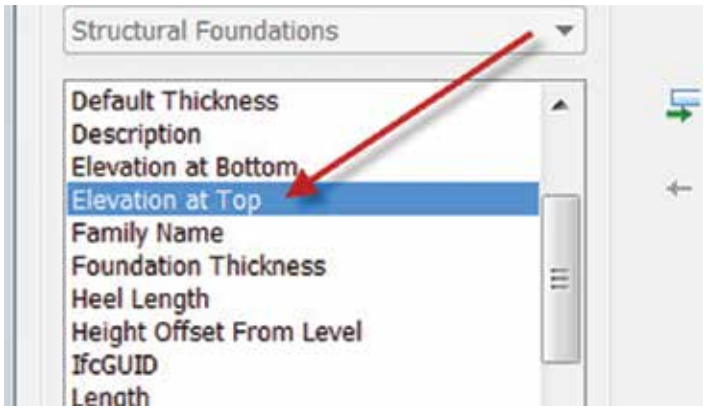


Figure 8: Top elevation parameter

Figure 9 below shows the parameter added to a foundation tag. Then the tag was applied to an isolated foundation.

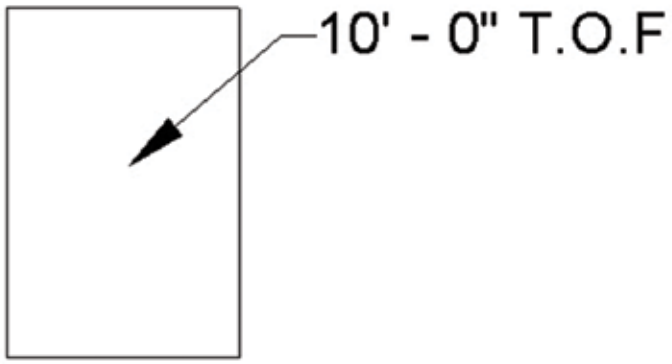


Figure 9: Top of footing elevation tag

Revit Structure 2015

ANALYTICAL MODEL LOCAL COORDINATE SYSTEM

Local Coordinate System (LCS) for analytical model elements is an important factor during structural design. LCS is used in many steps of the design process. In the past, users were not able to view the LCS on a structural element. It is now a subcategory in visibility graphics.

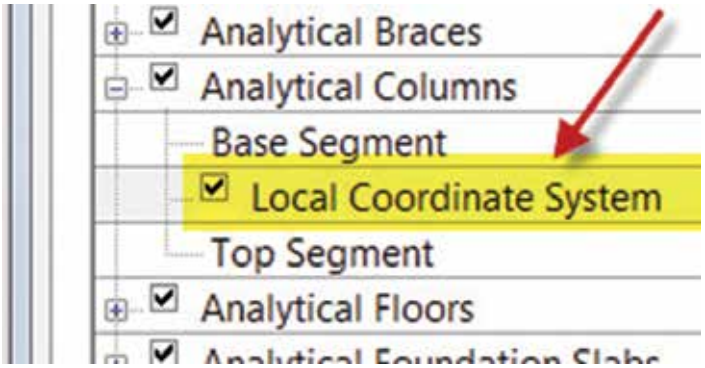


Figure 10: LCS subcategory

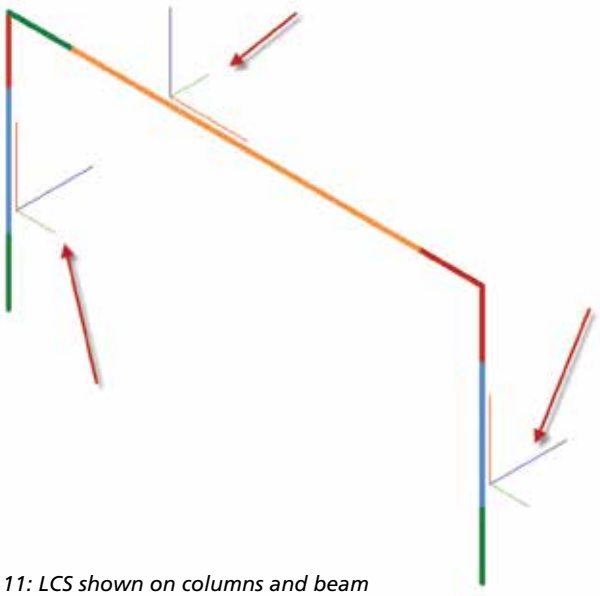


Figure 11: LCS shown on columns and beam

The LCS helps with the following:

- To define axes of selection characteristics.
- The orientation of loads and supports.
- Defines directions for offsets and releases.
- Allows for interpretation of shear force, bending moments, etc.
- Defines Code Check conditions for buckling and deflections.

There are several improvements to the Local Coordinate System including:

- All linear analytical elements can be oriented to the host LCS.
- Loads hosted to analytical elements have consistent LCS notation, which makes the analytical model talk with the analysis packages more consistently. This will also give the structural engineer a better understanding of where issues may reside.
- LCS for slabs and floors are well defined, the x-axis is aligned with the span direction of the structural floor.
- LCS for walls is defined; the z normal axis is oriented by the exterior face of the wall family, and the x axis in-plane is oriented upward.

SUMMARY

New features in this release of Revit Structure fill in some gaps with reinforcement and analytical model control. These features should help the industry move even closer to a complete solution by allowing the Revit model to link better to fabrication and analysis, improving overall workflow.

Philip Russo began with AutoCAD version 2.5 in 1986. Through the years he has held positions in the CAD industry as CAD Draftsmen, CAD Manager, Sr, Applications Engineer, and is a Certified Autodesk Instructor. Lately Phil's focus has been on the implementation of standard practices for the Revit platform. He currently holds the position of Corporate BIMM Applications Manager at O'Brien & Gere Limited and has his professional product certifications for Revit Architecture 2014, 3DS Max 2103 and AutoCAD 2014. O'Brien & Gere is an engineering firm located in Syracuse, New York. Phil can be reached at phil.russo@obg.com

VRMesh Triangulation for AutoCAD

http://bit.ly/1fHpcFu

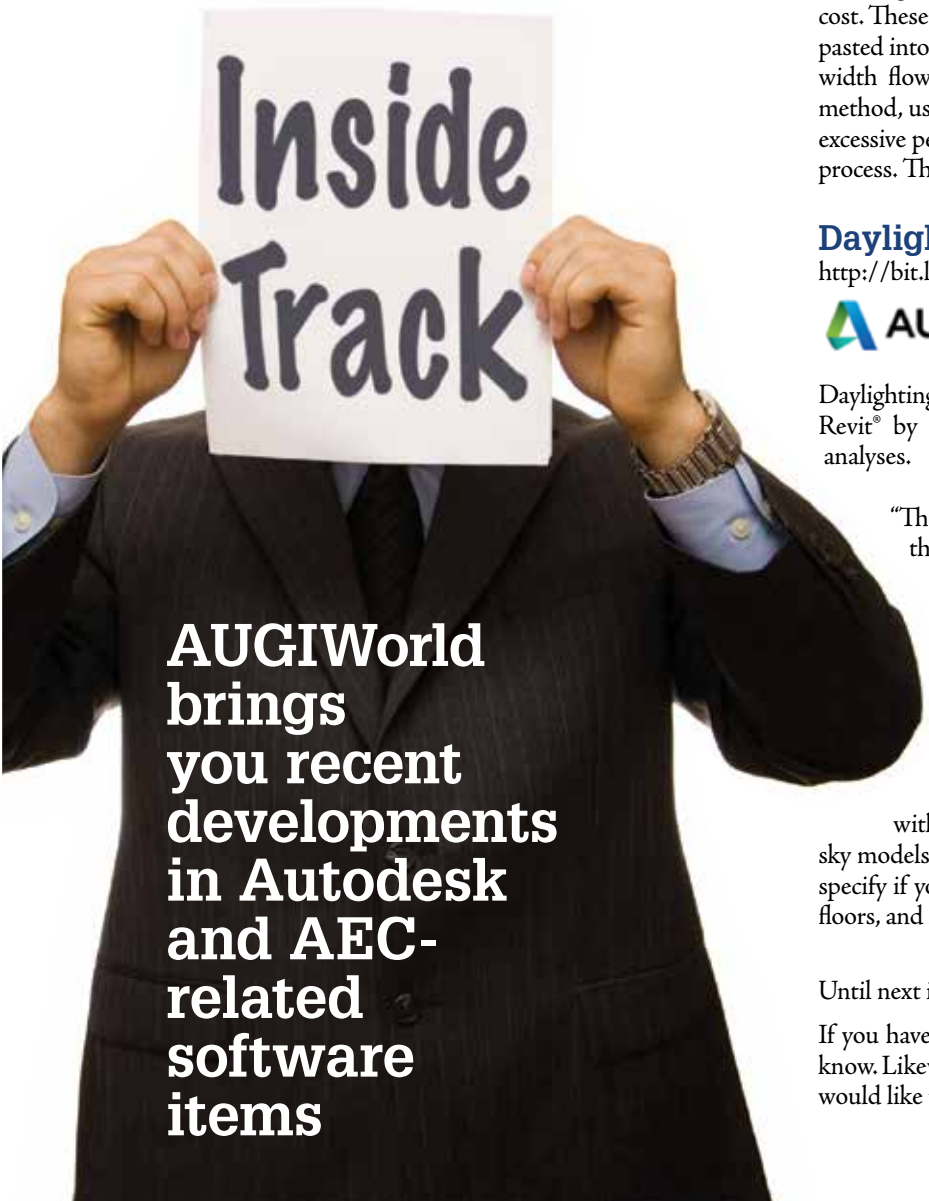
VRMesh Triangulation for AutoCAD® is a plug-in developed by VirtualGrid that can be used to process point cloud data. The plug-in is designed for AutoCAD 2014 and AutoCAD 2014-based products.

"With VRMesh's cutting-edge technologies, the plug-in provides AutoCAD users with a powerful tool for point cloud and mesh processing that can be used in the field of urban planning, architecture, civil engineering construction, transportation, gaming, etc."

The plug-in is "a powerful point cloud and mesh processing software that allows you to wrap point cloud data into accurate triangle meshes within the AutoCAD environment. It delivers best-in-class point cloud clean-up and triangulation functionalities for users to generate high quality meshes. It also provides the ability to create cross-section curves from triangle meshes and point clouds."

Key features include:

- Advanced point cloud decimation algorithm
- Accurate triangulation
- Efficient denoising with edge-preserving capability
- Cross-section curve generation
- Finding the line of intersection between two planes
- No limit concerning the point cloud and mesh size
- Supporting *.txt, *.asc, *.xyz, *.las, *.ptx, *.pts, *.stl, *.obj



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

Proplanner Flow Planner

http://bit.ly/1cCuvQK

Flow Planner is an AutoCAD® add-on by Proplanner that allows you to generate flow diagrams and then get statistics based on the results such as time, cost, and distance.

"Flow Planner is designed for engineers responsible for industrial or commercial facilities with extensive material and/or people flow. Designed by industrial engineers, for industrial engineers, Flow Planner provides a quick and painless way to diagram and quantify the flow of people and materials within any AutoCAD layout drawing. Since it is hard to reduce or eliminate what you can't see, Flow Planner helps you visualize the flow. This visual analysis will be an invaluable tool in any process improvement team's arsenal against waste.

Working within AutoCAD, Flow Planner automatically generates flow diagrams and calculates statistics such as travel distance, time, and cost. These flow statistics can be output to reports and spreadsheets or pasted into any MS Windows-compatible application. With variable-width flow lines color-coded by people, part or material handling method, users quickly see how layouts should be arranged and where excessive people and material handling should be eliminated from the process. The ultimate result is a smooth flow with less waste!"

Daylighting Analysis for Autodesk Revit

http://bit.ly/1l2a6tp

AUTODESK. // LABS_

Daylighting Analysis (RDA) is a technology preview for Autodesk® Revit® by Autodesk, Inc. that allows you to perform daylighting analyses.

"The Revit 2014 Daylighting Analysis (RDA) plug-in uses the Autodesk 360 Rendering cloud service to perform very fast and physically accurate daylighting analyses from within Revit. In this first release of the plug-in, we have enabled it to provide LEED IEQc8.1 2009 results for most models in less than 15 minutes once the analysis is started.

The Revit 2014 Daylighting Analysis plug-in (RDA) is specifically designed for architects to be able to use without learning the difference between the Perez or CIE's sky models, direct normal incident or direct horizontal radiation. Just specify if you want to analyze the whole building, a single or multiple floors, and kick-off the analysis."

Until next issue!

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

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