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The Official Publication of the AUGI Design Community  
August 2020

## Strategies for Implementation

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- Civil 3D and Revit Coordination





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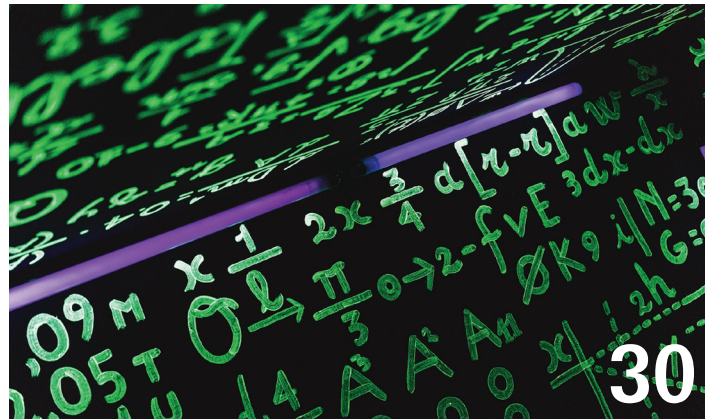
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# Letter from the President



# AUGI

## GREETINGS!

**A**nother month of summer has flown by and soon the kids will be (hopefully) headed back to school soon! I have a high school junior, and of course things went spinning out of control during the last half of the school year with the Covid pandemic. Teachers across the country learned very quickly the process of implementing online learning so students could continue their education. I have to say our own school district did a fantastic job in dealing with the sudden changes. So much so that my son has decided he does not want to go back! I am not sure that is how it was supposed to work.

Implementing any new software or process can be a challenge. The key to implementation (I believe) is strategy and planning for the unexpected. An unsuccessful implementation process can turn users into angry beings and cost your company time and money. Do not worry! Our authors have written a variety of articles to guide you through different implementation processes. What better way to learn than from someone who has "been there, done that"?

Autodesk University has announced that not only will this year's event be conducted virtually, but it is also free to attend! This is a great way to experience the keynotes from Autodesk executives and class sessions from some phenomenal colleagues, without the long walk through a smoky Las Vegas casino, dry chapped lips, and sensory overload. Be sure to share the virtual event with your employers and coworkers so they can also see the value in attending AU!

In light of the changes in AU, where we typically host our Annual General Meeting, we are currently exploring options for a virtual AGM. Please keep an eye on our social media channels as well as our email communication for further information as we continue to work out the details.

I also wanted to give a shout out to my predecessor, Kate (Morrical) Towne, who became a mom for the first time in June! Congratulations, Kate!

Wherever you are, my hope is that you continue to stay safe, stay well, and keep looking up!

Cheers!

Kimberly

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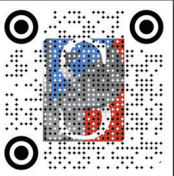


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# Strategies for Implementing 3ds Max for the Entrepreneur

➡ **3**ds Max is used in conjunction with many other programs to create content. The list is long and continues to grow. One reason for this is 3ds Max is simple to implement.

Additionally, implementation is less constrained by technical barriers with the software, than by the capability of the user. Still, countless startups fail by not understanding the work involved with creating content using 3ds Max. Too many try to be a studio that can do everything, but they don't have the capital or the workforce to accomplish the tasks appropriately, and sink. However, 3ds Max is not the anchor that pulls them down. It is the studio and those implementing the workflows and procedures. So, after speaking with various professionals in different industries using 3ds Max, I will share some advice for those considering 3ds Max as their solution for their services.

1. Do not “wing it” or “fake it until you make it”: Understanding the service and processes involved, allows implementers to break those down into steps that enable employees to succeed. Doing that helps to improve teams' capabilities while building skills necessary to be a professional. Generating a focused, project-based, stepped approach requires isolating the service(s) you wish to provide and divvying out tasks in a manner that will build skill, challenge users, and help them to create a great product.
2. Focus on skill building, not software: For architectural visualization, a professional will understand area shadows, soft particles and atmosphere, depth of field, advanced post effects, parallax mapping, anisotropic and translucent shading, real-time refraction, reflection, caustics, rays, dispersion, and much more. They will also understand furniture placement, interior decorating, exterior landscape, human behavior, security concerns, vehicular and pedestrian travel behavior, and much more developed over time. Consider 3ds Max as a tool used to highlight a person's capabilities. Like a hammer, anyone can pick it up and start tossing it around, but not everyone knows how to build a beautiful home.
3. Be flexible to new minds: Company owners are called decision-makers. If you happen to be one deciding whether or not to implement 3ds Max in your company, you have likely been outside production for a considerable amount of time. You have built your skills around negotiation, legal challenges, budgeting, human resources, accounting, and more. Recognize that while you developed those skills, others have focused on honing their technical and design capability. Add them to your team and consider them your best support and asset for implementation.
4. Do not be afraid of the future (or bugs that come with it): Studies show early adoption is painful, but in almost every case, early adopters reap benefits; late adopters do not. Be at the forefront of innovation and be prepared to budget for its success and failures; your competition will be.
5. Spread your wings: Your implementer will need to maintain an understanding of current trends and challenges affecting everyday users and provide potential problems or solutions for workflow. This information spreads by word of mouth shared through professional networks and connections. Start by aligning yourself with professionals and forums like AUGI and others that focus on software solutions and where you will find mostly professionals.





Figure 1 – Industries Served Using 3ds Max

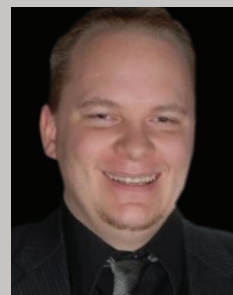
Let me put all this in context. While starting, it will be near impossible for a small shop to be a successful architectural visualization company while simultaneously creating assets for games, visual effects for film, and motion graphics for advertisements, but 3ds Max is used extensively for each of those. See Figure One, for example. Each of these requires an extraordinary amount of knowledge of even the basic components, to the advanced applications that take years to develop.

It will be unlikely a studio stretched so thin can successfully compete with firms who focus their resources. Especially if bidding processes are or become involved.

Taking a lesson from sports, make sure the goal, the final product, is marked on the field. Map out your positions and your playbook. Identify what is in and out of bounds for the players and the team. Map out the plays a person needs to practice the skills they need to build and inspire them to do just that. Ensure every player knows their part and can execute it flawlessly most of the time. Mapping these out ensures you implement realistic, obtainable goals. Do not be afraid to adjust as needed. Flexibility is an attribute of success, not a failure. Don't have individuals play too many positions. You wouldn't want your best pitcher to be a 3rd baseman, nor would you want to bench your best quarterback. Working with 3ds Max is no different. If your best lighting artist is stuck texturing assets, you risk not only substandard work, but losing them altogether.

Finally, expect at first, even simple tasks will take time to master. For example, in an architectural visualization firm, importing and exporting FBX files is a necessary process. While it might seem relatively simple, depending on the scene components, complexities, and bugs, building successful workflows for this can take a considerable amount of time that users must work through. Since every file is unique, there may not always be a single solution.

Finally, success will be determined by whether or not you mapped out tasks in a manner that provides a consistent path to learning/skill-building while forming autonomy, creative thinking, and expression (3ds Max is a tool for artists after all) that challenges users to better themselves. Good luck!



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Autodesk's BIM 360 is a cloud-based solution that is designed to manage a project from start to finish. As part of Autodesk's Construction Cloud, BIM 360 helps deliver a complete project lifecycle solution. But what is it? BIM 360 is a collection of Modules and each Module is a solution. In order for all of the Modules and other Construction Cloud solutions to speak to each other, Autodesk uses a common Application Programming Interface – or API – called Forge. Forge creates the unified platform that is BIM 360 Next Generation. The foundation “module” that all the solutions within BIM 360 live on top of is BIM 360 Document Management. That is where you will find BIM 360 Model Coordination. Model Coordination reads the models it is to clash, based on the folder within Document Management.

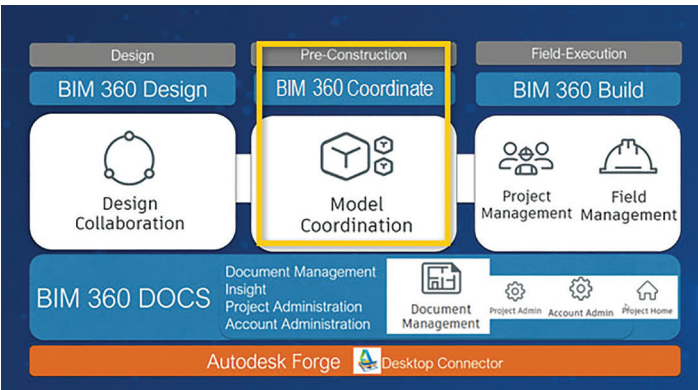


Figure 1

Model Coordination can now read folders placed in both Plans and Project Files locations! This means design teams can now coordinate their working, live models at the start of the project

with little extra effort and a few licenses of BIM 360 Coordinate. In this article we are going to focus on BIM 360 Model Coordination with an overview from set up to managing models to working with clashes.

### A BRIEF OVERVIEW OF BIM 360

BIM 360 is one part of the Autodesk Construction Cloud. While other aspects of the Construction Cloud also work in various phases of a project, this article is focused on the BIM 360 component.



Figure 2

An overview of all modules and a brief description of what they do and what they are also known as.

MODULE	DESCRIPTION	AKA
Document Management	Complete document solution	Docs
Design Collaboration	Share and link project models	Design
Model Coordination	Clash combined models	Coordinate
Plan	Construction schedule	Plan
Cost Management*	Project budget and pay tools	Cost
Field Management	Field execution of checklists, issues, and daily logs	Field
Project Management	Construction execution of RFIs, meeting minutes, and submittals	PM
Layout	Locates points from the model to the field	Layout/APL
Insight	Project Health and Reports	Insight
Operations	Maintaining the completed project	Ops

\*add-on

Figure 3



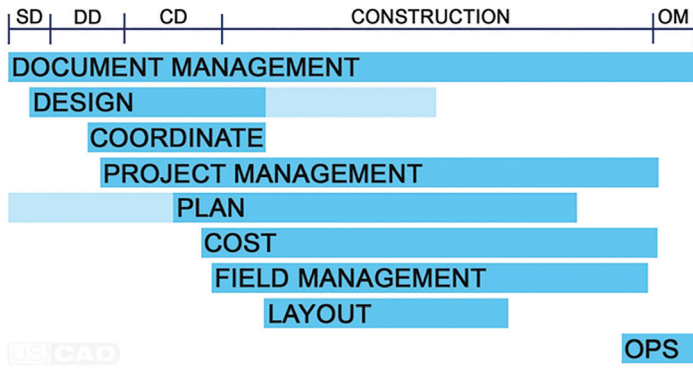


Figure 4

Each Module is designed to work at different points in the project lifecycle with all of them interacting with Document Management throughout the entire process. Coordination typically is focused on subcontractor or fabrication models but has grown to help designers with their design models.

The Project Admin Module is where setting up the Coordination Spaces for Model Coordination happens. While the Document Management Module is where Model Coordination will read the models from as well as feed issues to the model.

## NEXT GEN MODEL COORDINATION

Navisworks Manage has been the main tool in Autodesk's wheelhouse for Clash Detection. With BIM 360 Classic – the first cloud solution – BIM 360 Glue was introduced. While it had its positives and its negatives, it was a viable solution that as many adopted as rejected. After all, it is hard to please an industry notorious for the slow integration of technological change.

With BIM 360 Next Gen, living on top of the Forge platform, it seemed like cloud solutions were finally poised to take the construction world by storm. With the announcement of Model Coordination, many were expecting a melding of the best of Navisworks with the compatibility of Glue. It quickly developed the nickname Glue 2.0 following the adoption of Field 2.0 and other Next Gen versions of BIM 360. Autodesk and Beta Testers were quick to point out that Model Coordination was a 'reimagination' of Clash Detection.

The Next Generation of Model Coordination started at the ground level: what are you clashing and why? Putting in some Machine Learning, Model Coordination was born. It would take the models in a location and clash them against each other and automatically grouping the results. The automatic grouping here saves many hours for every Clash Report that must be created compared to Navisworks. From here, new features get layered in; assigning and tracking clashes through Issues, what to group clashes by, and tools to review the model. More workflows and features come out with every release, including tying BIM 360 Issues to Navisworks.

## GETTING STARTED

First things first: upload the models you want to clash into the same folder! You can use the Copy option within BIM 360,

Desktop Connector, or Upload Files if you do not want to use live files, or different locations for storing models to be clashed.

Next, go to the Project Admin module from the Module Selector (or Waffle Menu, Rubik's Cube, etc). In the Project Admin, go to the Services. On the left-hand side, choose Model Coordination from the list. Here you will see a list of all the created Coordination Spaces. Click on "Create" to make a new one. You can also Deactivate ones that are no longer in use from here. (Image5.jpg)

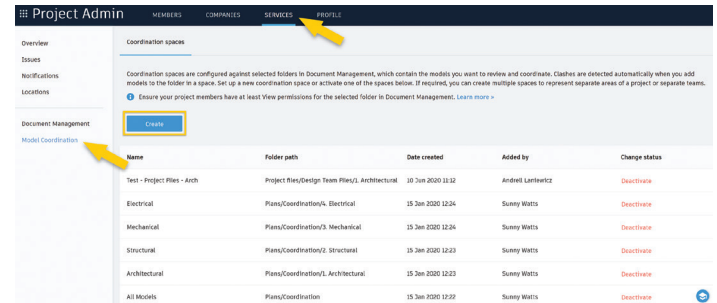


Figure 5

Once you hit "Create", the Coordination Space will need to be named and the folder location of the models chosen. Note: the folder must already exist, but models can be added or removed later especially depending on your workflow. You will be able to cycle through all Active Coordination Spaces from within the Module.

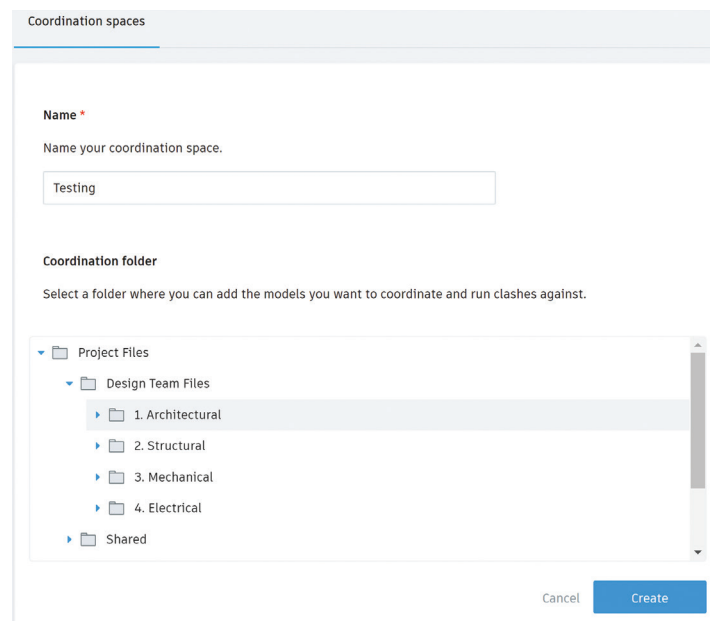


Figure 6

And now we wait. Wait time is dependent on number of models, size of models, number of clashes, and complexity of clashes.

## MODEL COORDINATION: ACTIVE CLASHES

Once you have set up your Coordination Spaces, we finally get to go into the Model Coordination Module. The Landing Page will



be on the Models tab. This is where all models in the Coordination Space will be listed. To cycle through the Coordination Spaces, use the drop down in the upper right.

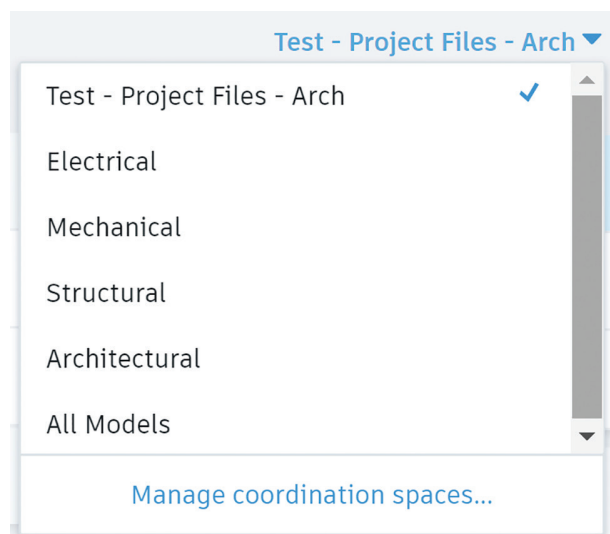


Figure 7

	AR - EQUIP_EXPORT_50750_Arch.rvt	AR - HOLE_EXPORT_50750_Arch.rvt	AR - SHELL_EXPORT_50750_Arch.rvt	AR - SITE_EXPORT_50750_Arch.rvt	EL - POWER_EXPORT_Electrical.rvt	EL - LIGHTING_EXPORT_Electrical.rvt	M - DOMESTIC_EXPORT_50750_Mech.rvt	M - DUCT_EXPORT_50750_Mech.rvt	M - DOW_EXPORT_50750_Mech.rvt	M - NPIPE_EXPORT_50750_Mech.rvt	ST - FID-S_EXPORT_50750_Struct.rvt	ST - SUPPORT_EXPORT_50750_Struct.rvt	ST - WALL-S_EXPORT_50750_Struct.rvt	(30)_inc_basic_sample_project.rvt
AR - EQUIP_EXPORT_50750_Arch.rvt	0													
AR - HORIZONTAL...T_50750_Arch.rvt	74	27	6	3	59	1	51	4	1	4	25	16		
AR - SHELL_EXPORT_50750_Arch.rvt	280	130	4	24	3	15	73	8	14	7	159	78		
AR - SITE_EXPORT_50750_Arch.rvt	4	3	2					1		3	3	4		
EL - POWER_EXPORT_Electrical.rvt	154	31	55				42				50	44		
EL - LIGHTING_EXPORT_Electrical.rvt	245	234	6				17	2	1		11	10		
M - DOMESTIC_EXPORT_50750_Mech.rvt														

Figure 8

Migrate over to the Clashes tab and the Active subtab. Here is an example of a grid matrix. Each intersection will have the number of clashes between those two models. A color intensity is applied to visually represent areas of higher and lower numbers of clashes. Darker shades indicate a higher count of clashes while lighter shades indicate fewer clashes. The key here is to note that the models in the column on the left-hand side are Primary Models. Primary Models control the number of clashes and grouping. This includes the Clash IDs. The behind-the-scenes IDs allow modelers to remove an element, re-add it, and for Model Coordination to still tie that 'new' element to an existing Clash Group instead of creating a New Clash – as would happen in Navisworks or Glue. This is starting to show off the power of what Model Coordination is!

To further add to some of the complexity of what is shown, you can have a different 'total' number of "clash groups" as compared to the number of

clashes between models added up. To get a clearer understanding, let's discuss managing these clashes and how the API is working!

Selecting an intersecting box will open the Model Coordination Viewer with those two models and those clashes only. If you select a row by clicking on the model on the left-hand side, it will open all of the models and display all of the clashes with that model.

## MANAGING CLASHES

The Viewer in Model Coordination is the same Viewer across all of BIM 360. It does have one notable difference: Levels is on the bottom toolbar and not the side fly-out menu. It opens a list of the levels and will isolate the view to just that level. Counterintuitively, in order to restore the model to the full view and not a section around the level, you must select the level again. Essentially, the level names in the dialog box function as Toggles.

When the Viewer opens, you will see green and red geometry: red being the Grouped By Model's geometries and green being the model geometry that is clashing with it. These colors will be a bit muted and the rest of the model will be either ghosted out

or not visible based on your options set. On the left-hand side, the Clashes fly-out menu will be open. At the top will be the main "Model" to group by – you can switch this, and the colors will swap as will the groupings. However, it will not change which model is primary and what the clash IDs assigned to those geometries are. Note: a clash can come up multiple times this way as the IDs are based on the primary models, not the groups.

The next item is "Property". When Autodesk reimagined Clash Detection, they focused on the main properties that were used to create clash sets and why. It boiled down to Object (geometry specific with no sets needed), System Name (for MEP), and Type Name (for more specific geometry grouping across multiple trades.). As you cycle through these options, you will notice the clash groups change, but not the number of Clashes. This should help clarify why the

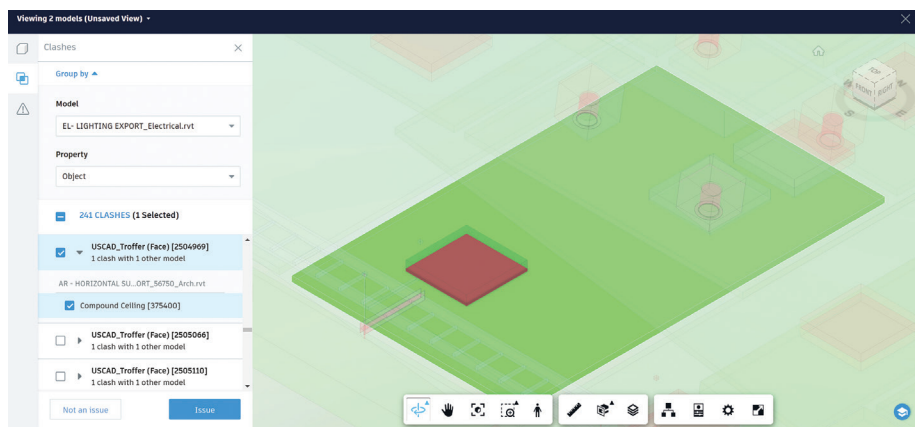


Figure 9



numbers of Clash Groups and individual clashes have different numbers on the Clash Matrix.

Once you have set up how you want your clash groups set – for now – select a clash. When you do, that clash will brighten, the others will become transparent and even more faded. If you use the drop down, you will see all geometries involved in the clash (if there is more than one). The ability to select the entire Clash Group or individual parts of the clash gives you more control. Select the items and then choose if they are an “Issue” or “Not an issue”. See figure 9.

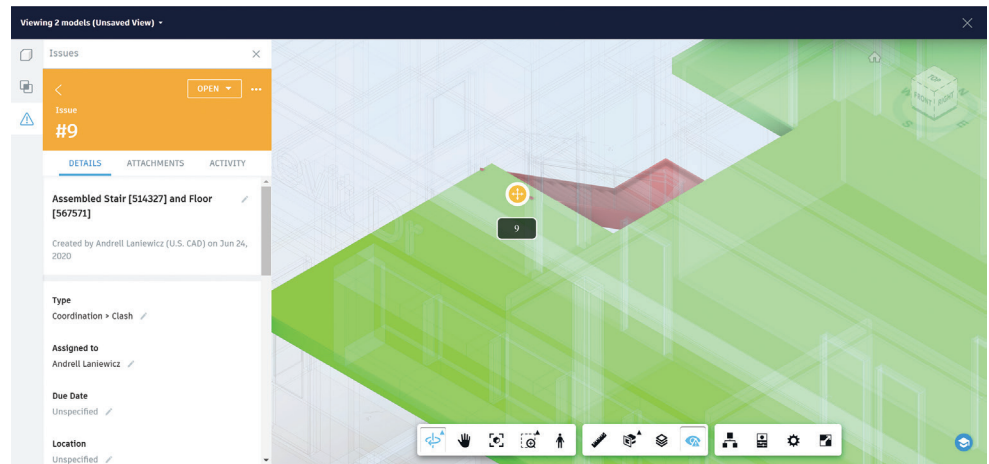


Figure 10

If you choose Issue: click to place a point on the red geometry, fill in the Issue (some will automatically fill in for you), and click “Create”.

If you choose Not an issue: choose a reason, fill in comments (if needed), and click “OK”.

Remember how the Levels dialog was previously pointed out and ultimately raises the question of why would that even be useful as opposed to a section box? Another powerful feature of Model Coordination that Navisworks does not have, is the ability for you to select a geometry in the viewer and have it pull up that clash!

## LET'S TALK WORKFLOWS

Did you catch that? The Issues get assigned to the red geometry. You can also group by System Name or Type Name. Using these options, you can quickly get through a majority of typical “Not an issue” clashes. You can even have multiple Clashes and Clash Groups selected at once.

For example: Sheet metal and Architectural models are being clashed; set the red model to the sheet metal and change the property to Type Name, scroll through the Clash Groups to “Flex” (typically Flex – Round), select all, review to verify, and mark all as “Not an issue”. You can then repeat this with the Supply and Return Grills that intersect ceilings. Apply this to a clash between Architectural and Lighting: group by Architectural Model and Type Name to review clash groups with the ceiling. Uncheck items that are “actually issues” and mark the remaining clashes in the Clash Group(s) as “Not an issue”.

Issues function as Issues. You can use the Activity area and tag others that might need to be involved, you can reference other drawings or attachments, manage the Issues by Due Dates, get a report of the counts in the Home Module, and more. Issues have Custom Attributes! This means you can set an Attribute for Priority, add it to Coordination and Clash Issue Types, and then sort and manage the Clash Issues by Priority. All Issues are tracked, so you can view when someone reviewed a Clash Issue. This helps a coordination team change the conversation to accountability and teamwork instead of trying to place blame or play Hot Potato.

There is currently an add-in to tie BIM 360 Issues into Navisworks Manage, but only in NWD files. This creates an interesting workflow of being able to view Model Issues in Navisworks and even create them, but to not have a living model or have Navisworks Clashes translate to Issues in BIM 360. The good news is that Autodesk has added more communication between Model Coordination and Navisworks on their roadmap in the upcoming months. The workflows should change with new possibilities opening up. So, stay informed!

## FORGE APPLIED PROGRAMING INTERFACE (API)

To understand a bit more of how Model Coordination works, here is a basic diagram from the Model Coordination API page from Autodesk. It illustrates what clashes feed the clash numbers versus the clash groups.

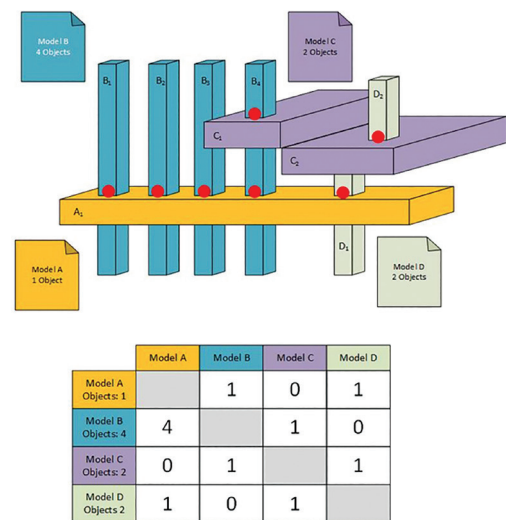


Figure 11

Autodesk has exposed some of the Forge API (currently in Beta) for Model Coordination. With what has been exposed, it increases the ability to manage clashes such as adding newly closed Clash Groups to a Closed clash that was already created. The API will allow you to automate the examples from above. You will



potentially be able to take an item with “Flex” in its property and assign it to a closed group. The API does expose more options in Model Coordination than the interface gives you direct access to. However, Revit uses C#, and Forge uses JavaScript, Python, and more. So, your current developer(s) may need some additional training to get this up and running.

## RELATES TO NAVISWORKS

Navisworks Manage is a Navisworks Working file, or NWF, while in BIM 360, there are Coordination Spaces. In Navisworks, there is the tool Clash Detective. In BIM 360, there is the module Model Coordination. Within Clash Detective, there are Clash Tests. Within Model Coordination, there are Rows and Cells that are referred to as Clash Tests – automatically set up from the Coordination Space. Once clashes are run, Navisworks must be manually told to update and Model Coordination will automatically do it when opened. In a Clash Test, clashes come in as New while existing ones become Active once the Clash Test is updated. In Coordination Spaces, all Clashes that are unassigned and open are Active. When reviewing clashes in Navisworks, they can be marked as ‘Reviewed’, ‘Approved’, or ‘Resolved’. In Model Coordination, reviewed clashes get marked as ‘Assigned’ once they are made into an “Issue”; or ‘Closed’ once they are marked as “Not an issue”. This makes the process of managing clashes very cut and dry with assigning responsibility for a clash. In Navisworks, a Clash Report can be generated with several options and multiple deliverable file types. In Model Coordination, Issues would be filtered to Clash/Coordination and exported. Since file versions serve as records of submissions to track changes, there are no other main goals behind this reimagined process than tracking and resolving clashes.

## CHALLENGES

Several challenges exist to Model Coordination. When you mark a clash as an Issue, the Issue that pops up to fill out does not have all the fields available. You have to Assign the Issue, then go into it through either the Assigned sub-tab or through Issues in Document Management to fill in more information. Information such as any Custom Attributes like Priority, add another person who needs to look at it, or change the Assigned To field from a specific person to a Company. Another complication to Model Coordination is with the switching of models. While you can click a geometry in the Viewer, and it will load the clash, if a clash is selected and you switch the Model to group by, the clash nor the geometries are still selected. Since an Issue only attaches to the red geometry, if the other model is the one that holds the geometry that needs to be moved or have the Issue associated with it, you cannot simply select the geometry, swap the models, and make an Issue from the new Clash Group.

With Issues, the challenges are focused around core functionality. In the linked file, the other model causing the clash does not appear, nor is it in the reference documents. This means that only the red model that the Issue is associated with gets loaded. If a pipe is intersecting a duct and the pipe was what was tagged, then the piping model loads. The specific pipe is even highlighted, but there is no information about where it is hitting the duct or where it

would need to move to resolve the clash. Since Model Coordination is one of the few viewers where all models can be aggregated, this can be a challenge to track down. To solve this, use the element ID, find it in the Revit model and have an NWC or linked Revit file of the duct loaded, and that will give you a complete picture.

Since Sets are not a true thing in Model Coordination, a lot of specifics and existing workflows must be evaluated and either tossed out entirely or replaced. This is by no means an exhaustive list of challenges but are the main items to keep in mind for developing workflows for Model Coordination.

Autodesk does keep coming out with new features, enhancements, and connections. These challenges could be a thing of the past with one update.

## CONCLUSION

Model Coordination is fast! It tracks Assigned Clashes and creates accountability, changing the conversation from “I” to “we”. With some of the current challenges it faces, General Contractors and Fabrication Modelers are less likely to see adoption and success easily. However, it is so user friendly and intuitive that this is what I would recommend for Designers, Architects, MEP, and anyone else. Use the high level of Clash Detection this gives to further your design files before turning them over for Fabrication. I would even advocate for this to be used for initial coordination while the GC is waiting for Fabrication Models to be produced. This will highlight areas of concern early, and it shows an aggregated model with an easy-to-use interface to review with the Project team or even owners. It can put you weeks ahead in the coordination process in that way. Model Coordination is a solid tool that is poised to only get better.

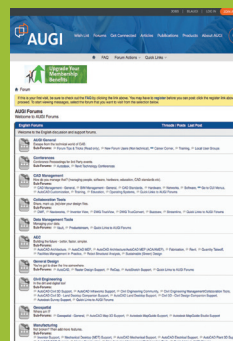
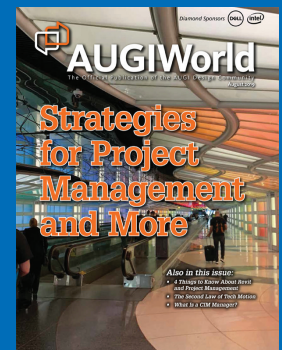
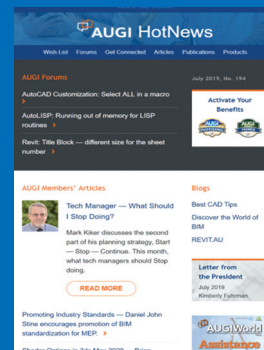


*Andrell Laniewicz has working in the VDC world since 2011. During this time, she has been involved in everything from Model Coordination, 4D, 5D, and Quantification to Proposals, Site Logistics, and more. She has worked for General Contractors and MEP Design to Fabrication firms. She has taught BIM for Construction Management at Universities, presented at Autodesk University and BiLT, and consistently delivers social media content. At U.S. CAD, Andrell works with clients to evaluate their existing workflows, implement solutions and technology, and providing training to get clients to their ultimate end goal. She focuses on Revit, Navisworks, BIM 360, FormIt, and MSuite within Architecture, Construction, and Fabrication. She has her Certificate of Management in Building Information Modeling from AGC of DC.*

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# Better Management of Civil 3D with Profiles

 Profiles in AutoCAD and Civil 3D are a great way to standardize settings for consistency across your organization. In this article, we explain the benefits of profiles and how to share your settings.

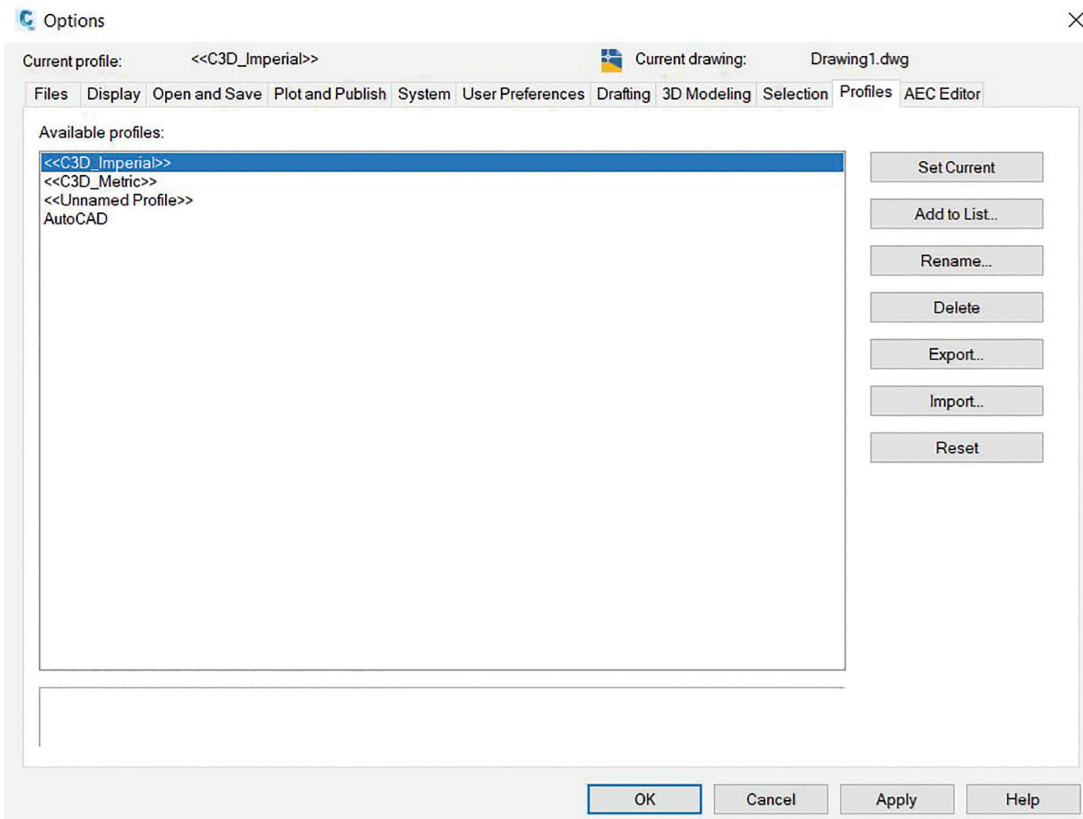
Have you ever noticed that your prints do not necessarily match other people's prints? Or maybe your Civil 3D interface does not look like a coworkers' Civil 3D? It is possible that your profiles are different. Now when we think of Civil 3D, the term "profile" usually means Plan & Profile, or the side view of a road. In this case, profiles are .arg files that control common paths and the settings that Civil 3D uses to function. Where should the software look for fonts? Where should it look for print settings? What drafting settings should be adjusted from default? This all lives in the profile. It is the main file that holds all your Civil 3D Option settings.

## PROFILE PURPOSE AND USAGE

In the out-of-the-box configuration, Civil 3D will contain 4 profiles, C3D Imperial, C3D Metric, Unnamed Profile, and AutoCAD. These are all accessible in the "Profiles" tab of the Options dialog box. Switching between them is as easy as, selecting the one you want and clicking on the "Set Current" button to the right. Your interface may flicker quickly as it adjusts.

You might also notice that when a new version of Civil 3D is installed, you will get 2 shortcuts planted on your desktop, Civil 3D Imperial and Civil 3D Metric. The only differences in these desktop icons is the profile it points to. More on that in a bit.

The trusty <<C3D\_Imperial>> profile is used by a majority of Civil 3D users across the country that have not done proper customization. If that profile is set current, it is a sign that there is significant room for improvement.



Now the Options dialog box has a lot of settings, but what gets saved into the simple .arg file? Lots of things!

As shown in the image above, the .arg file contains paths and settings for many of the key functions of Civil 3D. It is highly recommended to spend time configuring these settings, and then sharing this .arg file with others. Keep in mind that this file will need to be recreated with each new version of Civil 3D. It doesn't always work to reuse an older .arg file. Something else to add to the list before deployment! What I have normally done is just expand all the settings and take a screenshot. That way you can easily match up the paths when creating the new Profile for the new version of Civil 3D.

Figure 1 – The “Out-of-the-Box” Profiles.

## CUSTOMIZING PROFILES

As soon as you make a change to the settings in the Options window, you are modifying the default profile. From Supporting File Paths, to Drafting Settings, to Pickbox Settings, there are dozens of small changes that can be made to the AutoCAD/Civil 3D user interface to make it more efficient and usable for daily design work. Since Civil 3D is built on top of AutoCAD, you can expect similar results with these customizations regardless of which program you use most often. Civil 3D Profiles simply contain extra information that doesn't apply to AutoCAD. Things like Survey, Pipe Network Catalogs, Quantity Take Off, and Intersection information are specific to the Civil 3D Profile. Keep this in mind before you start modifying things too much. Do not expect the same profile to work the same way in both AutoCAD and Civil 3D. You will want to keep them separate, and you will want different profiles for each “year” version of the software as well.

## PROFILE INGREDIENTS

The heart of the Profile lies in the Files tab of the Options dialog box. This will give Civil 3D the “addresses” it needs to find everything. What fonts are available? What Workspaces are available? Things like that. Chances are that your firm has a few locations on your server where these objects are stored. Wouldn't it be nice if Civil 3D could just find them as soon as it started the software up? Searching for these things takes valuable time away from your design and production. By harnessing these profile settings, we can regain that efficiency and consistency that we are missing likely out on.

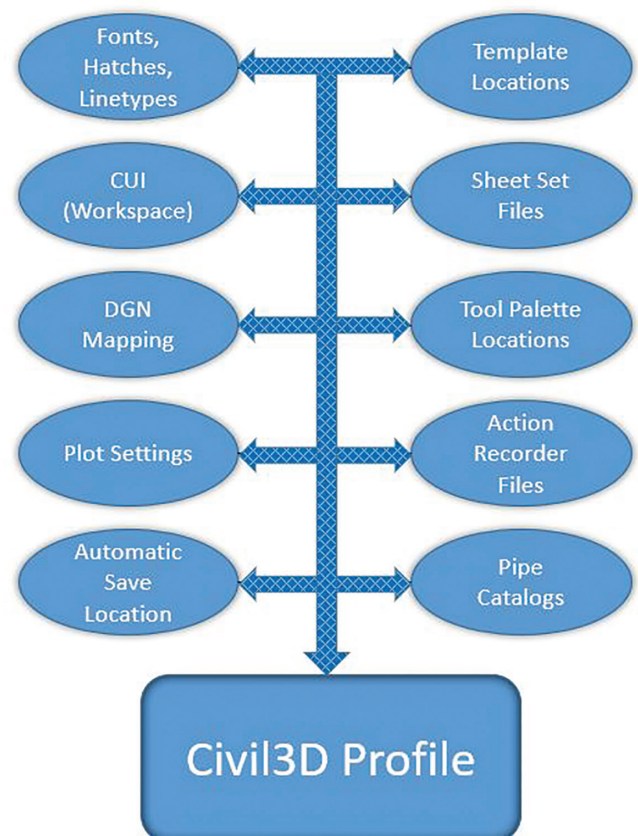


Figure 2 – There is even more than this!



# Civil 3D 2021

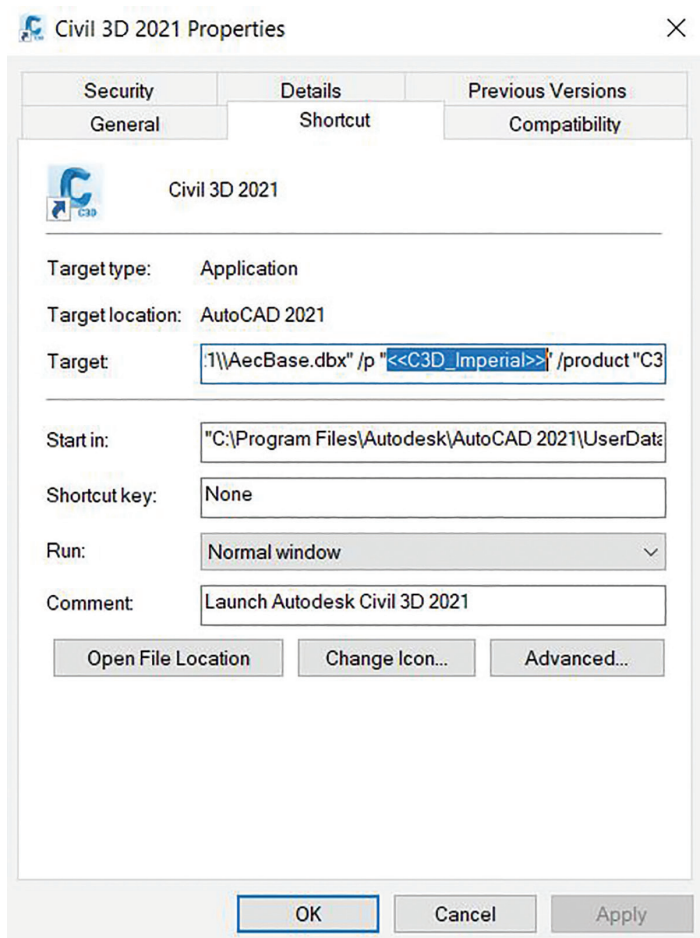


Figure 3 – Default C3D Imperial Shortcut Icon uses the <<C3D\_Imperial>> Profile.

## BASIC OPERATION

As mentioned earlier, the icon that you launch Civil 3D with, controls what profile is loaded. You are using the desktop icon to start Civil 3D right? You absolutely should! This profile switch is yet another reason to do so. When you double click a .dwg file in Windows Explorer, it bypasses this profile and can cause all sorts of odd issues.

## BASIC CONFIGURATION

After populating the Options and all the File Paths needed for your organization, we then need to export that Profile to share with others. There are a couple ways to do this, and the way you choose really depends on company size. We will start with a small firm. If you have a handful of users, this workflow is a little faster.

1. Create your Profile by making your desired changes, then export it to a network location from the Profiles tab of the Options dialog box.
2. Create a customized desktop icon that points to the defined network location. Simply make a copy of the C3D Imperial shortcut and change the <<C3D\_Imperial>> in the Target path to match the network location. Keep this path inside of the quotation marks and include the .arg extension. The entire path would look like this:

```
"C:\ProgramFiles\Autodesk\AutoCAD 2021\acad.exe" /ld "C:\Program Files\Autodesk\AutoCAD 2021\AecBase.dbx" /p "PROFILE PATH\CompanyStandards.arg" /product "C3D" /language "en-US"
```

3. Copy this new shortcut to the same network location as the Profile (Optional, but recommended)
4. Copy this shortcut to user's desktops and remove the default C3D Imperial shortcut.

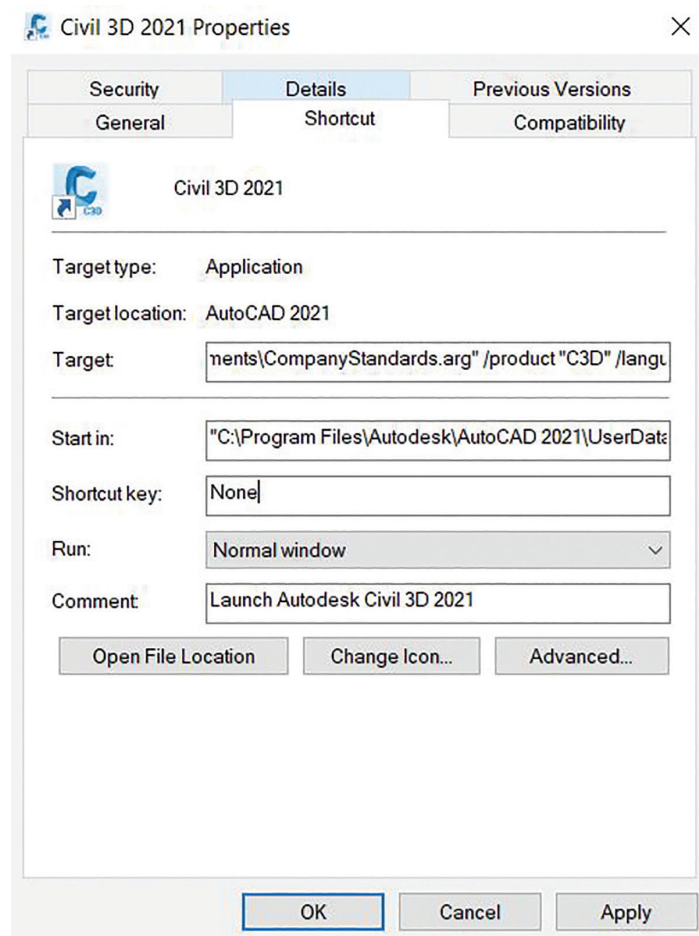


Figure 4 – Your Custom Profile Path needs to be inside of the quotation marks.

## ADVANCED OPERATION

Obviously, there is more to Civil 3D than just these Profile settings. If you are really using Civil 3D for all its capabilities, then you have many other components that go into getting the job done. Survey configurations, Tool Palettes, system variables (SYSVAR), and LISP routines are also commonly used tools in the average CAD user's toolbox. So how can we do everything all at once? Use one of two methods. Utilize the acadoc.lsp at startup or use Windows scripts to make copies from a dedicated server location onto each user's machine.

## ADVANCED CONFIGURATION

There are numerous resources out there for using the acadoc.lsp functionality, so I do not need to get into too much depth. Basically, it is a simple LISP routine that loads when Civil 3D is started, and it configures the settings to be used. System variables, other

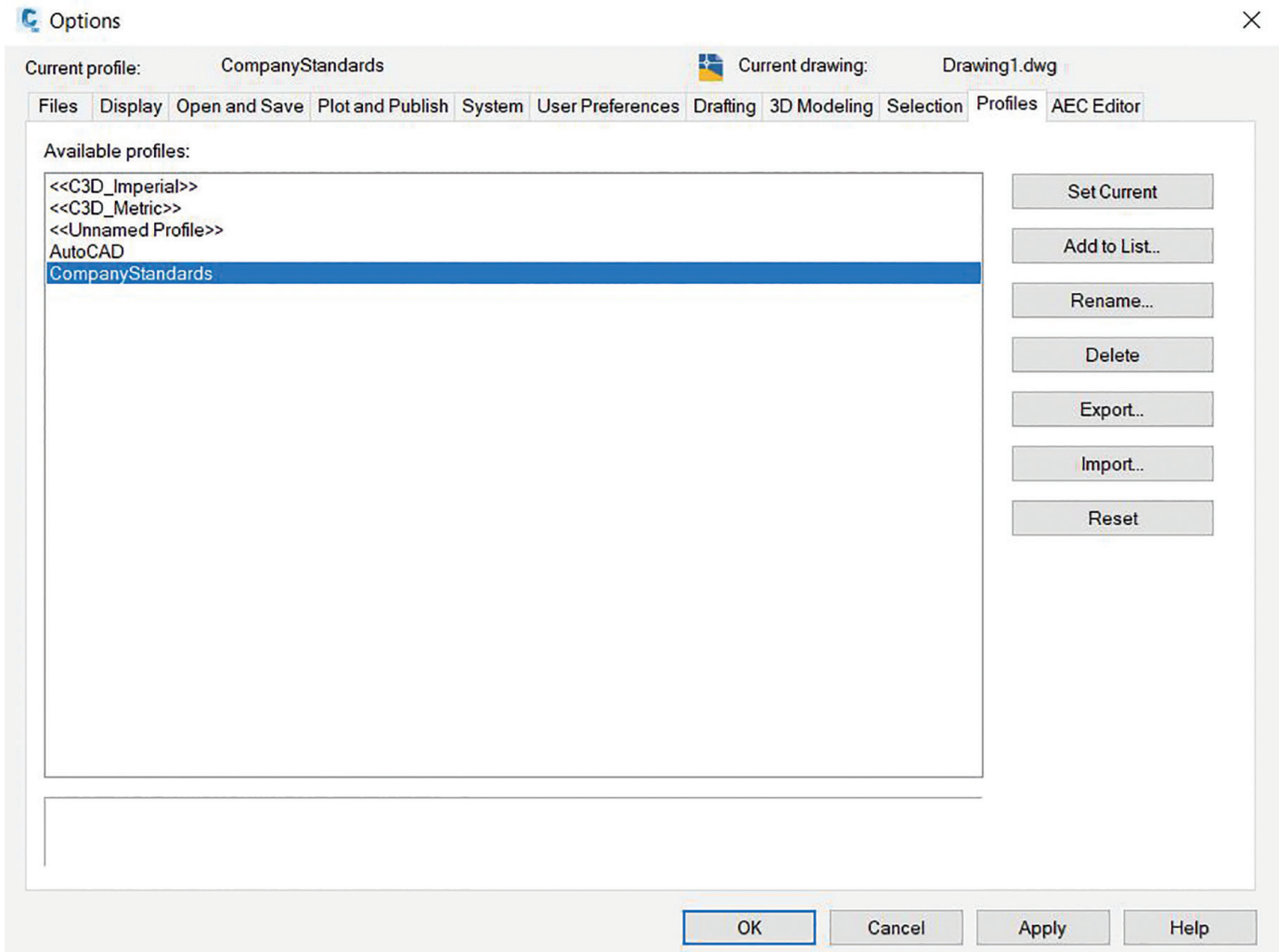


Figure 5 – Your Company Standards are in place and ready for use!

lisp routines, and many other configurations can be used with the `acaddoc.lsp` function. Profile loading certainly falls into that list as well. Configure the `acaddoc.lsp` to load the desired profile and all the other settings (do not forget your Survey Settings, Pipe Catalogs, etc.) and do it that way. You will still need to maintain a centralized location for these files, but then the `acaddoc.lsp` will set them.

Additionally, basic scripting can be utilized to make a copy from that central location (Server) to the user hard drive. This leans on the `robocopy` command, and it is easier than you would think. The basic function that needs to happen is that the CAD Manager or IT Professional would configure the required Profile and settings into a folder on their Host or Main computer. The script then makes a copy of that folder onto the Server, then another script will copy that folder from the server onto the user machines. This can be configured to run daily, weekly, or whenever and will overwrite whatever the users had before. This makes consistency easier, while silently resetting those rogue users! The `robocopy` command would then be used to copy that desktop shortcut as well so that it targets the correct profile, along with copying all of the other supporting files your organization might have like custom Tool Palettes, Survey Settings, and Workspaces. With

more and more people needing to work remotely these days, this is a great way to keep people updated while away from the office. Once they log into the network, this script will copy the objects to their local machine, then they can do their work on their local machine and have all the resources they need.

## BONUS TIP

You just might want additional profiles for different types of work, depending on client or jurisdiction. Repeat these settings and steps for new profiles! Switching your settings for the next project is as easy as clicking on the applicable desktop icon.



Jason Artley, LEED AP is an Autodesk Certified Instructor with over 20 years of experience in the Civil Engineering Industry. From surveying to to design to CAD Management, Jason has seen all aspects of Civil workflows from field to finish. Jason works as a Senior Technical Specialist for ATG USA, An Autodesk Platinum Partner.



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## planBIM



<https://www.planbim.io/>

**Autodesk Revit**

**Version: 2021 , 2020 , 2019 , 2018**

With the help of the planBIM plugin, take your BIM workflows to the next level. This plugin provides Autodesk® Revit® users with various productivity enhancements and acts as a tool for better BIM Management. Users can connect to their BIM data on the planBIM cloud directly using the planBIM Revit plugin.

**Scope:** Visually classify elements inside your models according to Level of Detail (LOD), Level of Information (LOI), and Level of accuracy (LOA) as per the Scope defined in planBIM (<https://app.planbim.io>).

The user can view the LOD Specification for a specific category in Revit by merely clicking on a relevant element in the model space. The specification gives an idea of the LOD, LOI, LOA as well as the parameters that need inclusion in the Revit element.

There is also functionality to associate a family or family type of selected element to a scope specified in planBIM. Using this plugin, the BIM team can stay on top of the modeled elements and their respective LOD in a Revit file.

**Files:** Visualize detailed analytics of your Revit files as dashboards on the cloud. Data including families, warnings, sheets, schedules and more is automatically extracted and privately published to your workspace in planBIM.

**Content:** Access all your Revit family libraries on the cloud and insert them into your projects. View which families are approved and which ones rejected by your BIM Managers.

BIM Managers also have the ability to track who downloaded which objects using our web app in conjunction.

## InstaFoundation



<https://www.rcccad.com/revit-plugin-instacrete/>

**Autodesk Revit**

**Version: 2020 , 2019 , 2018 , 2017**

“InstaFoundation” can build a stepped, as well as, a trapezoidal foundation. The user can use this tool in the Autodesk® Revit® structural foundation template. The foundation is formed using the dialogue box. The user is not required to draw a single line in the graphics window.

1. You can create footings in Imperial as well as Metric units.
2. It saves 90% of your time.
3. Very easy to use.
4. The user can also create a single pedestal footing.
5. Along with step footing the user can also create trapezoidal footing.
6. InstaFoundation is a free tool.

## EditAtt



<http://www.cadprograms.ca/>

**Autodesk AutoCAD: 2021, 2020, 2019, 2018, 2017**

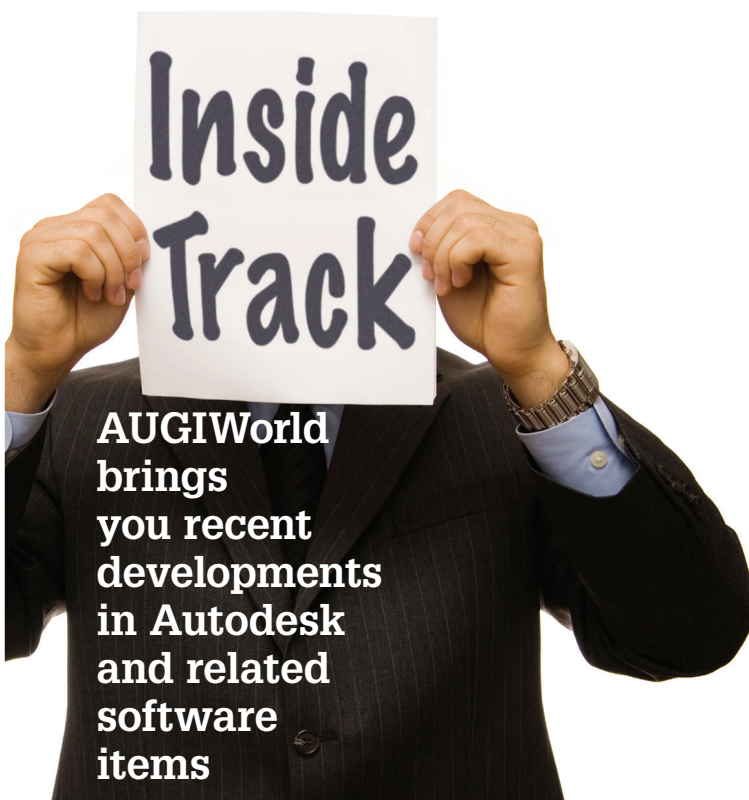
**AutoCAD Electrical: 2021, 2020, 2019, 2018, 2017**

**AutoCAD Mechanical: 2021, 2020, 2019, 2018, 2017**

**AutoCAD Architecture: 2021, 2020, 2019, 2018, 2017**

This app will allow the user to directly edit the value of an attribute without using the Block Attribute Editor or the properties panel.

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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# How Bad Timing Can Derail Your Next Software Upgrade



**I** like the latest versions of software. I usually upgrade when a new release comes out. On the personal side, I auto upgrade the OS and apps on my Pixel phone. I do not do that on my wife's iPhone. I upgrade my MacBook when a new OS is about 2 months old and the kinks are worked out. I upgrade my WinOS after the troubles die down also. My Chromebook auto-updates all the time.

So, you can see that while I have a desire to upgrade to the latest versions, I do not do that across the board. I do not do it all at the same time. I do not treat every device the same. I also time the upgrade for a convenient time, or an opportune time, or a time when the negative, that might happen, won't annoy me beyond belief. I also do not do every device at the same time. I make sure

that I have a stable device handy in case I need to search out a fix for a problem. So timing is key. Back in 2008 I wrote some advice on getting the timing right for an upgrade and I "update" that advice below.

## DON'T LET IT HAPPEN WITHOUT GOOD TIMING

You probably get the popups on your phone or laptop that an update is ready to install. You could just hit "Start" and make it happen, but it might be advantageous to think about doing it later. You get emails urging you to jump to the latest release. The temptation to just get it done can be daunting. Timing a personal device upgrade impacts only you but timing a firm-wide upgrade is another matter. The timing needs to set you up for success.

## BEFORE THE NEXT PROJECT BEGINS

Many Tech Managers want to prepare and move before a major project starts. Rather than move the whole company at one time they take one project into the next release and manage the process like a Project Manager. This can be a good thing and a bad thing.

This would set you up to use the increased productivity in the new release for the new project. It also places you on track for the future since the project will outlast your prior release use. By taking one project into the new release, you can control the tools used on a small scale, selecting which new tools to apply. No need to use all the new improvements, just select the ones that will impact the project for the better. And you can take the successes into the next new project, expanding as the work rolls in.

Be aware that the upgrade may slow down the project schedule as staff get up to speed. Training and tech support issues may impede project timeline. Productivity may (will) take a slight dip until users stabilize. All this impacts the project. Also, make sure the Project Manager is supportive. Let him/her know the issues surrounding the use of the new software. Make them your ally. If not – they could turn into your worst critic. If they are reticent to upgrade, wait for another project.

Make sure you track the troubles you have and the successes. Document anything that is a concern. Define new processes and establish new guidelines. Make a definitive process of expanding it to the next project.

## AFTER TRAINING

Most firms want to do some form of training prior to a new rollout. It may be formal, informal, or just a handout.

When you have completed training your users are hopefully excited and ready to use the software. Training can create momentum for the migration. It could be a one-day, new features training. It could be a webinar to remote workers. I might take on many forms, but it needs to be done just as the software is made available. I have seen some firms upgrade the desktop machines while the person was in the training. When they returned to their station, the new was already in place.

Training does take time away from project work, but productivity loss from training time will be recovered as users return to the project environment and use new tools that make things run faster. Training does not stop when the class ends. Keep in touch with the users. Make handouts that can be used as reference material. Have refresher talks. Do not let them slip back into old habits.

## WHEN CLIENTS REQUIRE A SPECIFIC VERSION

Sometimes the client sets the pace for upgrades. Part of the contract agreement was to get everyone to use a version that is one or two steps ahead of where you are. Sometimes you don't have a choice. You just need to move so that all project teams and firms are on the same platform.

**WHEN NEW HARDWARE IS COMING, IT MAY BE TIME TO MOVE TO NEW SOFTWARE. YOU WILL HAVE THE HORSEPOWER TO MAKE THE MOVE AND YOU NEED TO CAPTURE THAT INERTIA.**

Don't fret, this may force your team to make a move if you are having difficulty making progress. It is often hard to get the migration started. After I was prepared, I have used a client's demand for upgrades to get my team moving. The demand may come before you are ready. You may not have trained. You are forced to move and may be reluctant. Bad morale may creep in since it was not your choice.

## WHEN YOU ARE BUYING NEW HARDWARE

When new hardware is coming, it may be time to move to new software. You will have the horsepower to make the move and you need to capture that inertia. I have most often seen the software push you toward new hardware, but the opposite may happen too. Opening a new branch office might be a good time to take the entire office to a new level. They will get new hardware and they are open to change.

## THE TIME IS COMING

The timing of when to move may or may not be in your hands. If it is, you can think about the timing as outlined above. If it is not, and others might foist it on you, you should prepare for it because it may be inevitable. Be prepared! Be prepared before anyone asks you. Get everything set and handle the migration on your terms, even if the timing is not.



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).



# Civil 3D And Revit Coordination

A little change in Revit causes a potential headache for Civil and the Revit users unless you change one setting...

*Editor's Note: The following article features some active links, in order to access the linked articles please read the online or pdf version of AUGIWorld.*

**R**evit and Civil 3D! Why can't we just all get along!!!

It is amazing to see that these two programs still cause so much frustration, headaches and contentious relations between Civil/Survey and everyone else. Almost a decade or so ago, I had an established method for positioning and coordinating both Revit and Civil 3D files work together. I even made my first video about this very topic, and sadly not much has changed.

Aside from a couple of coordinate changes under Revit's hood, and an underutilized tool put out by Autodesk in 2015 called the Shared Reference Point Tool, it all remains the same. So why is this very topic STILL one of the top searches in our industry?

- Why are there over 3,000 classes on Autodesk University covering this topic?
- Why does this topic still confuse people?
- How can you get consistent results?
- Is there a Civil Site Template in Revit?
- what settings need to be on or off in revit?

- what settings need to be set in civil 3d?
- What is the best method? the most consistent method?

## A NEW ISSUE ARISES MAKING IT MORE COMPLICATED.

While teaching a class in the 2020 versions I noticed certain objects would rotate to another location on certain projects, but not all. At first, I just chuckled it up as I fat fingered it, but upon further investigation I found the problem to be much more serious. Currently no one seems to be aware of this issue!

The issue is that any AutoCAD 3D objects, like a solid, or a Civil 3D Surface, would appear to rotate away from the rest of the AutoCAD 2D objects, and they were in the SAME FILE! See figure 1 for example.

After talking to various Revit experts and getting their various ways of coordination, being forwarded Autodesk University links, blogs, websites and YouTube videos, I ended up more confused than ever! Even Autodesk's official Help files weren't helpful. They had a





While cataloging the various ways trying to find some commonality, I also noticed that all the Autodesk and Autodesk University data sets were all the exact same one (figure 2). This made me a little suspicious to say the least. If you want to see the spreadsheet of my findings go to <https://docs.google.com/spreadsheets/d/1yPGpiPRdjGApf6Q-aQ1UgbkO68HUm5KrW2f1uzg1OfM/edit?usp=sharing>

- Like what insertion method did they use to link in Revit and CAD files?
- Did they start with Auto - Center?
- Did they change the view range in Revit to see the data?
- Did they set the view to Project North or True North? Will that affect the insertion while linking?
- Did they create a new "Position"?
- Did they just use the Autodesk Shared Reference Point tool?
- What other settings did they use in their Revit template before they started?
- What settings have been done to the Civil 3D DWG?

Figure 2

Now to throw an even bigger wrench into the coordination. When I performed any of the processes in the spreadsheet mentioned above, all of them were missing important settings. They all assume your templates are the same.



# Civil 3D and Revit

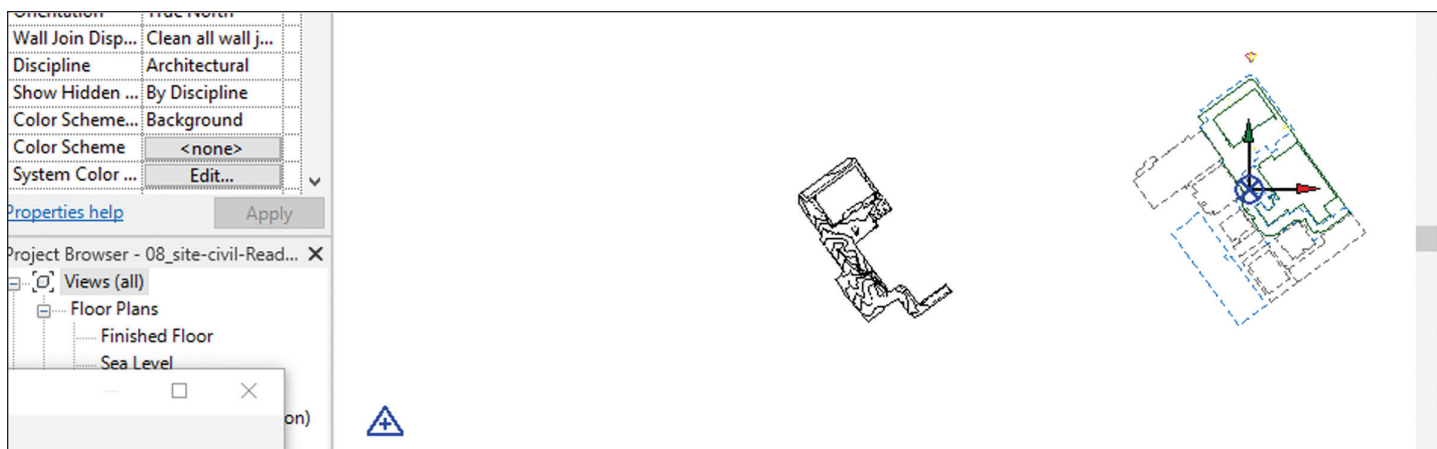


Figure 3

No matter which process I used, NONE of them would place the Linked Topography in BIM360 to the correct location for this project (figure 3).

Not to mention all the error dialogs I would get... If you ever see a dialog box in Revit like the one in figure 4 this means your coordinate system is not working or setup correctly. This will cause your file to default to Auto – Center – Center.

## THE EUREKA MOMENT AND THE FIX!

After banging my head on the desk (not really) and three days into failed attempts, reading more than I do in an entire average year, and watching hours of videos I finally figured it out! And guess what? None of that reading, watching and trying told me the key. But the sayings are true, persistence is key, and in the words of Thomas Edison:

*"I have not failed. I've just found 10,000 ways that won't work."*

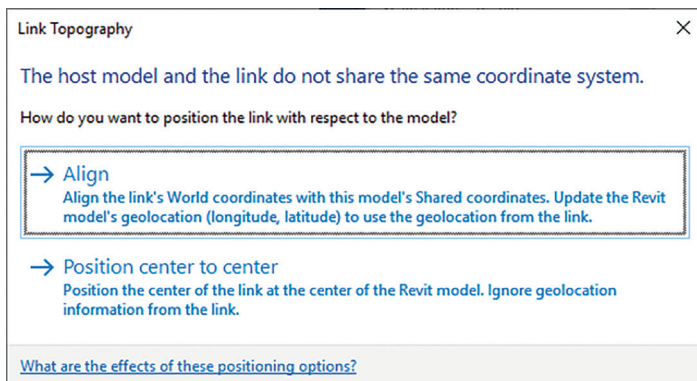


Figure 4: You do not want to see this box; it means you are about to get Auto – Center – Center

It all has to do with the way Revit handles files with GIS Coordinates now. (My suspicion is that this change was to even further enhance the Autodesk & Esri relationship. Hopefully provide an ArcGIS import option inside Revit. I know they could greatly benefit from the free public GIS data out there and would

make them setup the Revit file in the right coordinate system to begin with.)

My theory on the change in Revit that caused the issue came from info provided by one of my go to Revit gurus:

*"Revit 2020.2 (note the .2) changed the Project Base Point a little bit. They took away the clip, which means that the coordinates will change as you move it vs not changing when it was clipped before. Some people relied on changing the Project Base Point this way. The Survey Point continues to work the same." - Doug Bowers*

Now that you have read all the way down to here, or at least skimmed to find the fix. Here it is. It is just ONE little, but big setting in Civil 3D that must be changed. The key term that jumped out at me was in the Revit error dialog box: **The share coordinates of the host model do not match the GIS coordinate system of the linked file...**

Ironically when you watch all the Autodesk videos, and the Autodesk University handouts, they all say to just ignore this box. I was like, when did Revit understand GIS Coordinate systems? And then it hit me in the face like a ton of bricks, **'no match to Civil 3D files GIS coordinate system'**, is it really that simple?

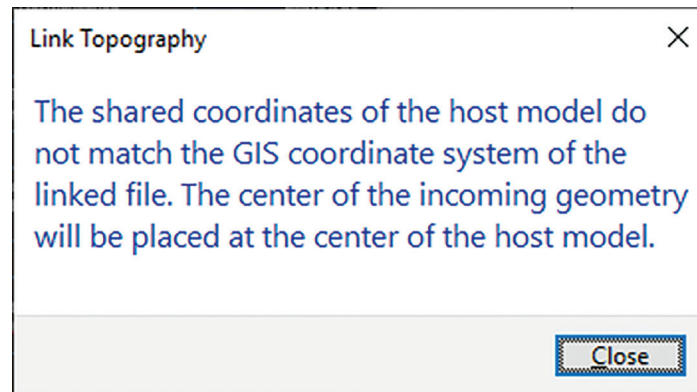


Figure 5

I fired up Civil 3D, went to **Toolspace > Settings > Drawing Settings > Units and Coordinates** > changed it to **No datum, no projection**. Then I published the surface again and saved the file,

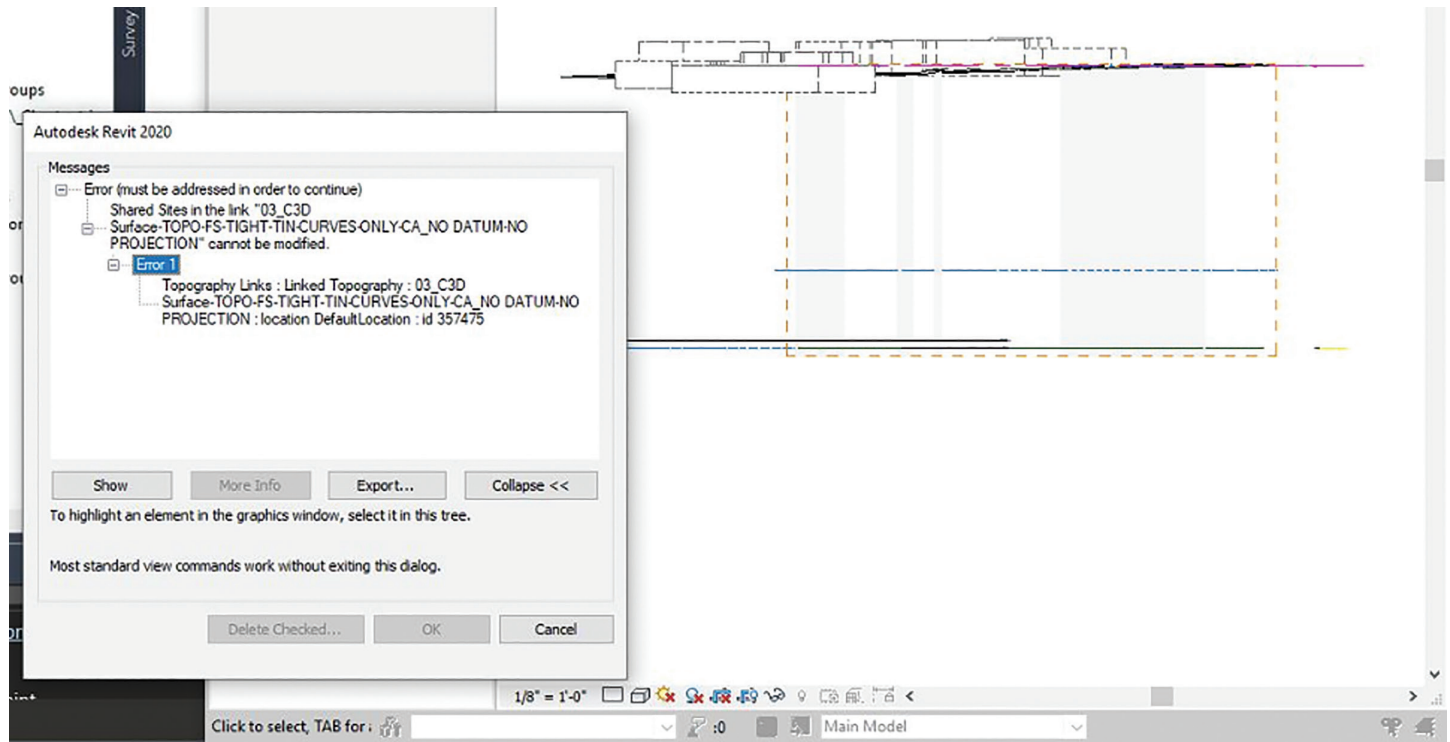


Figure 6

waited for BIM360 to update. In Revit I tried linking the surface again and EUREKA! That was it! The surface landed in the correct spot on the horizontal.

Then I found out the vertical was off!

Here we go again, but since I have already spent 22 hours trying various experiments, I knew there could only be a few small settings that could be the culprit. The [BIM 360 Linked Topography](#) was dropping down to a "0" elevation (figure 6).

I tried to just move the Linked Topo.

I remembered I had used an elevated line to run the [Shared Reference Point Tool](#). So that line got flattened and I started the entire process again. This time the surface came in correctly. Make sure the line you use for the [Shared Reference Point Tool](#) is at elevation "0" (figures 7 & 8). Note this is only necessary when using the BIM360 Link Topography option.

It appears that BIM360 is extremely picky, uses the Survey point (and Site Position) as the "0,0,0". I don't know why it doesn't like it when you have an elevation specified.

## WHY DOES THIS HAPPEN

Well this opens a very sore wound between Civil Engineers and Surveyors. Not all surveyors take the time, or don't know who to place their survey in an actual coordinate system.

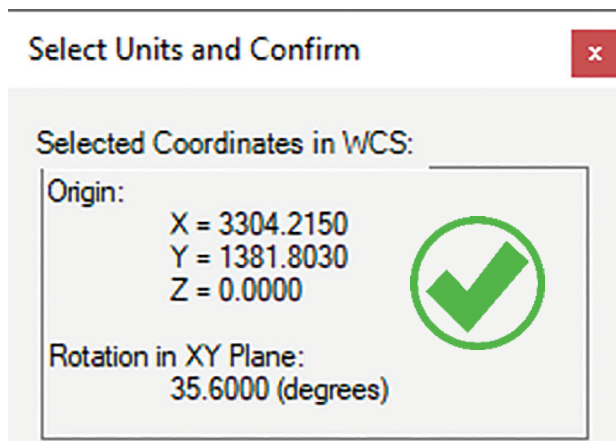


Figure 7

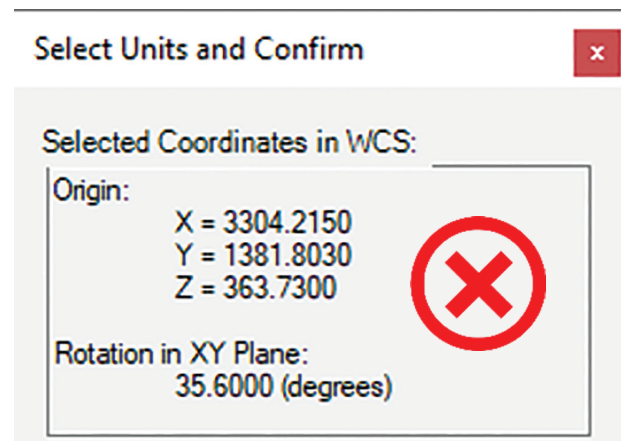


Figure 8



# Civil 3D and Revit

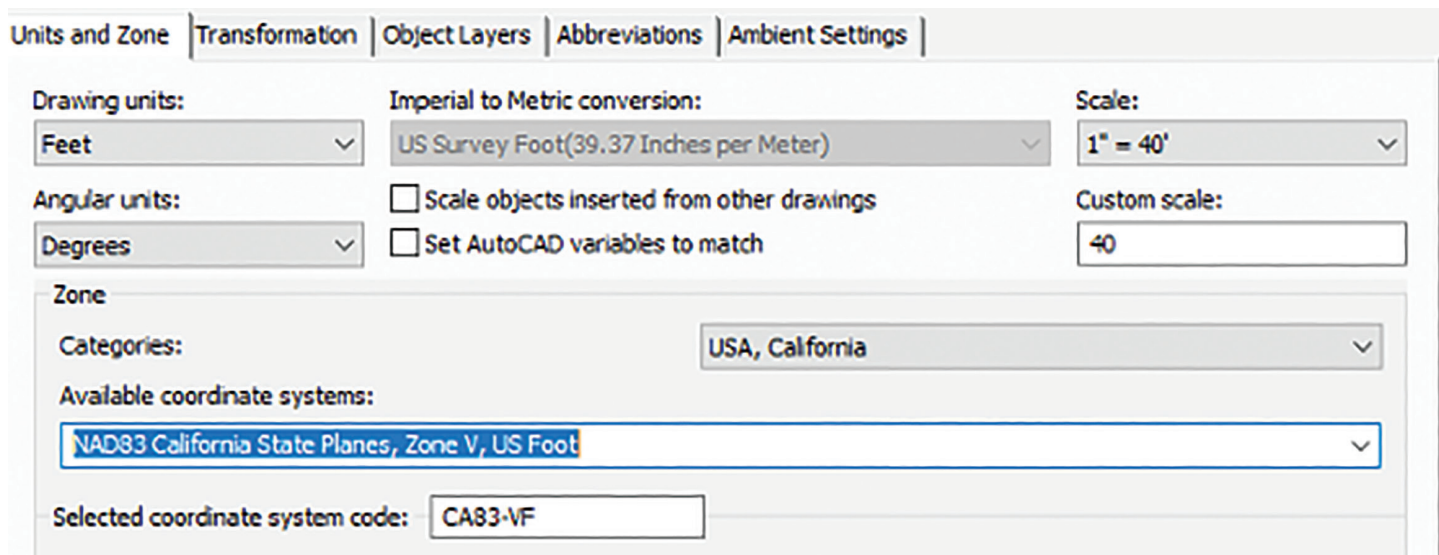


Figure 9

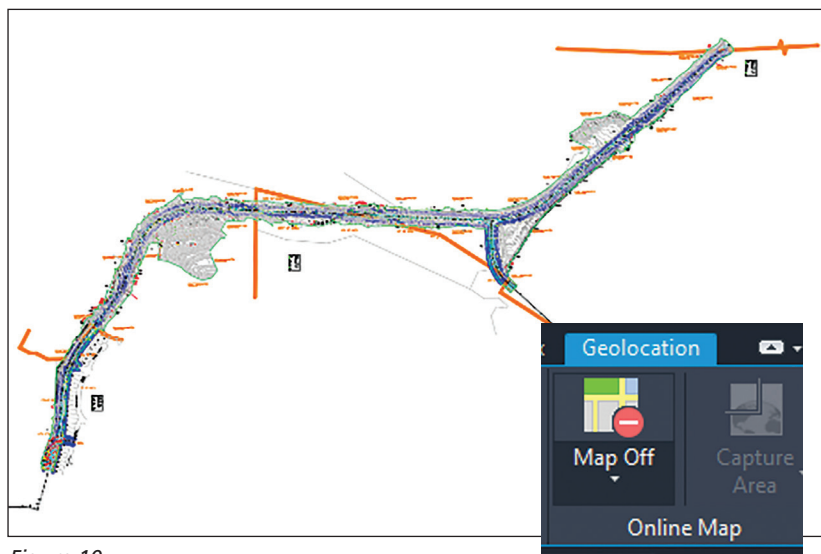


Figure 10

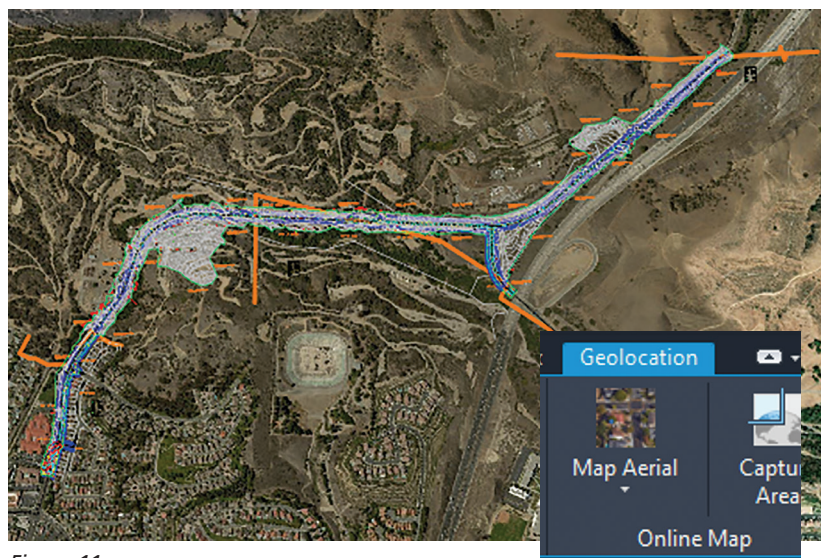


Figure 11

It is common practice for surveyors to perform what is traditionally referred to as a 'here survey'. This survey is tied to a local benchmark, etc. Not an actual datum or coordinate linked into a "known coordinate" system that can be used in an GIS capable program.

Tips on how to check if your survey is in a known GIS Coordinate system:

1. Open the Survey in Civil 3D
2. Toolspace > Settings > Drawing Settings > Units and Coordinates > change the coordinate system to the state planes for the area of the project, those are the most commonly used. (Also note Revit does not understand International Feet). See figure 9.
3. The GEOLOCATION context ribbon should pop up, on the Online Maps panel > Map Off, change to Maps Aerial or any of the others.
4. If the background maps lineup then you have a winner!

This Surveyor is a keeper! They provided everything, points, alignments, surfaces. With the world of easy access to GIS this will help you leverage that useful data. It also means it will line up inside of InfraWorks without a fuss.

Here are a few keyS TO tell if your survey is bad:

- Your survey cannot be placed on your project in a known coordinate system.

Every project needs some form of a survey to document the existing conditions. The survey sets the foundation for the rest of the project. If the foundation is in the wrong location, how good do you think your data will be? You will not be able to tie in ANY GIS data, and there is a whole new world out there. See the images below of some GIS data that was free and easy to import into Map 3D, Civil 3D, or InfraWorks. My next article will go into more detail about this new world of data at your fingertips!





Figure 12

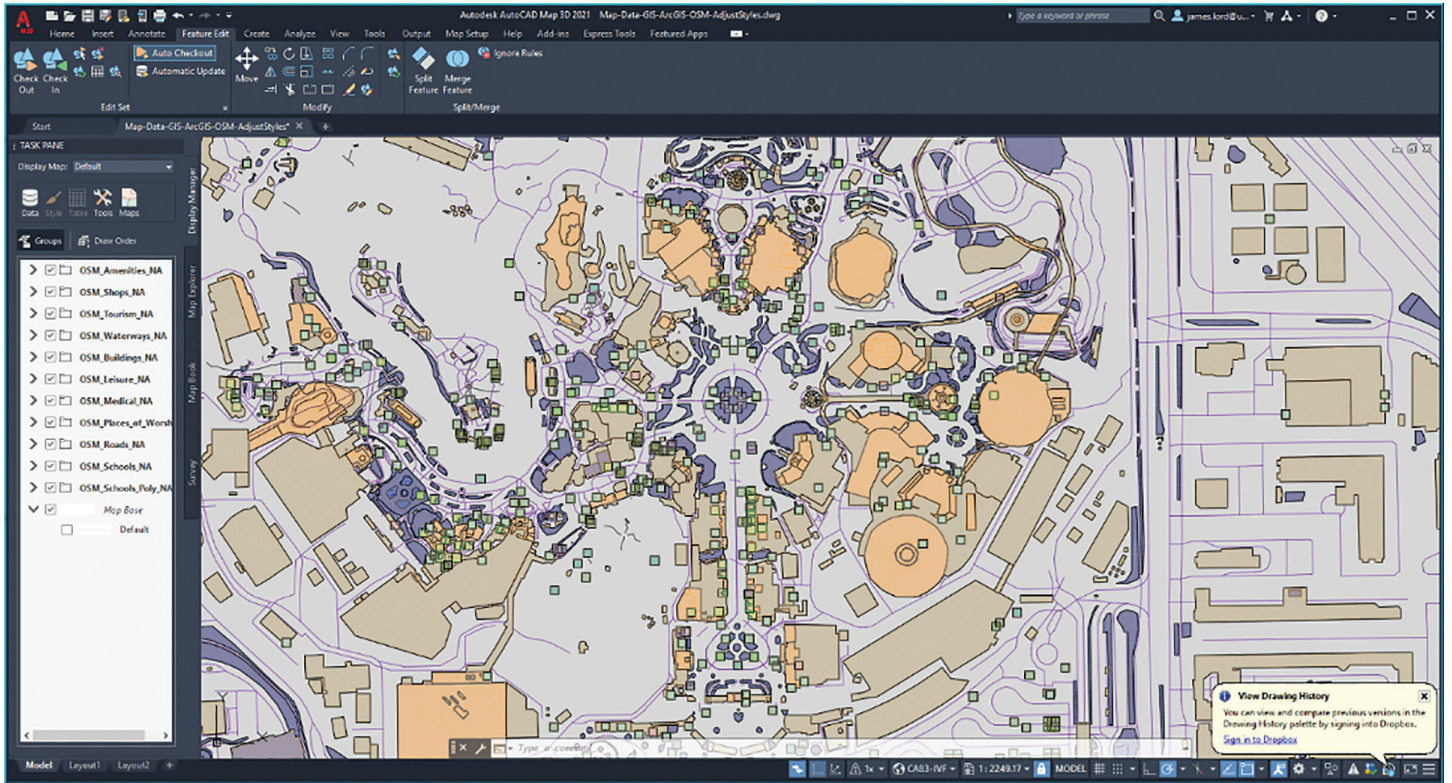


Figure 13



# Civil 3D and Revit

## NOW TO ANSWER THE REMAINING QUESTIONS

How can you get consistent results?

Follow this [guide here](#), but ultimately it depends on what data you want and what you would like to use it for. THE KEY IS ALWAYS TO ESTABLISH A SHARED COORDINATE AT THE START OF THE PROJECT!

Is there a Civil Site Template in Revit? what settings need to be on or off in revit?

- YES! I have created a Revit Site Plan file with a lot of setting that are specific to a Civil site file. If you would like a copy of this, please take our Revit and Civil 3D class.

What settings need to be set in civil 3d?

- Make sure that your dwg's do not have a coordinate system set unless they are in a known coordinate system.

What is the best method? the most constant method?

## RECOMMENDED WORKFLOW

Here is a quick outline, but use the links and documents provided below for more details.

- Get a good survey, in a known coordinate system.
- Establish the point on that survey you will use as soon as possible. (If you can't get a survey that quick, then use the free GIS parcel data in your area!)
- Use the Shared Reference Point Tool, it will make your life a lot easier!
- Use my Civil Site Revit Template (To see what settings I have changed in that template click [here](#))
- Follow the Instructions:
- Watch out for My Video Playlist to be posted on my YouTube here and I will also post a link to the playlist on my LinkedIn:

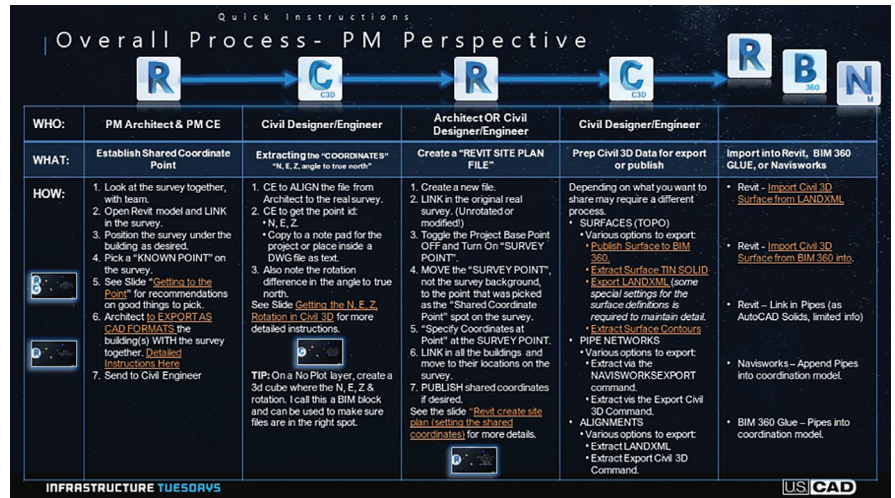


Figure 14

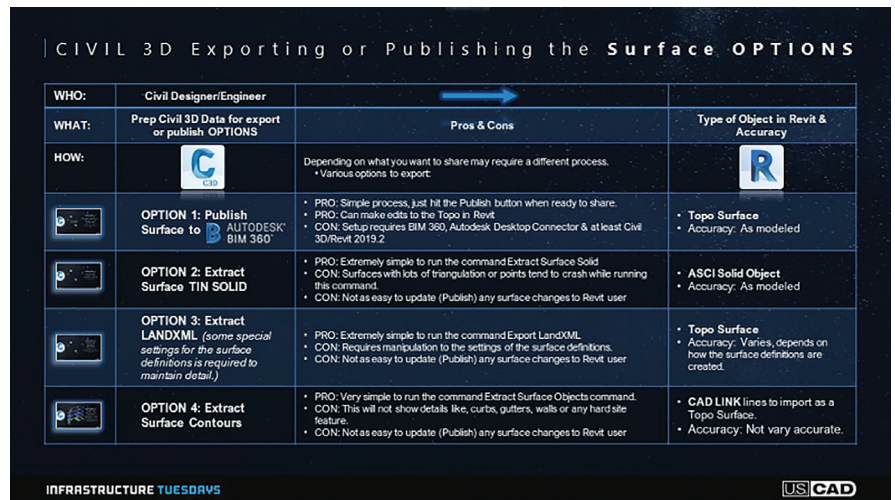


Figure 15

<https://www.linkedin.com/in/starlordjames/>

- My PDF Handout here

## NOW YOU ARE SETUP FOR SUCCESS

If you follow the info above, you will not have any headaches, well unless program changes happen again.



James Lord is 100% nerd at heart. I love all new technology, software and any futurist view I can get my hands on. I enjoy learning about new features or deciphering the inner-workings and I especially love discovering new uses for things not originally intended. Creating new workflows to increase efficiency is always my goal in whatever I do. "Why do something the hard way or waste time just because that is the way we have always done it?" I love traveling, meeting new people and just listening to their stories, issues or concerns. It really doesn't matter if it is a personal or a technical issue, the joy comes from trying to figure out a solution to that issue, or just letting someone vent. Being helpful in any way is a truly rewarding experience. As a presenter, teacher, instructor and mentor, I am always trying to find a better and more entertaining way to effectively communicate with people. We all learn and process information differently, so I try to adapt on the fly when I can tell someone is just not getting it. If you can make it fun, then they are more likely to remember. Sometimes the content can be a bit dense, so it is entertaining to play a game or put a spin on it, like when I was tasked to create an instructional video about using a plotter. I threw in a little Star Wars to spice it up: <https://www.youtube.com/watch?v=VumIGDDYwzc>. Checkout more of my published articles via my LinkedIn page: <https://www.linkedin.com/in/starlordjames>



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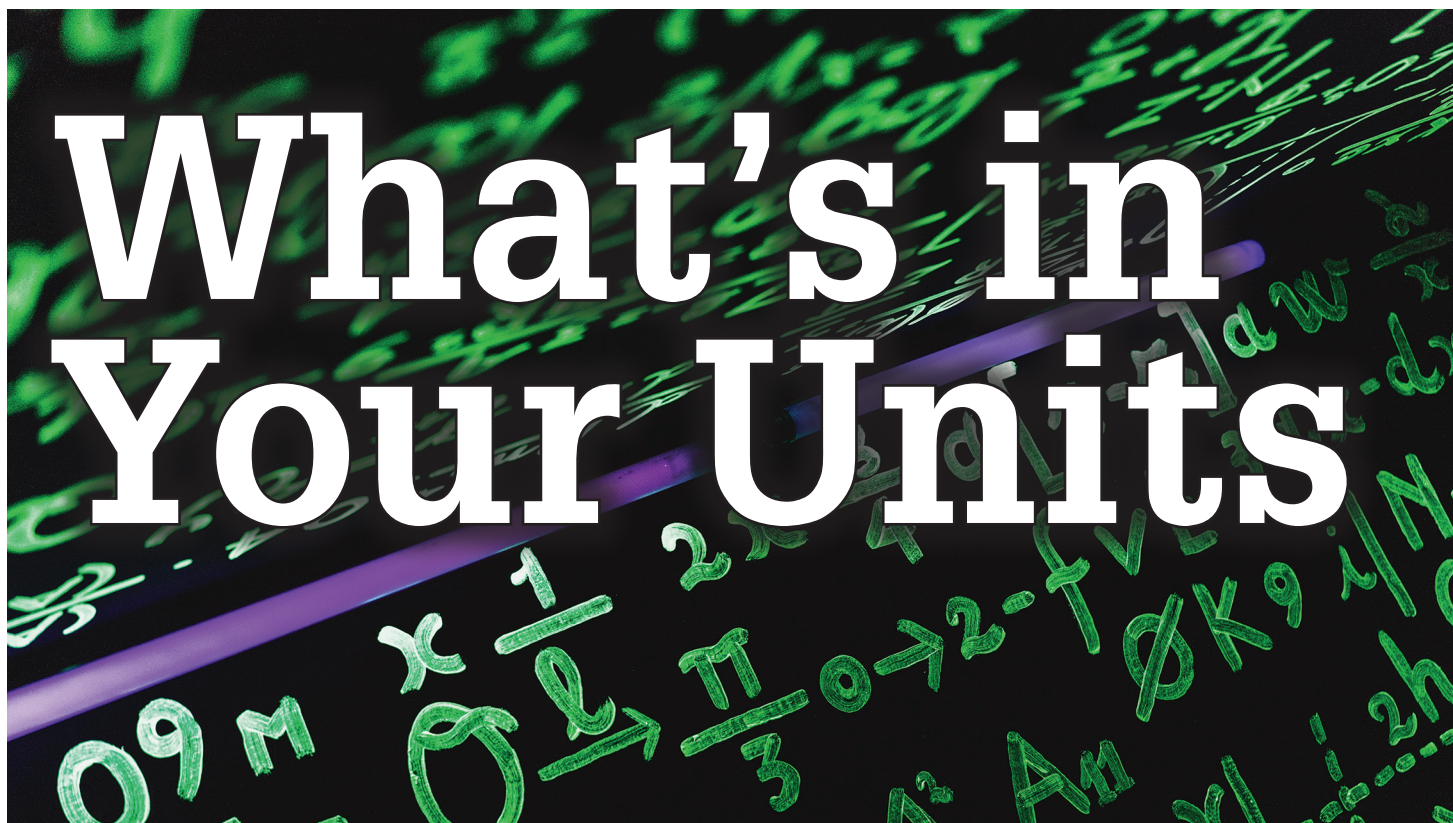
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- *HotNews* (full access)
- *AUGIWorld* (full access and in print)
- ADN 2013 Standard Membership Offer

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➡ Implementing Revit (any flavor)? If your units are set up like Figure 1, then you are dismissed... EVERYONE ELSE, implement your templates and files with maximum precision, put building components in the correct place, and dimension as always.

IF YOU GET A "BAD" DIMENSION: MOVE THE OBJECT!

If you do not understand the difference between the 2 following choices, please leave AEC immediately!

A. PUTTING THINGS IN THE CORRECT PLACE

Vs.

B. ROUNDING DIMENSION STYLES TO APPEAR CORRECT

That is not a hyperbole. Rounded dimensions cost everyone in the entire AEC chain through construction and these costs of waste grow simply because of tolerances (ironic;) that are set for lazy, unobservant imbeciles in my honest opinion.

Building Information Modeling takes even more and even better mindfulness than Computer Aided 2D Drafting, BUT CAD IS THE WORST!!! It's been a long time since I challenged all of you and all of your firms to show me a coordinated set with no "slightly off axis" lines, or with no objects at funny dimensions. And I'm still waiting...

So Please...

1. Set Units Precisely

2. Draft & Model Precisely (THIS IS REALLY WHERE WE GET THE 1/8" OR 1/16" "Tolerance")
3. Dimensions will REPORT correctly

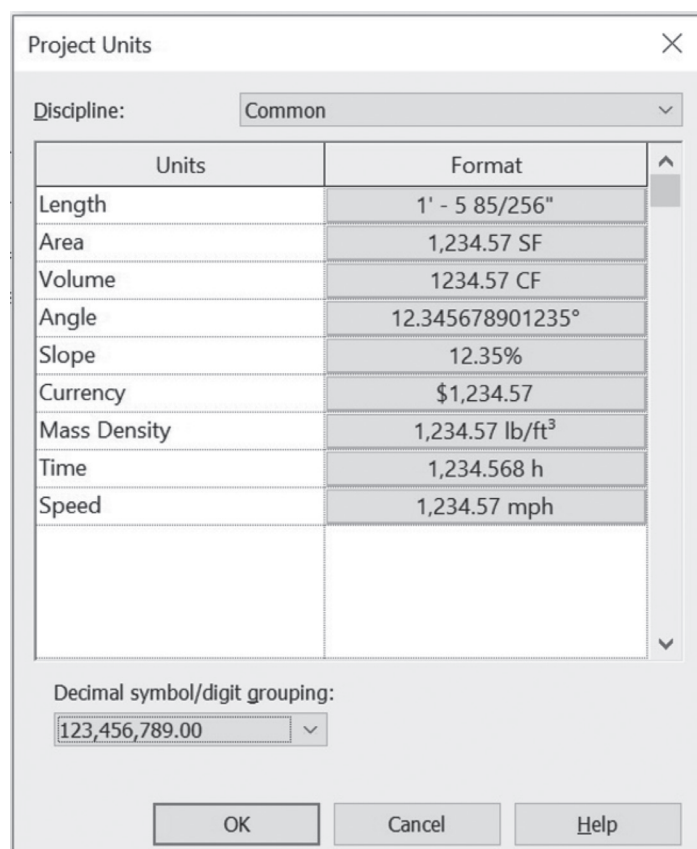


Figure 1: Image illustrating proper overall units

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 editorializations, 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... For what it's worth, 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 that in these files are some of the causal factors (and if you're still reading, have ignored such Revit warnings). Regardless, a BIM process shall be correct, and not approximated or rounded to the 1/8" (or whatever contractual precision has 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 following setup.

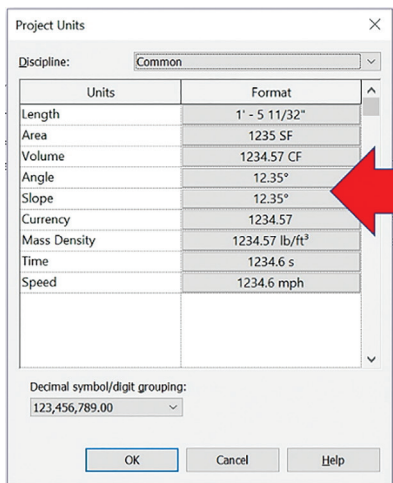


Figure 2: Image illustrating possibly the most unprofessional and unintelligent setup of units possible

1. Set up Dimensions to respect Project Units.
  1. I am not saying leave dimensions that report to the x/256 of an inch.
  2. What I am saying is:
    1. IF A DIMENSION REPORTS BAD NUMBERS (1/256" etc.) FIX IT!
    2. 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).
  1. Make this rounded dimension red.
  2. Rarely use this for individual dimensions, where geometry dictates or when the site dictates odd angles, etc.
  3. Never use these for dimension strings. FIX THE MODEL in that case!

## UNITS

Setting up Revit units correctly and professionally.

1. Type "UN"

## LENGTH

1. Click the button under the "Format" heading for "Length" and set up as follows:
  2. YES, 1/256".
  3. "Suppress 0 feet" is cool to uncheck if you're into that sort of old-timey thing. I like it personally but still I do not usually use it.
  4. Digit grouping makes numbers look as we like in the USA... commas and all.
  5. "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.

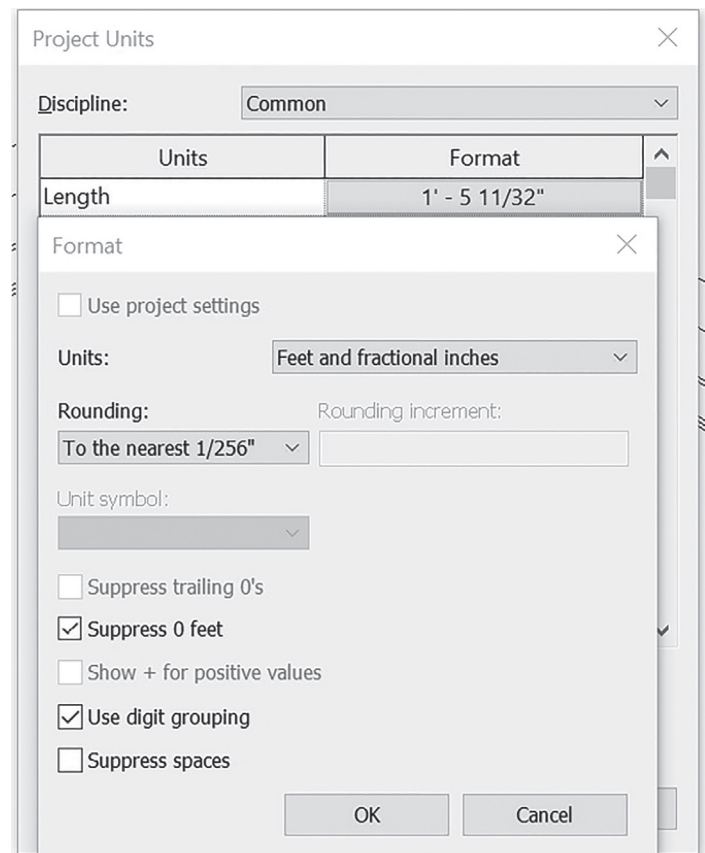


Figure 3: Image illustrating proper "Length" units



**AREA**

- Click the button under the “Format” heading for “Area” and set up as follows.
  - Two decimal places.
  - Suppress trailing 0s.
  - 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!)
- All the rest as shown.

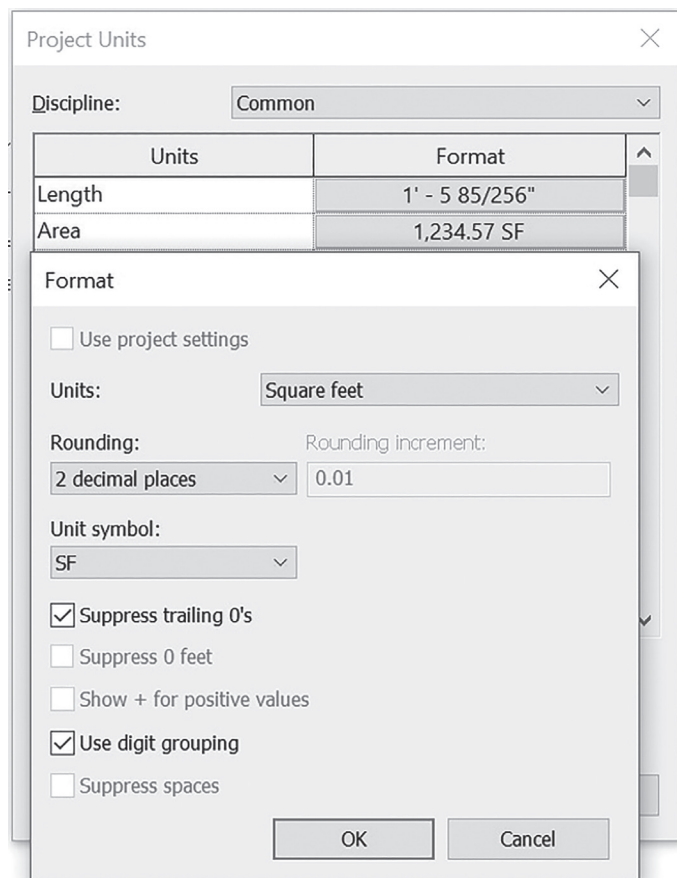


Figure 4: Image illustrating proper “Area” units

**VOLUME**

- Click the button under the “Format” heading for “Volume” and set up as follows. See figure 5.
  - Note: one may want to get more granular with this if refined calculations are desired.

**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)

- “Rounding” set to “Custom”
  - Place cursor between the 0 and 1, to the right of the decimal point.
  - Enter “0” ten (10) times.
    - Just do it, you will thank me when Shared Coordinates don’t blow up anymore (as if).

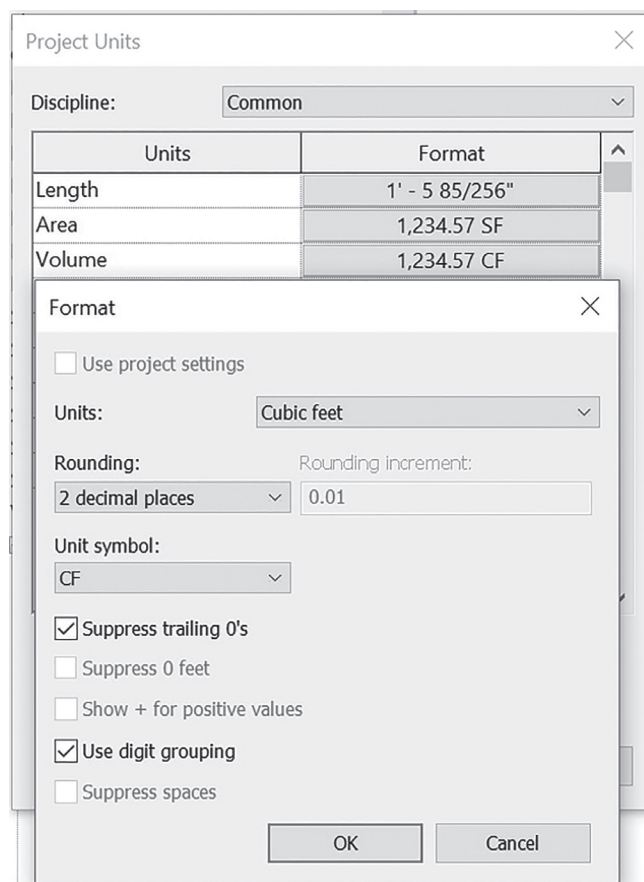


Figure 5: Image illustrating proper “Volume” units

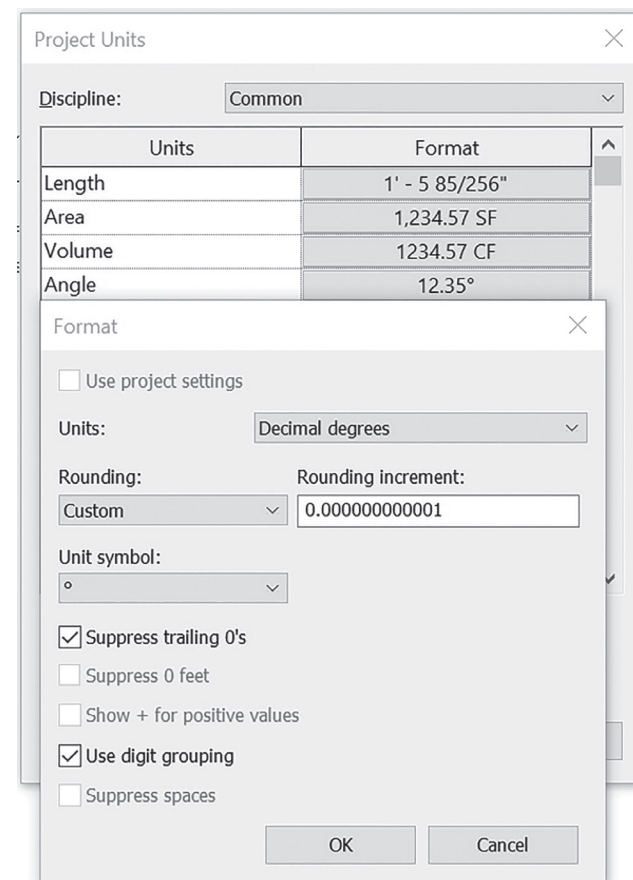


Figure 6: Image illustrating proper “Angle” units

- 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).
- Just do it, you will thank me when Shared Coordinates don't blow up anymore (as if).

See figure 6.

## SLOPE, CURRENCY, AND MASS DENSITY

Settings are all in figures 7-9. There are not many comments until "Time."

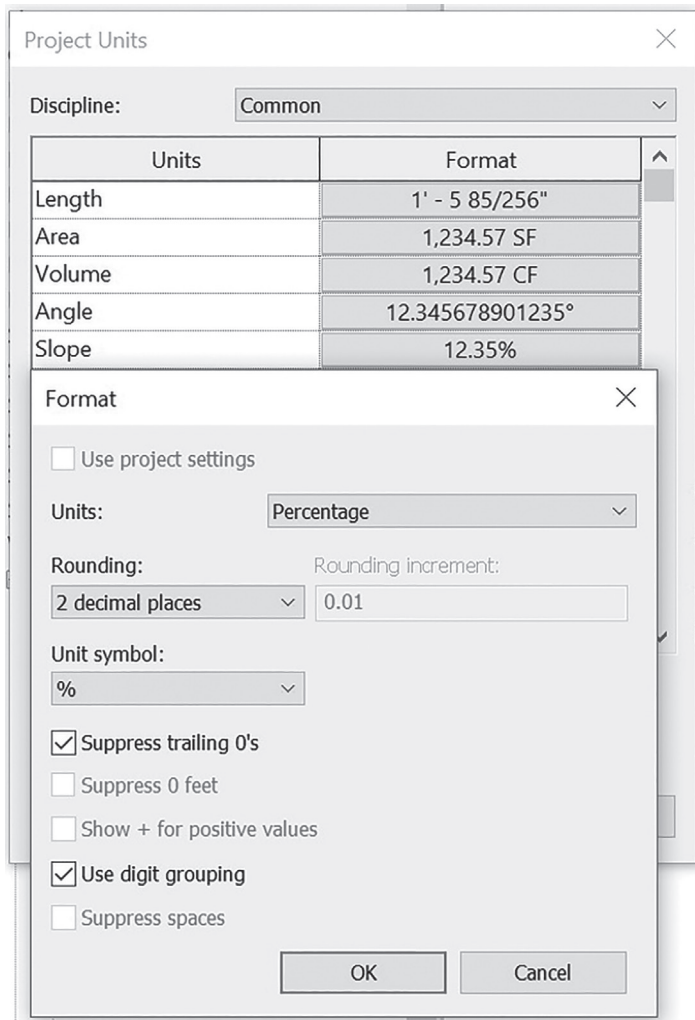


Figure 7: Image illustrating proper "Slope" units. (Yeah, you can set them up for Rise/12, etc... these are often modified to satisfy municipalities, outside jurisdictions, etc.)

## TIME AND SPEED

- New to Revit 2020, Time and Speed are going to allow a lot of future capabilities and I am looking forward to it!
- 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.

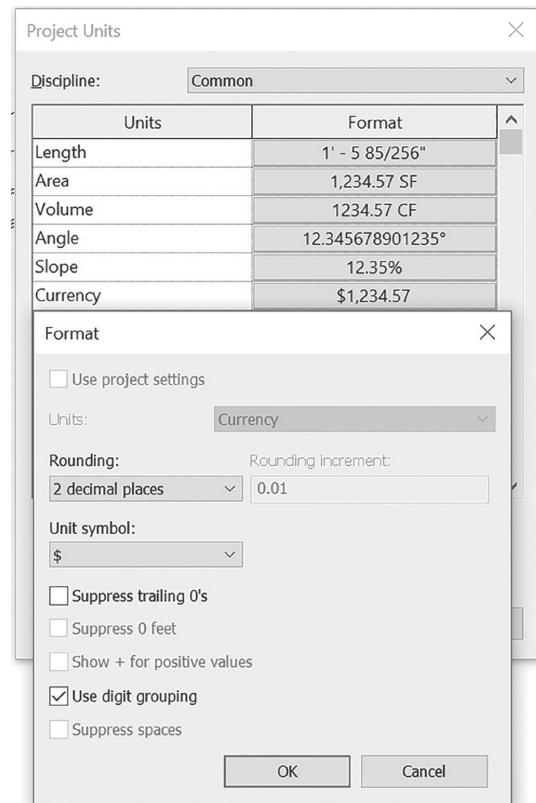


Figure 8: Image illustrating proper "Currency" units (add the dollar sign!) I like to set it up like money (since that is what this unit is lol...) so I let the trailing 0s show proudly

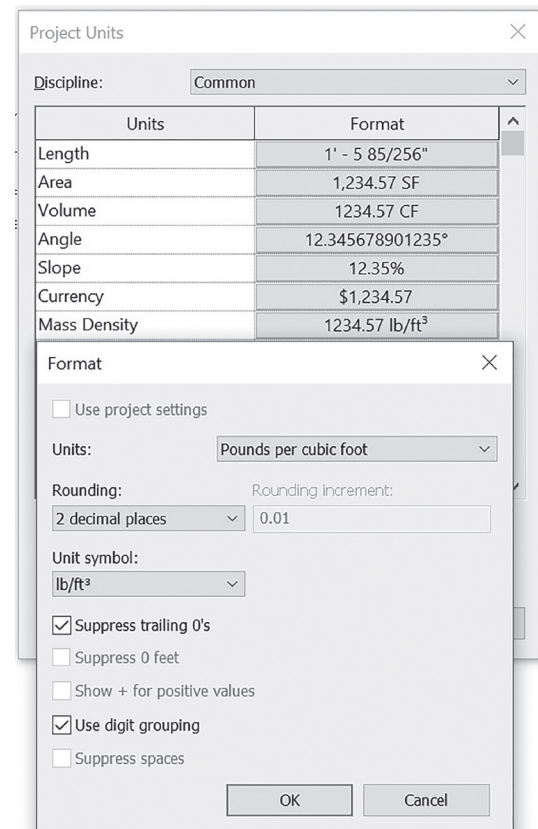


Figure 9: Image illustrating proper "Mass Density" units. The next time I use these will be the first, so if there are any mass density experts reading this, please let me know if there are better setups



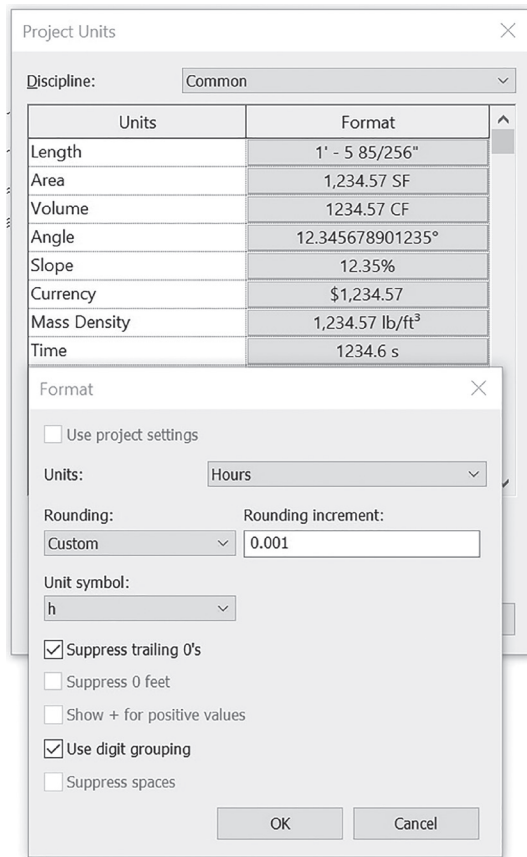


Figure 10: Image illustrating proper "Time" units

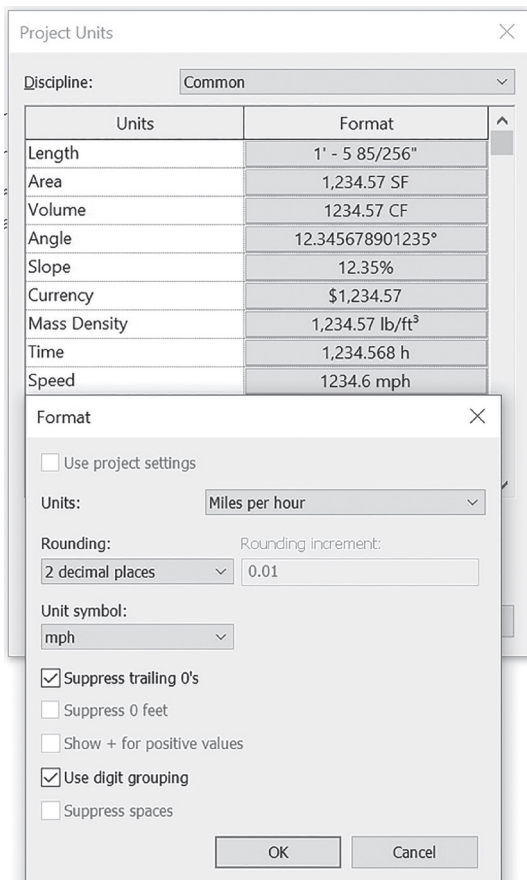


Figure 11: Image illustrating proper "Speed" units

## UNITS CONCLUSION

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

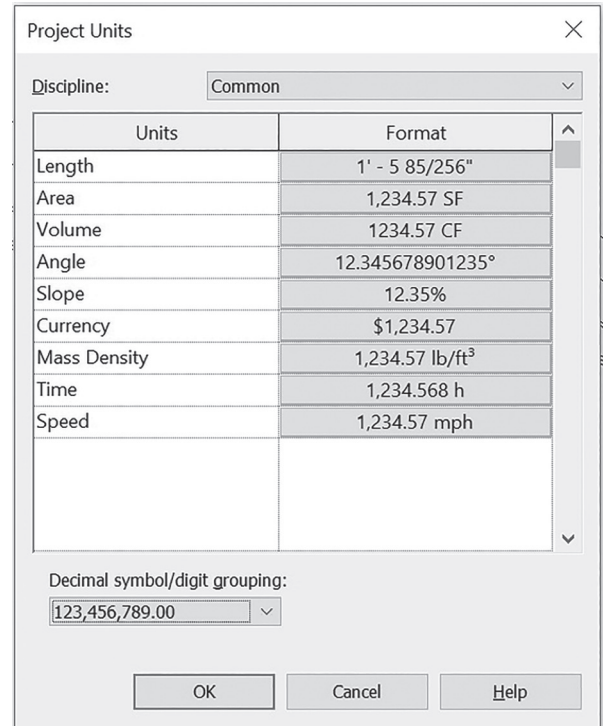


Figure 12: Image illustrating a properly set up Units dialog



Jay B Zallan | AECO | VDC | Design/Construction Technology Conductor | Fine Artist

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

He 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), Jay adds unique and collaborative insights and perspectives to every team he is part of.



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