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# AUGIWorld

The Official Publication of the AUGI Design Community  
June 2019

# Introducing Autodesk 2020

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- Promoting Industry Standards
- Set Up Revit for Success
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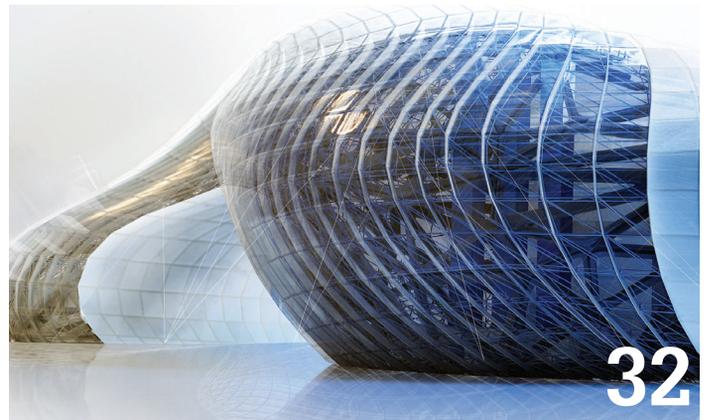
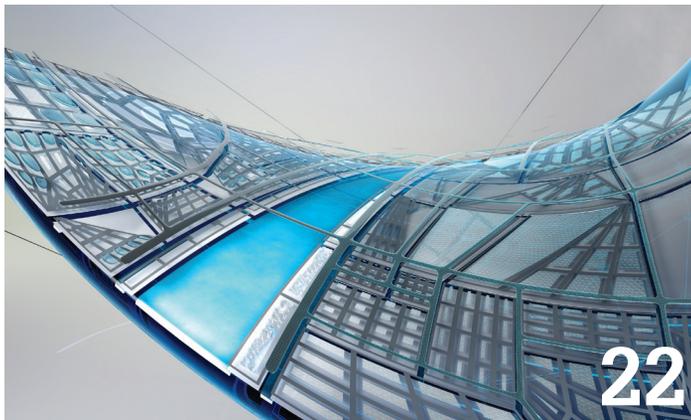
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# Letter from the President



# AUGI

## GREETINGS!

**W**elcome to the June issue of *AUGIWorld*!

It is hard to believe we are almost halfway through 2019! This month marks one year since I started my own consulting business, and let me tell you I have learned so much more in the past year than in most of my career. There are some things I have known about myself (I am not a morning person!), and there are some things I really tried not to admit. So, here goes. My name is Kimberly, and I am a PROCRASTINATOR!

I had been employed continuously since I graduated tech school way back when. I would get up in the morning, go to work, do my job, come home, get a paycheck. Repeat. But when I decided after a layoff last year to strike out on my own, I was in for some life lessons! You see, I don't really have a boss (other than my clients) demanding that I sit at my desk from 8 a.m. until 5 p.m., five days per week. However, if I'm not disciplined enough to do just that, I don't get a paycheck (see above)! Sometimes it's just easier to sleep in, or drink that second cup of coffee while watching the morning news and catching up on Facebook. But that won't pay the bills. Add in trying to finish a degree online, family obligations, and other commitments, and my time is limited. I'm not complaining, of course. This is the path I have chosen.

I have learned that procrastination is the enemy of production. Some people say they do their best work under pressure. Not me. I can and will meet deadlines if it kills me, but I know that if I had just tackled a task sooner, I could have put more effort into a better outcome. It has taken many painful experiences of late nights and many tears to finally get what my fourth grade teacher was trying to tell me... "If Kimberly could ever get organized, she would be an excellent student."

All of this introspection leads me to this: we are not guaranteed tomorrow. Where have you been procrastinating in your career? Do you want to learn Dynamo or Maya or InfraWorks? What are you waiting for? Are you wanting to do something more, but aren't sure where to start? I used to open my edition of *AUGIWorld* every month and only read the articles for the software I was using at the time (usually AutoCAD and Revit). *AUGIWorld* is filled with articles across several different software platforms. Even if you're not familiar with them, I would encourage you to read them. Our AUGI authors put their own time and effort into writing every month. If there is a topic you want to see, contact any one of our Content Managers to submit your own articles for our publication. Remember, this is YOUR user group.

In the wise words of Benjamin Franklin, "Don't put off until tomorrow what you can do today." And since today is the deadline for submitting this letter...

Cheers!  
Kimberly

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NEWSLETTER

# Shader Options in 3ds Max 2020

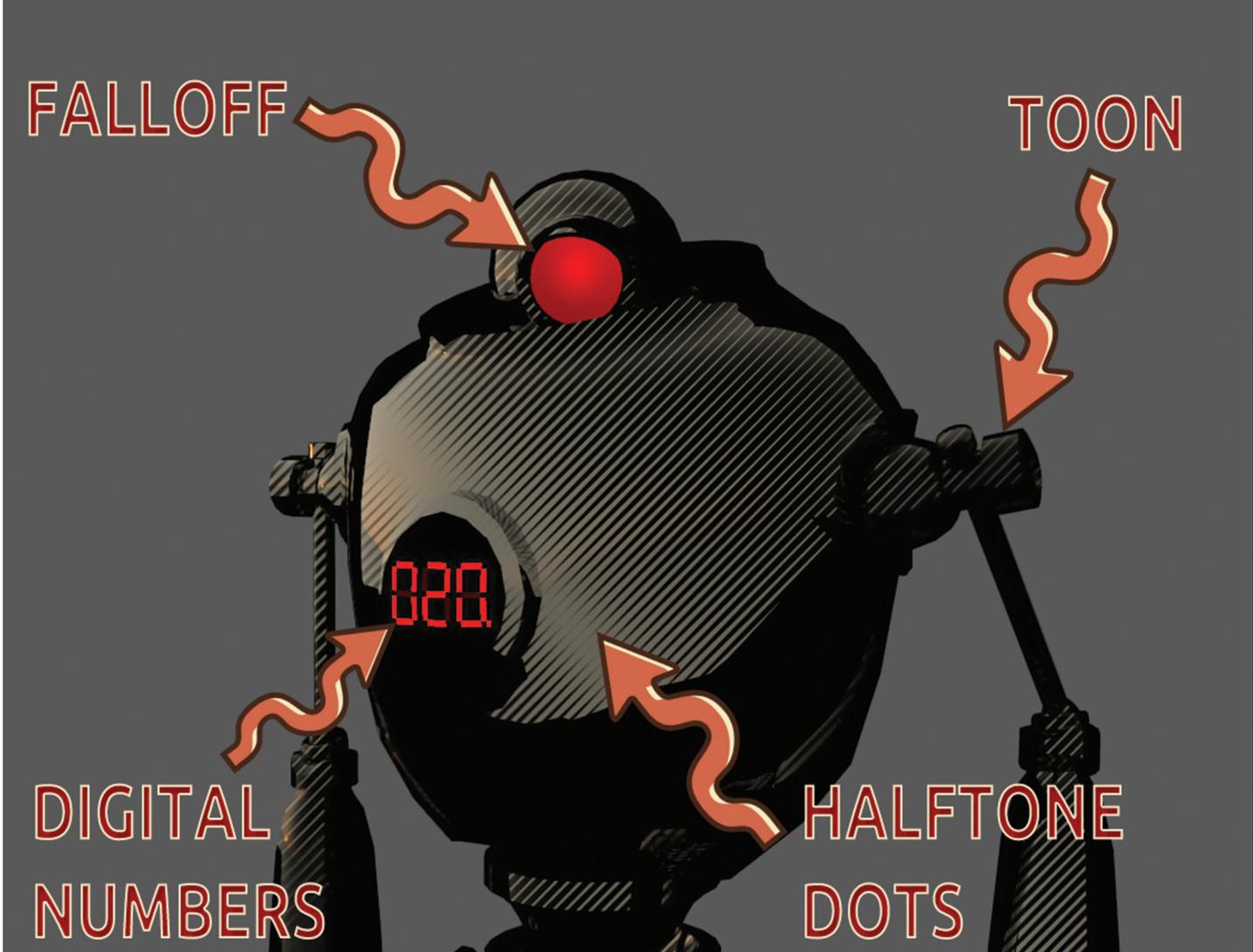


Figure 1: Example of OSL shaders for 3ds Max 2020

Autodesk included more than 100 shaders to support OSL since its introduction to 3ds Max<sup>®</sup>. The 2020 update comes with 14 more. These are: Colorspace, Falloff, Halftone (dots), UVW MatCap, Normal, Random Index by Number/Color, Simple Gradient (which is more powerful than it sounds), Tiles, Tri-Tone, Threads, Toon Width, Waveform (animated), Weave, and ColorKey.

Some features users are excited about are displayed in Figure 1. Using a Falloff map set to face the camera, I was able to imitate a robotic eye. The toon shader is particularly powerful, although my examples only display the outline (silhouette) feature. Figures 1 and 2 use the same Toon shader map to trace the silhouette and provide a thickened outline. Halftone dots were stretched to generate a cross-hatch pattern in Figure 1, and an option was selected to adjust the intensity in conjunction with the light. We

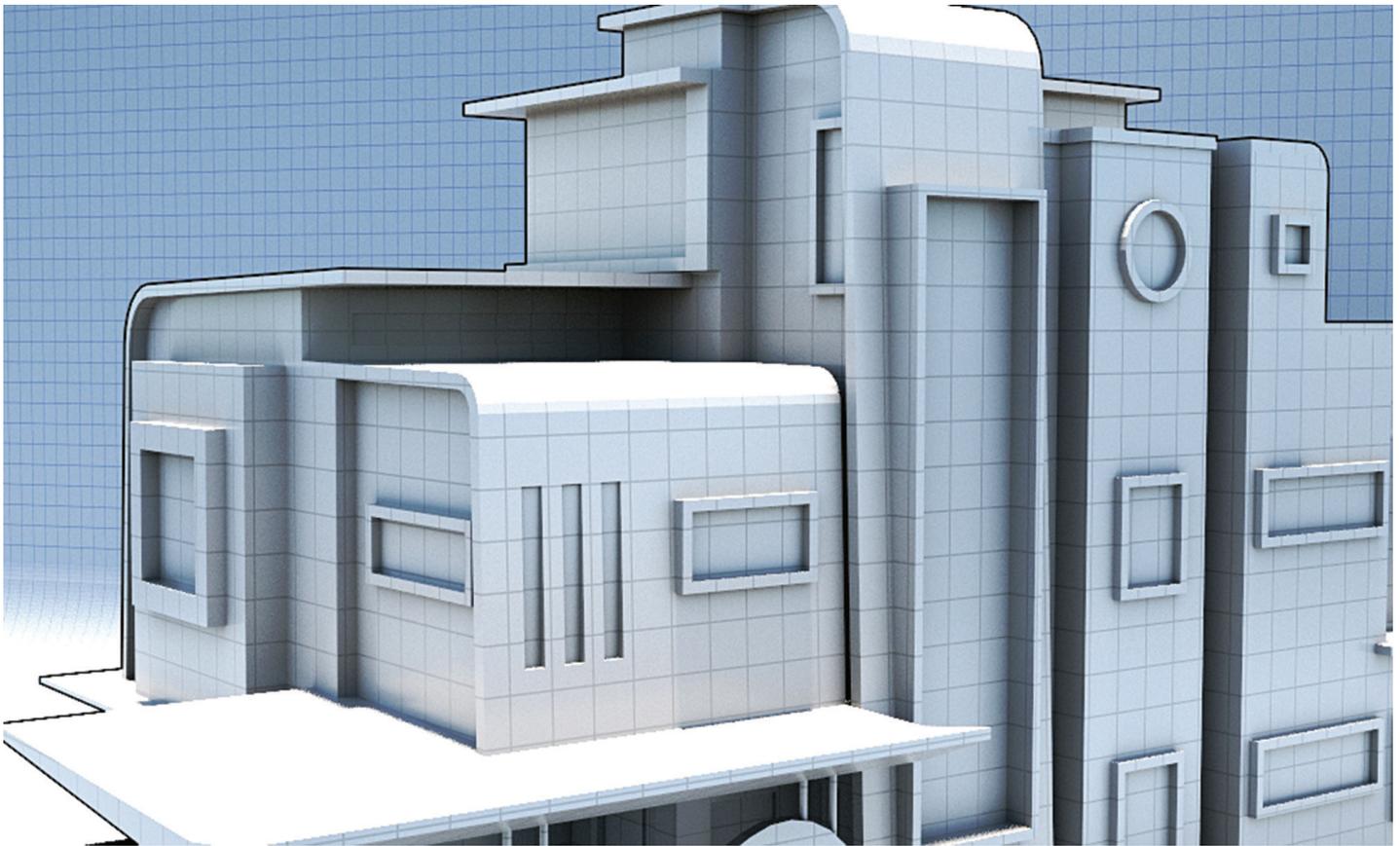


Figure 2: Toon shader for blueprint effect

Halftone.osl

Halftone Dots (by default i screen space)  
Works well together with toon shaders.

OSL: Halftone Dots (Map #105)

OSL Shader: HalftoneDots

```
14 // string help="Halftone Dots (by default i screen space)<br>  
15 // "Works well together with toon shaders."  
16 // name="Halftone Dots" ]]  
17  
18 // = transform("raster", P)  
19 // input coordinate. If not connected, uses screen pixel space" ],  
20 // 0,8.0)  
21 // of the dots. In the default screen space mapping, this is in pixels." ],  
22 float  
23 // color [ [ string help="The size of the dots to yield the right halftone density. " ],  
24 int U_Input = 0  
25 // [[ string help = "If U is connected in a 'base_tonemap' input of an Arnold Toon shader.",  
26 // string widget = "U",  
27 float Fuzz = 0.1 [ [ float min = 0.0, float max = 2.0 ] ],  
28 color BlackDots = 0.0  
29 // [[ string help = "The size of the dots" ]],  
30 color WhiteDots = 1.0  
31 // [[ string help = "The distance between the dots" ]],  
32 // Outputs  
33 output color Out = 0.0  
34  
35 {  
36 vector pos = rotate(UW, radians(Angle), vector(0.0,0.0,1.0));  
37 pos = vector(pos[0] / Scale[0], pos[1] / Scale[1], pos[2]);  
38 if (Scale[0] == 0.0)  
39 pos[0] = 0.5;  
40 if (Scale[1] == 0.0)  
41 pos[1] = 0.5;  
42  
43 color inputV = InputValue;  
44 if (U_Input)  
45 inputV += u;  
46  
47 pos = pos - floor(pos);  
48  
49 float dist = 1.0 - (distance(vector(0.5,0.5,0.0), pos) / (sqrt(0.5*0.5+0.5*0.5)));  
50 color factor = smoothstep(0.0, inputV, dist);  
51 Out = mix(BlackDots, WhiteDots, factor);  
52 }  
53
```

OSL - Open Shading Language

Viewport Accuracy (in Realistic Mode): 100%

OSL 1.10.2

The OSL Map is linked to a file and shown in Read Only mode.  
Unlink the OSL Map to allow editing of a local copy stored inside the map.

Reset Parameters

59%

**MODIFY THE SHADER'S SCRIPT**

Figure 3: OSL code editor

# 3ds Max 2020

can also animate the OSL maps including the new Digital Numbers displayed in Figure 1.

Aside from an extensive library of shaders available throughout the net, OSL is particularly powerful inside 3ds Max because it works with nearly every rendering engine. We can also modify the shader's code inside of 3ds Max while watching the changes occur dynamically. Mixing OSL shaders with Vray materials while modifying the OSL code gives us an infinite number of possibilities. To modify the script, we have to select the magnifying glass next to the OSL file name as shown in Figure 3.

Figure 4 exhibits using the OSL simple tiles map with a VRAY material.

## ADDITIONAL UPDATES

There are numerous updates from 2019 to 2020. Some include improved performance, Revit® import features, improved animated preview system, faster UVW unwraps, extended point cloud compatibility, improvements to the viewport Activeshade system, a considerably more powerful chamfer modifier, and many more.

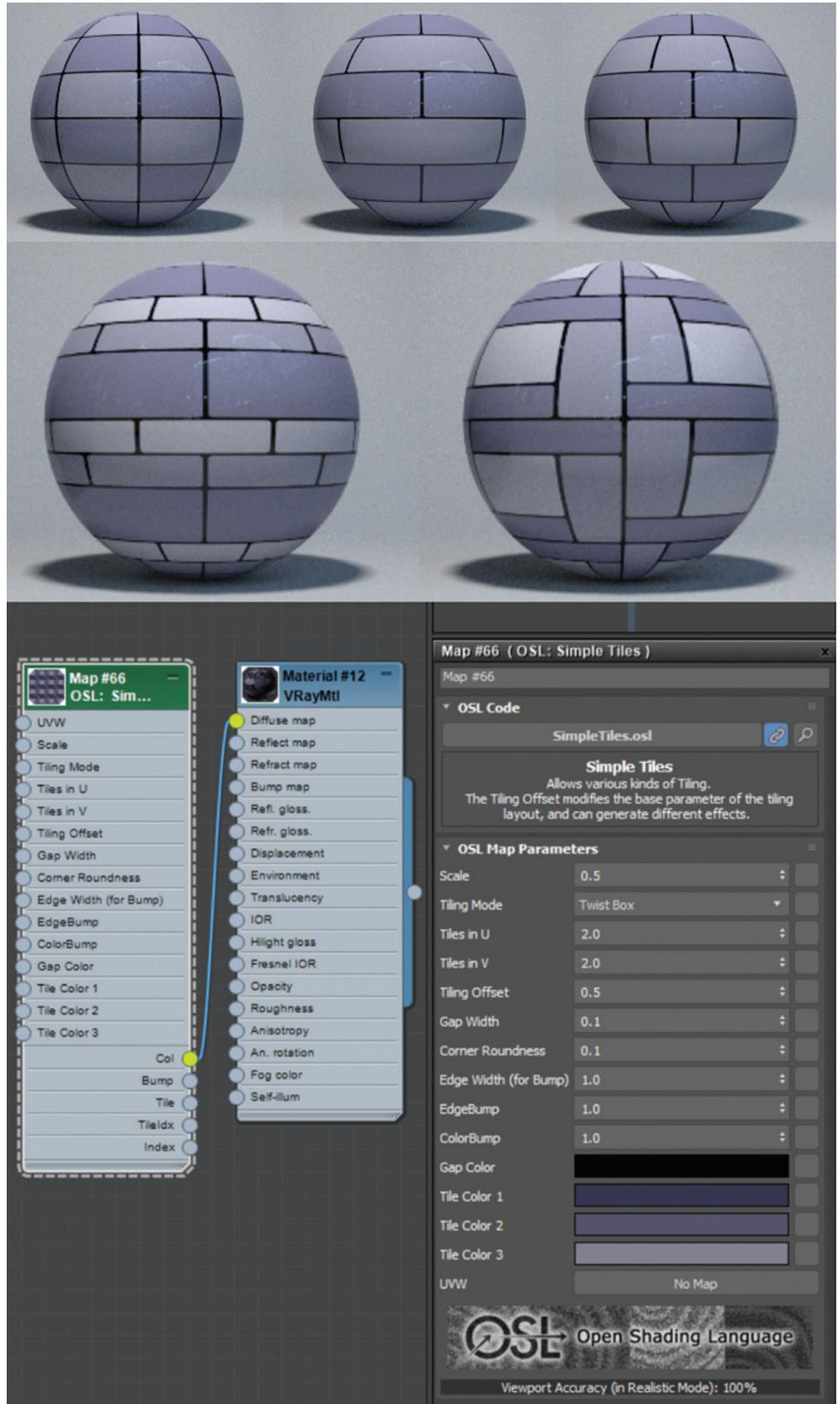


Figure 4: VRAY material with OSL simple tiles map



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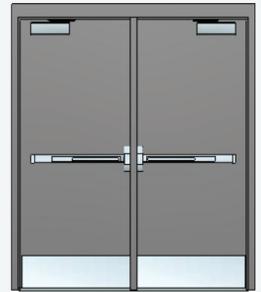
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# It Takes a Village



Implementing Autodesk® Revit® Structure 2020 in your own office can be a difficult task, especially if you try to do it alone. Can you ask for help from your Local Revit User Group of Revit Structure experts? Would you like to learn and share Revit Structural experiences and knowledge with others? Come explore some findings with us, Rick and Adam, as we share ideas to help you implement a local knowledge-sharing user group in your office, hometown, suburb, or city.

## WE ALL HAVE QUESTIONS

You can implement a new workflow and if you're lucky, implement new software, but if you want to really understand how Revit Structure is utilized in the big picture, you may have to implement a new local user group. The more you learn about other disciplines, the better your understanding of Revit, BIM, and VD&C, and the more you realize what you don't know. To find the answers, you must look outside your comfort zone. Do not be afraid to ask questions. That may just be the greatest lesson in BIM.

To help better your greater understanding, you may want to consider trying to kickstart a local knowledge base user group, based on BIM and VD&C in general. A Revit Structure Focus

Group within your new or existing user group will help you bridge the gap.

## 1 + 1 = A GROUP

We could learn by ourselves, or we could share that knowledge and learn together. Find someone local who is also interested in learning and sharing together, then you two can work as a team. As you two share stories and visions for the group over lunch, write your ideas down to help bring your dreams to fruition. You can both ask around and check for other people who may be interested. The next thing you know a group is formed. It's helpful to learn the basics of what others are doing with all the many aspects of BIM and VD&C. You don't have to fully understand all these new workflows and technologies, but at least make note of them for future investigation and possible implementation.

## CHECK OUT THE AUGI WEBSITE

If you get connected with the AUGI Website, you can read up on all there is to know about Local User Groups (<https://tinyurl.com/AUGI-LUG>) and download PDFs to help you such as the *User Group Handbook* (see Figure 2) and the *Local User Group Leaders and Content Admins Guide* (see Figure 3). If you're not an AUGI Member, join today. It's free!

The *User Group Handbook* contains multiple ideas and suggestions and is the most in-depth resource we've been able to find to help



"THE BRIDGE ITSELF WILL START ABOUT HERE"

Figure 1

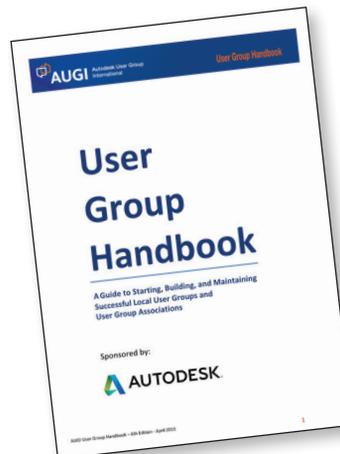


Figure 2: User Group Handbook (<https://tinyurl.com/AUGI-UGH>)

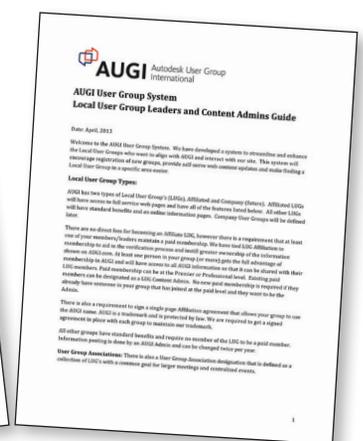


Figure 3: User Group System Leader Guide (<https://tinyurl.com/AUGI-LUGLDR>).

you with your user group. Take the time to read this and utilize tried-and-true methods from the experts at AUGI.

## A FLYER FOR YOUR FIRST MEETING & THE 5 “W”S

Your first meeting flyer is very exciting to create and should answer: who, what, when, where, and why. RSVP information is also important, as is a thorough review for misspellings and to ensure correct RSVP addresses. A flyer that can be printed in color should also print well in black and white as not everyone has access to a color printer. Refreshments and games are nice, but not mandatory when it comes to putting that information on the flyer. Here are more ideas and questions to ask.

### What Exactly Is This?

Our first meeting goals for a local knowledge sharing user group were to help introduce group ideas, share our vision of group collaboration, and a call for participation! Our first meeting flyer went something like this:

*“This group is for those who want to learn and share BIM and VD&C knowledge and ideas with the Local AEC industry. Whether you’re a Drafter, Architect or Engineer, young or old, Student or Teacher, Expert or Novice, in the office or in the field, we want to learn, share and collaborate with you!”*

This can help you find other folks who are learning and utilizing BIM, VD&C, and, hopefully, Revit Structure. You can also learn from other disciplines, workflows that can help you interact with other trades and software. This will help build stronger relationships between the models and the field. You can also research what the GCs and various trades within your construction community are looking for in your model. Are they able to utilize any of the BIM, if at all? Often, they may still need exports in DWG format for documentation and/or fabrication purposes, etc. Go find out!

### Who?

Who should join? Who do we want to present? Do you even want to have presenters? Who wants to sponsor, or do you even want sponsors? We chose to hold off on allowing sponsors for the first meeting so we could ask the group if we should allow sponsors. Sponsors often can host, provide food and/or drink, present software, lead discussions, teach groups, and offer various services.

Who is going to help organize these events? Who wants to help/volunteer? Who wants to be collaborative and who will show up? Some experts may live too far away and not be able to arrive on time due to traffic and job requirements. Maybe they can eventually attend online. Sometimes folks will also want to attend from other parts of the state, country, or even around the world! Streaming video of the meeting online brings its own challenges, but also the reward of input from worldwide experts.

### When?

Which day of the week is best for the group to meet? Many people are not super motivated on Monday or may have important meetings that day. Fridays are not good either as most people



Figure 4: Let’s learn the Ubuntu philosophy “I am because we are” “the belief in a universal bond of sharing that connects all humanity”

want to start the weekend. Take note of those current and future team members who are willing to meet on the weekend—they are serious movers and shakers, possibly a little more passionate than the average Joe. So while the weekend may not be good for a first meeting, it should not be ruled out for future meetings. Think of a “hacker style” or multiday meeting that will produce game-changing ideas.

Tuesdays, Wednesdays, and Thursdays are probably your safest bet, but should still be cross checked with other local group meetings and events to ensure everyone will be available. Also check the various sporting events, championships, and so on. Even the NFL Draft could be your competition.

### Where?

The first meeting location should be big enough to accommodate a collaborative environment. One option may be placing chairs in a circle as opposed to a classroom-style environment. You do not want to be the only one talking and you want everyone to be heard well, so a roundtable setup might work.

If you ask, you may be surprised to find that many group members will be willing to host the event at their facility, which is great! Be sure you also make note of that, then follow up and help set that in motion. You can also look into renting small spaces around your city or town—look at IHOP or maybe a sushi place. We’ve always thought it would be cool to rent out a small movie theater for one of the meetings!

Having enough space, enough chairs, enough drinks, enough food and/or snacks can all be a little stressful, so RSVP should be requested while advertising the event. Again, on the day of the event, be sure to ask the attendees if anyone is willing to host future meetings. One idea is to move the event around to encourage experts who live further from the big city to join in and share their expertise.

# Revit 2020 – Structure

## Why?

Why not? Learning Revit Structure can be both frustrating and exciting—wouldn't you much rather have others to bounce ideas off of and learn with? Your typical local Revit user group may not have many folks interested in the structural aspects, so search for them! You can still learn from architecture-dominated LUGs, but eventually you hit roadblocks. Does your LUG invite all trades and associated software?

You can Google and YouTube to your heart's desire, but eventually you're going to need to talk to other Revit Structure experts. Intricate details of construction and documentation in Revit, or working with ArchiCAD, Tekla, or those fun IFCs can pose challenges. Suggest to your current or future user group to have or allow you to run a subgroup or "focus" group for Revit Structure, Dynamo, or any other topic you desire!

## HOW, YOU ASK?

*\*in your best Rob Schneider voice\** "You can do it!" Grab a friend, buy a lunch or two, start the discussion in your town or smaller city. See who you can find, reach out on LinkedIn, but definitely utilize word-of-mouth. One thing we must stress is: DON'T HESITATE! We delayed doing this for years for various reasons, but all are just excuses.

Also, don't let nerves or the unknown scare you away from wanting to learn with local experts. Make a checklist of items you will need. Have a few of your most important talking points to bring up during the meeting. You're going to be fine!

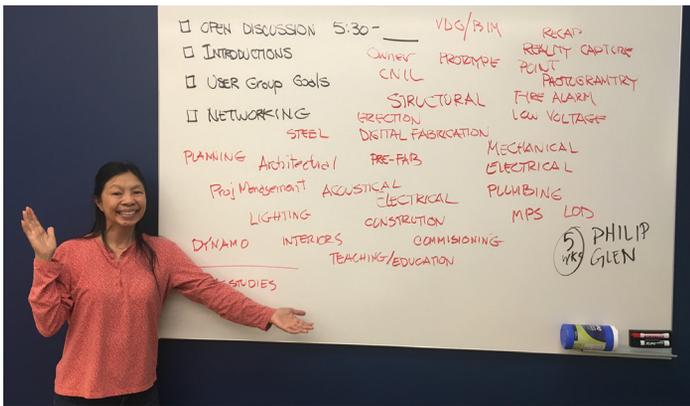


Figure 5: Here are some ideas Carol and the group came up with on our first group meeting

## CREATE A QUESTIONNAIRE

Some people do not like to talk or stand up in front of a crowd and would rather write down their ideas. Some, including us, come up with their best ideas once they've had a chance to mull things over. We created a hard-copy questionnaire to help group attendees with ideas and can be utilized as talking points during the event. Ask things such as: Do you have any software or field experience? If you had one wish for the group, what would it be? Do you have anything you would like to contribute, share, or discuss with the group? The latter can include hosting, sponsorship, presenting and/or leading a discussion, providing food or drinks, etc.). Finally, any concerns or ideas?

Handouts are also a great way to get feedback later from those who could not make it to the meeting. Encourage the group to take the questionnaire home and send in their ideas later.

## CONTINUED EDUCATION IS THE KEY

User groups have been a dying breed, especially since the advent of the Internet, but the beauty of a LUG is members helping other members with "real life" solutions to solve difficult/challenging new workflows and technologies. In other words, it takes a community of "users" to make a successful knowledge group! By not joining or starting a group, you're denying and delaying the knowledge and inspiration for yourself and others.



Figure 7: Ain't nuthin to it but to do it!



Rick Gauthier is the Training Manager for Borges Architectural Group. He is a BIM advocate and coach. His interests are focused in blending his talents in architecture with his skills in technology to advance the AECO industry. He is an instructor at Sierra College and a certified Revit Architecture Associate and Professional. Rick is also past president of the Sacramento Chapter of Construction Specification Institute (CSI), receiving a 2012 Institute Award for his work in BIM.



Adam Munoz is the BIM/CADD Studio Manager for PZSE in Roseville, California. He is AGC CM-BIM certified, AutoCAD and Revit Structure Certified Professional. He is a Professional AUGI Member and AUGI Volunteer. Adam enjoys collaborating with others who share his passion for research and development, knowledge sharing, and brainstorming.



It's 6 PM.  
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are still at the office.

But Chris  
is hanging  
by the pool

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# RTC to Digital Built Environment Institute: A New Era

**A**s a 17+ year member of AUGI, I have 'grown up' with the implicit recognition of the importance of a strong community and the value of collaboration. In the early days as an Autodesk Revit user, groups like AUGI were one of the very very few resources you had to lean on. Indeed, Autodesk University taught the same lessons: I first attended in 2003, and in that year there were only about 40 people at the 'Revit Mixer'. Those people rapidly formed a small, close-knit community, and many of them remain friends to this day. The lessons learnt then have colored how I look at the stumbling blocks I see us continually running into, as well as the basic tenets of the answers that I foresee.

My name is Wesley Benn, and, if I've not yet had the opportunity to meet you in person, I am the founder and executive chairman of the RTC/BILT event series. I am a New York-born Australian and studied architecture at the University of New South Wales in Sydney, Australia. I set-up and ran an architectural practice in Sydney, and have used both ARCHICAD and later Revit in my practice. I was fortunate (or not, as some may argue) to have stumbled onto Revit just prior to its release, so have been on the boat for the entire journey. What a ride it has been! I have trained people in Revit, implemented BIM into organisations worldwide, taught Architectural Technology at University, and spoken at many events around the world.

All of these experiences have helped shape that early recognition of the power of community from where the RTC/BILT events have grown and evolved.

## OUR HISTORY

The legacy of the RTC name, and the Revit Technology Conference series, began when we were truly a Revit focussed event, back when we ran our first conference in 2005. The members of RUGs had grown very close-knit, and wanted something more than just a drink or two once a month. The sense of community and the desire to share more intensively drove the need for a longer, deeper, interactive environment. In the years since, we have stuck to that mantra, of intimate, deep, together. We have kept the numbers at the event relatively small, and we have catered to those looking to advance their processes and to use their tools better. 2 years ago the name of our primary event series, RTC, changed to BILT – Buildings, Infrastructure, Lifecycle, Technology – to represent the changing nature of our events and to more accurately reflect the BIM community's needs. Our goal now is not only to provide knowledge around software and technology, but to be a trusted builder of communities dedicated to the built environment. We are all about sharing knowledge, working smarter and more collaboratively in order to increase productivity and efficiency as well as reduce waste in our industry together, and this is how the creation of the Digital Built Environment began.

The Digital Built Environment Institute (DBEI) is a global non-profit organisation established with the goal of responding to the demonstrated inability of the AECO industry to achieve the sort of productivity gains seen in every other industry worldwide. DBEI believes that the answers are within our reach and that we must take responsibility, must take action, to implement those answers and to provide a better environment for our descendants. We have seen how we have failed to make an impact with our work to date, now we must find the ways to expand beyond our existing constraints in order to have an impact on the wider stage.

The DBEI tagline reads 'Advancing People, Processes and Technology'. People are core to our philosophy, processes are what *people* implement, and those *people* are supported by technology. Once again, it comes back to the community. There are many voices engaged in the discussion of what and how we do our work, and therefore how we move forward, but the voice that is missing from that conversation is ours – the users, the people who actually carry out the work that everyone is debating. The people who understand action and consequence most clearly are the people who are missing from the conversation! DBEI aims to give a voice to the user community so that the expertise, the knowledge, and the needs of the broad user community can be accounted for in the global conversation.

## WHAT DOES THIS MEAN?

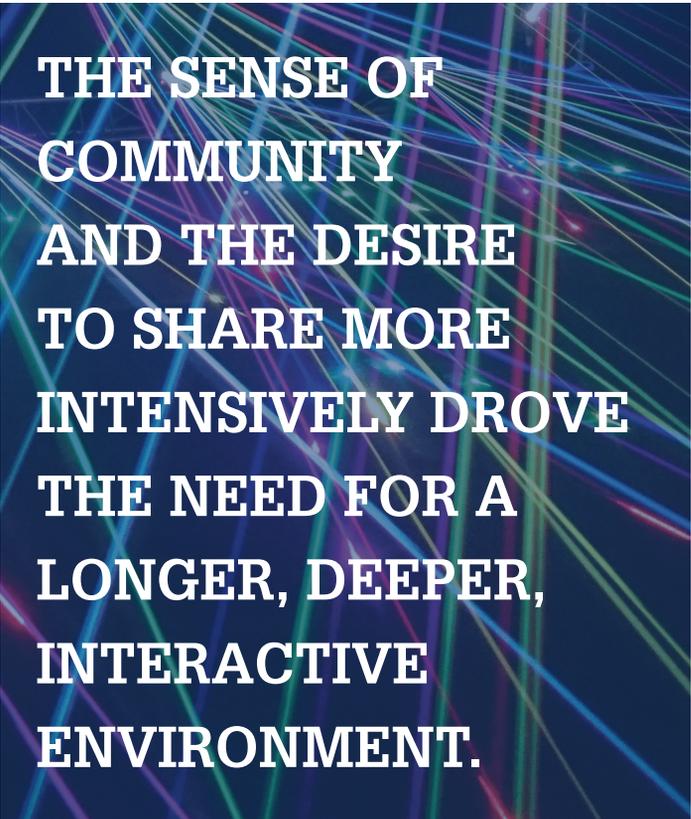
We will remain the same team with the same core values and community that make our events unique, just with a new name to suit the direction our organisation is heading. We are now the Digital Built Environment Institute.

## SO WHAT'S CHANGED NOW?

1. **We won't just do events.** As our event series' have grown in both numbers and regions (hosting 15 events across 5 countries this year!), we needed a brand that matched our vision and mission. Yes we hold events – but our goal for the future is so much more than that. We aim to help develop and grow the community with future services, resources and outreach opportunities which we couldn't deliver under the old RTC name: So expect more exciting news to come!
2. **We are now a not-for-profit.** While our goal throughout the years has never been a for-profit exercise, operating officially as a not-for-profit enables our organisation and events to integrate with other similar communities and industry associations, allowing us to learn and grow with a wider audience. It also means that we are closer aligned to our mission and goals as an organisation.

## WHAT HASN'T CHANGED?

1. **Our values, vision and mission.** Our goal is to be recognised as a trusted builder of communities dedicated to the built environment. With this name change we feel this suits our community more closely.
2. **Our events.** The core goal of our events will not be changing, while we have a few format changes to this year's events, the core purpose and goal will not change. They will now simply sit under the DBEI brand in an effort to ensure we continue



**THE SENSE OF  
COMMUNITY  
AND THE DESIRE  
TO SHARE MORE  
INTENSIVELY DROVE  
THE NEED FOR A  
LONGER, DEEPER,  
INTERACTIVE  
ENVIRONMENT.**

to push for a collaborative approach and vendor/software neutrality.

3. **Our team.** We are the same people with the same committee members volunteering their time and effort into the running of our events. RTCem will remain the Event Management company, however the Digital Built Environment will host our events.

## WHAT'S NEXT?

From now on, you will see the DBEI will take ownership of the existing event series that we currently run. This includes not only the BILT event series, but also the Design Technology Summit, Data Day, Building Content Summit, BILT Academy and our newly created Hackathon series. We will also work to connect more and more of the industry community together through other activities which we will begin to solicit feedback on in the coming months. We are already actively working to expand inclusiveness in our events through outreach to contractors, to the estimation community, to facility managers. We are also looking at how we can make the event environment more open and inclusive without losing the focus and intimacy that characterise our events. Some of the other activities we are considering could include a membership environment, a certification program, an AECO equivalent to the maker space movement, and more. Most importantly, though we want you involved in determining what those activities could be. We need to build on the basis of what we as a community identify as the needs of the community, not the imposed assumptions of someone outside looking in. We need your help to do this. Contact [whatweneed@dbeinstitute.org](mailto:whatweneed@dbeinstitute.org) with any thoughts/ ideas you have about how DBEI can serve your needs and the needs of the broader community, and let us know if you would like to get involved!

# TAYLOR DESIGN USES REVIT AUTOMATION TO SAVE TIME ON INTERIOR PROJECTS



➔ **T**ools that automate data collection and reporting present a big opportunity, finds Taylor Design.

California-based [Taylor Design](#) specializes in healthcare architecture and interior design projects. As part of their service to the client they produce furniture specification reports that assist with procurement, assessing costs, and ensuring confidence in the final product.

Taylor Design team members have been doing specification reports for more than 30 years, but moving to Revit made generating the reports more complicated and required the use of external apps.

It was a 20-step process for each furniture item in the sheet, and on average it would take ten minutes per sheet to set up. The amount of time that it was taking and the manpower required to produce the reports was no longer sustainable according to Jamison Delfino, Lead Interior Designer.

“It was one of those painful tasks you weren’t excited to spend a day doing,” says Jamison.

““ It has completely automated the process and is saving hours and hours on our projects. ””

“It was an unintuitive process that was too complicated to remember without guidance. Realistically we needed to find a better solution.”

RTV Tools Reporter addin collects useful stats from parameter data in Revit and automatically assembles them into a simple report, making it an ideal tool for interior designers. Jamison and the Taylor Design team have been using the RTV Tools Reporter addin for two months now.

“It has completely automated the process and is saving hours and hours on our projects. We were having to budget time for those specification reports, but now we are delivering faster times on top of having new functionality.”

Taylor Design utilizes the Reporter tool to scan their Revit models and extract data on each furniture item, how many items there are, what room they are in, and even a 3D representation of each piece along with a preview of material patterns, and it automatically assembles this information in a report.

“This is really useful because often we review bills from furniture dealers on behalf of clients to make sure they’re accurate, and the reports are a quick and easy way for us to show them exactly what is being ordered,” says Jamison.

“Dealer quotes are very technical – basically a list of numbers pulled out of software designed for manufacturers that wouldn’t make sense to anybody outside of the furniture industry. But the documents we are now able to produce from Revit are more

visual, explaining quickly what you are getting with each furniture specification.

“In fact, one of our larger clients is now insisting on this type of visual report so that when the furniture arrives on site they can verify they are getting what was designed.” But it’s not just saving time and money that has added value, says Jamison.

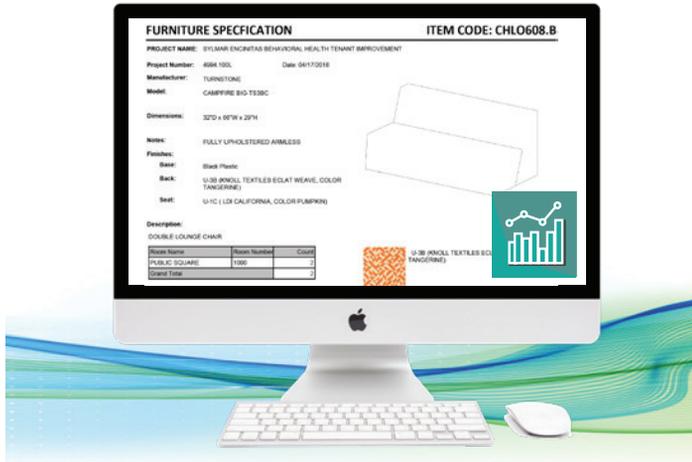
“Because we are not wasting time labouring on reports, it has allowed us to be more detail oriented in the way that we’re doing our specifications. We have more time to really think through our

dynamo file that works with all the different features and flavours of Revit with your first script.”

“RTV Tools takes care of all that with the Reporter addin and we know it consistently works. With this process I have a training document built that tells staff exactly what they need to do to make this tool work, and it is consistently repeatable,” says Steve. Another advantage is that the application works entirely within Revit as a plugin, meaning it has been easier for regular users to pick up with less training required for staff to build reports for themselves.

“The younger generation in particular are more apt at doing everything in Revit and using the software to its full capability. Now anyone can build these reports whereas formerly only two employees knew how to use the external software,” adds Jamison. Making use of the power of automation has enabled greater control of the appearance of the final product.

“We are able to create a template for how the report should be set up including items such as layout, logo position and titles. The tool will use this template and automatically assemble each page in the report,” says Jamison. “Previously there was too much room for user error with set up, and we couldn’t guarantee consistency from page to page. This tool is precise and represents the accuracy we like present in our work. It’s a huge bonus.”



design context. We’re not just worrying about putting together a deliverable, we’re actually thinking through the solution more, ultimately providing a better design.” Automation is a priority for Taylor Design going into the future, according to BIM Manager Steve Bennett.

“It was taking 10 minutes a sheet before, but now we can pump out hundreds of sheets in a few minutes.”

“This process has been a big time saver. It was taking 10 minutes a sheet before, but now we can pump out hundreds of sheets in a few minutes - that’s a huge time savings for our company,” says Steve. “If there is something we can automate, then I am all for that. Reducing the amount of bits and clicks that people have to do to put information together is something that is near and dear to my heart.”

Before Taylor Design came across the RTV Tools Reporter addin, they were trying to develop their own solution in Dynamo, a DIY visual programmer. Steve warns against other interior design firms going down that route.

“If things weren’t set up just right, it wouldn’t work, and it required a lot of handholding between the script developer and the interiors people. There’s nobody that can provide you with a

Like many firms, Taylor Design has a specific format that is used for all major projects that needed to be carried through into the new workflow.

“Simon from RTV Tools collaborated with us to build a template that would produce exactly what we needed. I sent him our Revit families and some examples, and he came back with a template. In the end we had a tool giving us the report exactly how we wanted it,” says Steve.

According to Jamison, the next area for improvement that the industry could look towards is using this tool to automate material take-offs.

“As the industry moves in the direction of utilizing Revit to build more accurate models, contractors could really benefit from the automation of material take-offs. They could easily inquire on the quantities of materials in the project and use the tool to provide a visual of what each material is to ensure accurate ordering. This would align the design team and contractors, providing better pricing to the client to avoid budget changes at later stages of the project,” she says.

## Contact RTV Tools

web: [www.rtvtools.com](http://www.rtvtools.com)  
email: [sales@rtvtools.com](mailto:sales@rtvtools.com)



# Don't Forget to Say Thanks



**W**hen was the last time you thanked someone, and did so with deep appreciation? Really gave a heartfelt thank you to someone who assisted you along the way? Someone who gave you a leg up. Pushed you further. Challenged your thinking. Encouraged you to dream. Introduced you to an expert. Invited you to join them. Gave you advice. Told you the truth. Covered for you. Accepted you as you are. Did not scold you for doing something wrong. Gave you permission to fail. Told you how to avoid the pitfalls.

I could go on with this list, but you get the idea. Now I want you to make it happen. Take the time today to say thank you to your fellow workers, your team, your boss, your spouse, your kids, your teacher, your mentor, whoever. Do it face to face, or via handwritten letter or a quick note. Maybe take time to make a phone call or even an email will do. Just go do it.

The power of a thank you is spoken of by Dr. Laura Trice. Google it and watch her TED talk. Others have spoken and written on the positives it brings to the person being thanked and the person doing the thanking. It feels good to be thanked and also produces positives in the one offering the thanks.

Now let me focus on just one area of thanks that you might think about doing... your fellow AUGI members. Most of you have gotten advice, suggestions, answers, and so much more from AUGI members. Have you thanked them recently? I am sure you do it quickly when you get some great tip, but I encourage you to circle back around and say thank you to them again and tell them how their advice impacted you and your work life.

## IS THERE ANYBODY OUT THERE?

AUGI members serve each other, but sometimes feel lost in the shuffle of tips and tricks flying back and forth. They take the time to post or write and pour out their wisdom for all to share. They

do it, not for the limelight, but to help others as they have been helped. They sometimes may not feel connected or appreciated when they offer advice because they do not hear back from those that have benefited.

Classic rock gave us some magnificent bands—Pink Floyd among the most celebrated. Remember the album *The Wall*? On the two platter release is a song called “Is There Anybody Out There?” which asks that exact question. The best way to let someone know you are out there is to reach out and thank them.

## AUGI FORUMS

So many members have advanced their careers and knowledge through the forums that it is un-countable (is that a word?). But how often do you see lengthy acknowledgments and appreciation in the thread? Oh sure, people say thanks, but seldom do they stop and write an extended paragraph on how it personally made their jobs easier. Most of the help offered is not to get a thank you. Most, if not all, AUGI members are selfless givers and help others because that is the culture of AUGI. But go back and thank a couple.

## AUGI VOLUNTEERS

Behind the scenes, volunteers work tirelessly to make AUGI happen. Forum moderators, magazine content managers, web content manager, wish list helpers, organizers, recruiters, Autodesk University volunteers, and so many more. Some of these volunteers have worked for years with AUGI. They love the work they get to do, but can be encouraged when someone extends a “thank you” to them. Send an email and let them know.

## AUGIWORLD WRITERS

The writers of the rag you hold in your hand or read online are not paid staff. They don't get a paycheck for their work. They do it because they love to, but still could use a kind word now and then. And they seldom hear back from those who read their work. It takes an extra measure to write back. Most authors have emails right there at the end of each article in their bio. Stop and take a minute to email them and tell them what you think of their article and the good it has done for you. Let them know if they helped you and how it helped. How much time they saved you. Tell them how they changed your thinking. Mention how they made you stop a bad habit or build a good new habit.

## YOUR LOCAL USER GROUP LEADERS

Reach out and let them know that you really appreciate the time and work it takes to pull off a Local User Group (LUG). These things don't just happen by themselves. Every month or so they struggle to find topics, speakers, sponsors, and more so their members can soak up the rewards. Offer them a pat on the back and a public thank you at your next meeting. A round of applause to those LUG leaders out there.

## AUGI STAFF

Even though they get paid for the work they perform for AUGI, they are no less deserving of your appreciation. Look on the

**OH SURE, PEOPLE SAY  
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website for a list. Graphics staff, editors, web support, accountants, newsletter developers, BLAUGI posters, HotNews publishers, advertising reps, emails campaign staff, and so much more. Let them know that you are grateful for their efforts.

## THE AUGI BOARD

Thank the AUGI board of directors for doing the work they do. They think AUGI all the time. They ponder new features, new offerings. They struggle with handling the thousands and thousands of members. They prep for Autodesk University. They struggle with budgets and staffing. They interact with Autodesk directly. Give them a shout out of thanks.

Thank You do not create themselves. They don't magically appear unless someone takes the time to speak up. Good intentions don't lift someone's spirits until shared. Make it happen. Thank one person today and start thanking more tomorrow.

Don't leave these people and others wondering... is there anybody out there?



*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](http://www.caddmanager.com) and [www.bimmanager.com](http://www.bimmanager.com).*

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## Helical Gear Generator

<https://apps.autodesk.com/FUSION/en/Detail/Index?id=9029586664984391977&appLang=en&os=Mac>



Helical gears resemble spur gears with the teeth at an angle. They can be meshed in parallel or crossed orientations at 90 degrees or arbitrary angles and can be generated with as little as a single tooth forming a screw gear.

Gears may be specified in either the Normal or the Radial system or the fixed profile Sunderland standard, any of which can be generated as either left or right handed. Handedness in helical gears refers to the direction the teeth lean when the gear is placed flat on a table.

Using this add-in, proper Herringbone gears (such as the gears used for this add-in's thumbnail) can be created by using a Sunderland profile then mirroring the gear about one of its faces. In the case of Herringbone or other double-helix gears, the handedness of the base gear is not as significant as it is for single helix gears. To effectively change the handedness of a Herringbone/double helix gear, all you need to do is flip it over, whereas for a single helix gear it must be mirrored to change its handedness.

Finally, by setting a helix angle of 0 degrees, Spur gears can be created and defined in the Metric system (as opposed to the sample Spur Gear script, which defines gears in the American system) with this add-in.

Be sure to check out the "Gear Down For What" YouTube channel and on thingiverse where some amazing things are being done with Helical gears!

## Export to Unity

<https://www.emanuefavreau.com/>



Export Autodesk® Revit® models directly to Unity with materials and textures. Send visible elements of a 3D view to the assets folder of a Unity project. The tool will generate OBJ, MTL, and image files format that can be read by Unity. Benefits include:

- Other VR and modeling software such as Unreal Engine or Blender can also read these types of files.
- All meshes from the 3D view will be parsed and exported to .obj files according to vertices number.
- Three grouping options are available: By Materials, By Entities, or One Single Object.

Export to Unity works only with Revit version 2018.1 or higher.

## AutoExcel

<https://shop.bimize.com/>



With AutoExcel, you will be able to quickly export and re-import any Autodesk® Revit® project schedule to Microsoft® Excel®. The process is simple:

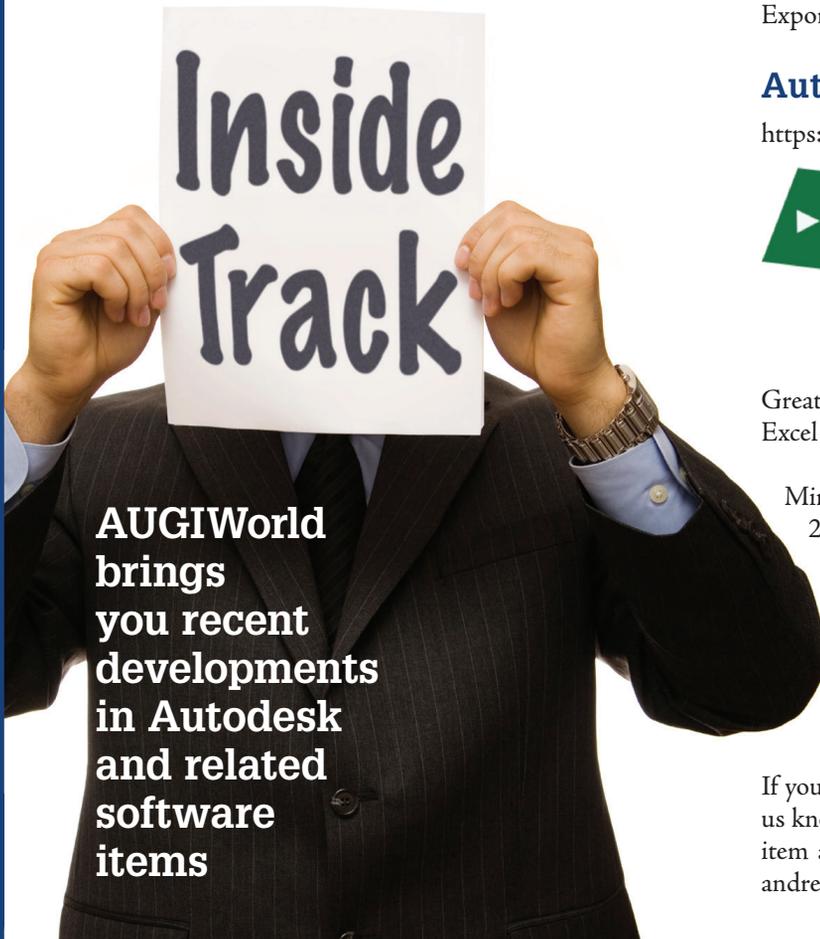
1. Open any project schedule and click "export."
2. Modify the Excel-generated file.
3. Go to the project schedule and click "import."

Great for modification of tons of parameters in a single step. Use Excel to organize your data and parameters!

Minimum requirements: the oldest Excel version supported is 2013 (v15.0).

This is a trial version with a 30 day period. To purchase this app, visit [shop.bimize.com](https://shop.bimize.com/).

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](mailto:brian.andresen@augi.com)



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**Y**ES! Another release of AutoCAD® Civil 3D®, just as you probably finished installing the latest 2019 “fix.” That was somewhat sarcastic, but I do see much needed improvements to AutoCAD 2020 and its vertical products such as Civil 3D.

This article looks at some of the top new features within AutoCAD Civil 3D 2020 and may help you make your decision to download and install today.

**VERSION INTEROPERABILITY**

Typically, the first question asked is about prior version interoperability. The AutoCAD format for 2020 is also the 2018 format previously introduced. This means you should have no problem going back and forth between 2018, 2019, and 2020. One exception is that the newer Civil 3D object/features will not go backwards, but this shouldn't be a problem.

**HEY GOOD LOOKIN'!**

**New Icon**

The last several versions of Civil 3D have used the “A” logo, and different variations of the logo dating back to 2012. 2020 has a new “C” logo, which actually makes sense (Figure 1).



Figure 1

## Dark Color Scheme

One thing I initially thought was WAY overhyped was the introduction of the dark color scheme. But after the initial install and working in 2020, I realized it actually is pretty easy on the eyes!

The dark scheme controls the appearance of the ribbons, application window, and other elements and is especially sleek looking when using the contextual ribbon tabs.

You can change this in your options, under the Display tab (Figure 2).

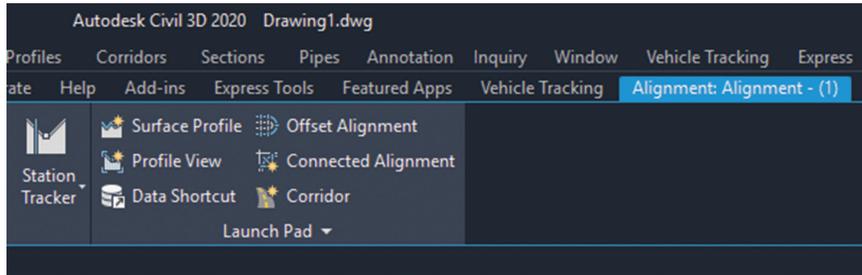


Figure 2

## AUTOCAD PLATFORM ITEMS

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

- Blocks Palette:** The new Blocks palette makes it easier to insert blocks with visual galleries and the ability to filter for the exact block you seek. You can simply drag and drop blocks into the drawing from Current Drawing, Recent, or Other Drawing tabs.
- Purge Redesign:** The Purge feature has been redesigned for easier drawing cleanup. Remove multiple unneeded objects at once with easy selection and a visual preview area. There is a “Find Non-Purgeable Items” button with a Possible Reasons section, to understand why certain items can’t be purged (Figure 3).

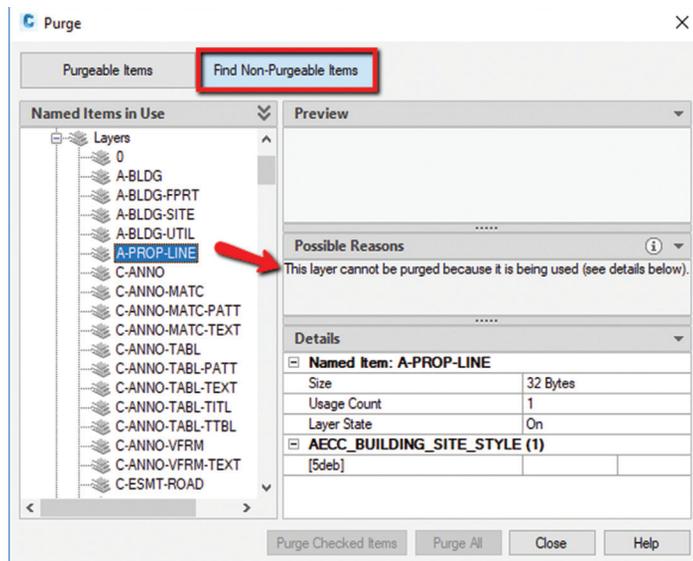


Figure 3

- DWG Compare:** This was one of my favorite additions from last year. The ability to compare two drawings and quickly see what has been modified. Now in 2020, you can compare two versions of a drawing without leaving your current window and import desired changes into the current drawing in real time. Quickly toggle on and off the comparison with the new DWG Compare toolbar.

## AUTOCAD MAP 3D PLATFORM ITEMS

### Autodesk Connector for ArcGIS

AutoCAD Map 3D 2020 allows you to access your GIS data on ArcGIS Online or Portal for ArcGIS Enterprise and bring them into your drawings. Look for this connection tool in Map® 3D, Civil 3D, and Infraworks®.

### CIVIL 3D 2019.1, .2 (NOW IN 2020)

Most, if not all of the 2019 update enhancements have been rolled into the software. Some of the following items may be of interest and really help in streamlining workflows and

enhancing design.

### Rail

There are a bunch of recent updates to the software for rail design. You’ll see a whole new ribbon for Rail design that contains alignments, platform edges, crossovers/turnouts, and additional content such as more subassemblies for rail design.

### Pipe Networks

Specify the type of connection points on structures to use when laying out pipe networks. When you lay out a pipe network, you can select which type of connection point to use:

- Structure insertion point.
- The default connection point (the first connection point that is defined for a structure).
- Closest connection point to the cursor.

The following part types have been updated to have new connection points and grips.

- Rectangular Underground Structures:** Pipe connection points have been added at the inside center of each wall.
- Eccentric Cylindrical Structures:** A single pipe connection point has been added to the center of the underground barrel.
- Rectangular Grates:** Move grips have been added to the back left corner, back center, and back right corner of each rectangular grate. Rotation grips have been added to the back center of each rectangular grate.

### Collaboration and Data Exchange Updates

- Publish surfaces to Autodesk BIM 360® Document Management for use in Autodesk Revit.
- Use updated LandXML import and export features when importing or exporting data.

# AutoCAD Civil 3D 2020

- Reference sample line groups into drawings using data shortcuts.

## Transparent Commands

Still something people tend to forget, and usually the first toolbar closed! But now the transparent commands are in a ribbon tab and accessible from the right-click menu (Figure 4).

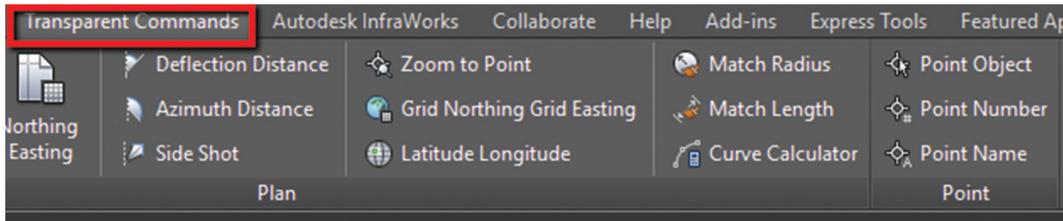


Figure 4

## PRODUCTION EFFICIENCY UPDATES

- Add crossing objects to profile views to show where linear objects cross the profile relative to the parent alignment. You can show alignments, profiles, feature lines, survey figures, and 3D polylines as crossing objects in a profile view.
- When creating a data shortcut reference to a sample line group, you can now automatically create references to the sampled sources if data shortcuts exist for those sources.

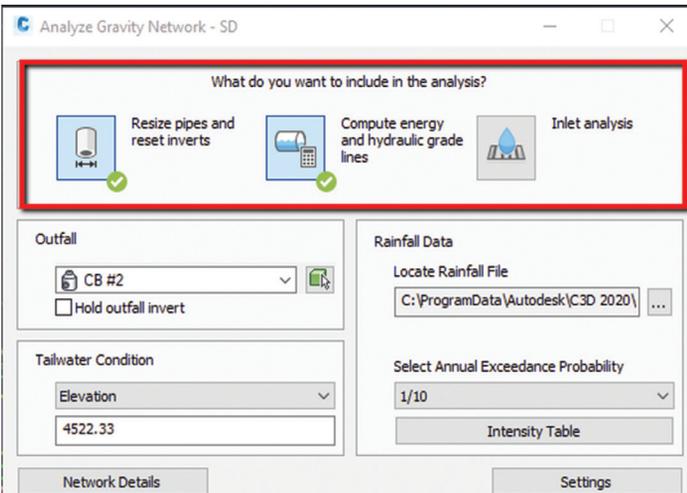


Figure 5

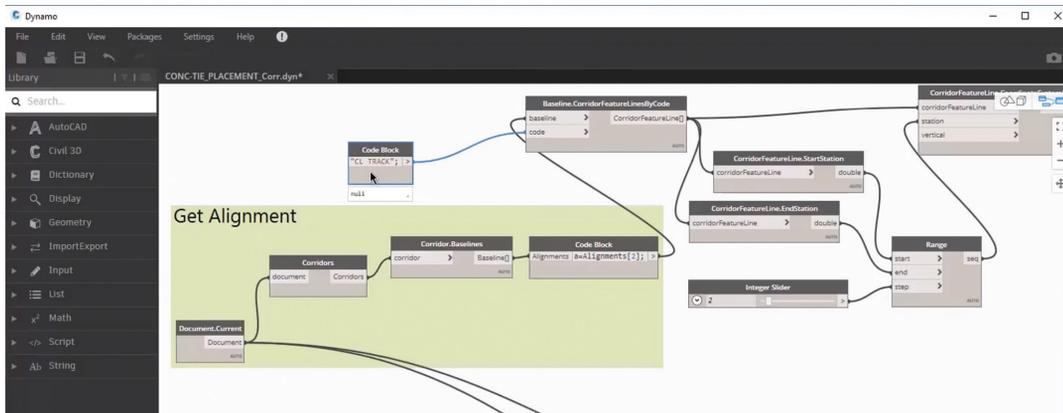


Figure 6

## Gravity Network Analysis

You can easily use the Analyze Gravity Network tool to analyze a pipe network directly within Civil 3D and even apply those analysis results to the pipe network. You have the following three options for analysis (see Figure 5).

- **Resize Pipes and Reset Inverts:** Analyzes the flow through the pipes, and then resizes the pipes and resets inverts to accommodate the flow. Applying the results of the analysis will update the pipe sizes and invert elevations according to the calculated results, and will apply all of the calculated properties to the pipe network.
- **Compute Energy and Hydraulic Grade Lines:** Calculates the energy and hydraulic grade lines, and then reports whether each line in the system is in a normal state, surcharged, or flooded. You have the option to apply these results to the pipe network from the results page of the dialog box. Applying the results of the analysis will apply the calculated energy and hydraulic grade values to the affected parts in the pipe network.
- **Inlet Analysis:** Analyzes the capacity of the inlets and reports the flow, depth, and spread at each inlet on the results page of the dialog box.

## DYNAMO FOR CIVIL 3D

What is Dynamo for Civil 3D? Think of this as putting your corridor on steroids! Dynamo for Civil 3D is a visual programming tool that adds the power of Dynamo scripting and 3D modeling to control and interact with AutoCAD and Civil 3D drawings directly inside the CAD environment.

The good thing about Dynamo is that it is made for designers, drafters, engineers, and others. So, if you're like me and have ZERO programming capabilities, then you will really enjoy this! To me, this is closer to Subassembly Composer than true programming (Figure 6).

Visually, nodes appear as blocks. These blocks contain all the design parameters for a particular element of the model you are

working on. Nodes are then strung together using a visual editor to form the final script. These scripts can expedite time-consuming or repetitive workflows. You can save these scripts in a library and reuse them as needed.

Currently, most Dynamo tools for Civil 3D are going to be transportation related. Slicing corridors to replicate construction, adding linear items

such as lights, powerpole, etc are just a couple of the tasks that Dynamo can help streamline. But look to Dynamo in the future for improving almost any workflow.

Value	Description
0	Property sets will never be synchronized when related data referenced objects are synchronized.
1	Property sets will be synchronized when related data referenced objects are synchronized.  Property set synchronization will occur in the host drawing only if the object has been changed in the source drawing. <ul style="list-style-type: none"> <li>If the object has been changed in the source drawing, the object and the related property set will be synchronized in the host drawing.</li> <li>If the object has not been changed in the source drawing, the object and the related property set will not be synchronized in the host drawing.</li> </ul> Note: If the property set has been changed in the source drawing, the property set will not be synchronized unless the object has been changed in the source drawing.

Figure 7

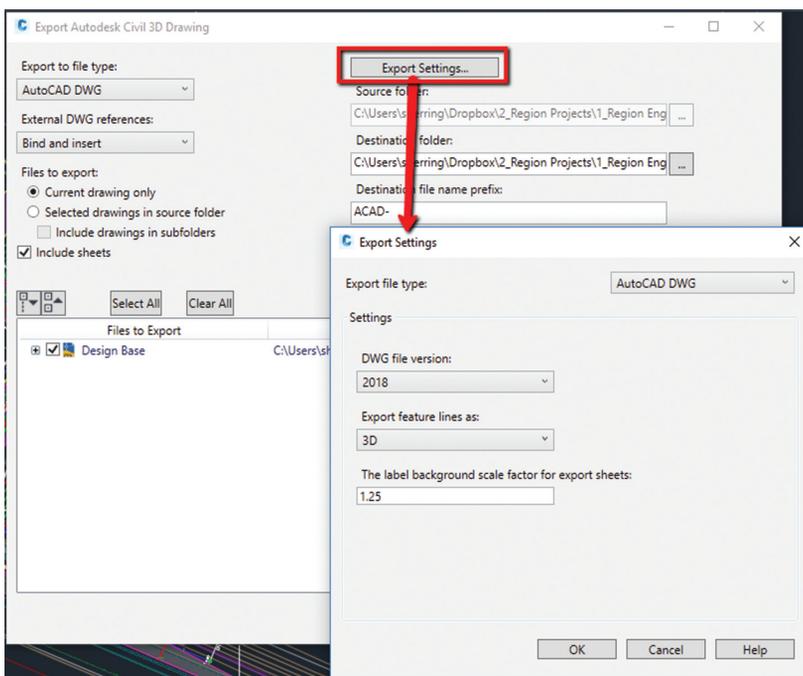


Figure 8

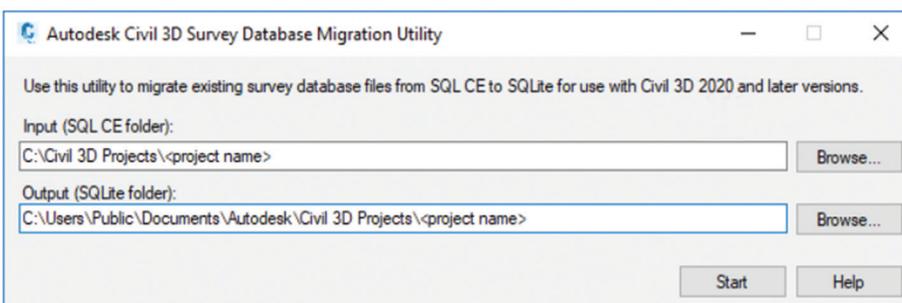


Figure 9

## DATA SHORTCUTS

Use a new system variable named *SyncDrefPsetToSource* to control whether property sets are synchronized when you synchronize data shortcut references. You can use the following settings for *SyncDrefPsetToSource* (see Figure 7).

## EXPORT CIVIL 3D DRAWINGS

The Export feature has always been a bit annoying, and only works half the time—and that’s being generous! However, the Export Civil 3D Drawing command has been updated with the following features (Figure 8).

- Labels with background masks are no longer exported with bowtie-shaped hatches.
- Xrefs are exploded appropriately on export.
- Proxy state messages are no longer displayed on export.
- The option to convert feature lines, parcel segments, and survey figures to 2D or 3D polylines that was included in the Autodesk Civil 3D 2019.2 update is included in Autodesk Civil 3D 2020.

## SURVEY DATABASE FORMAT

The survey database format has been updated from Microsoft SQL Server Compact (SQL CE) format to SQLite. To use existing survey databases with Autodesk Civil 3D 2020, they must be converted to SQLite.

Use the Autodesk Civil 3D Survey Database Migration Utility to convert survey databases from SQL CE to SQLite (Figure 9).

The Autodesk Civil 3D Survey Database Migration Utility is a separate download available at <https://www.autodesk.com/civil3d-survey-database-migration-utility>.

Note: Migrated databases are not compatible with earlier releases of Autodesk Civil 3D.

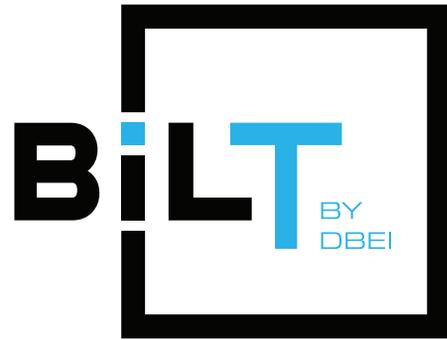
## BIM 360 DOCUMENT MANAGEMENT (BIM DOCS)

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 what it can offer to you and your design workflow. I’ve been using this for a few months now as simply a PDF review/markup tool and a project coordination tool. Have “Review Sessions,” create tickets/issues, and assign items to team members. You can also overlay PDFs and compare version to version to see what may have changed (Figure 10).

## CONCLUSION

I must admit, I thought 2019 was going to be the best release yet, and boy was I WRONG, as 2019 had a lot of issues. However, 2020 seems





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# Promoting Industry Standards

**P**lease consider the following information, which promotes BIM standardization within the AEC industry for Mechanical, Electrical and Plumbing (MEP). I highly encourage you to share this with your colleagues, consultants, and resellers to help promote this ambitious effort.

This is not a sales pitch for the MEP Productivity Pack (MEPPP) per se, but a call to action. We are giving away, for free, our Shared Parameters file, User Guide, and some reference material to promote and facilitate this cause.

## OVERVIEW

The first three chapters of the free user guide document the standards used when creating the MEPPP. These standards will serve as a starting point as we continue to work with manufacturers and organizations in pursuit of Revit® standards for the mechanical and electrical industry. History (e.g., Autodesk® SEEK standard) shows us that standardized shared parameters alone are not enough to establish an industry standard. We need standardized shared parameters that are also developed into

standardized schedules, standardized connector settings, and standardized formulas to truly pursue an industry standard.

So why would someone want a standard? The answer is simple—time is being wasted fixing content to schedule and propagate flows, which only hurts the bottom line. Firms are not using intelligent information in the models because it requires too much time to accomplish that.

Imagine a world where an engineer or designer can use any manufacturer's family to drop in the model and have the family tag and schedule instantly, or even better yet, by having the schedule already filled in with actual selection information. Instead of spending valuable project time and budget to fix families and perform data entry, we should spend time reviewing selection information in the model, using intelligent information to propagate flow through systems, and reviewing clearances and layout for optimization. This is only possible if an industry standard is achieved.

There is no better place to begin this discussion than standardized shared parameters.

## BACKGROUND

In the words of Autodesk, “Shared parameters are parameter definitions that can be used in multiple families or projects. The shared parameter is a definition of a container for information that can be used in multiple families or projects.”

Think of shared parameters as the connectors of information in the BIM world. They connect information in the Revit families, to information in the tags, to information in the schedules. These containers of information all have very specific data types, which allow engineering calculations to be performed in the model. An airflow data type, for example, is uniquely different from a number data type. Figure 1 shows a sample of some of the different data types available for shared parameters. The key element to standardized shared parameters is utilizing the right data types for each possible piece of information. It is also important to not use “units” in shared parameter names since units can be changed in the project, making the shared parameter value and name invalid.

Units	Format
Density	1234.5679 lb/ft <sup>3</sup>
Friction	1234.57 in-wg/100ft
Power	1235 Btu/h
Power Density	1234.57 W/ft <sup>2</sup>
Pressure	1234.57 in-wg
Temperature	1235 °F
Velocity	1235 FPM
Air Flow	1235 CFM
Duct Size	17"
Cross Section	1234.57 in <sup>2</sup>
Heat Gain	1234.6 Btu/h
Roughness	1234.5679'
Dynamic Viscosity	1234.57 cP
Air Flow Density	1234.57 CFM/SF
Coil Load	1234.57 Btu/h

Decimal symbol/digit grouping:  
123,456,789.00

Figure 1

## SHARED PARAMETER GOALS

So what were the main goals and objectives when creating the mechanical and electrical shared parameters for the MEPPP?

- Preserve proper data types.
- Use names that are clear and easily understood by users.
- Keep names short enough to be easily read in any of the many Revit windows displaying them.
- Use names that don't contain “units” so the name is always valid in the project and also compatible with the Metric system.
- Use tooltips for clarifying abbreviated shared parameters and also for instructions to users.
- Use hidden shared parameters to declutter the properties window for users in the project.

## ABBREVIATIONS BASED ON ASHRAE AND NECA

After multiple iterations, over the years, of developing master shared parameters, the parameter name length has been the most challenging goal.

Thus, the ideal scenario is to abbreviate names. But which standard should be followed?

The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) is recognized as a leading organization in our industry with extensive development of standards currently being used across the globe. The 2017 ASHRAE Handbook of Fundamentals includes Chapter 38: Abbreviations and Symbols. This chapter was used as the foundation for abbreviations in the MEPPP shared parameter file. Similarly, the electrical abbreviations are based on National Electrical Code (NEC) and National Electrical Contractors Association (NECA) standards. As shown on the left in Figure 2, this has dramatically cleaned up parameter names in Revit windows while still keeping parameter names in line with what the industry already knows and accepts.

## THE MEPPP SHARED PARAMETER FILE

The current release of the MEPPP has taken the need for intelligent parameters to another level. We have Articulated Cartesian Arms with super flexibility that require a great quantity of hidden parameters containing formulas; we have autosizing Air Terminals and Equipment that rely on parameters with tooltips to help users through the autosizing process; and we have engineering equations in many families that heavily rely on shared parameters with proper data types.

So, here is what we ended up with, which hopefully is the beginning of an industry standard:

- Over 2,000 shared parameters with implemented abbreviation standard from ASHRAE (2017 ASHRAE® Handbook - Fundamentals Chapter 38 Abbreviations & Symbols & ASHRAE Standard 90.1-2013).
- Electrical parameters and symbols are based on NEC and NECA.
- Over 500 shared parameters include tooltips.
- Over 500 shared parameters are invisible in project to provide the user the cleanest environment in the model.

Video overview: Shared Parameters for Industry (YouTube) <https://www.youtube.com/watch?v=MPv9OzUHNC0>

ASHRAE, NECA, and Autodesk: we need your help in pursuing an MEP industry standard for Revit. We look forward to further collaboration and engagement.

We also need MEP engineers, designers, and contractors to continue to reach out to their contacts at ASHRAE, NECA, Autodesk, and manufacturers to help consolidate everyone's effort. There is a clear benefit for the manufacturer to follow a widely adopted standard that is being used by engineers. Better and

# Revit 2020 – MEP

more compatible families developed within a standard increases their chances of being the basis of design and scheduled on the drawings, which is a step above making it into a specification.

This discussion has already started with manufacturers, but you can still send them this *MEPPP Information Kit* and tell them to contact CTC Software ([feedback@ctcsoftware.com](mailto:feedback@ctcsoftware.com)). We would welcome a continuation of this important discussion.

Figure 2 shows how the MEPPP shared parameters file is organized.

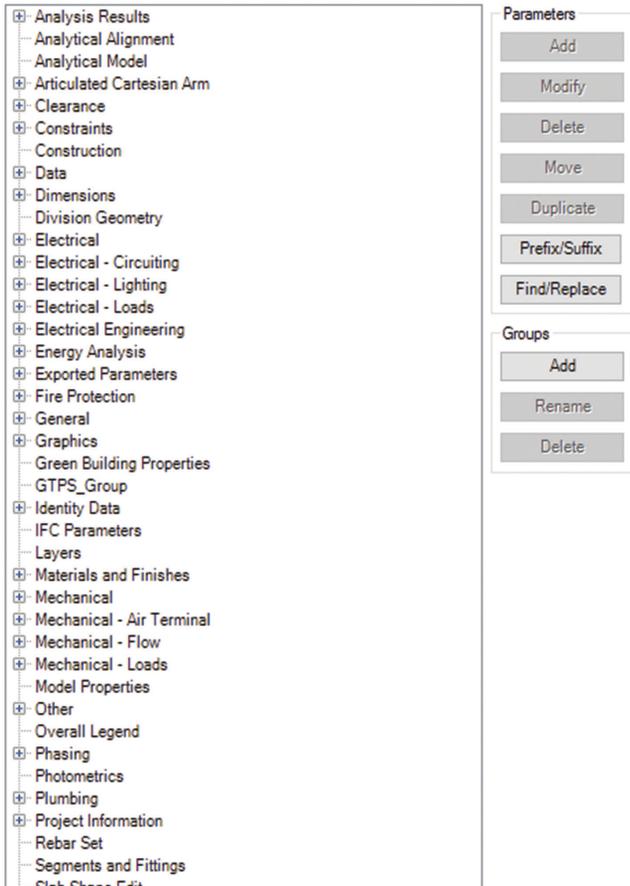


Figure 2

## DOWNLOAD THE FREE MEPPP INFORMATION KIT

To help facilitate this standard please download and review our 269-page MEPPP User Guide, the Shared Parameters file and lists/examples: family list, view template list, schedule, and detail example PDFs, and much more.

<https://ctcsoftware.com/product/mechanical-electrical-plumbing-productivity-pack/>

## CONCLUSION

With this information in hand we, Blake Guither (Gausman & Moore), Dan Stine (LHB), and Shawn Zirbes (CTC Software), hope you will join us in this important endeavor to make our industry more efficient!



Daniel John Stine AIA, CSI, CDT, is a registered architect with more than 20 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 & Enscape, 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. He has presented internationally on BIM in the USA, Canada, Ireland, Denmark, Slovenia, Australia and Singapore. Dan was ranked multiple times as a top-ten speaker by attendees at 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 and brainstorm new Revit features in 2016.

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 12 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.



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**ALLEGION**  
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# Unitsosaurus: Set Up Revit for Success

**S**purred on by a bit of tweetie-bashing of file conversion qualities, or lack(s) thereof, and by seeing countless individuals (CAD and BIM “Managers”), thus projects, teams, AND finally, firms that can’t get simple geometry straight... literally (see every CAD drawing ever)... well, this mediocrity of basic quality is rampant in Revit® and further, BIM, to an all-too-

large degree. If your units are set up like Figure 1, then you are dismissed lol... everyone else, be very scared, but read on.

Okay, so since you are still here I hope this will clear up a few ideas or at least give a starting point for more research into quality, precision, and what it is we are doing in AECO.

If your Revit project template’s units (today we are talking Revit, but I do not care about the software: set Units as granular as possible) are NOT set as shown in Figure 1, and they are more like Figure 2, set your units up as I will explain. IMMEDIATELY after reading this. No joke!

I will hold back on much more editorialization, except to say that if you disagree with any of these concepts, please contact me on twitter @JayZallan and try your best! I dare you... fwiw I have geometry, floating-point precision, and quality in my corner.

Do you have any “Wall is slightly off axis” or worse yet “Line is slightly off axis” warnings? “Slightly Off Axis” warnings are directly related to mediocre, or just plain bad, modeling. If you use any CAD drawing in your process, you will most likely have found these files are some of the causal factors (and if you’re still reading have ignored such Revit warnings). Regardless, a BIM shall be correct, and not approximated or rounded to the 1/8” (or whatever contractual precision’s been set) until the dirt hits the shovel (AKA: during construction). Both bad modeling and bad CAD create bad BIM, which is costing your firm time and money.

So here we go—only tech from here on out.

1. Do not use the setup shown in Figure 2.

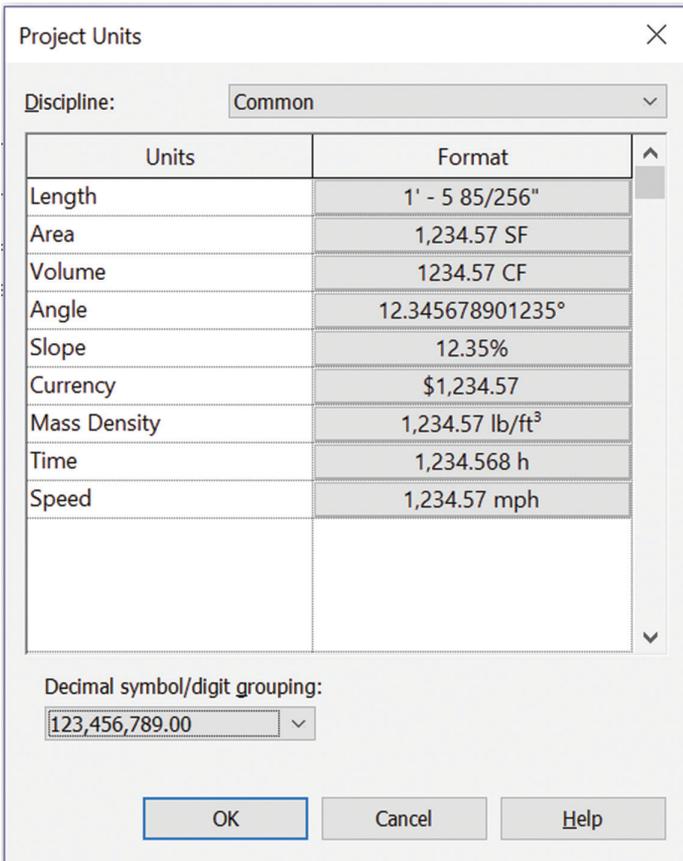


Figure 1: Image illustrating proper overall units

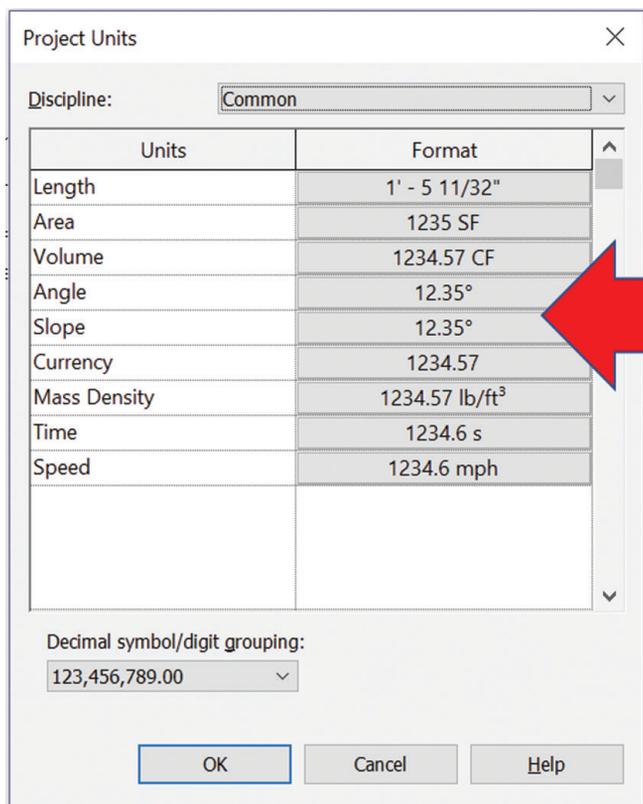


Figure 2: Image illustrating possibly the most unprofessional and unintelligent setup of units possible

1. Set up Dimensions to respect Project Units.
  - a. I am not saying leave dimensions that report to the x/256 of an inch.
  - b. What I am saying is:
    - i. IF A DIMENSION REPORTS BAD NUMBERS (1/256" etc.) FIX IT!
    - ii. Fix the model, do not override dimensions.
2. I do create one Dimension Type that does not use Project Units and rounds to 1/8" (if that is your contractual obligation).
  - a. Make this rounded dimension red.
  - b. Rarely use this for individual dimensions, where geometry dictates or when the site dictates odd angles, etc.
  - c. Never use these for dimension strings. FIX THE MODEL in that case!

## UNITS

Setting up Revit units correctly and professionally.

1. Type "UN"

## LENGTH

- a. Click the button under the "Format" heading for "Length" and set up as follows.
  - i. YES, 1/256".
  - ii. "Suppress 0 feet" is cool to uncheck if you're into that sort of olde-timey thing, I like it personally but still I don't usually use it.

- iii. Digit grouping makes numbers look as we like in the USA... commas and all.
- iv. "Suppress spaces" is ok to check if you're into that sort of thing.
  1. Please understand that this comment goes for all following Units' dialogs as well, as I am not into suppressing spaces.

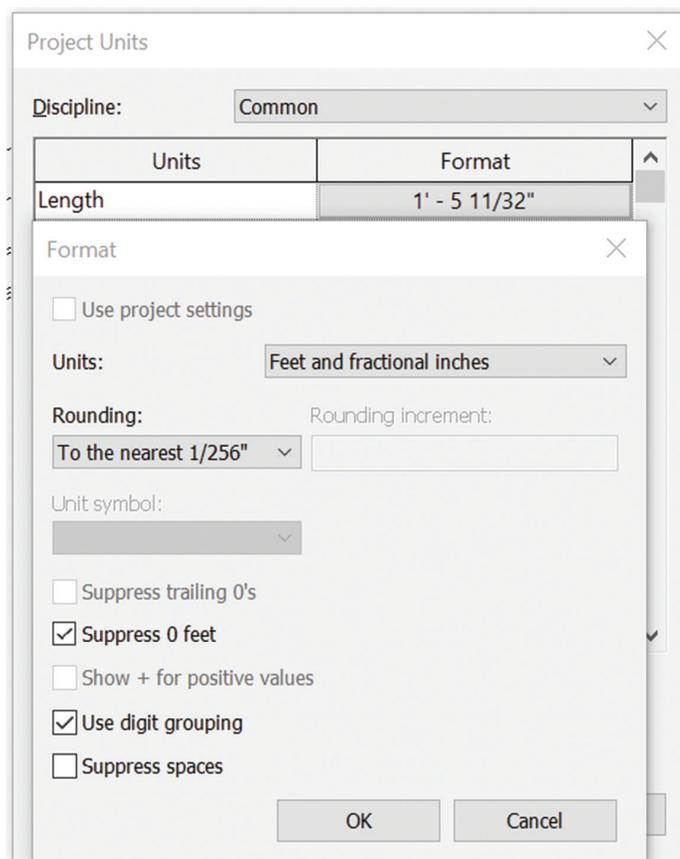


Figure 3: Image illustrating proper "Length" units

# Revit 2019 – Architecture

## AREA

- b. Click the button under the “Format” heading for “Area” and set up as follows.
  - i. Two decimal places.
  - ii. Suppress trailing 0s.
    1. This is key. One will only see extra 0s if there are numbers other than 0 to the right of the decimal (0s are visible in Temporary Dimensions and when OBJs are selected, but that’s how it should be. Let me see reality!)
- iii. All the rest as shown.

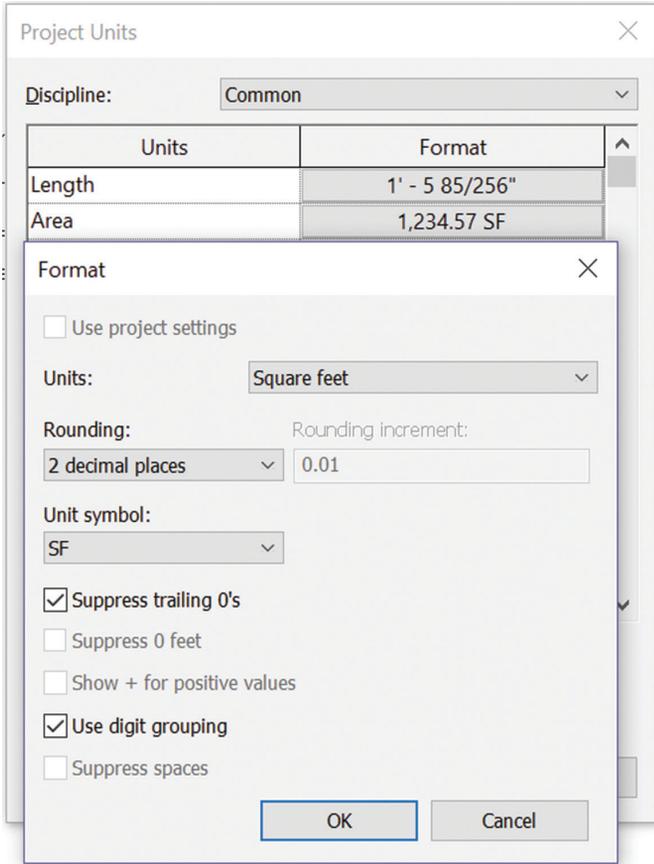


Figure 4: Image illustrating proper “Area” units

## VOLUME

- c. Click the button under the “Format” heading for “Volume” and set up as follows.
  - i. Note: one may want to get more granular with this if refined calculations are desired.

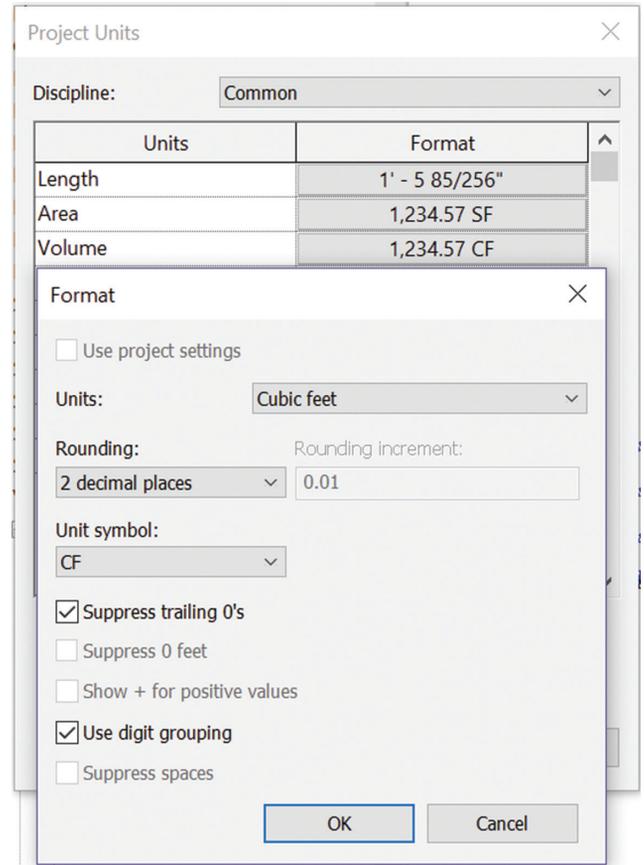


Figure 5: Image illustrating proper “Volume” units

## ANGLE

The following settings are even more important than the length settings, as we geolocate our models and need this granularity and quality. (Full Stop)

- d. “Rounding” set to “Custom”
  - i. Place cursor between the 0 and 1, to the right of the decimal point.
  - ii. Enter “0” ten (10) times.
    1. Just do it, you’ll thank me when Shared Coordinates don’t blow up anymore (as if).
  - iii. Remember, the trailing 0s will only show up when the geometry is... well, let’s just say “probably needs work” (at best) and “is totally a joke for someone who calls themselves professional” (at worst).
    1. Just do it, you’ll thank me when Shared Coordinates don’t blow up anymore (as if).

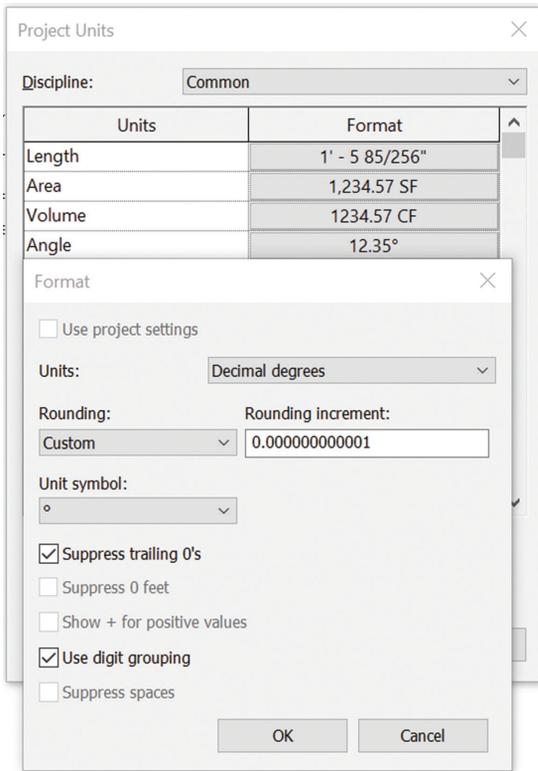


Figure 6: Image illustrating proper “Angle” units

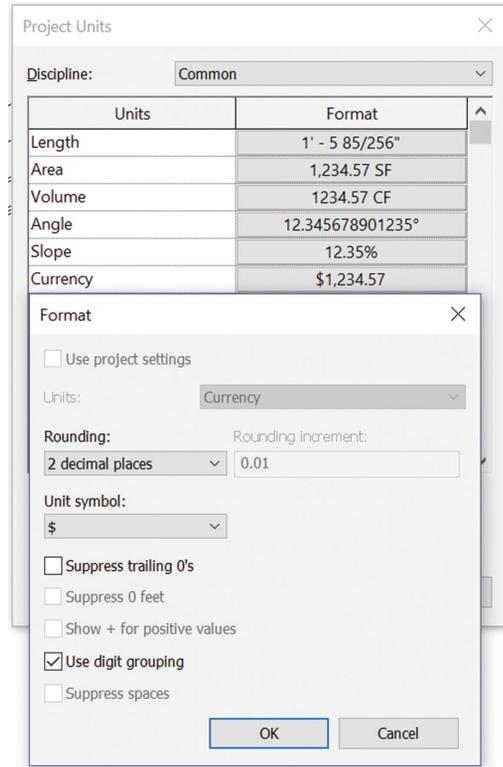


Figure 8: Image illustrating proper “Currency” units (add the dollar sign!) I like to set it up like money (since that is what this unit is lol) so I let the trailing 0s show proudly

## SLOPE, CURRENCY, and MASS DENSITY

Settings are all in the following images. There are not many comments until “Time.”

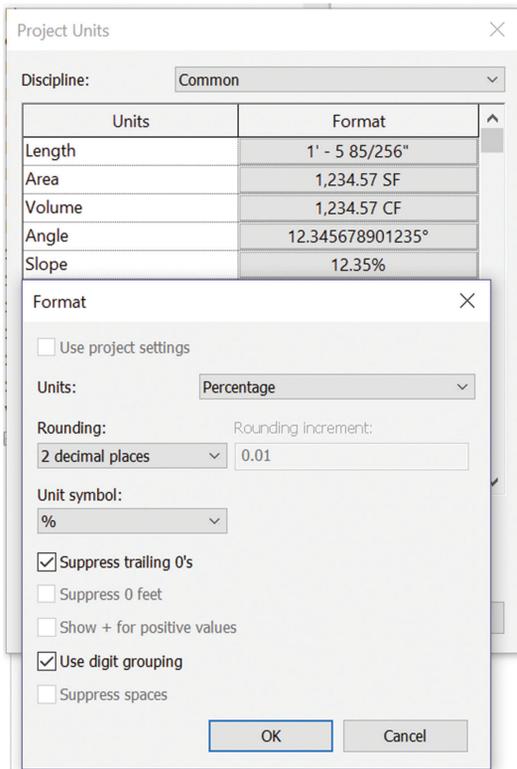


Figure 7: Image illustrating proper “Slope” units. (Yeah, you can set them up for Rise/12, etc... these are oft modified to satisfy municipalities, outside jurisdictions, etc.)

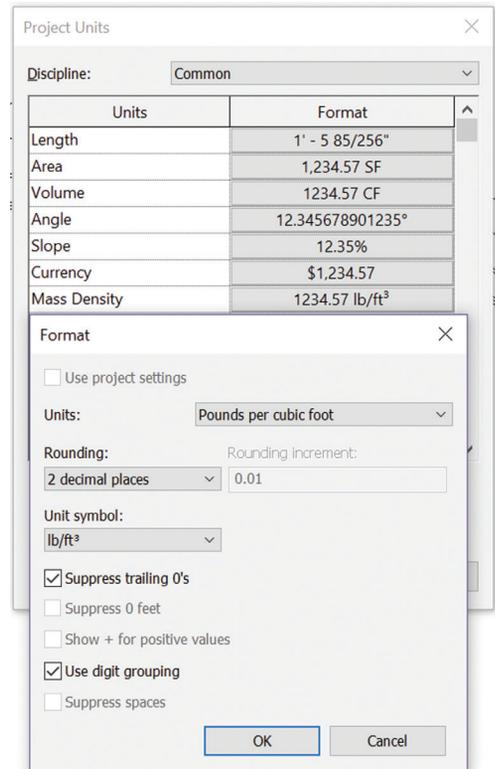


Figure 9: Image illustrating proper “Mass Density” units. The next time I use these will be the first, so if there are any mass density experts reading this, please let me know if there are better setups

# Revit 2019 – Architecture

## TIME and SPEED

- e. New to Revit 2020, Time and Speed are going to allow a lot of future capabilities and I am looking forward to it!
- f. Currently used in the new (and one day to be working properly) Exiting Path tools, with more potential functionality and workflows, beyond exiting alone for the creative masterminds.

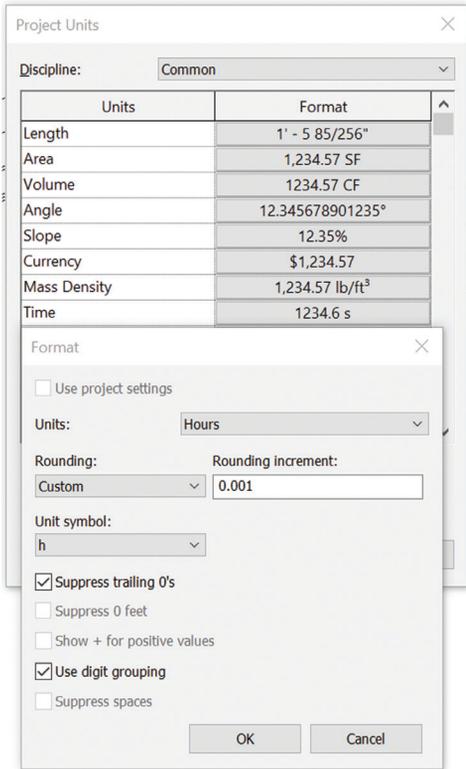


Figure 10: Image illustrating proper "Time" units

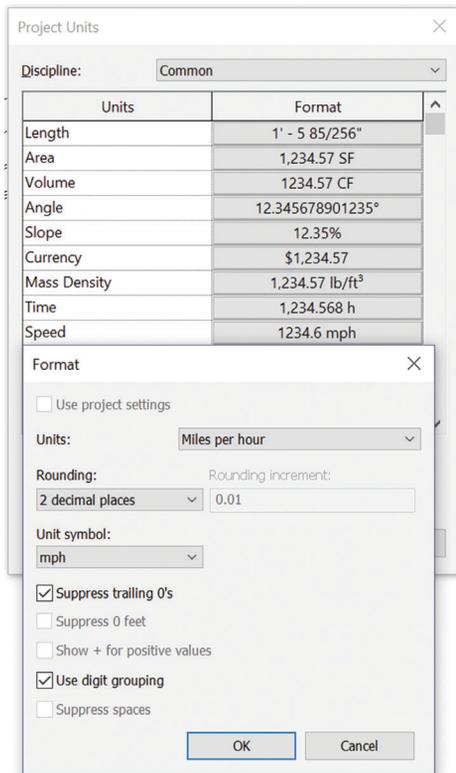


Figure 11: Image illustrating proper "Speed" units

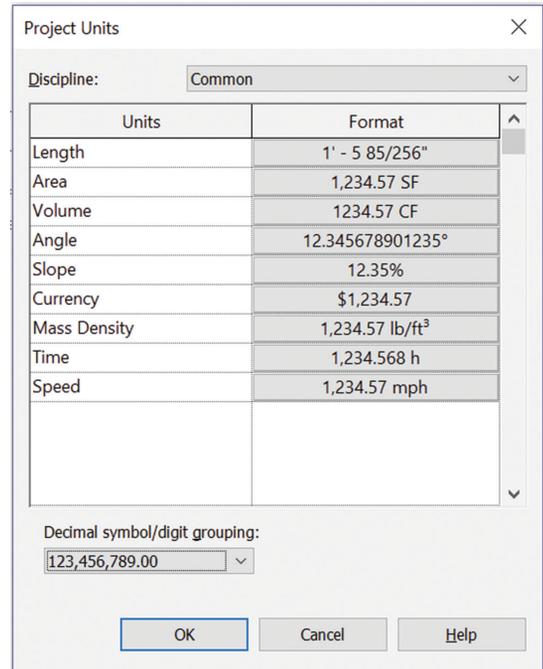


Figure 12: Image illustrating a properly set up Units dialog

## UNITS CONCLUSION

Revit Units should look something like Figure 12, but if there are differences, a few things should (if not must, imo) remain constant: Length and Angle must be as granular as allowed, whether in Revit, CAD, or any other software used to author BIMs or any portion therein. Set the Units granular and then draw and model to rational dimensions. PERIOD ;)



Jay B Zallan | Virtual Design & Construction Technology Conductor (& Fine Artist)

Mr. Zallan brings wide-ranging Design, Delivery, Management, Mentoring and Teaching experiences to the readily changing AECO industries, founded on an expansive 35 plus year career.

Jay has focused on VDC planning, production, process development and research & development; to help enable efficiency-generative creative project execution, delivery and success throughout the AECO landscape.

This JayZ is an educator, author and industry lecturer throughout the BIM world; Jz strives to inspire current and future generations to achieve and exceed beyond even their own expectations.

Being a Fine Artist (large format oil & mixed media canvases), J adds unique and collaborative insights and perspectives to every team he is part of.

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