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The Official Publication of the AUGI Design Community

June 2020

What's New in Autodesk 2021 Products

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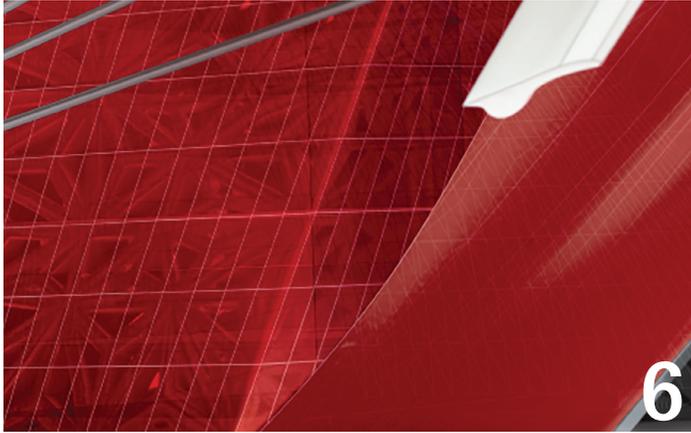
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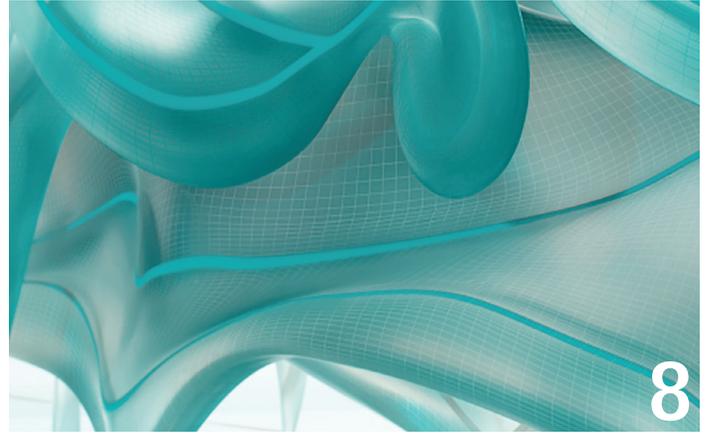


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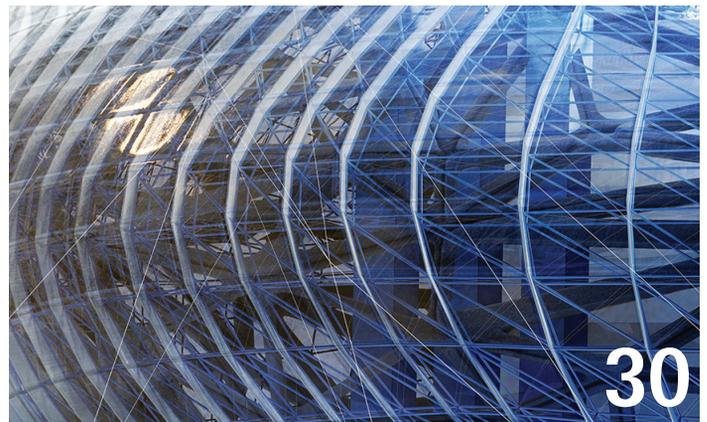
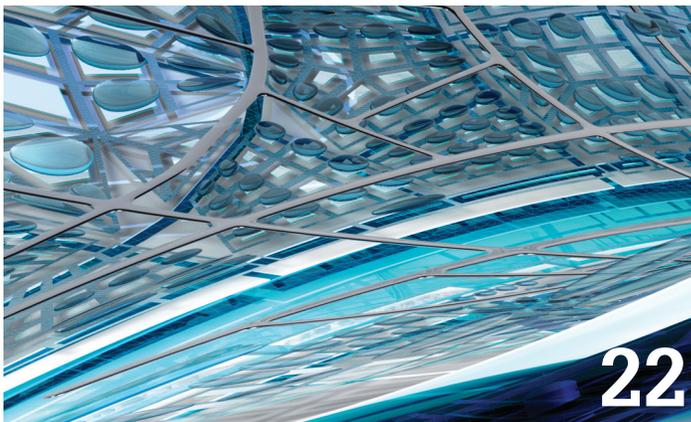
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Letter from the President



AUGI

GREETINGS!

I hope this letter finds you well. As I write this, our state is still under stay-at-home orders from Covid-19. I hope by the time you read this, wherever you are, things have started to change for the better! It has certainly been a strange time with so many unknowns. My youngest son was disappointed with missing the rest of his sophomore year in high school, and his lacrosse season. It is difficult at that age to understand that our health and the health of those around us supersede this, and hopefully he will come to appreciate the bigger picture of it all.

June is probably one of my favorite months of the year. No, I didn't get married in June. I did give birth to the aforementioned child in June. But to me, June signals the start of the warm summer months - my absolute favorite season of the year. Flowers are blooming and the trees here in PA are green. After months of gloomy tree brownness, green is my favorite color! Many people here appreciate having four very different seasons and say they would miss the snow in winter if they moved away. I do not think I am one of those people! School is officially done, vacations and picnics are scheduled, and everything just feels fresh and new.

While the world around us is trying to get back to "normal" (always a relative term), one thing is always for certain, spring means that new releases of Autodesk software have arrived, and our AUGI authors are eager to share the new features and updates with you. I love the fact that our authors are genuine colleagues - people in our industries who just want to share their knowledge. We don't require celebrities (although some may say that Mark Kiker is a legend!). If you have an idea for an article, please reach out to us (even if you are a celebrity)!

Have you noticed more of an AUGI presence on social media? We now have a Social Media team consisting of Melanie Stone, Frank Mayfield, Chris Lindner and KaDe King who are working tirelessly to bring you the latest and greatest news from around the industry to your social media feed. Be sure to follow our new AUGI company page on LinkedIn, as well as on Facebook, Twitter (@AUGI) and Instagram (goaugi). Thank you team!

We certainly appreciate all our authors and volunteers. I would like to personally thank Marilyn Law, who has served for many years as our copy editor for *AUGIWorld*. Marilyn has recently stepped down, and Todd Rogers has taken over her duties. Thank you, Marilyn and thank you Todd! We could always use more help in many capacities. Please feel free to reach out to me or any of our board members to find a way to volunteer with AUGI. In the meantime, stay safe, cover your face, and wash your hands!

Cheers!

Kimberly

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What's New in AutoCAD 2021

We are approaching summer, the air is getting hotter, and we are stuck in a pandemic. Fun times for sure. With the new #WFH, we are diving into the new releases of Autodesk software.

This article will cover what's new in AutoCAD 2021. We will not be discussing the new AutoCAD with Specialized Toolsets, which includes the likes of AutoCAD Electrical, AutoCAD Architecture, AutoCAD MEP, and many more.

DRAWING HISTORY

The new Drawing History feature is a huge change for your workflow, giving you insights on the evolution of your drawings. Over time, you can see the changes made and get instant visuals by comparing previous versions right within the context of your current drawing.

Subscribers who access a file saved on OneDrive, Dropbox, or Box can easily compare a drawing with previous versions of that drawing in AutoCAD.

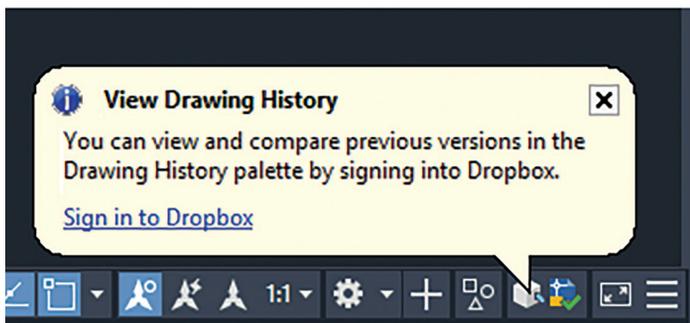


Figure 1

XREF COMPARE

You now have the capability to compare two version of an XREF and implement changes without leaving your current drawing session.

With XREF Compare, you can toggle visibility to turn off the previous XREF version, or to turn off the most recent XREF version. You can also toggle visibility for the geometry in the XREF that hasn't changed, as well as the geometry that isn't being compared, such as the host drawing, or other references. As you navigate to the changes in the XREF, you can edit the geometry of the host drawing.

A balloon notification displays to let you know something needs updated. By default, the box is checked to use the Compare feature. Alternatively, you can uncheck the box and reload the XREF as you normally do.

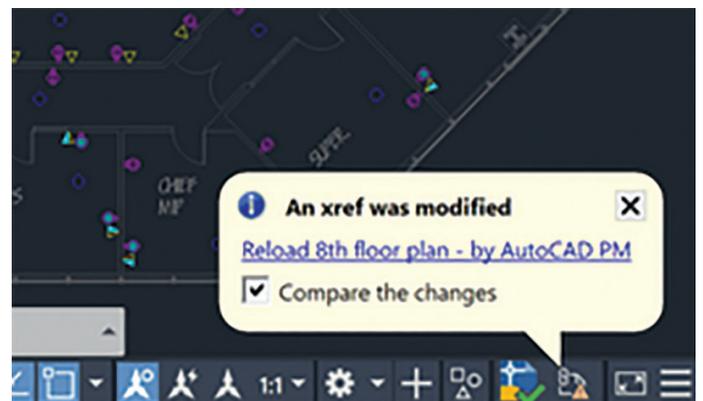


Figure 2

BLOCKS PALETTE

Stay connected to your block content anytime, and anywhere. You can insert blocks efficiently from the Libraries tab on desktop or in the AutoCAD web app.

The Blocks palette now lets you sync recent blocks in a drawing to a cloud storage location and access them from desktop or web. The Other Drawings tab is now the new Libraries tab, displaying the five most recently used block libraries for faster access. You can now specify a folder, drawing file, or any block definition stored in a drawing to insert as a block in the current drawing.

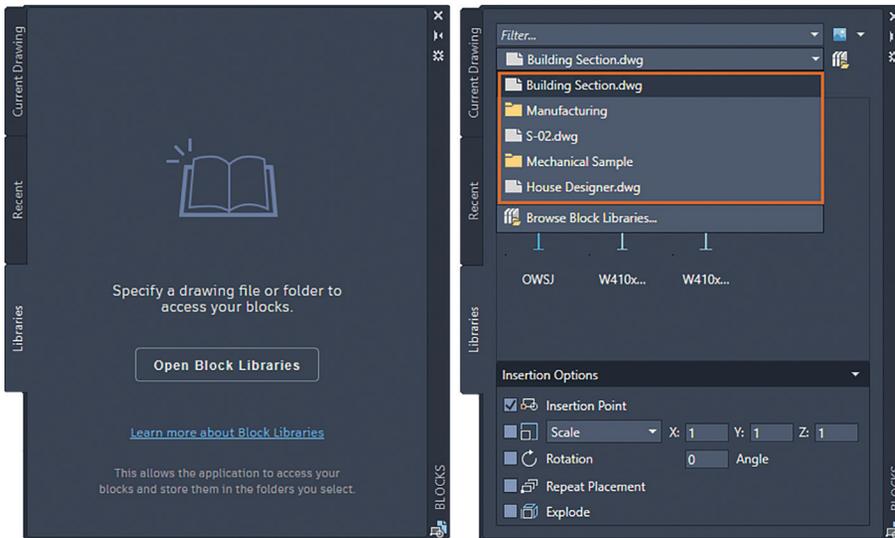


Figure 3

ENHANCEMENTS

- Revision cloud enhancements - automatically adjust the radius of the revision cloud when you use it for the first time in your file. In the previous version, you need to adjust the radius by yourself.
- Break objects at a single point - the new BREAKATPOINT command, the Break at Point tool on the ribbon can now be repeated by pressing Enter. This command directly separates a line, arc, or open polyline into two objects at a specified point.
- System and graphics performance – faster saves and install times, as well as leveraging multi-core processors.
- Support for gestures - Pan and zoom. When no command is in progress, drag with one or two fingers to pan. When a command is in progress, drawing with two fingers to pan. Pinch or spread with two fingers to zoom. Selection. Tap on an object to select it. When a command in progress requires you to select objects, you can drag one finger to create a window or crossing selection. ESC. Double tap with one finger to end a command or clear a selection.
- Autolisp extension for Microsoft Visual Studio (VS) Code - A new AutoLISP extension was released for use with VS Code that allows you to edit and debug AutoLISP source (LSP) files with AutoCAD. Create and modify LSP files using features such as Autocomplete and Code Snippets, format all or selected code statements in a LSP file, add watches and breakpoints while debugging a LSP file, and

execute AutoLISP code statements, AutoCAD commands in the Debug Console, and support for Unicode characters.

QUICK MODE FOR TRIM AND EXTEND

Instead of having to first select boundaries for the Trim and Extend commands, the default Quick mode selects all potential boundaries by default. Other effects include the following:

- After you start the TRIM or EXTEND commands, simply select the objects to be trimmed or extended.
- The default options for selecting the segments to be trimmed or extended are individual selection, freehand selection, and two-point fence selection.
- Start a freehand selection by holding down the left mouse button and dragging the cursor through one or more objects.
- Start a fence selection by clicking two points that define a segment crossing through the objects.
- Selected objects that cannot be trimmed are deleted instead.

CONCLUSION

There is not a whole lot of new features, but the ones provided should get you working a little faster and a little more productive. That's the idea, right? There are several blogs, and of course the Autodesk AutoCAD Help Guide, available with more detailed and robust descriptions with videos on these new features and enhancements; not to mention better remote functionality.



Mr. Todd Rogers is a certified Partner Service Expert (P.S.E.) and certified Autodesk instructor with over 27+ years of experience in teaching, managing, and providing hardware and software solutions for hundreds of engineering firms throughout the greater Houston, Texas area. Mr. Rogers is a valued member of Walter P Moore, where he works as a BIM Manager. He also holds the "Autodesk Expert Elite" status - a program to recognize individual community members who have made extraordinary contributions with helping customers by sharing knowledge, providing community leadership, and exemplifying an engaging style of collaboration that drives a healthy and valuable Autodesk customer community. He is an active blogger. Through his personal blog website (civil3dj.wordpress.com), he shares tips and solutions with Autodesk software issues.

What's New in 3ds Max 2021

The new features in 3ds Max 2021 give it a next-gen flavor, where professionals are considering early adoption more seriously than they ever have before. Many known industry professionals already made the switch. I will list the reasons why.

Autodesk hit the trifecta with their viewport enhancements, the addition of PBR materials, and the HDRI material node. See Figure 1, for a live viewport (not rendered) where I applied PBR materials to a model in an environment lit with an HDRI.



Figure 1

AMBIENT OCCLUSION IN VIEWPORT

A vital component of the viewport enhancement is the ability to see, review, and tweak ambient occlusion in real-time. Ambient occlusion plays a significant part in the presentation of objects by simulating the effects of ambient light, most noticeably in peaks and valleys. The ability to see, control and modify this, is one of the most critical factors in quality production. See Figure 2, for an example of an object presented with, and without, ambient occlusion. Pay attention to the shadow in the mouth/cheek area in the image where the occlusion is on. Note this is also using 3ds Max's viewport technology and is not a rendering.

PBR MATERIALS

PBR materials are excellent materials for production. The PBR Material (Metal/Rough) and PBR Material (Spec/Gloss) are simple to implement and provide quality results. See Figure 3, for example.

Figure 4 shows the settings for each of the materials applied to the teapots in Figure 3, demonstrating how simple they are to work with.

HDR IMAGES AND THE ENVIRONMENT

New shaders allow us to use the HDR images to work dynamically in our viewports with powerful features to manipulate them to make our presentations perfect.

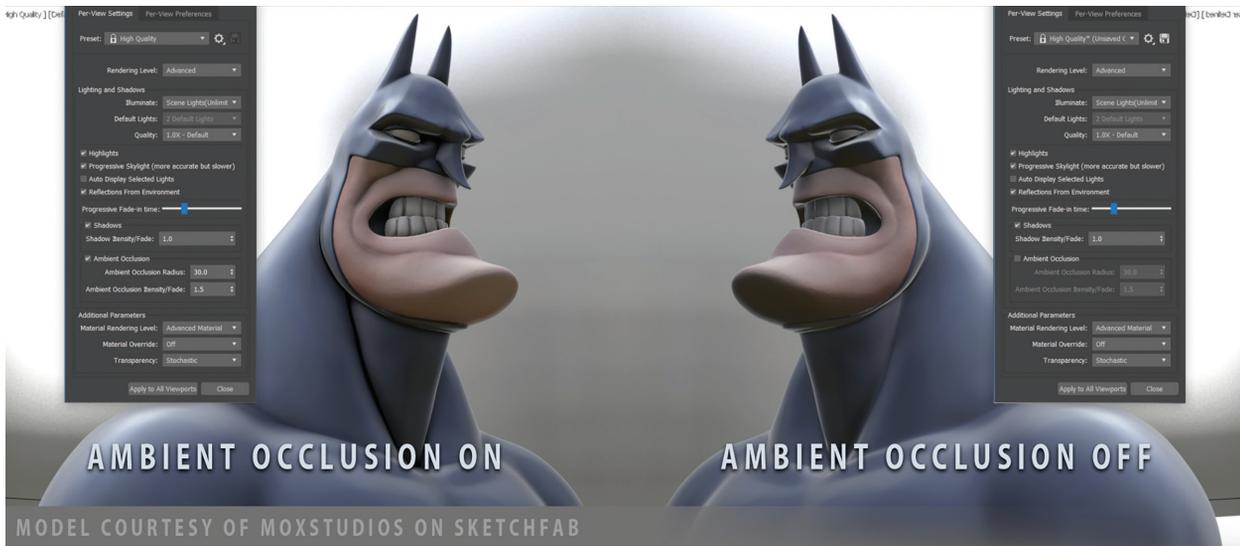


Figure 2



Figure 3

MORE

There are a dozen or more incredibly exciting enhancements with 2021. Some include shader improvements, like complex types of noise for Uber Noise such as Perlin, Fractal, Cell, fBm, and Worley, along with additions like color correction, float and color curves, and spherical projections. One more notably exciting feature, is the new modifier to improve vertex normal projections to produce cleaner results.



Brian Chapman is an Autodesk Authorized Developer, Digital Artist, and a CAD Applications Specialist for an engineering firm located in Las Vegas, Nevada. Brian shares tips and tricks at procad.blog with a portfolio of digital artwork and renderings at emptypawn.com. Brian's email is procad-man@pro-cad.net

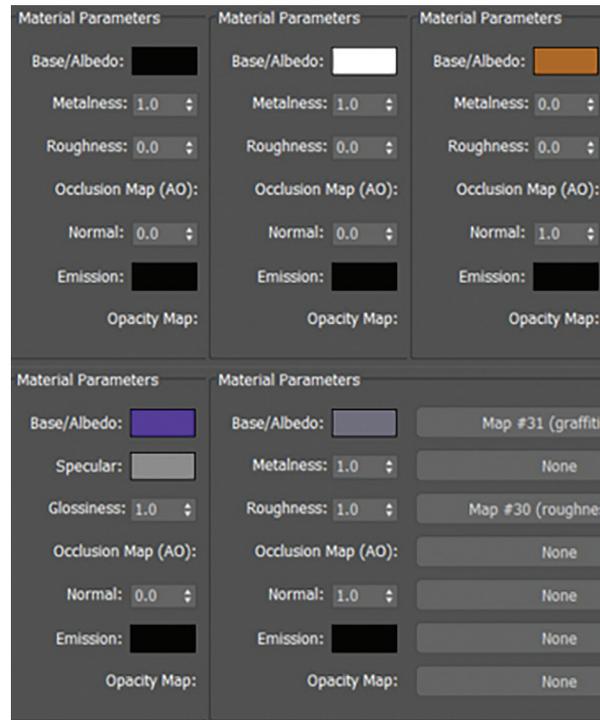


Figure 4

What's New in Revit Structure 2021



Autodesk's recent release of Revit includes several improvements and enhancements for Revit Structure users. We will explore some of the top features available in Revit Structure 2021.

Autodesk continues to pour into improvements for our Structural users. Revit 2021 is no exception. With improvements in Rebar, Precast, Steel Connections & modeling, and Structural Analysis. We will take a brief glimpse at each of the new Revit Structure improvements in Revit 2021.

REBAR MODELING

Modeling rebar has continued to be one of those features that could always use something more. Revit 2021 now includes the ability to rotate the hooks at the ends of the bars. This allows for more flexibility (pun intended) in the rotation of the rebar ends. Make sure to include hooks in the Rebar Shape definition before placing rebar. If hooks are included in the Rebar Shape definition, the hook rotation will already be set.

End treatments can now be added to the end of a bar without using a rebar coupler. This is applicable to any rebar in the project.

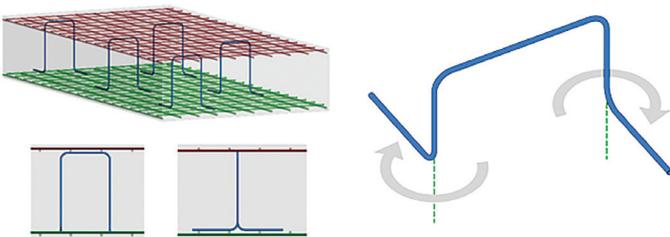


Figure 1 – Rebar Shape Modifications.

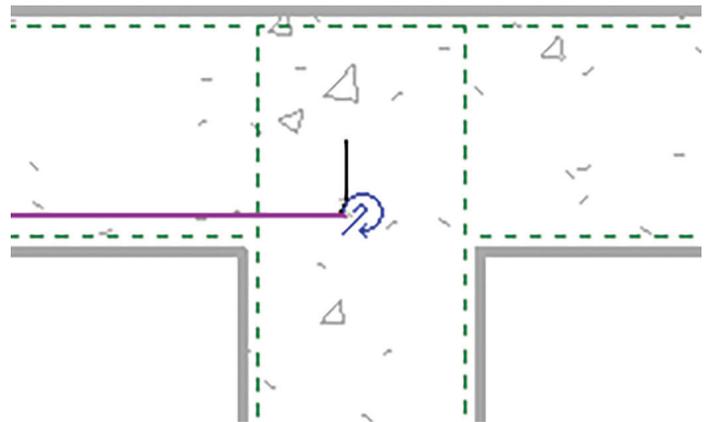


Figure 2 – Modifying Rebar Path Hook Control.

Regarding rebar couplers, they can now be used on tangent, arc-shaped bars when used in circular concrete structures.

PRECAST TOOLS

For our precast fans, the Structural Precast Extension is now integrated into Revit. Look for the Precast tab with various panels for Segmentation, Connections, Reinforcement, and Fabrication. It should be noted that Precast dependent families must be loaded – they are not automatically included in the default templates. A Precast structural template is included in the install, but it is not one of the default options for creating a new project. See Figure 3.

DYNAMO NODES FOR STEEL CONNECTIONS

Have you discovered the power of Dynamo integrated with Revit? You do not need to be a scripting guru to start using Dynamo scripts for Revit Structure. Dynamo now includes some basic

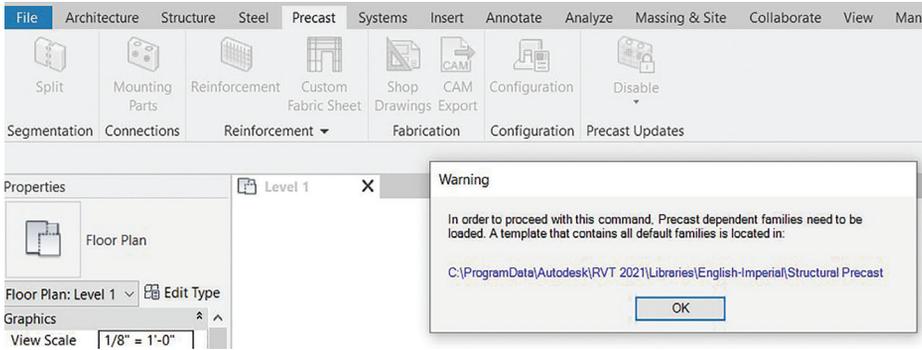


Figure 3 – Precast Tab

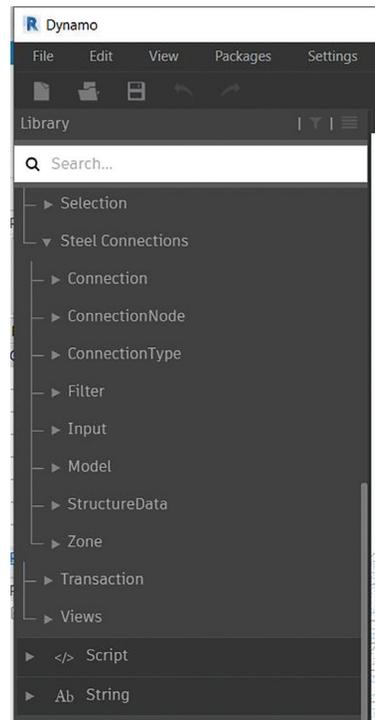


Figure 4 – Dynamo Nodes for Structure.

nodes for Steel Connections to help you get started.

Dynamo is a visual programming software that helps with automating tasks within Revit and sets up scripting for use in Generative Design. New Generative Design features are also included in Revit 2021. Generative Design is located on the Manage tab.

ENHANCED TOOLS FOR STEEL MODELING

Enhancements have been made to various Steel Modeling tools. A Stiffener connection has been added to the Structural Connections Settings.

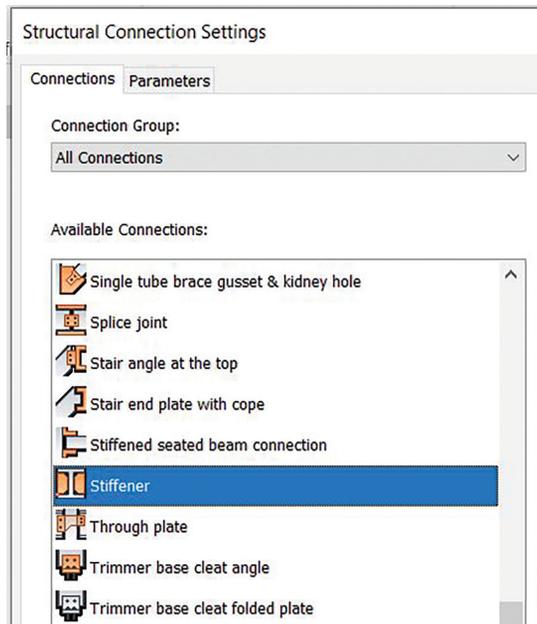


Figure 5 – Stiffener Steel Connection.

This connection can be used to reinforce a beam or column section by welding one or two steel plates. Apparently, it can be used on I, T and channel profiles, and some (but not all) L profile beams. The Stiffener connection will only show in a Fine detail level and will not show a connection symbol in Coarse or Medium detail levels.

REINFORCEMENT VISIBILITY IN 3D

Fabric Sheets and custom Fabric Sheets in 3D views can now be viewed as solid or unobscured. Select the fabric sheet, and then select the Visibility States Edit button in the Properties dialog. Select the 3D view to modify the visibility in that view.

STRUCTURAL ANALYSIS STORAGE AND EXPLORATION

This feature was formerly an add-on and has now been integrated into Revit. Find it on the Analysis tab.

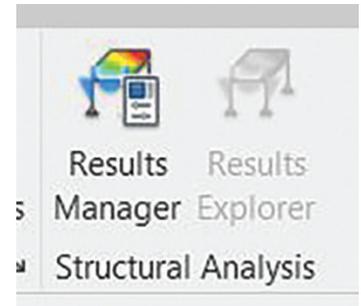


Figure 6 – Structural Analysis Panel – Analysis Tab.

ONWARD AND UPWARD

That pretty much sums up the new features and enhancements for the Structural function of Revit 2021. As always, I am sure the Revit development teams are continuing to develop more and more to make your lives easier. If there is something specific you would like to see, why not add it to the Revit Wish List on AUGI.com? And while you are there, make sure to update your AUGI profile, visit our forums, and check out the different benefits available to our members. (This is what happens when you let the AUGI president take over an article column!).

Cheers!



Kimberly Fuhrman, LEED AP BD+C, Assoc. AIA, is President of AUGI and just happens to be filling in for our regularly scheduled Revit Structure authors. Follow her on Twitter @FuhrmanKimberly or on LinkedIn.



Remote Workers

As I write this, we are right in the middle of a global pandemic that has caused many to stay at home. Many are now working remotely for the first time in their career. Having done this before, and managed remote workers, I have been able to settle in quicker. So, I figured I would share lessons I have learned that might seem like common knowledge now that the entire planet may be working from home.

WORKING IS DIFFERENT - FOR NOW

Many face-to-face guidelines still apply. Even though you may be miles apart and not in the same office space, the same general rules apply. Stay connected to people. Phone calls, texting, group chats, and many other tools can be pressed into service now. When you are online, let everyone know. Do not hide your online presence. Now more than ever you need to know how others want to communicate with you. If in the past they have preferred using

a phone, then they will prefer that even more now. If they liked texting, it will increase. If they choose email, that will pop into your inbox more now.

Management by walking around – remember that concept? Getting out of your office chair and walking the halls of the office to talk to others. Now you must “digitally” walk around. Connect to those that are not in your work circle. Use their preferred method, not yours. Make sure you check in with others that have not talked with you in a while. Keep relationships alive.

Keep it personal. You need to ask some questions on the personal side of life. Not too intrusive, just something not related to work. How is the family and kids? How are you coping? What are you watching on Netflix? If you group chat with a team, peel off occasionally and chat one-to-one with a team member.

Meetings - Do it face to face. No not in the same room, but in the same meeting tool. Zoom or Google Meet or other tools that you might use – and keep the camera on. Don't go just audio if video is available - ever. You are a leader and people need to see you. Yes, just like everyone, they are checking out what is in the background of your home office, kitchen, closet or wherever you may connect. Whatever. Make it look as nice as you can and move on. People need to see you even if they have video turned off.

Define a work area. You need to have a space that is dedicated to work. It may not be an entire room but it needs to be a place that you can leave at the end of the day. When you define a work area, you can then leave it. Make it as ergonomic as you can and use it only for work. When the day is done, move away from that area.

If you are managing a team and they report to you, enforce days off and down time. Your team needs to remember to take a day off occasionally, even if they are trapped at home. They should disconnect and focus on something else.

EXPECT THE UNEXPECTED

Speaking of meetings, expect interruptions. It will happen and it is okay (briefly). Kids and pets do not understand what work means. Don't worry about it. Let it go. Also, noises will happen. Many live near busy streets, sirens, trash trucks, street sweepers and more, are just outside the window. Learn to love the mute button so others don't have to listen to your noises. During online meetings, I have heard Sesame Street on TV's, other phones ringing (yes – also mine), and other people answering other phones during meetings (no, not me). I have heard people singing with their kids during meetings. Remind others of the mute button too. And don't forget to unmute when you need to talk.

Speaking of mute, expect tech problems. Not everyone is tech savvy on every new remote tool that will be pushed to the front of the line. Not everyone will learn at the same speed. Not every tool works as good as the vendor says it will. Expect things to go wrong. But try hard to keep things moving forward.

Expect to be misunderstood or misunderstand others. With all of us scattered and communicating in new and stressful ways, expect to not get the message across the first time. Repeat yourself (advice I have given before). Have others tell you what you just said. Summarize all meetings and action items. Just keep saying the same thing again and again. Others might get it after your many efforts.

SET YOUR SCHEDULE

One of the hardest things to do for those who are new to working from home is to settle into a schedule. When you first start working remotely, the day may never end. Other people try to contact you off hours, the emails never stop, the issues continue to roll in. When you work in an office the clock tells you when to stop and go home. When you are at home, it gets crazy.

Force yourself into a schedule. Start work at a specific time and be on time. Don't let it change every day. Start times usually nudge

**IT IS SO EASY TO
OVERWORK WHEN YOU
WORK REMOTELY. THE
DAY NEVER SEEMS
TO END. YOU MUST
RESPECT DOWN TIME
AND NON-WORK HOURS.**

earlier and earlier and end times run later and later. Take breaks during the day and take a lunch hour (or half hour) just like in the office. Stop working at the end of the day. If it is 5pm or 6pm, pick a time and stop working. Leave your office area, silence your cell phone, stop reading texts and emails and be "at home", with the family.

Get outside. Don't become an inside hermit. You need fresh air and sunlight. Go for a walk. Make the weekend different from the work week. Cook more, cook healthier. If your area is restricting outside activities, then get creative. Work in the back yard or patio. Start a garden, plant some flowers in a pot. Work on that broken fence. Build something in your garage.

We will get through this. Many areas are starting to pull out of it. Many people are getting out more. If there is a resurgence in the Fall, then keep in mind what you learned from this round of remote work. Working from home can be productive and manageable. Try hard not to let it get out of control.



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.

Welcome to *AUGIWorld* Inside Track! Check out the latest opportunities to advance your skills, processes, and workflows in your firm with the most current AEC-related software and hardware updates available.

Auto Dimension Columns and Grids



<https://apps.autodesk.com/RVT/en/Detail/Index?id=2821213095514357911&appLang=en&os=Win64>

Autodesk Revit: 2021 , 2020 , 2019 , 2018

The “Auto Dimension Column and grid Tool” is an Autodesk® Revit® Add-On that aims to the automatic dimension between grid and column with offsets from column and dimension type which the user can specify.

Instead of wasting time in dimensioning each face of the column with the nearest grid or axis you can easily select all columns and grids needed. With only one click all dimensions from the face of each column to the nearest grid are placed.

Fast Architecture Trial



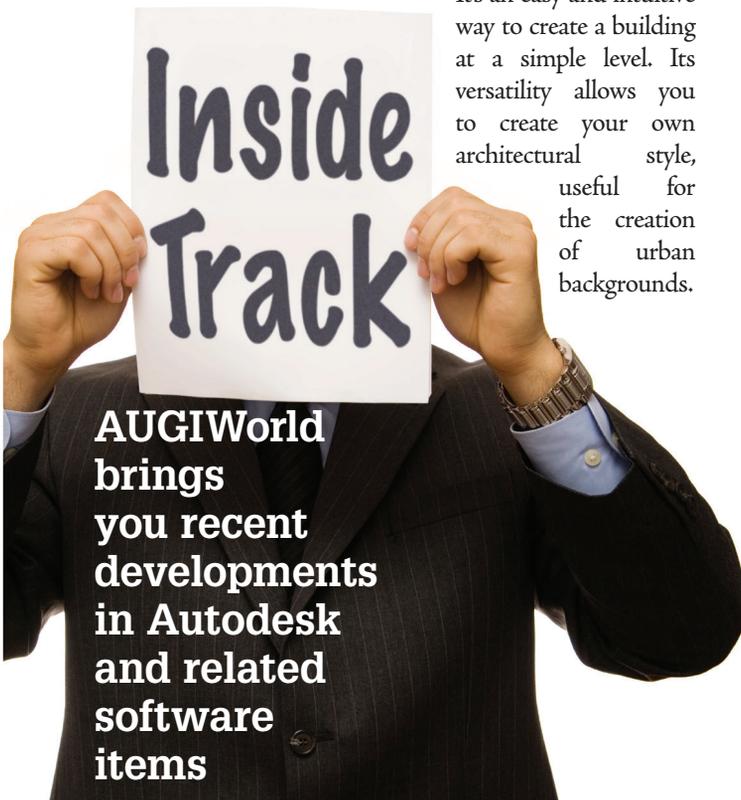
<https://apps.autodesk.com/INVNTOR/en/Detail/Index?id=5454556850521421748&appLang=en&os=Win64>

Autodesk Inventor: 2020, 2019, 2018

Autodesk Inventor Professional: 2020, 2019, 2018

Fast Architecture is a custom procedural mesh object that generates an architectural structure. You can change parameters and watch the results in real time.

It’s an easy and intuitive way to create a building at a simple level. Its versatility allows you to create your own architectural style, useful for the creation of urban backgrounds.



This plugin creates an FA_Building object which works as any Autodesk® 3ds Max® Object: any deformer can be applied, animatable parameters, can be converted to mesh etc.

Customizable features:

- * Windows
- * Frames
- * Balconies
- * Columns
- * Roof
- * Curved facade

Other features:

- * Every part of the building has its own material ID making the texturing easier.
- * Manage 6 different material IDs for the windows.
- * Tiles, windows and balconies fill include their own UV mapping.
- * The principal parts of the building have an optimize option to decrease the mesh weight.
- * Save/load parameters in an external file.
- * Multiply all distance values at once, easy way to adapt the object to your scene units.

Bonus:

- * Includes Oblong & Oblong Void primitives. After purchasing Fast Architecture you will receive an E-mail with the confirmation to download this plugin for free. This may take a few days.
- * You can also download some models made with Fast Architecture for free. Watch the web site for more information.

NavisGame



<https://apps.autodesk.com/NAVIS/en/Detail/Index?id=1185199928064756627&appLang=en&os=Win64>

Navisworks Manage: 2020 , 2019 , 2018 , 2017

Navisworks Simulate: 2020 , 2019 , 2018 , 2017

Play it. Navigate in Autodesk® Navisworks® with a PC Joystick. It’s easy, fast and accurate! Navigate through your BIM model as never before, using a joystick to have all the control in your hands. It’s as easy as gaming. Move forward, backward, sideways, up and down, to get every corner of your model in the speed of your mind.

Also you have three special visualization modes:

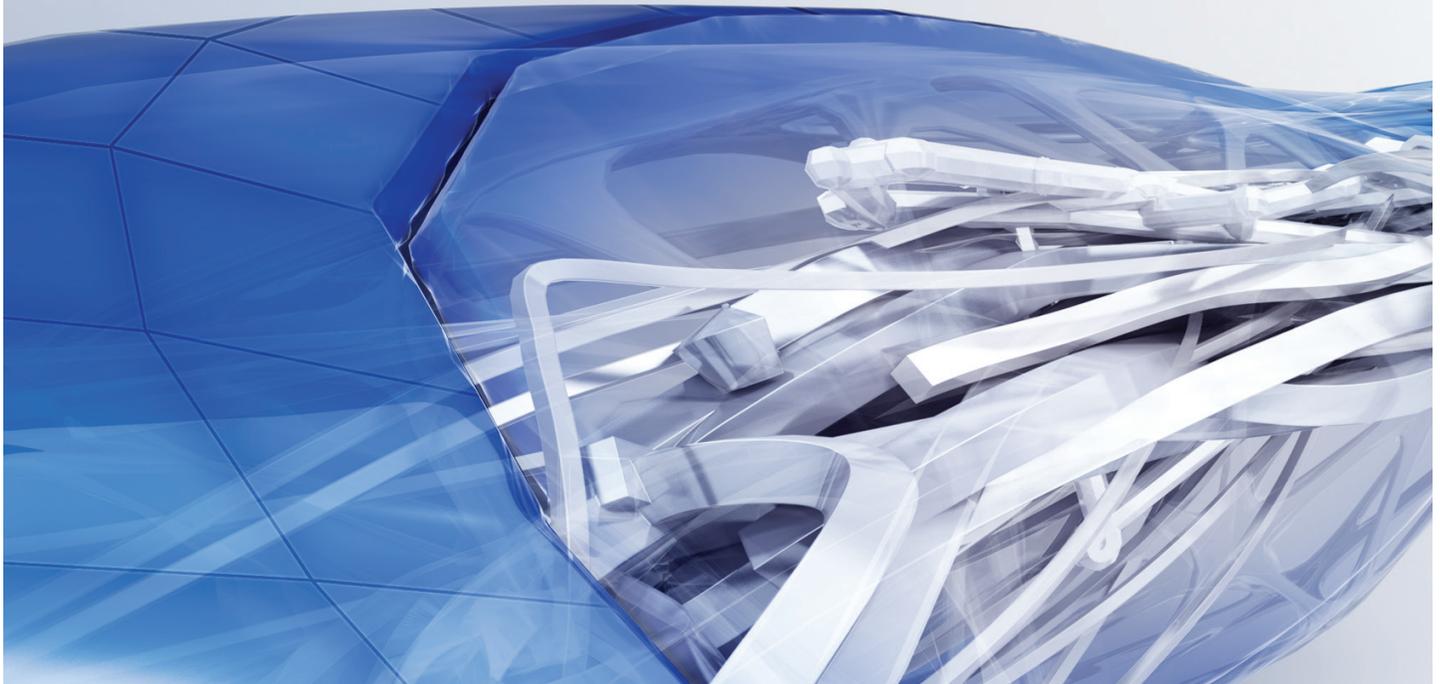
- * X-RAY to turn all the structure and architecture of your model transparent, allowing you to see all the MEP elements inside.
- * WHITE MODEL (CLAY MODEL) to turn all the structure and architecture of your model white.
- * BLACK MODEL (EBONY MODEL) to turn all the structure and architecture of your model black.
- * Save current Viewpoints adding information of the discipline and issue description for your ICE Session (Integrated Concurrent Engineering).

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. brian.andresen@augi.com



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What's New for MEP



It's that time of year again. Even with all the uncertainty brought on by COVID-19 the annual release of Autodesk software continued as planned. For those of us in industries using Autodesk software it offers some sense of normalcy when so much of regular life is, or was, disrupted. Did that Revit idea you've been voting for make the cut? Is there a new feature that was added that you didn't even know you wanted?

Before looking at what's new in 2021, I want to go back in time. A formal review of 2020 (at least for MEP) didn't happen last year for *AUGIWorld*. However, Revit 2020 contained an enhancement/improvement that, in my opinion, was a long time coming (too long). It was a change to the level Offset/Elevation

parameter. This was a 'platform' enhancement that has big implications for MEP workflows and documentation.

- **Level height parameters renamed (2020):** To improve usability, several parameters for specifying offset and elevation were renamed and relocated on the Properties palette:
 - For pipe, duct, cable tray, conduit, and fabrication parts:
 - Offset is now Middle Elevation
 - Start Offset is now Start Middle Elevation
 - End Offset is now End Middle Elevation
 - For family instance:
 - Offset is now Offset from Host
 - Elevation is now Elevation from Level
 - **Elevation parameter (2020):** To improve ease of use in annotation and documentation, Elevation is now a built-in parameter for use in tags, schedules, and view filters for the following family categories:
 - Mechanical Equipment
 - Plumbing Fixture
 - Lighting Fixture
 - Lighting Device
 - Sprinklers
 - Electrical Fixtures
 - Electrical Equipment
 - Data Device
 - Communication Device
 - Fire Alarm Device
 - Nurse Call Device
 - Security Device
 - Telephone Device
 - Specialty Equipment
 - Air Terminal
 - Generic models
 - Furniture
 - Plant
 - Casework
- The Elevation parameter was renamed to Elevation from Level, and the Offset Value parameter was renamed to Offset from Host. In addition, the Schedule Level parameter was relocated next to the Elevation from Level parameter in the Properties palette. See About Elevation from Level.

Figure 1

In previous versions, the Offset parameter controlled the height from level for non-hosted elements. The Elevation parameter controlled the height from level for face-based elements. Face-based elements placed vertically, also had an Offset parameter that controlled the offset from the host. This was confusing in general, but especially so for new users.

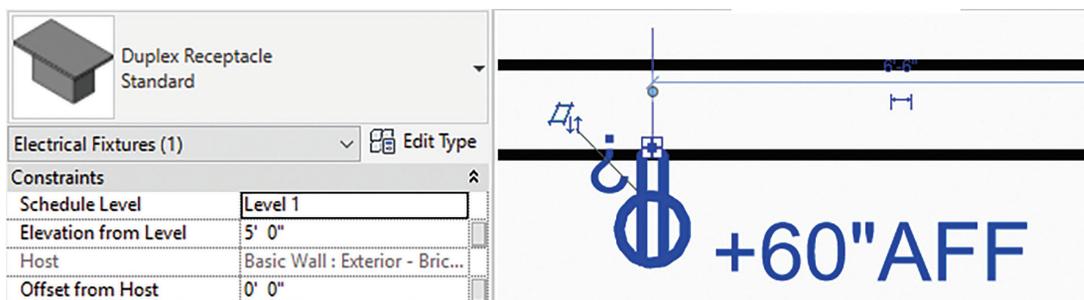


Figure 2

These parameters were renamed and redesigned. Elevation changed to Elevation from Level and Offset changed to Offset from Host. For face-based elements, the parameters are now more self-explanatory. Elevation from Level controls the 'mounting height' and Offset from Host indicates moved off the host, usually a vertical wall. For non-hosted elements (and non-work plane-based), these two parameters now do the same thing. This simplifies and streamlines the user experience across face-based or non-hosted elements. With this change came the ability to add a default elevation that was previously only available to face-based families.

It also finally made the parameter that is driving the placement of MEP devices available for view filters and documentation like tags and schedules. Displaying the mounting height of several MEP elements (AFF), either on plan or in a schedule, is a common practice for conveying design intent in documentation. Making that information accessible for these uses is a better BIM workflow. Gone are the days of arduous workarounds to access and display the elevation information of these model elements. See Figure 2.

electrical for this release, beginning with circuit naming schemes. The settings for this can be found in electrical settings. It allows for greater flexibility in circuit numbering depending on project or regional standards. There is also a load classification abbreviation parameter which can now be added to the circuit naming or numbering as loads are added. Shared parameters are also accepted. This provides a lot of flexibility that previously wasn't possible. See Figure 3.

Another area of electrical that got some attention, was improvements to distribution systems logic. For switchboards, you can now select which phase a 1 and 2 pole circuit will connect to on a switchboard. The Max #1 Pole Breakers parameter was replaced

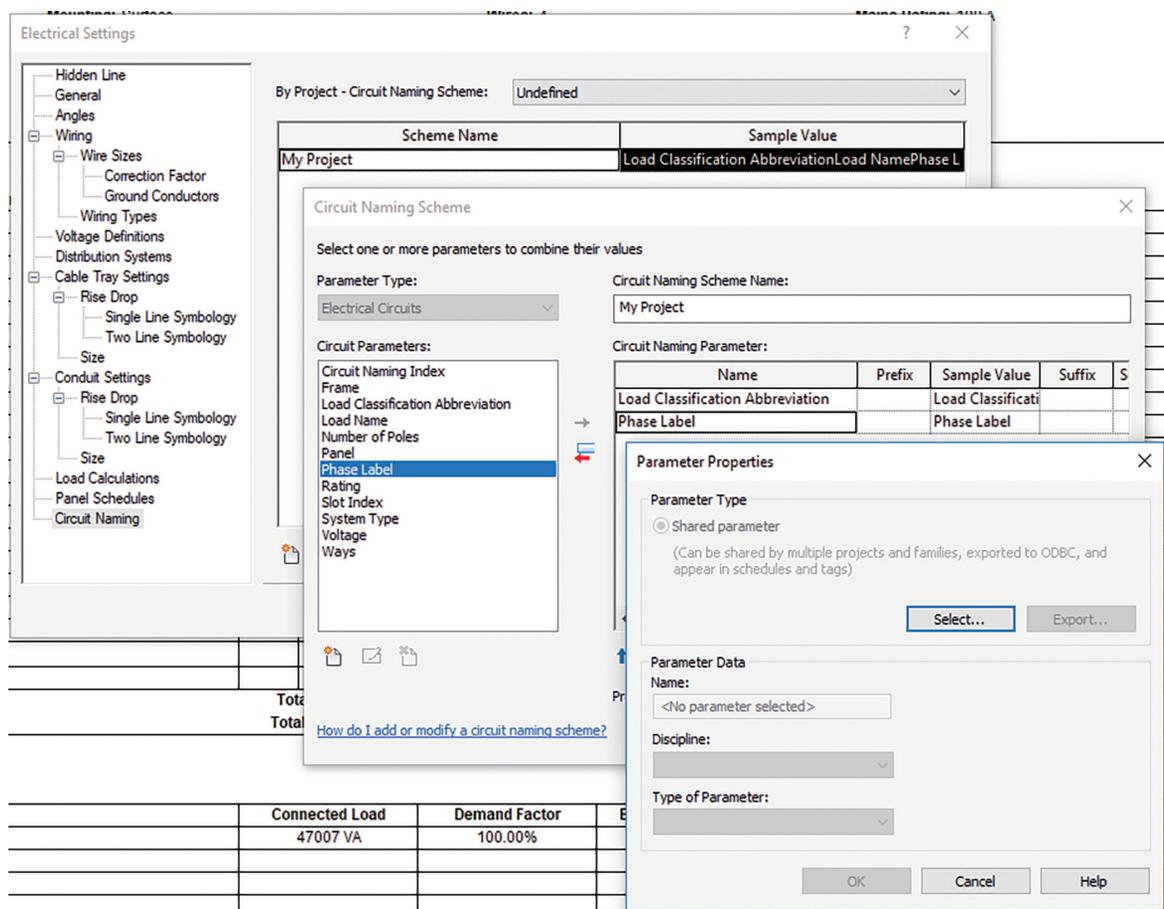


Figure 3

Enough about the past, let's talk about the present! What's new in Revit 2021?! For starters, there was a clear focus on

	Connected Load	Demand Factor	
	47007 VA	100.00%	

Revit 2021 – MEP

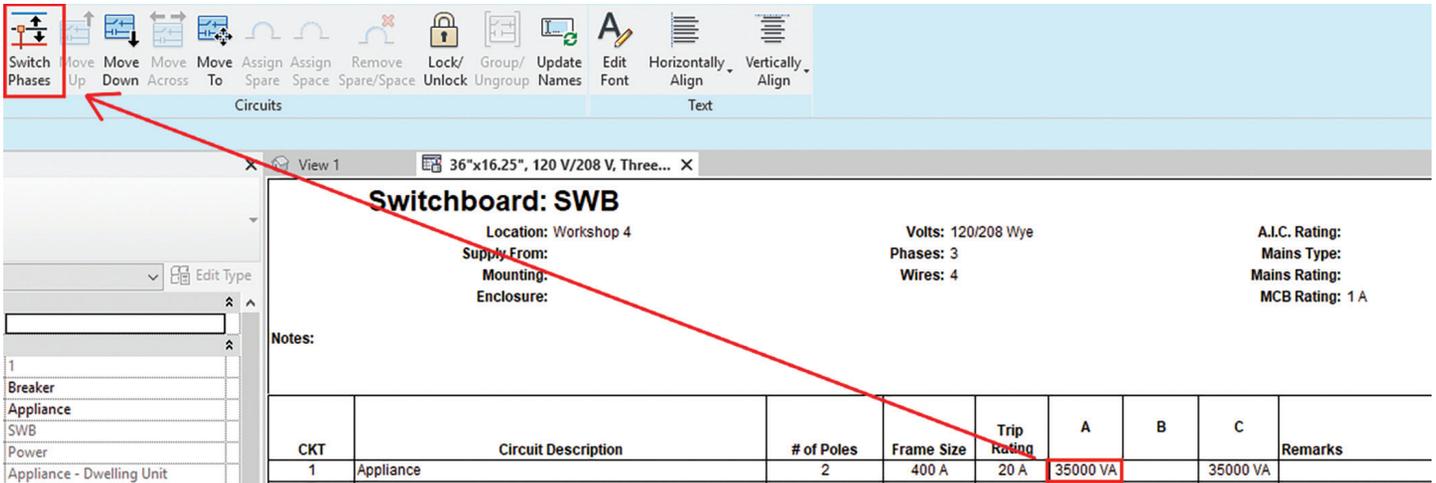


Figure 4

with Max Number of Circuits. This will allow the 'Variable based on max number of circuits' to be used when making the switchboard schedule, addressing the workarounds normally needed, like making different schedule templates for different fixed values, or creating circuits past what is visible in the schedule. Single phase (L-N) panelboards, normally used in non-US markets, are now properly supported in Revit. See Figure 4.

One last item in the electrical theme, is that panelboard schedules on sheets are now listed and visible in the project browser on their respective sheet. This seemingly pedestrian enhancement does make working with, and finding, panelboard schedules easier. It is also consistent with how views, legends, and schedules on sheets report in the project browser.

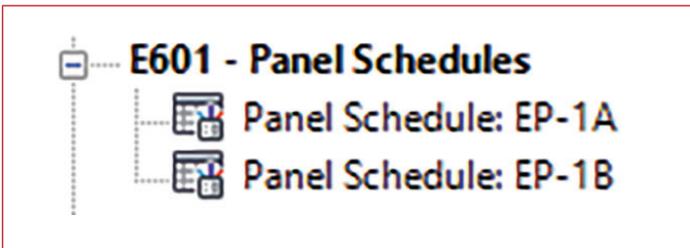
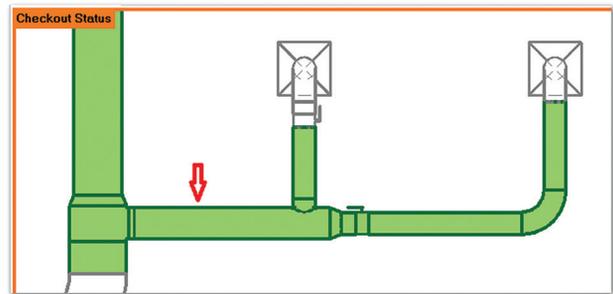


Figure 5

A broader and fairly significant change affecting MEP is how worksharing will now be handled for interconnected elements in systems. Previously, modifying an interconnected element, such as a fitting or accessory, would cause the other elements to update or move, requiring the interconnected elements to be checked out. This could cause circular references between users when opening a model. The implication is that now when making a change to interconnected elements, such as removing an in-line valve, the broken segment will no longer 'fix itself'. The user will have to join the segments.

At face value this is disappointing, but if it eliminates problems associated with worksharing it also makes sense. Worksharing is rather essential to most MEP projects. I am only speculating

at this point, but I wonder if BIM 360 and/or the switch to Autodesk accounts for licensing may have played a role in this. In a file or server-based worksharing environment, there were ways around this problem that, while disruptive, were probably less disruptive than models hosted in BIM 360. Models on BIM 360 cannot be opened detached and easily resaved as new centrals. And since BIM 360 also requires an Autodesk account, or perhaps your software access is tied to your Autodesk ID, the username in use by Revit cannot be changed to address worksharing permissions when opening models. Either way, for more information there is a full write up on the issue on the Autodesk Revit blog. (Images 6 and 7 taken from 2021 Help.)



In Revit 2021, only the directly modified element is checked out when you move a run of duct, pipe, conduit, cable tray, or connected equipment or fixtures.

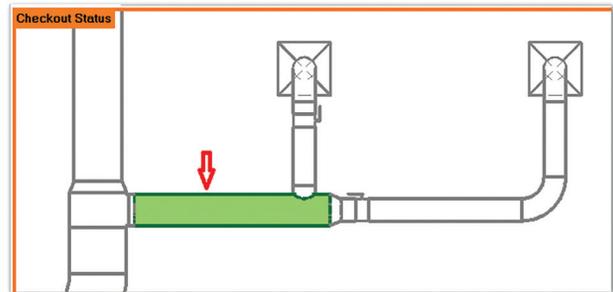


Figure 6

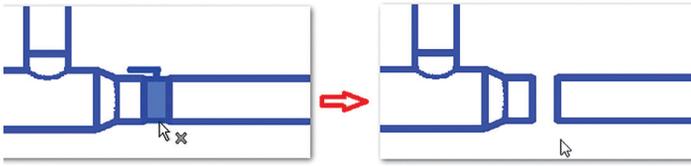


Figure 7

An enhancement to the entire Revit platform is, revamped PDF and image functionality. The ability to import PDFs was added in 2020 and images have been able to be imported for as long as I can remember. Now in 2021, PDFs and images can not only be imported they can also be linked. This is good news. See Figure 8.

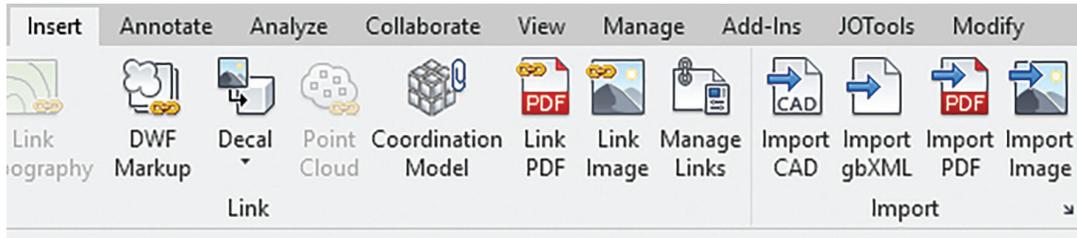


Figure 8

In 2020, imported PDFs were effectively converted to images and thus appeared in the Manage Images dialog. While technically still treated as images, part of the new functionality of 2021 is that PDFs 'remain' PDFs for management purposes. As such, the Manage Images dialog is no longer available. Management of PDFs and images has been moved to the Manage Links dialog. From here PDFs and images get their own tab. Each item indicates its reference type as well as the ability to change from link to import or place instances already in the project. See Figure 9.

A few other features that I look forward to using that are worthy of an honorable mention. First, is a new feature in Visibility Graphics that allows for enabling/disabling a view filter. Previously, filters had to be removed to be disabled. Potentially undoing lots of mouse clicks. This is a small but effective enhancement. See Figure 10.

Second, is the ability to display striped schedule rows on a sheet. Striped rows were a feature added in 2020 but only visible in the schedule view. It was more of a visual aid while

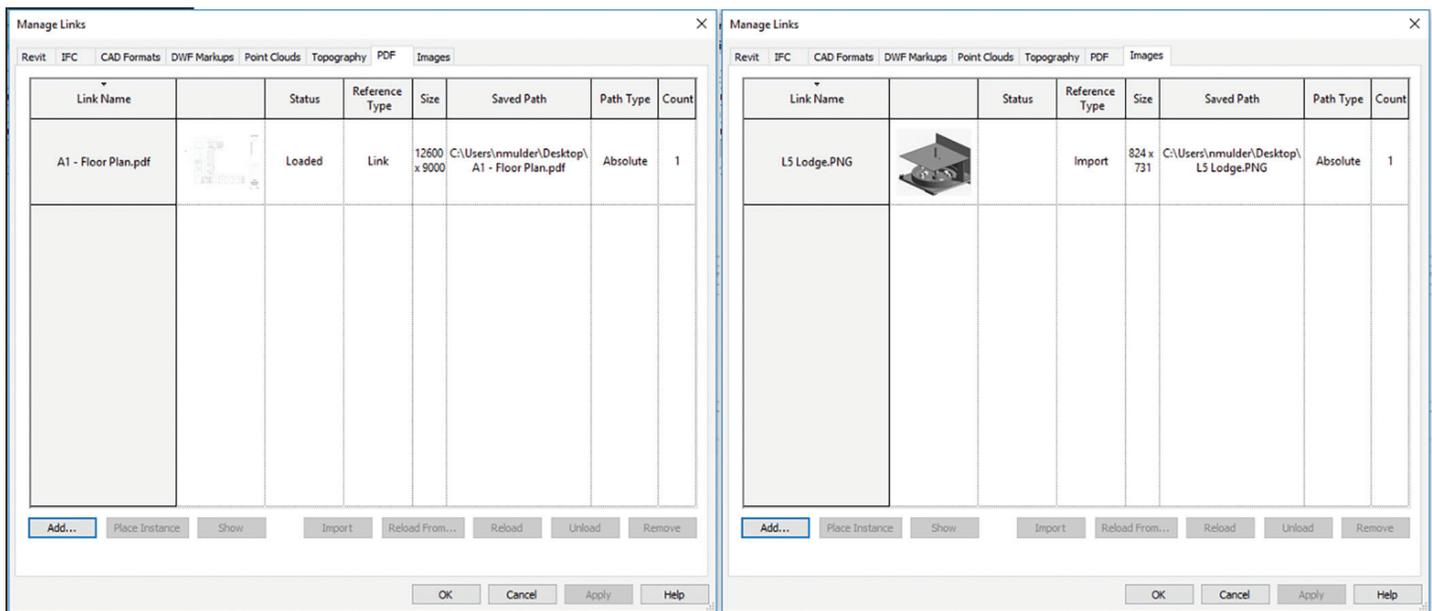


Figure 9

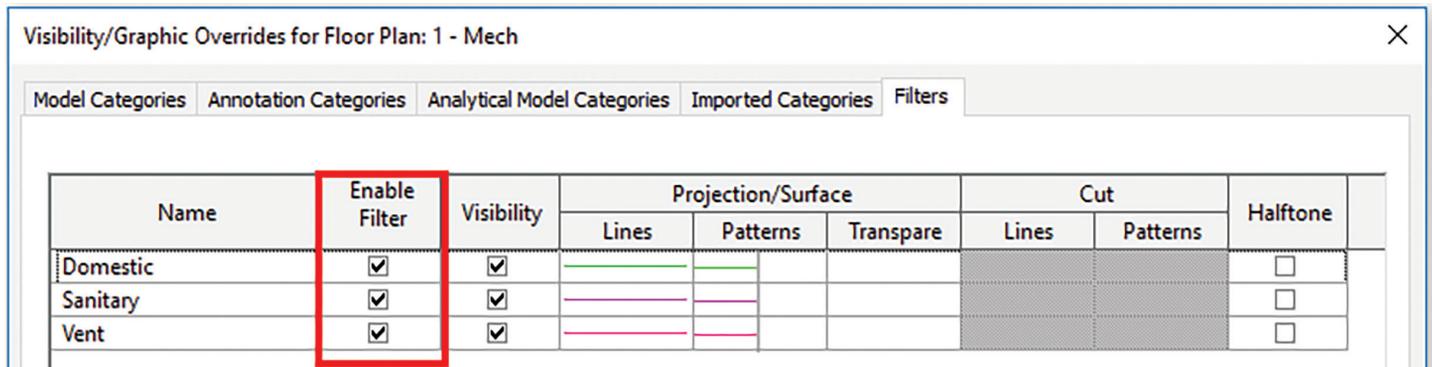


Figure 10

Revit 2021 – MEP

working. Now in 2021, striping can be added to schedules, they can be visible when on sheets, and the colors are user defined. Another small but welcome enhancement. To configure stripe rows, go to the Appearance tab of Schedule Properties. See Figure 11.

A third change worth mentioning, is tag rotation. To enable this functionality, edit the family and check the box for 'Rotate with component'. This change only affects certain tag categories, which are listed in Help. Previously, these tag categories could only be horizontal or vertical. Or, more tediously, specific types for each desired rotation needed to be created. I intend to explore this new feature for some scenarios where moving the generic

annotation, but not the family itself. This is traditionally handled by building movement controls into the family for the nested generic annotation. I think nested generic annotations will still be the best option for most MEP devices and situations. This new functionality won't replace that workflow, but it may be able to supplement it. See Figure 12.

This completes my rundown of what's new in Revit 2021. For obvious reasons, not all changes and improvements can be discussed here so I had to be selective for this article's purposes. Check it out for yourself to see what new features you like the most. All in all, I think 2021 delivers a pretty decent punch containing enhancements and new features that should appeal to a wide audience.

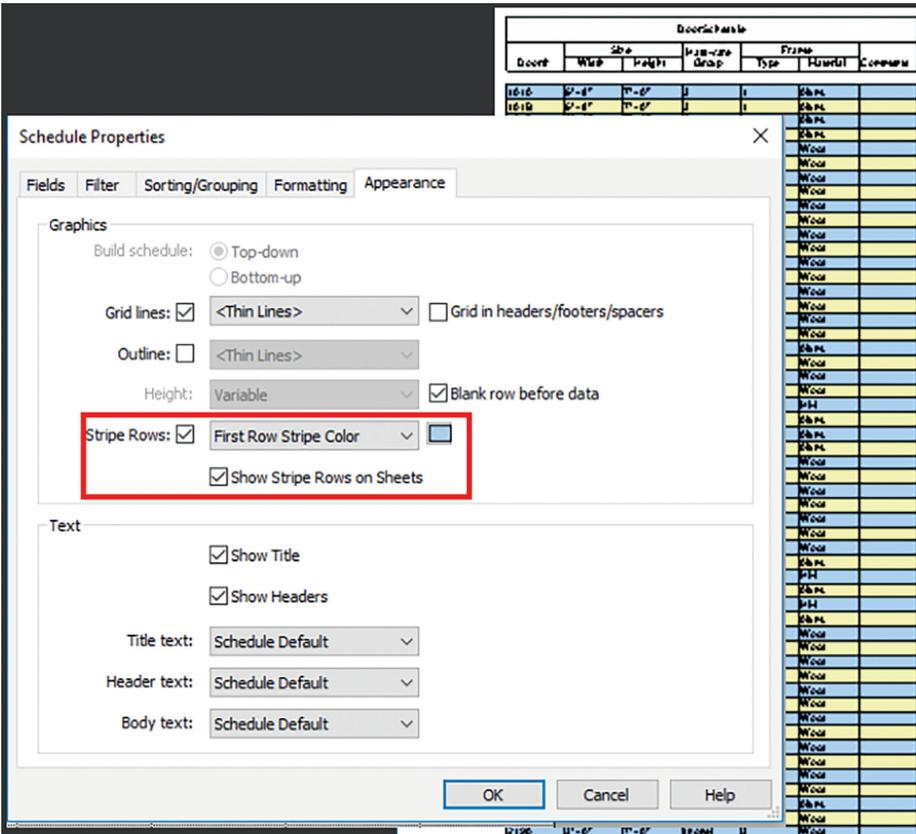


Figure 11

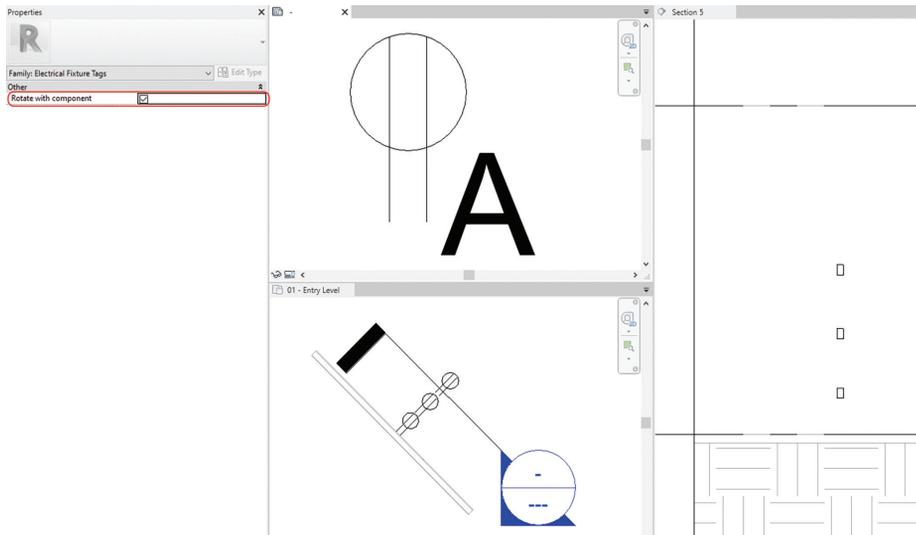
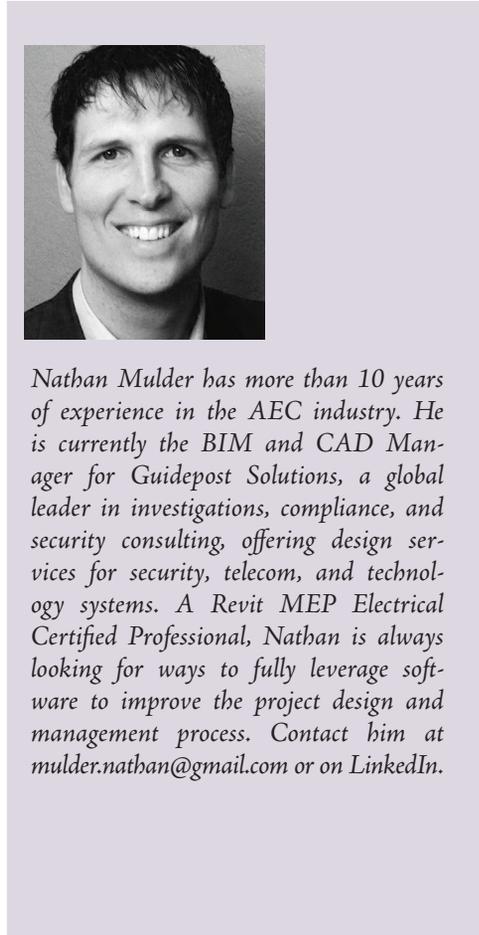


Figure 12



Nathan Mulder has more than 10 years of experience in the AEC industry. He is currently the BIM and CAD Manager for Guidepost Solutions, a global leader in investigations, compliance, and security consulting, offering design services for security, telecom, and technology systems. A Revit MEP Electrical Certified Professional, Nathan is always looking for ways to fully leverage software to improve the project design and management process. Contact him at mulder.nathan@gmail.com or on LinkedIn.

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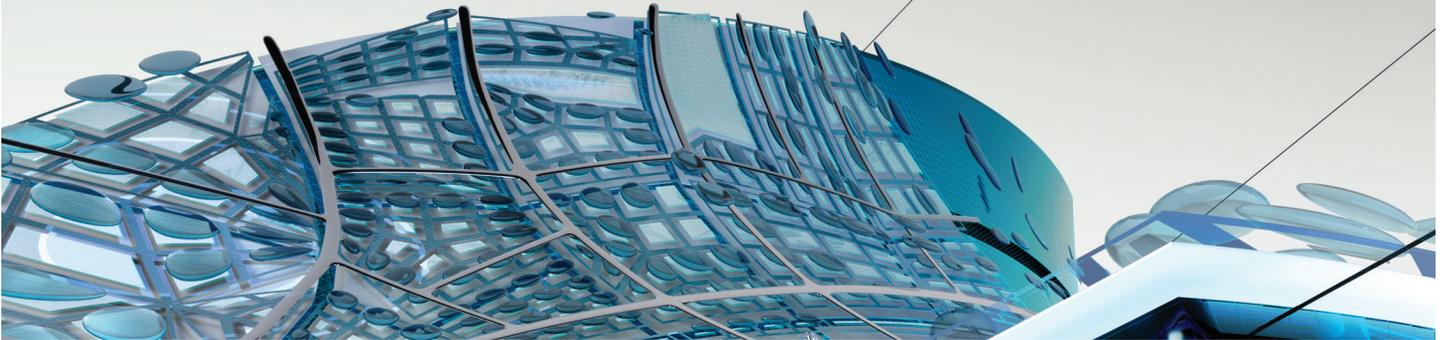
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What's New in InfraWorks



It is that time again....and it feels like Christmas. All the latest 2021 versions of Autodesk design software are now out. Time to download, install, and open our new subscription software and see what is new in InfraWorks 2021. Like the prior years, collaboration is a crucial part of the design workflow when working on any civil and architectural site project. One of Autodesk's main focuses on AEC Collection design software, such as InfraWorks, is to enhance the design and collaboration synergy between client, stakeholders, design teams, departments and offices. This keeps companies updated with project milestones, design statuses, and construction updates.

In this article, we will cover over some of the major improvements and enhancements to InfraWorks design and analysis tools for bridges, roads, visualization, and ESRI ArcGIS features.

BRIDGE

For the past few years Autodesk has made some great strides in improving upon the bridge preliminary design and analysis features to create more accurate bridge design that meets local and state ordinances. In this latest version release, Autodesk took it to the next level by improving the editing, analysis, and collaboration design tools to be more accurate and efficient.

There are typically 2-3 design teams that work on bridge design. One is the civil engineer designing the main design road, roadside grading, and utilities infrastructure. Second, is the structural engineer designing and analyzing the bridge structure based on the road type and size. The third, can be a site planner creating an overall 3D preliminary, conceptual modeling site by bringing it all together within InfraWorks.

With InfraWorks' 2021 new Civil Structures workflow, designers can seamlessly share parametric bridge components back and forth between different design software such as Civil 3D, InfraWorks and Revit. InfraWorks 2021 can now publish the bridge model to Revit as an IMX for more extensive design and analysis.

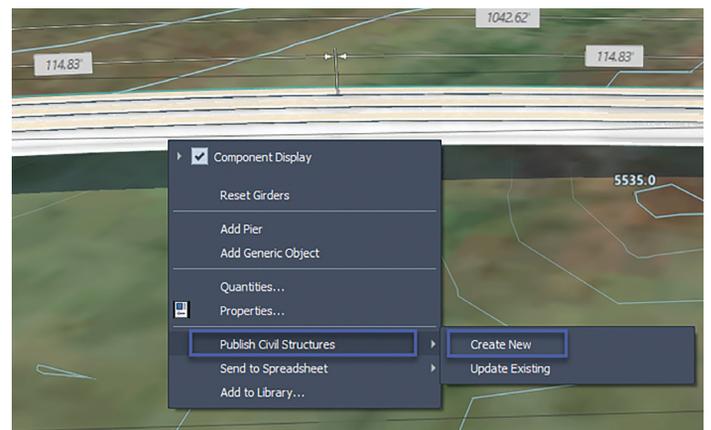


Figure 1

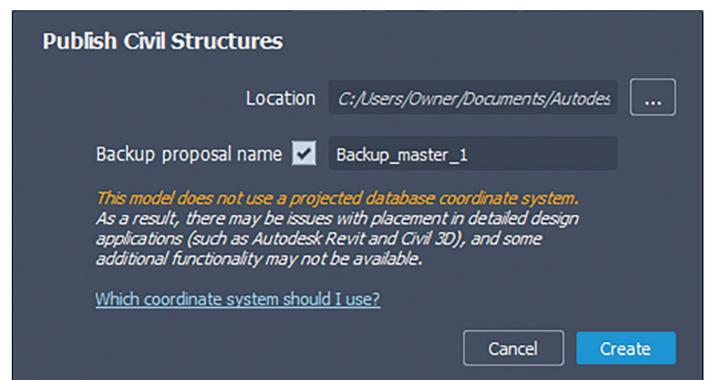


Figure 2

To export the bridge model, simply select the bridge girder, right-click, select Publish Civil Structures, and then select Create New option. One important note: if you do not have a coordinate system assigned to your InfraWorks model, you will get a notification to assign a coordinate system within the Model Properties (figure 1). Assign the new IMX with a file name and folder location so Revit and Civil 3D designers can access. Then click Create (figure 2).

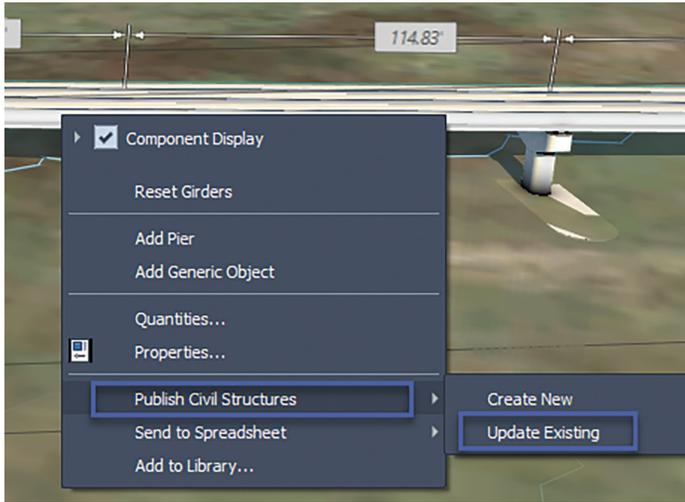


Figure 3



Figure 4

Identifier	Description	Units	D	E	F	G	H	I	J
1	name								
2	guid		Foundation 1	Foundation 2	Foundation 3	Foundation 4	Foundation 5	Foundation 6	Foundation 7
4	type		PierFoundation						
5	description								
6	creationDate								
7	terminationDate								
8	location								
9	tag								
10	locationData								
11	link								
12	Properties								
13	station	ft	278.237897	393.066796	507.896193	622.725787	737.554975	852.384171	967.213767
14	lateraOffSetFromPier	ft	0	0	0	0	0	0	0
15	lengthAboveGround	ft	0	0	0	0	0	0	0
16	longitudinalOffSetFromPier	ft	0	0	0	0	0	0	0
17	skew	deg	0	0	0	0	0	0	0
18	Dimensions								
19	ComputePilecapStaveBased: Size based on pile count								
20	LongPileSpacingToDiameter: Spacing ratio: Longitudinal		3	3	3	3	3	3	3
21	NumberOfPiles: Longitudinal	Count: Longitudinal row	3	3	3	3	3	3	3
22	NumberOfPiles: Transverse	Count: Transverse row	12	12	12	12	12	12	12
23	PileLength	Pile Length	49.21259843	49.21259843	49.21259843	49.21259843	49.21259843	49.21259843	49.21259843
24	PilecapDepth	Depth	4.921259843	4.921259843	4.921259843	4.921259843	4.921259843	4.921259843	4.921259843
25	PilecapLength	Length	16.40419948	16.40419948	16.40419948	16.40419948	16.40419948	16.40419948	16.40419948
26	PilecapLongDirEdgeOverhang: Longitudinal		2	2	2	2	2	2	2
27	PilecapTransDirEdgeOverhang: Transverse		2	2	2	2	2	2	2
28	PilecapWidth	Width	72.17847799	72.17847799	72.17847799	72.17847799	72.17847799	72.17847799	72.17847799
29	PilecapDiameter	Diameter	1.640419948	1.640419948	1.640419948	1.640419948	1.640419948	1.640419948	1.640419948
30	TransPileSpacingToDiameter: Spacing ratio: Transverse		3	3	3	3	3	3	3

Figure 5

Next, the structural engineer can access the bridge IMX within Revit to accurately make design changes to the bridge model or component. After making final changes in Revit, the site planner or civil engineer can update his InfraWorks model with the same IMX that was created and changed in Revit by simply selecting the bridge girder, right-clicking, select Publish Civil Structure, and selecting the Update Existing option (figure 3).

Another added feature to the Bridge tools, is the ability to have the bridge deck slope match the super elevation of an imported road corridor from Civil 3D. On top of the features listed above, designers also can modify bridge attributes through an Excel spreadsheet which helps streamline the design workflow. If you select, and right-click on the bridge girder, you will see an option to Send to Spreadsheet and Create New. This will create a structural bridge calculation spreadsheet which you can then edit manually (figures 4 & 5).

After saving the Excel sheet, you can update the bridge model by selecting the bridge girder, then selecting Send to Spreadsheet and Update Existing options. This will automatically update the bridge model (figure 6).

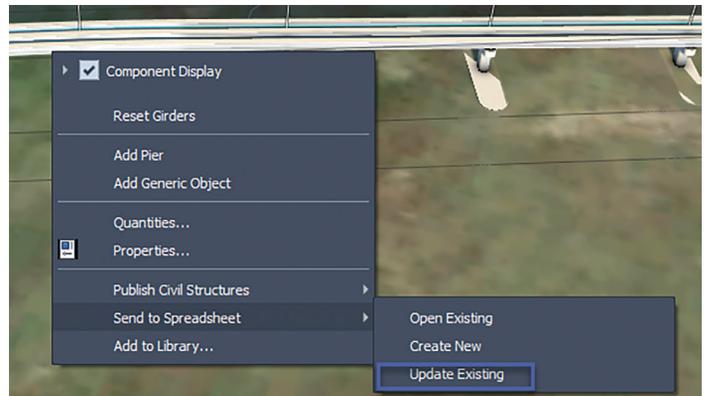


Figure 6

VISUALIZATION

For the past several years many designers have struggled with 4K monitor resolution issues while working in InfraWorks. If you tried to use a 4K monitor with InfraWorks, the interface gets

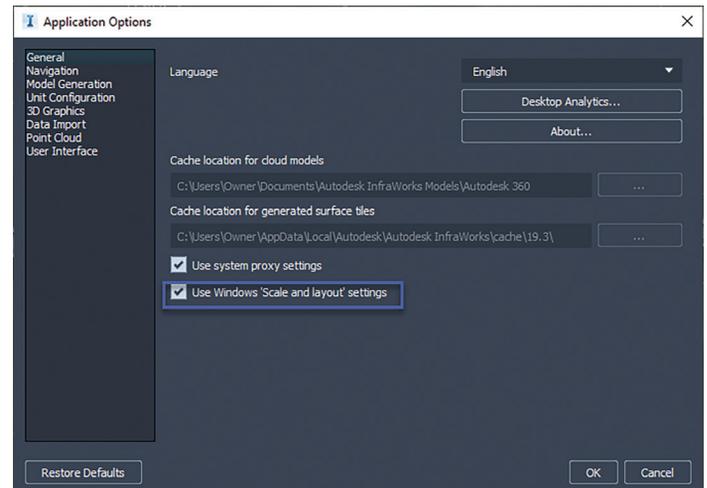


Figure 7

InfraWorks – 2021

shrunk down to small icons making it difficult to work in. With InfraWorks 2021, most 4K issues have been resolved by providing a high DPI scaling optimization support for 4K viewing for InfraWorks models. To turn on this feature, access the Application Options dialog box, then click the General section. At the bottom you now have a new option for Use Windows ‘Scale and layout’ settings (figure 7).

If you do plan to use a 4K monitor, there are a few important things you must understand. The high DPI scaling ONLY works for scale factors of 100%, 200%, and 300% on your monitor resolution. Any scale factor in between such as 150% resolution will be rounded to 200% as posted by Autodesk Knowledge Network.

In addition, another known resolution issue as posted on the Autodesk Knowledge Network, “the 3D portion of the InfraWorks user interface does not yet use high resolution DPI scaling. Instead, standard resolution is up-scaled to fit regardless of the monitor setting, which brings aliasing artifacts and can cause some pixilation.”

ArcGIS

Since the integration of the ESRI ArcGIS, Autodesk has continued making great improvements in streamlining the importing, exporting, and publishing data feature tools in InfraWorks. Now, with InfraWorks 2021, designers can publish out the desired geometry and layer content to an ArcGIS cloud environment while also assigning new attribute names. In addition, this new feature also works when exporting InfraWorks data to an ESRI File Geodatabase format (FGDB). This workflow provides designers more security to sensitive information while publishing (figure 8).

Autodesk InfraWorks - Bailey Ranch Subd.

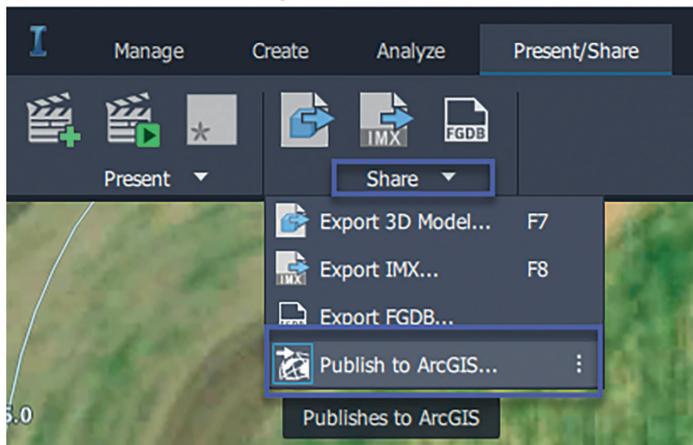


Figure 8

ROAD DESIGN

Another key improvement to InfraWorks 2021, is the ability to access Autodesk Civil 3D geometry accuracy and power for road corridor models when importing into InfraWorks. So, what does this mean since the ability to import a road corridor into InfraWorks already exists? When importing the corridor model through the Data Center, InfraWorks now provides capabilities to configure certain elements of the corridor and convert the corridor

into a component road automatically while maintaining certain corridor features. In addition, you can easily update a revised Autodesk Civil 3D corridor which helps streamline the process between both design softwares.

In the Data Source panel, Import option, select Autodesk Civil 3D Dwg. Then browse to your drawing that contains your corridor. The Choose Data Sources dialog box will appear (figure 9).

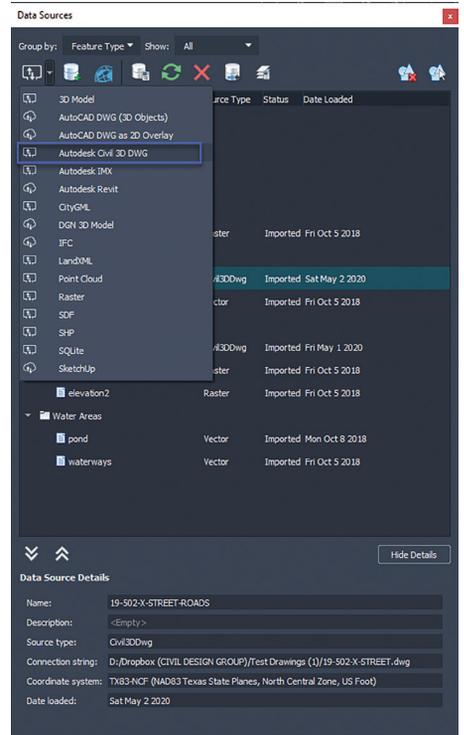


Figure 9

From the list you can select which surface or corridors you would like to import.

Once imported, the corridor will appear under the Roads section of the Data Sources panel. Double-click on your corridor to configure the data. In the Data Sources Configuration dialog click the Civil 3D DWG tab. Here, you can see the alignments, corridor and road types that was imported into the model (figure 10).

Under the Road Options column you have an option to import the corridor section as a Corridor Component Road or Component Road. The Corridor Component Road option provides access to the Civil 3D full corridor geometry while importing the corridor surface and alignments into InfraWorks. The Component Road option only imports in the alignments from the Civil 3D corridor model.

To configure, or re-assign different render materials for each element of the component road, such as lane pavement, curbing and sidewalk, you will need to click the Component Mapping Settings.

To assign a new material, simply double-click on the material type for the that line to assign the Select Material Style/Color. If you make changes to the road corridor in Autodesk Civil 3D, then updating the InfraWorks component road model is performed simply by accessing the Data Sources panel, right-clicking on the road, and selecting the Reimport options (figures 11 & 12).

Other additional road improvements include the US Survey Feet option in the Application Options>Unit Configuration>

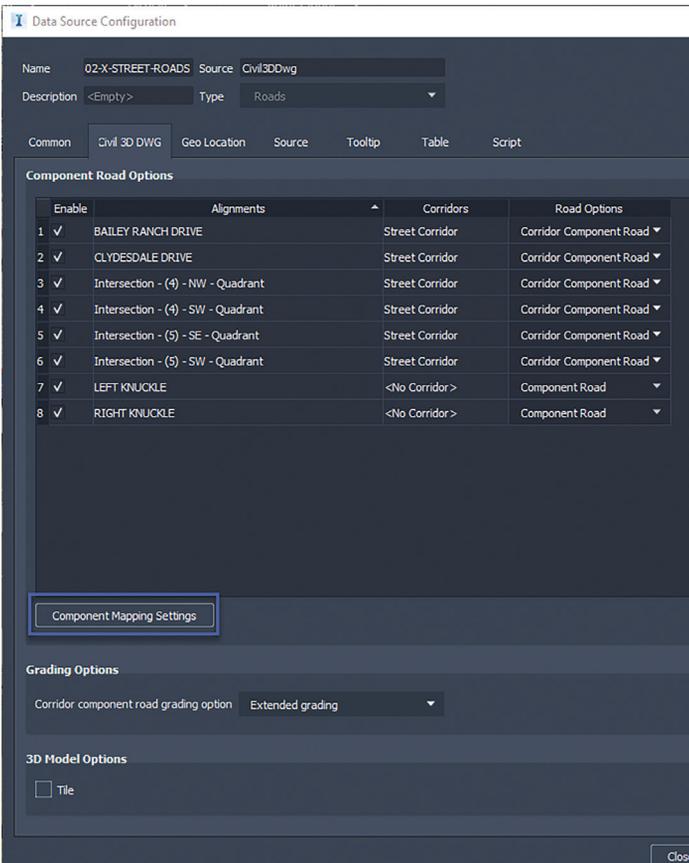


Figure 10

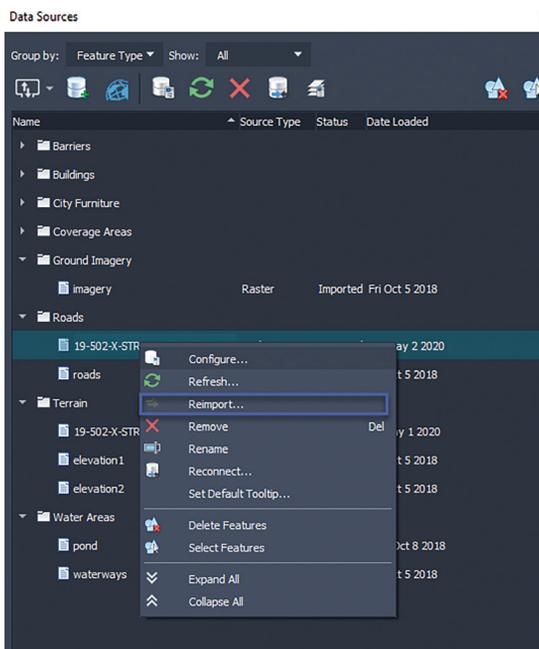


Figure 11

Transportation tab, under Type pull down menu. This addition helps resolve the minor discrepancy between the label and the actual road data (figure 13).

In conclusion, InfraWorks 2021 has greatly improved the collaboration for road corridors and bridges between other design software such as Civil 3D and Revit to create a more accurate and efficient design workflow.

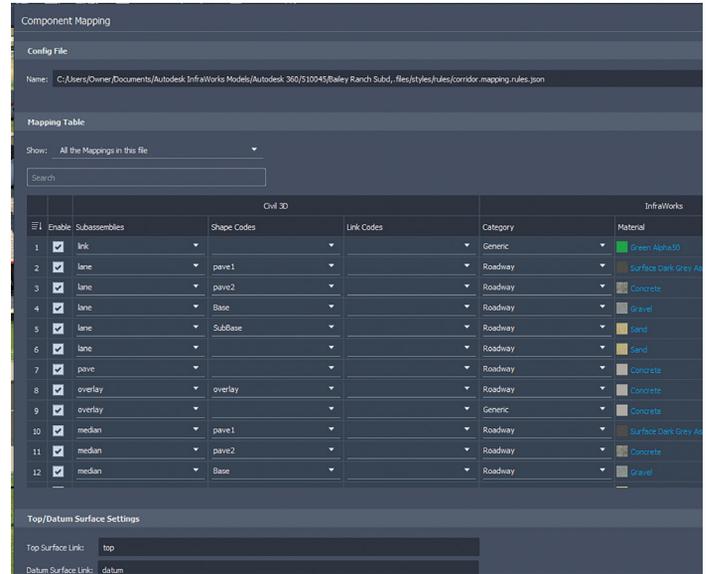


Figure 12

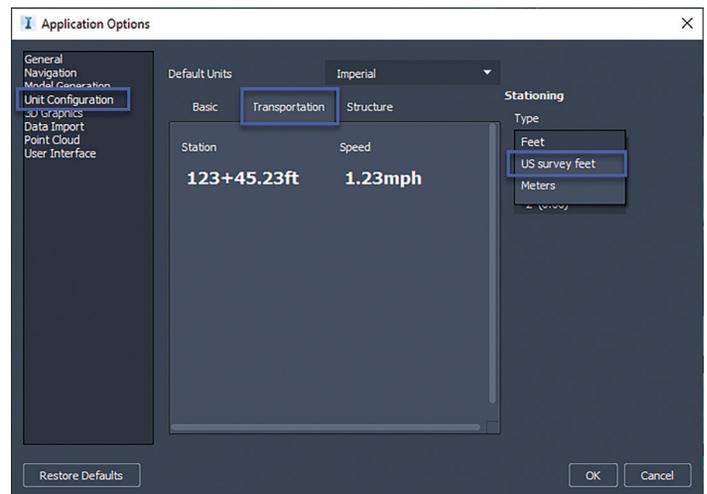


Figure 13



Tony Carcamo is President of Civil CAD Learning Solutions, and COO and part owner of Modern Engineering Solutions in Dallas, Texas. He has 23 years of experience in the civil engineering field performing different task from surveying, platting to full site, utility and drainage design, project management and business development. In addition, he has 12 years of CAD Management experience with several engineering firm. Tony is also a blogger, on most Autodesk committees and council group, president of the DFW BIM Infrastructure User Group, and certified professional in AutoCAD Civil 3D and InfraWorks 360, Autodesk Expert Elite member and member of the Autodesk Service Market Place.

What's New in Civil 3D 2021



YES!! Another release of Civil 3D, just as you probably finished installing the latest 2020 “fix”. That was somewhat sarcastic, but I do see some much needed improvements to Autodesk Civil 3D 2021 and all other 2021 products. Anymore, we can’t just look at what’s new in our hero product, but all other complimentary products as well, so I will briefly mention a few of those.

VERSION INTEROPERABILITY

Typically, the first question asked is about prior version interoperability. The AutoCAD format for 2021 is also the 2018 format they previously introduced. Meaning you should have no problem going back and forth between 2018, 2019 and 2020. The only exceptions to Civil 3D objects would be the newer Civil 3D object/features will not go backwards, but this shouldn’t be a problem.

NEW AND ENHANCED PRESSURE NETWORK

One of the bigger changes in Civil 3D 2021 is the introduction of path-based pressure networks, and multiple enhancements to the overall Pressure Network workflows. For those that do a lot of subdivision work, or complex pressure systems, you will really like these changes!

- ♦ **Pipe Runs** – This is a fantastic change to how pressure networks are created and modified. I wish they would do this for gravity networks now. Your pressure network can still remain as one entire network, but you can have separate “runs” within the network. This is great for subdivision development and will make your network much easier to manage.
- ♦ **Paths** – Fittings can be added and updated automatically when grip edited or moved. For example, if you have a 45-degree bend, and you grip edit a portion of a pipe, that bend can now change to the proper angled bend! Very cool addition.

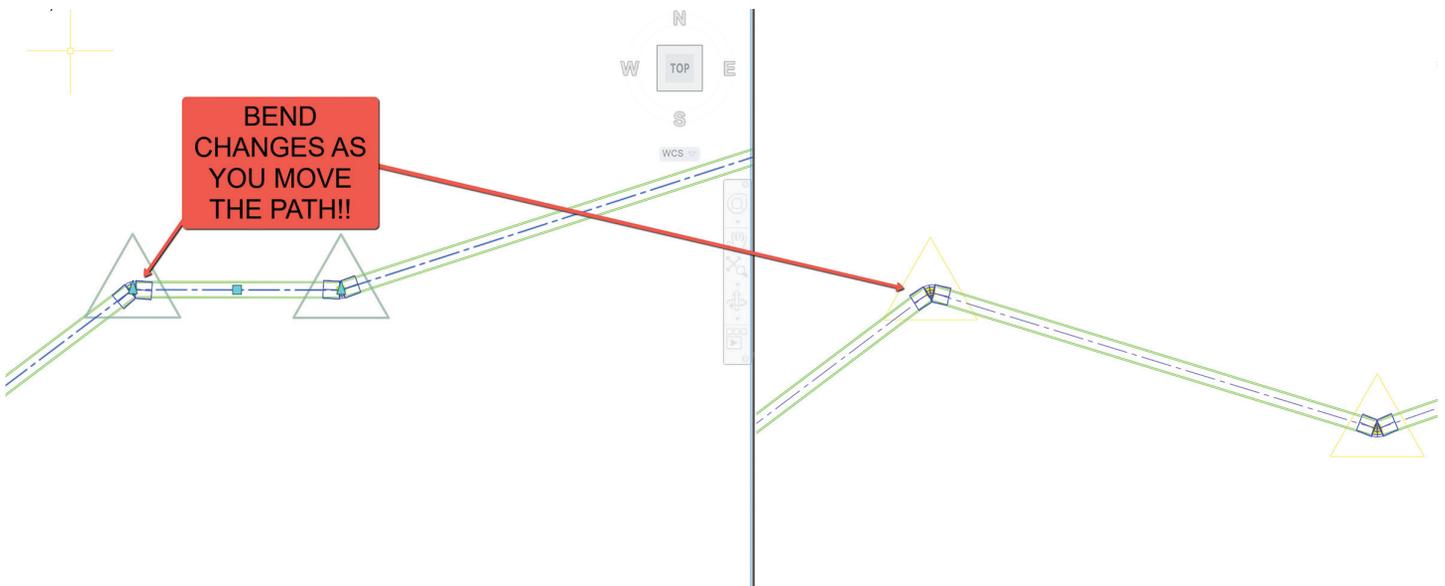


Figure 1

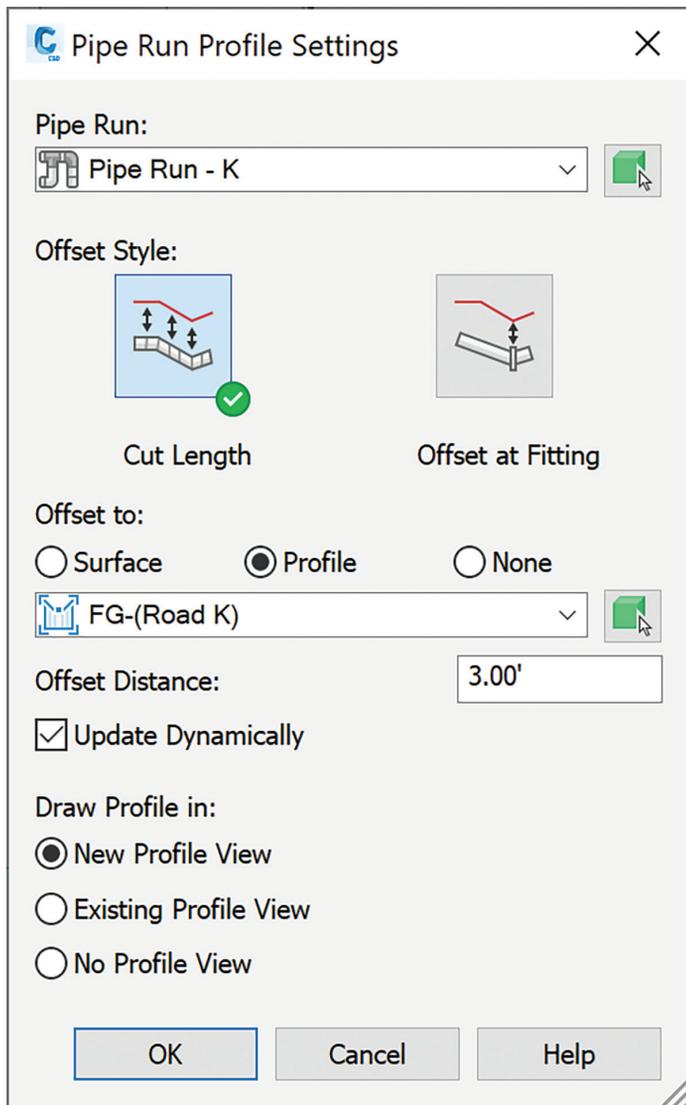


Figure 2

- **Pipe Run Profile Settings** – If/when you base your network on a cover depth, the pressure network can now remain dynamic to a profile!
- **Profile** – Better functionality for pressure networks have been introduced, such as adding vertical deflections just as you would a PVI in a profile.

AUTOCAD PLATFORM ITEMS

Here are few new things to look forward to in all AutoCAD platform products:

- **XREF Compare**
Similar to the drawing compare feature, you can now compare the changes made to a drawing file attached as an external reference (xref) in the current drawing. Any changes to the referenced drawing or a compared drawing are highlighted using revision clouds. (You can also uncheck this option prior to reloading your XREF, or change the variable to disable it)

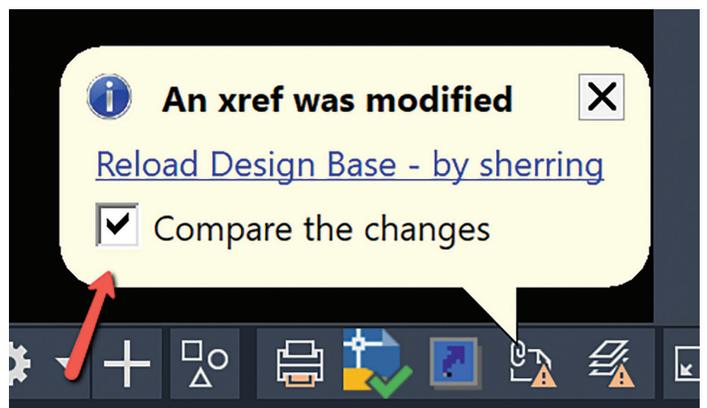


Figure 3

Civil 3D 2021

✦ **Drawing History Support – (Subscription Benefit)**
 If you save drawing files to a OneDrive, Dropbox, or Box account, additional versions of these drawing files are created as you work, creating a version history. The previous versions will be listed in the new Drawing History palette so you can compare them with the current version of your drawing.

✦ **Trim and Extend**
 I must admit, I can't stand this change!! Instead of having you select objects or boundaries for the TRIM or EXTEND command, the new "quick" mode selects all potential options by default.

To revert back to the standard way or using the Trim/Extend command, type in one of the commands and from the command line choose MODE, then switch to Standard.

✦ **Misc Commands**
BREAKPOINT – Allows you to break an object at a specified point

XCOMPARE – Compares an attached XREF with the latest state of the referenced drawing file, highlighting the differences with color within revision clouds.

REVLOUD – Some nice enhancements to the REVLOUD command which allows you to control chord length or modify a cloud.

XCOMPAREENABLE - Enables the comparison between an xref and the referenced drawing file.

TOUCHSCREEN ENHANCEMENTS - I'm not sure if this has been around a while, or I finally got a laptop cool enough to have touch screen capabilities, but there are a couple enhancements to the Pan, Zoom and selection.

INFRAWORKS INTEGRATION

✦ **Add Bridges to Corridor**
 The workflow between InfraWorks and Civil 3D has been enhanced to add bridges into your corridor design. If these bridges are modified in InfraWorks, you can simply reload them in Civil 3D.

✦ **Interoperability between Civil 3D and InfraWorks for Corridors**
 This enhancement has been needed for a while now! You can now create corridor component roads in InfraWorks from Civil 3D corridors. A corridor component road represents the designed corridor in Civil 3D and is read-only in InfraWorks.

When you bring a Civil 3D corridor into InfraWorks as a corridor component road, geometry for the shapes and links is created in the InfraWorks model.

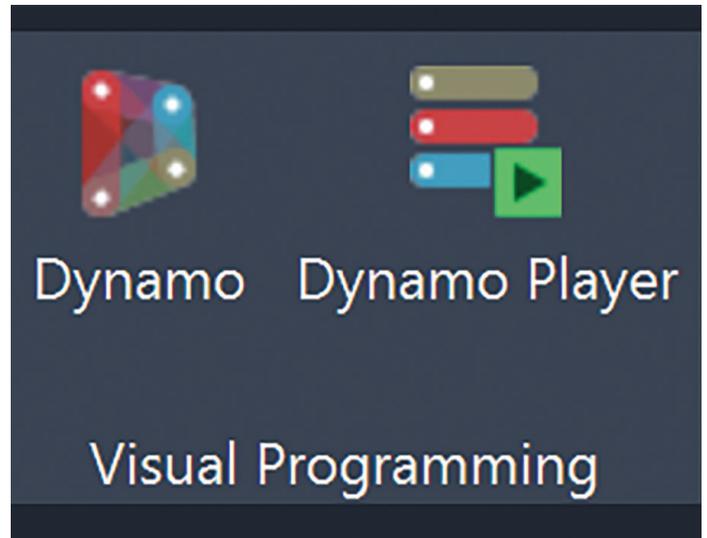


Figure 4

CIVIL 3D 2020.1, .2 - NOW IN 2021

Most, if not all, of the 2020 update enhancements have been rolled into the software. Some of the following items below may be of interest and really help in streamlining workflows and enhancing design.

- ✦ Use enhancements to the gravity network analysis including the support for multiple catchments per structure.
- ✦ Use the new drainage structure parameter mapping feature to map the parameters of Part Builder parts to parameters that are required for the Analyze Gravity Network command.
- ✦ Enhanced reference template features to manage styles and settings.
- ✦ The Manage Data Shortcuts command has been updated so you can specify a different data shortcut project path when the current path is still valid.
- ✦ Bring ArcGIS data into your Civil 3D drawings and save back, publish, and export data for use in ArcGIS.
- ✦ Export feature lines to LandXML files. This is a big benefit for survey and machine-controlled models.
- ✦ AASHTO 2018 design standards are included.

DYNAMO

DYNAMO for Civil was introduced in the 2020 release of Civil 3D and exploded with popularity!! The Dynamo Player has now been incorporated directly into Civil 3D, so no need for a separate install, and has enhanced capabilities for use within the civil space.



Figure 5

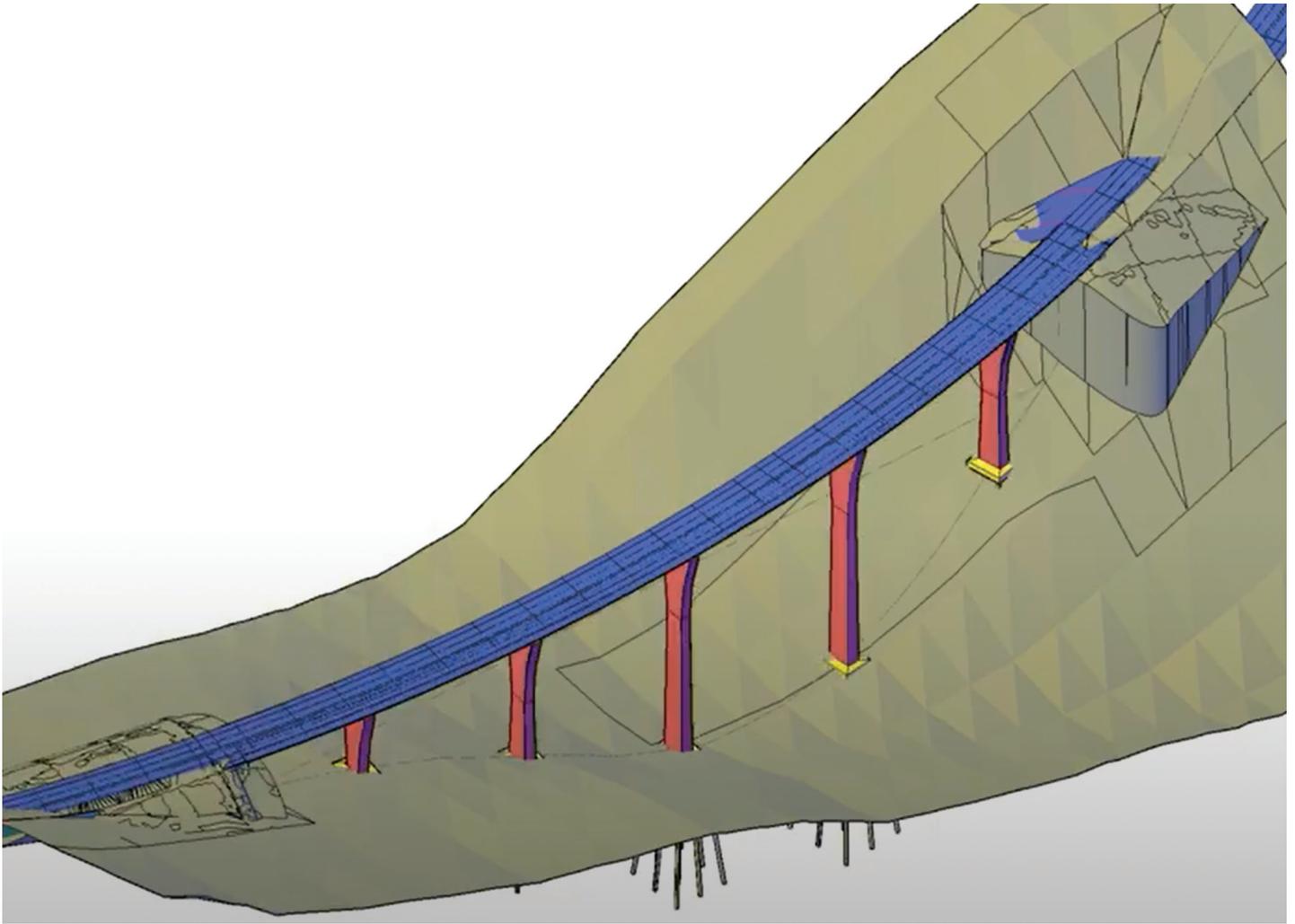


Figure 6

BIM 360 DOCUMENT MANAGEMENT (BIM DOCS) & COLLABORATION FOR CIVIL 3D

Now I know this is supposed to be an AutoCAD / Civil 3D article, but I really think you need to at least take a look at BIM 360 Docs and the new version of Collaboration for Civil 3D and what it can offer to you and your design workflow.

Three key features that I see, are file locking, file compare and versioning, and the utilization of datashortcuts.

Bryson Anderson wrote a great article in the February 2020 AUGIWorld magazine and explores BIM 360 Collaboration for Civil 3D in great detail.

CONCLUSION

I may not have covered all the features, and there may not seem like a ton of new features, but the new features and enhanced features will help in your everyday workflows.

I would love to hear from you regarding the new features and features you would like to see added or enhanced. So, feel free to call or email me anytime.



Shawn has been a part of the design engineering community for roughly 15 years in all aspects of design, construction and software implementations. He has implemented and trained companies across the Country on Civil 3D and other infrastructure tools and their best practice workflows. Shawn can be reached for comments or questions at awautocadcivil3dcm@augi.com.



Autodesk Revit 2021 is Here!

I have prepared this overview to highlight many of the enhancements and new features found in the new version of Autodesk Revit. I already have a good handle on all the new features, thanks to the fact that I update all six of my Revit textbooks every year, making sure they are ready for the academic fall semester.

- BIM 360 Design servers in Europe
- Worksharing changes for MEP systems.

REVIT PLATFORM

First, let's look at the non-discipline specific features found in this new version of Revit.

This article was first published in AECbytes (www.aecbytes.com) and is being reprinted here with permission.

In this article, we will look at the platform features and then the discipline-specific features: Architecture, MEP, and Structure.

My favorite new features are:

- Slanted walls
- Linked images and PDFs
- Generative Design in Revit

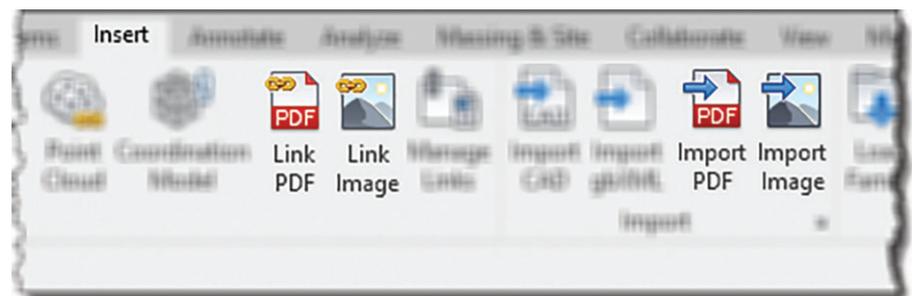


Figure 1

Link Raster Image and PDF files

Where we could only import an image or PDF file previously, Revit 2021 allows us to link raster image and PDF files from local or BIM 360 locations. If the referenced file changes, it will automatically update in Revit when reloaded or the project is opened. Notice, in the image below, there are now two sets of Image and PDF commands, one for Import and another for Link (figure 1).

Along with this enhancement, the Manage Links dialog has been updated to include an Images tab which replaces the separate Manage Images dialog. There is also a Show button to locate an instance of the image/PDF within the project. Additionally, instances may be placed from this dialog using the Place Instance command, and new images/PDF files can be added using the Add... command (figure 2).

In figure 3, I linked page 31 from the multi-page PDF file of my Interior Design using Autodesk Revit 2021 textbook.

Void Cuts Geometry Parameter

Within the family editor environment, Void elements have a new parameter; Cuts Geometry. This can be mapped to a family parameter which can be used to control if the void cuts geometry or not. Previously we had to use tricks like parametrically moving the void away from the geometry to prevent it from cutting (figure 4).

FYI: this only works on geometry within the family, not elements within the project that might be cut by the family.

The results, within a project, can be seen in the following image. Figure 5 shows one instance of the same family is being cut while the other is not.

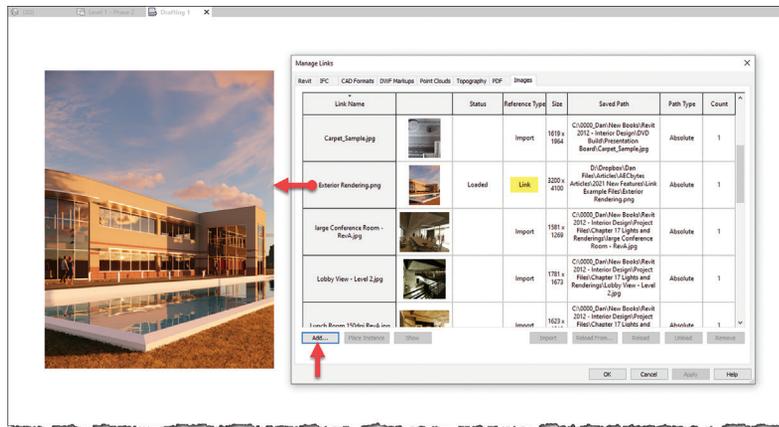


Figure 2

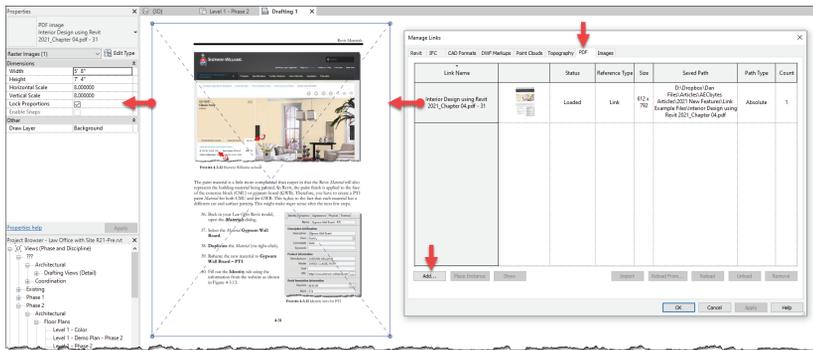


Figure 3

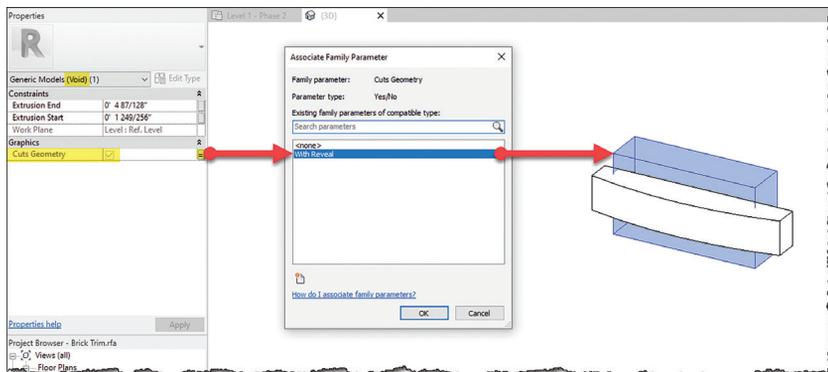


Figure 4

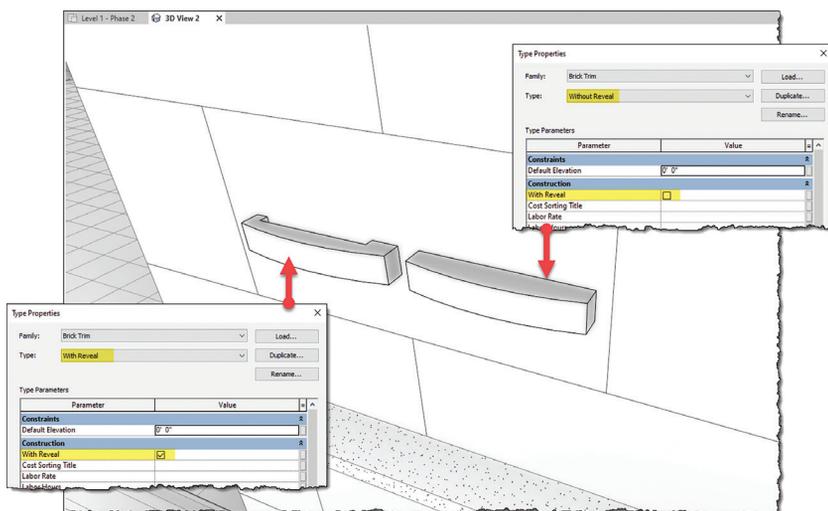


Figure 5



Revit 2021

View Filter On/Off

Previously, if you wanted to see a view without the filters applied, e.g., perhaps a filter is used to make all the furniture dashed, you would have to remove it from the Visibility/Graphic Overrides dialog. That was unfortunate as the various settings associated with that filter are lost (like visibility, transparency, line styles, etc.). Now we can simply disable a view filter without needing to remove it from the list using the new Enable Filter toggle (figure 6).

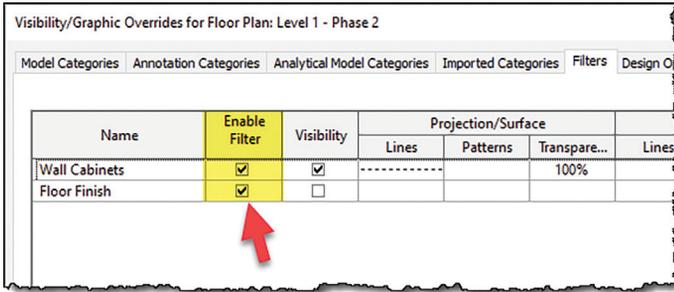


Figure 6

Tag Enhancement

More tags work as expected when Rotate with component is checked in the family editor. Although the parameter has always existed within the family editor, it did not work for several categories such as Furniture shown in figure 7. Now it does!

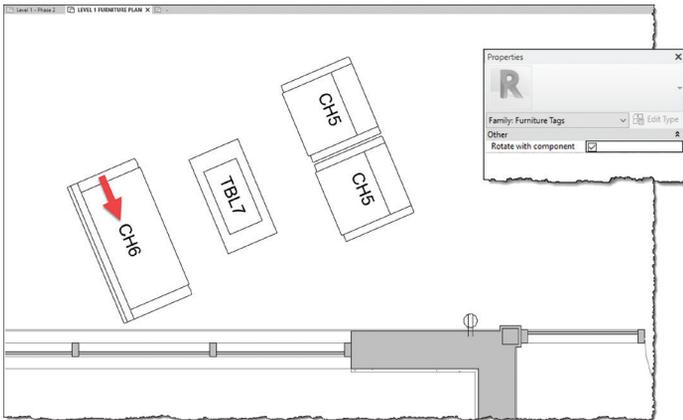


Figure 7

CH4	Steelcase	Coalesce Seating / Occasional Tables	CO300	Bindu	\$1235.00	\$17290.00	14
CH5	Steelcase	Coalesce Seating / Occasional Tables	476	Coupe Grande	\$1178.00	\$2356.00	2
CH6	Steelcase	Coalesce Seating / Occasional Tables	356-2	Donovan	\$1673.00	\$6692.00	4
CH7	Steelcase	Coalesce Seating / Occasional Tables	H350-S31	Enea	\$527.00	\$6324.00	12
CH8	Steelcase	Coalesce Seating / Occasional Tables	126111	Kart	\$526.00	\$4208.00	8
DK1	Steelcase	Elective Elements 6	E6WS3096	Worksurface	\$22050.00	\$88200.00	4
DK2	Steelcase	Coalesce Office	PDE8230R	Topo	\$13854.00	\$124686.00	9
DK3	Steelcase	Elective Elements 6	E6WD2490	Worksurface	\$7784.00	\$93408.00	12
DK4	Steelcase	Coalesce Office	PDEW7024	Topo	\$9840.00	\$9840.00	1
TBL1	Steelcase	Coalesce Office	CODRNDP4827	Denizen	\$2419.00	\$12095.00	5
TBL2a	Steelcase	Convne	CWFK60216	Conference Table Top	\$16000.00	\$16000.00	1
TBL2b	Steelcase	Convne	CFLEX724	Conference Table Base		\$0.00	3
TBL3	COALESSE				\$4545.00	\$4545.00	1
TBL4a	Steelcase	Coalesce Seating / Occasional Tables	COEL3624	Enea Lottus	\$1946.00	\$5938.00	3
TBL4b	Steelcase	Coalesce Seating / Occasional Tables	COEL4230	Enea Lottus	\$1746.00	\$5238.00	3
TBL5	Steelcase	Coalesce Seating / Occasional Tables	H35-T2442W	Enea	\$846.00	\$1692.00	2
TBL6	Steelcase	Coalesce Seating / Occasional Tables	72-2020H	Calm	\$1306.00	\$1306.00	1
TBL7	Steelcase	Coalesce Seating / Occasional Tables	72-2038LR	Calm	\$1006.00	\$1006.00	1
TBL9	Steelcase	Coalesce Seating / Occasional Tables	43-T222222	Sidewalk	\$1316.00	\$9212.00	7
TBL10	COALESSE				\$878.00	\$8780.00	10
Grand total: 213						\$561414.00	

Figure 8

Schedule Enhancement

When striped rows first came out for schedules, we could only see them on the screen. Striped rows now show on sheets and print (Figure 8). This is great!

Units Enhancement

The unit US Survey Feet has been added as a length to better support civil coordinates from Civil 3D. The surveyors in the office I work in say this is usually the only unit they use. However, in case you are worried about all your previous Revit projects, the difference between a "standard" foot and a "US Survey" foot is very small and not likely to be noticeable on a building or single campus project. (See http://vterrain.org/Projections/sp_feet.html for more information: State Plane Coordinate Systems and the U.S. Survey Foot.) See figure 9.

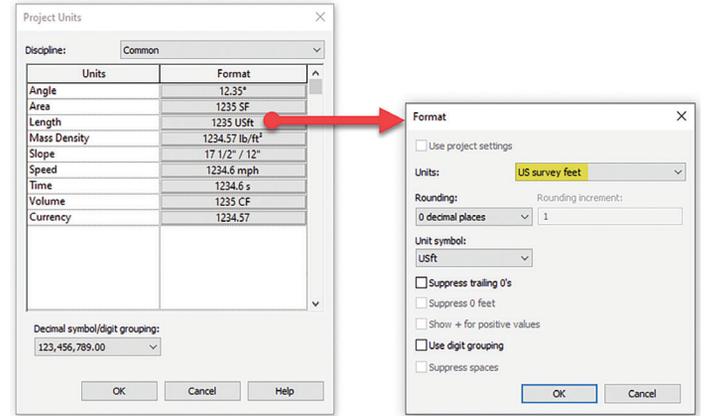


Figure 9

New Infrastructure Categories

New bridge-centric categories have been added to support bridge documentation and tie-in to Autodesk InfraWorks. Notice, in the image below, there is also a new filter list item called Infrastructure.

FYI: If you have Autodesk's AEC Collection, you have access to InfraWorks. See figure 10.

Persona Based User Interface

When a user first starts Revit 2021, they are presented with a dialog asking them to specify the type of work they do. Given that Revit supports multiple disciplines, the user interface (UI) often presents several ribbon tabs and tools not needed for their tasks. Thus, this wizard will turn portions of the UI off. There are no new settings, just a wizard that manages existing settings, which can manually be turned back on in the Options dialog at any time. See figure 11.

Doug Case esq.	
DC LAW OFFICES	
SCHEDULES	
Project Number	2012-0453
Date	March 14, 2021
Drawn By	Author
Checked By	Checker
A800	
Scale	

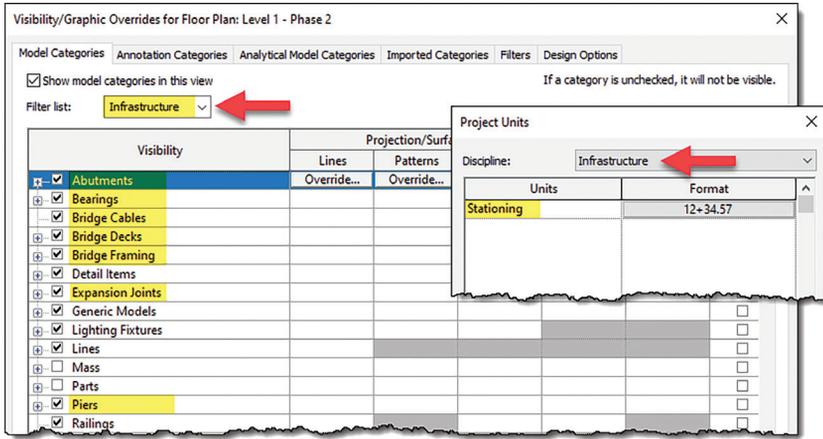


Figure 10

Autodesk Content Distribution Change

Autodesk is no longer providing all base content during installation. This often was problematic as the content was downloaded separately during the software installation. Most Revit users will not miss this content as they have custom content created or curated by their firm, and therefore do not use the out-of-the-box (OOTB) content. If, however, the content is needed it can be downloaded via the new Get Autodesk Content command on the Insert tab. See figure 12.

FYI: Students using my textbooks will need to do this, as that is the content used in most of the tutorials. And, do not be confused that the folders and a small handful of content still appear by default, post installation.

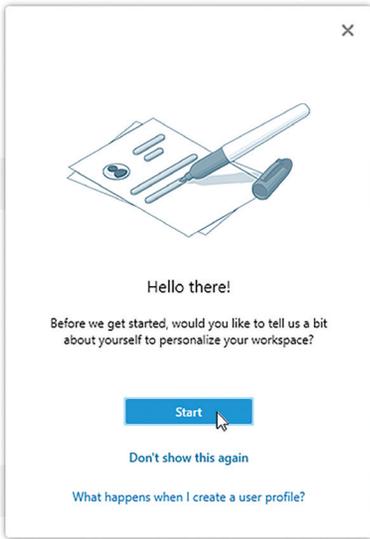


Figure 11

BIM 360 Enhancements

With the popularity of BIM 360 Design skyrocketing during the current #WorkFromHome situation and because Autodesk is offering it for free as a way of assisting struggling firms, any new features around this functionality will be greatly welcomed. Tip: For more on using BIM 360 Design for free, check out my BIM Chapters blog post: Autodesk to Offer BIM 360 Design Free Until May 31, 2020

Home Page Enhancement

Revit 2021 has improved BIM 360 Design project access from the Home page, including the ability to search. This also includes a link to the BIM 360 portal through your browser. See figure 13.

European-based servers

Autodesk now has European-based BIM 360 servers located in Ireland. Only Revit 2021 and newer projects are supported. When creating a project, the data location is not user selectable.

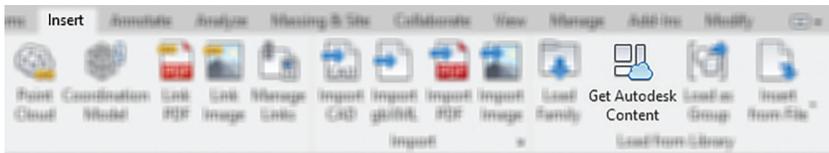


Figure 12

Functionality Change

The support for the Plans folder has been removed. Thus, the Project Files folder is now the only place for Revit models.

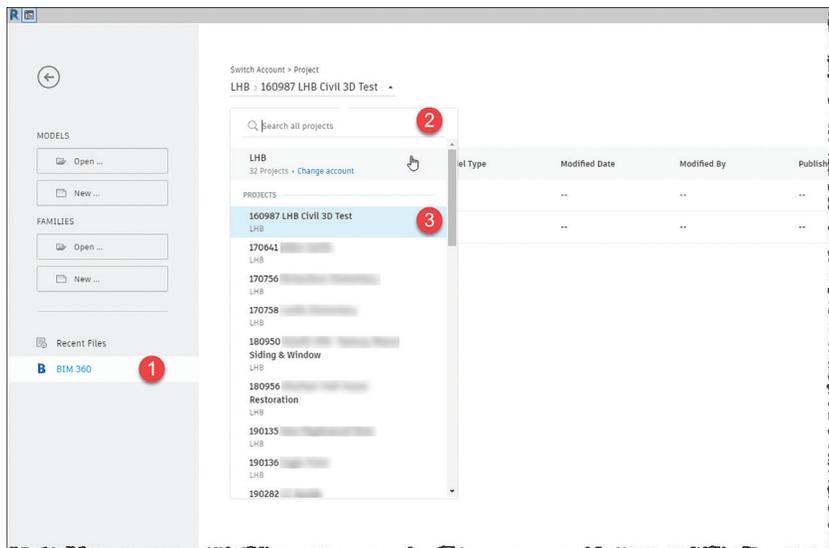


Figure 13

Dynamo 2.5

New nodes, package dependency tracking, latest Dynamo core and Dynamo Revit versions. Ten new nodes are included, most are about joining and unjoining geometry.

Decommissioned Add-ins

The following items will not be updated for Revit 2021:

- + Model Review
- + Site Designer, originally from Eagle Point

Revit 2021

ARCHITECTURE

The architecture discipline has a few new features sure to make many designers happy.

Slanted Walls

Walls can now be slanted without using a mass element as a host! Through new instance parameters, a wall can be defined to slope at a specific angle and automatically join with adjacent walls. See figure 14.



Figure 14

To make a wall slanted you must first toggle the Cross-Section instance parameter to Slanted. This reveals an adjacent parameter called Angle From Vertical. Slanted walls can host wall sweeps and windows which can be either vertical or aligned with the wall via the Orientation parameter, both of which are shown in figures 15 & 16.

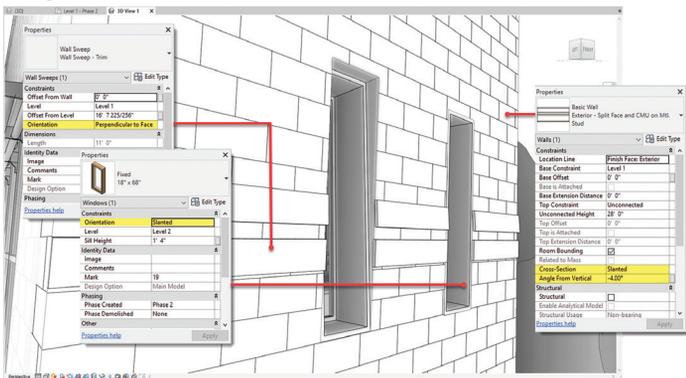


Figure 15

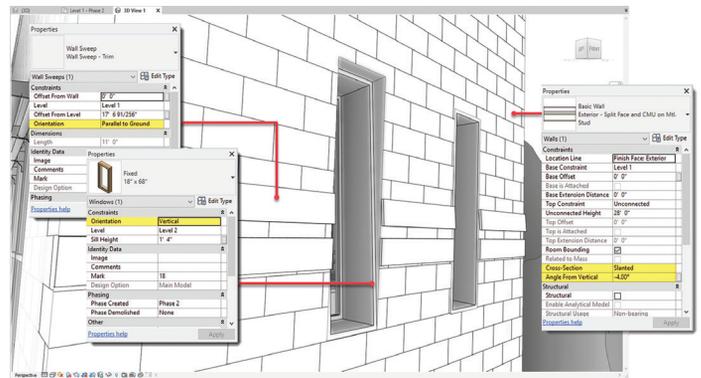


Figure 16

Realistic Views

Revit 2021 offers a totally new experience in terms of performance and quality. It's not Enscape, but it does provide a much-improved experience within Revit proper. See figure 17.



Figure 17

There are even moments of "oh, wow" within this new realistic view... notice the quality of the metal chair base in figure 18.

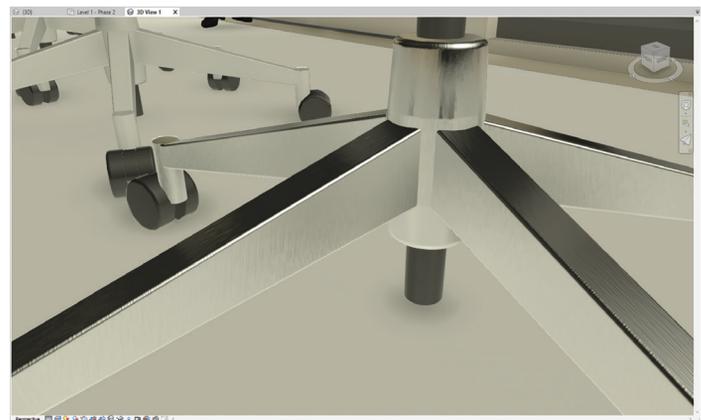


Figure 18

Path of Travel

Two new Dynamo scripts have been provided for Path of Travel workflow. Just fire up the Dynamo Player within Revit to see the list below, which includes the ability to Calculate Longest Exit Distance (figure 19).

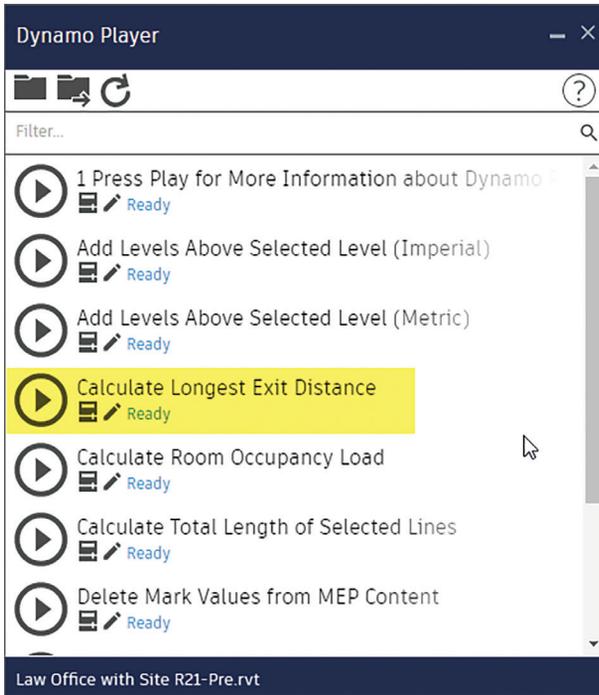


Figure 19

When running that script, the user must select an exit door. The result is a Path of Travel element like the one pointed out in figure 20.

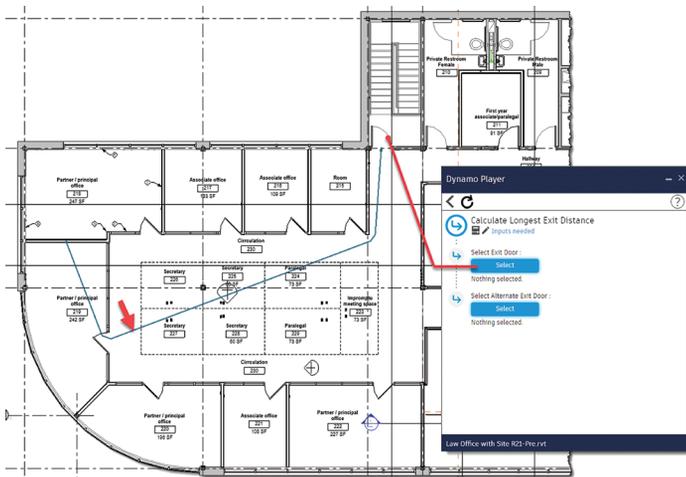


Figure 20

Generative Design for Revit

In this new release, Autodesk delivers its first Generative Design (GD) toolset directly within Revit. This functionality has graduated from the Project Refinery public beta, but an earlier version of these tools are still available for earlier versions of Revit via the beta site. However – let’s just get this out of the way now -- to continue to show value for its Enterprise and Collections

offerings, part of what I am about to cover is only available to those customers. But, anyone can access GD via Dynamo for Revit.

Be sure to check out Autodesk’s new Generative Design Primer (<https://www.generativedesign.org/>) to learn more. Another resource is their eBook titled Demystifying Generative Design (PDF download link).

Limited access portion found directly within Revit

The Manage tab has two new tools; **Create Study** and **Explore Outcomes**.

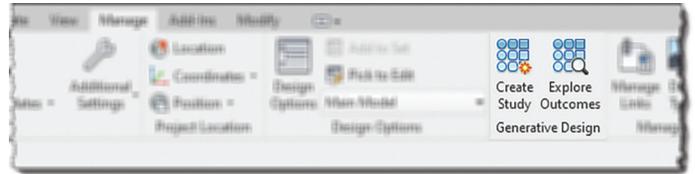


Figure 21

Clicking Create Study reveals three pre-built examples; Maximize Window Views, Three Box Massing, and Workspace Layout as shown in figure 22. Note that you can create custom studies as well. When a script is run, six instances of Dynamo run to calculate the solutions.

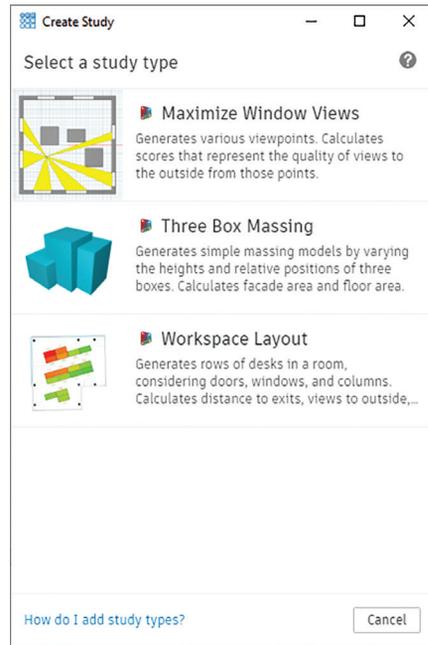
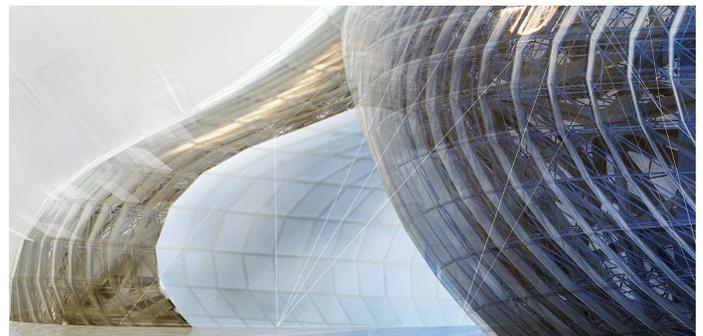


Figure 22



Revit 2021

The results can be revisited via the Explore Outcomes dialog shown here. Previous runs are listed on the left. Clicking one shows the outcomes to the right. If a preferred solution is found, click the Create Revit Elements button in the lower right ... in figure 23, the desks will be placed in the room.

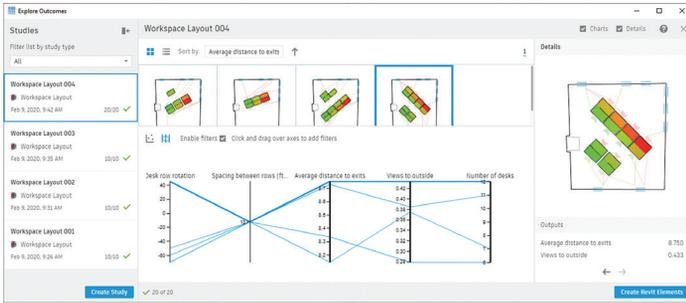


Figure 23

Analysis Tools

Insight – Lighting Analysis for Revit is still a separate install, but more easily found via the Autodesk Desktop App. Previously you could only find it at insight.autodesk.com.

MEP

For Revit MEP, this release’s major focus was on electrical features and globalization.

Circuit Naming

This enhancement supports international circuit naming conventions. The primary requirements came from the UK and France for this update.

The new settings can be accessed via Manage > Electrical Settings > Circuit Naming. An example, like the one shown below, can be seen by starting a new MEP project based on the 2021 UK template provided with the Revit install.

Panel board family example: Circuit Naming parameter lists new options. In panel board schedule: Renummer Indexes – specifically not automatic but automated for when needed.

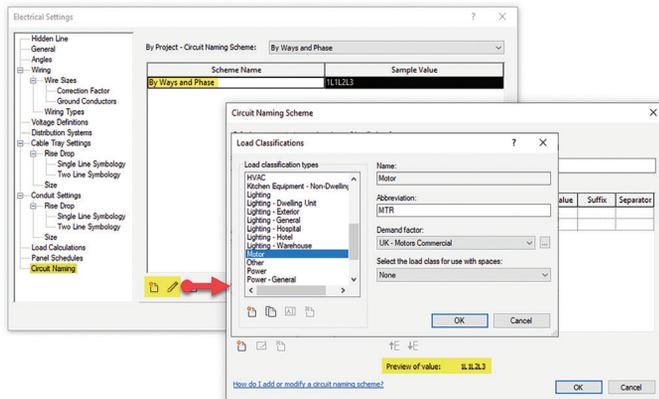


Figure 24

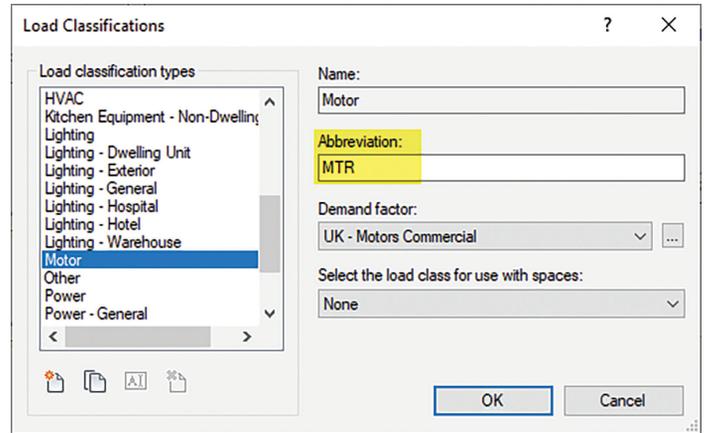


Figure 25

Load Classifications have a new Abbreviation option to help with the French standard.

Single Phase L-N Panelboards

Previously, Revit only supported 2 or 3 hot conductors, but not 1 hot so much, as the load does not propagate to distribution systems properly. Users may find other uses for this feature enhancement, like US lighting inverter panels can also use this method.

Higher pole panels can no longer be connected to lower pole panels. No changes to an existing Revit model during upgrade, but any changes will prompt warnings.

Switchboard Circuit Quantity

This enhancement addresses an Idea station comment “Fix the issue regarding multi-pole loads on a switchboard. Loads only take up one slot, but Revit thinks the panel is full when it is 1/3 full.” Maximum number of circuits on switchboard families as shown in figure 26. Panel families still have Max Number of Circuits.

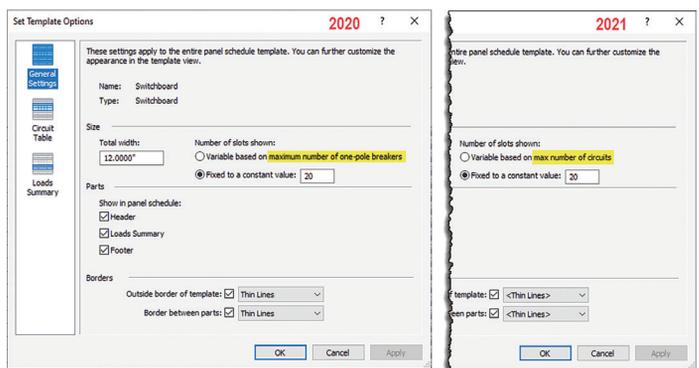


Figure 26

Switchboard Circuit Phase

Select which phase a specific circuit is on. Using the new Switch Phase tool on the ribbon for a selected circuit allows the user to move L-N and L-L loads to user selected phase.

Panel schedules

Panels now appear under the sheet node in the project browser.

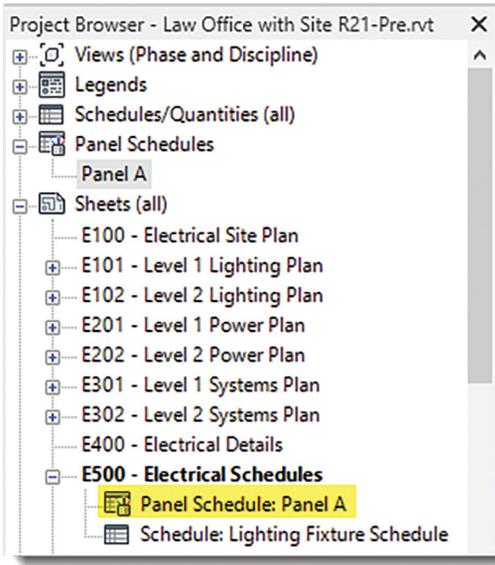


Figure 27

New Space and Spare Properties

New parameters have been created, as shown here:

- Spare: Frame Size
- Space: Number of Poles and Notes.

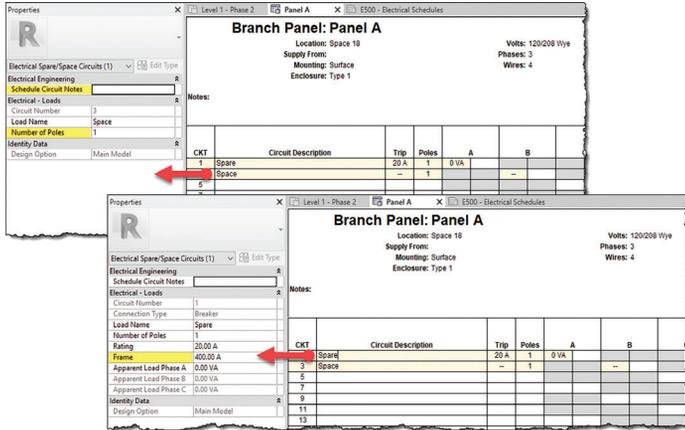


Figure 28

Worksharing Enhancements

To address circular syncing issues and users not being able to open a project file, changes to MEP elements no longer check out the entire MEP logical system and related elements. Now, just the elements within the system, being directly modified, are checked out.

Units Enhancement

Piping Units of Liters per Hour for flow has been added in figure 29.

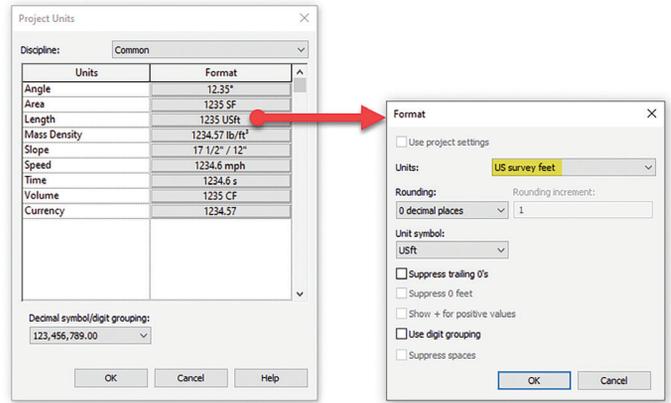


Figure 29

P&ID Modeler

This has been moved from Teams to Docs for Revit related functionality. Only affects 2021 and later projects.

STRUCTURE

Revit structure continues to see rebar improvements as well as an update to the Precast automation that supports imperial units.

More Rebar Improvements

Here is a list of the array of rebar-related improvements.

- New standard 3D rebar shapes
- Easier hook length adjustments
- Override hooks length by instance
- Couplers connecting arc shaped rebar
- End treatment without couplers for rebar
- 3D solid fabric sheet visualization

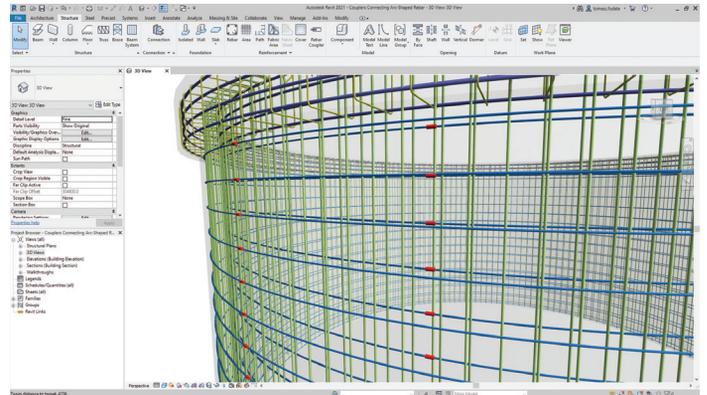


Figure 30 - Image courtesy of Autodesk.



Revit 2021

Precast Automation Enhancements

Revit Precast Automation integration enhancements now supports imperial units.

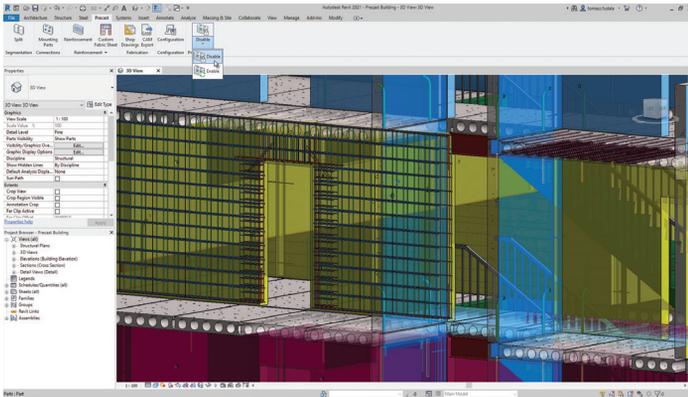


Figure 31 - Image courtesy of Autodesk.

More Dynamo Scripts for Structural

Dynamo – integrated steel connection automation nodes in Dynamo for Revit

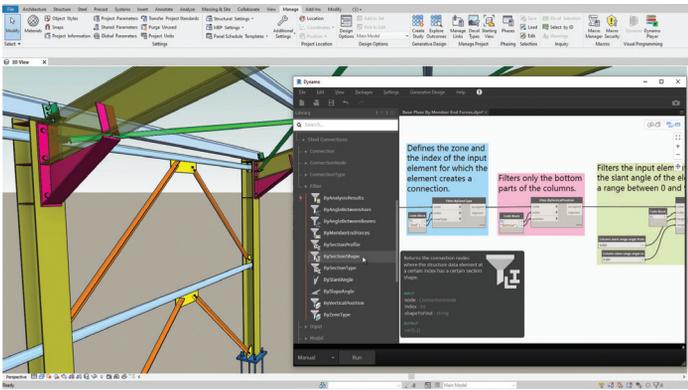


Figure 32 - Image courtesy of Autodesk.

Steel Detailing Enhancements

Improved steel detailing tools; added stiffeners.

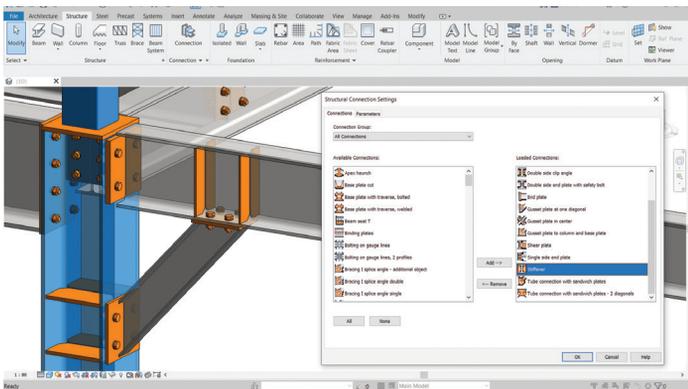


Figure 33 - Image courtesy of Autodesk.

CONCLUSION

While it is not possible for Autodesk to implement everyone's ideas and requests, they certainly managed to deliver a lot of value in this annual update. We will likely see additional features in the intermediate updates later this year.



Daniel John Stine AIA, CSI, CDT, is a registered architect with over twenty years of experience in the field of architecture. He is the BIM Administrator at LHB, a 250-person full-service design firm. In addition to providing training and support for four offices, Dan implemented BIM-based lighting analysis using ElumTools, early energy modeling using Autodesk Insight, virtual reality (VR) using the HTC Vive/Oculus Rift along with Fuzor & Escape,

Augmented Reality (AR) using the Microsoft HoloLens, and the Electrical Productivity Pack for Revit (sold by CTC Express Tools). Dell, the world-renowned computer company, created a video highlighting his implementation of VR at LHB.

Dan has presented internationally on Architecture and BIM in the USA, Canada, Ireland, Denmark, Slovenia, Australia and Singapore, at the following conferences: Autodesk University, RTC/BILT, Midwest University, AUGI CAD Camp, NVIDIA GPU Technology Conference, Lightfair, and AIA-MN Convention. By invitation, he spent a week at Autodesk's largest R&D facility in Shanghai, China, to beta test Revit features.

Committed to furthering the design profession, Dan teaches graduate architecture students at North Dakota State University (NDSU) and has lectured for interior design programs at NDSU, Northern Iowa State, and University of Minnesota, as well as Dunwoody's new School of Architecture in Minneapolis. As an adjunct instructor, Dan previously taught AutoCAD and Revit for twelve years at Lake Superior College. Dan is a member of the American Institute of Architects (AIA), Construction Specifications Institute (CSI), and Autodesk Developer Network (ADN), and is a Construction Document Technician (issued by CSI). He has presented live webinars for ElumTools, ArchVision, Revizto and NVIDIA.

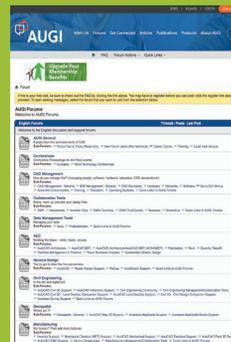
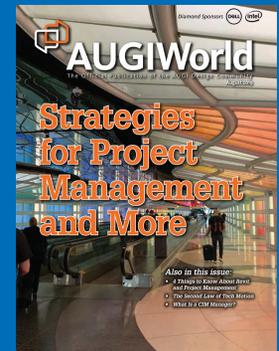
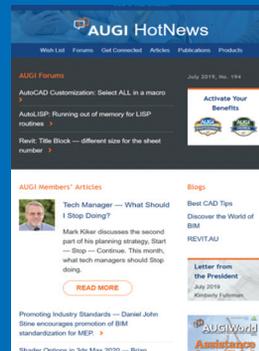
Dan writes about design on his blog, BIM Chapters, and in his textbooks published by SDC Publications:

- Autodesk Revit 2021 Architectural Command Reference (with co-author Jeff Hanson)
- Residential Design Using Autodesk Revit 2021
- Commercial Design Using Autodesk Revit 2021
- Design Integration Using Autodesk Revit 2021 (Architecture, Structure and MEP)
- Interior Design Using Autodesk Revit 2021 (with co-author Aaron Hansen)
- Residential Design Using AutoCAD 2021 • Commercial Design Using AutoCAD 2013
- Chapters in Architectural Drawing (with co-author Steven H. McNeill, AIA, LEED AP)
- Interior Design using Hand Sketching, SketchUp and Photoshop (also with Steven H. McNeill)
- Trimble SketchUp 8 for Interior Designers; Just the Basics (formerly Google SketchUp)

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