# AUGIWORLD

The Official Publication of the AUGI Design Community

**March 2021**

# Uncovering Tips and Tricks

*Also in this issue:*

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**AUGI**

# From the President

**H**ello and welcome to March! This will be the start of Spring for some of you and the last month or two of winter for others. Here in Northern Utah, we are never sure when winter will end, but we always hope for March. For me, in particular, I love to do some gardening. So, I welcome spring and being able to get some vegetables planted and I think this year I will be putting in new strawberry plants!

This month's *AUGIWorld* is dedicated to tips and tricks. Tips and tricks are the lifeblood of the CAD/BIM user! I personally find that I learn something new almost every day, mainly because I hear or see a co-worker share a tip, or I read an online article or post that opens my eyes to a new way to solve a problem or use a software tool. It is these small things that make a difference in our quality of "work" life!

I encourage all of you to share those tips and tricks you learn, or know, with your co-workers and others. A great way to do that in our current climate of working from home is to use some of the online tools that most organizations use to communicate. Tools like Teams, Slack, Google Chat, Discord and Mattermost. Consider creating a group where co-workers can share tips and tricks for CAD and BIM. This can easily fill in for the monthly internal user group meetings that many companies held prior to the pandemic. An excellent first post would be a link to the AUGI membership page so that your co-workers can receive all the great information that you currently have access to!

So, read on and learn something that will help you have an easier day and then share it with those in your circle!

My best regards to all of you,

KaDe

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# 12 Tips & Tricks You Need to Know

Here are twelve tips & tricks for 3ds Max you need to know.

Tip 1: The progressive shadow with viewports in high-quality mode can be disabled in the viewport settings by turning off Progressive Skylight. Alternately, increase the time it takes to generate so it is less distracting.

Tip 2: Use the Place Highlight tool to interactively set the location of light based on where you want highlights on your scene. See Figure 1.



*Figure 1.*

Tip 3: With the HDRI lighting option, we can add multiple HDR lights (umbrella lights, warm lights, cool lights, etc.). To control the point where the light targets an object interactively in the viewport, use the Convert to Point Helper option in the HDR light material setting. We can use the Place Highlight tool with the Point Helper object. See Figure 2.



*Figure 2.*

Tip 4: Projection mapping is a simple way to quickly project a material onto an object. One way to use this tool is to add details to objects that can be used with compositing work. See Figure 3.



*Figure 3.*

Tip 5: The Select and Place tool allows us to drag objects across the surface of other objects. Right-click over the icon to control various options. Holding SHIFT will dragging, allows us to quickly copy the object. See Figure 4.
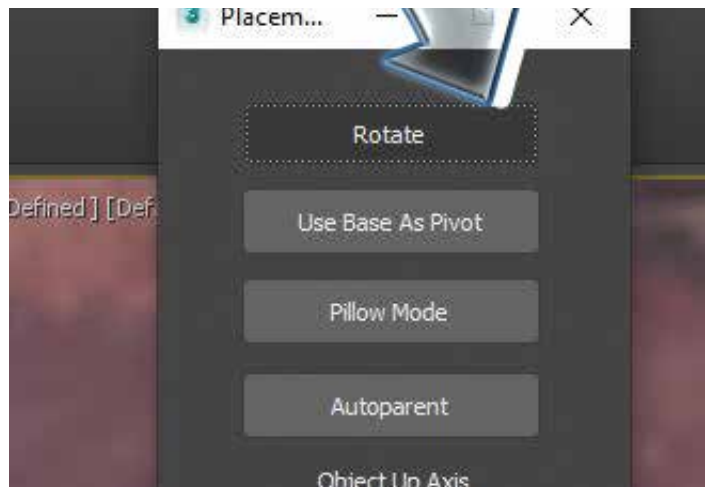


*Figure 4.*

Tip 6: Blended box maps allow us to add up to 6 different textures representing 6 sides of a cube (left, right, front, back, top, and bottom) and blend them together. Applying the material to an object will treat it like a cubed UVW map. It takes some



*Figure 5.*

thinking outside of the box (get it?), but it can be applied to objects in all kinds of ways. Some examples are, mapping the sides of buildings where details are not important, or applying interesting patterns to creatures without unwrapping. See Figure 5, where I applied a few textures to the lizard using the blended box map.

Tip 7: Motion Paths can be converted to splines. See Figure 6.
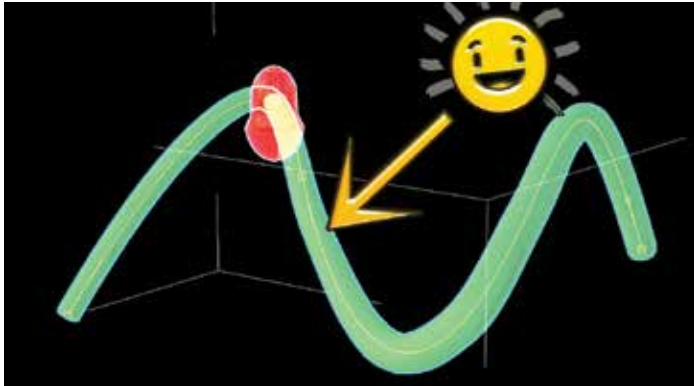

Figure 6.

Tip 8: Ghosting is an important tool for animation. 3ds Max does this well. We can modify the settings for ghosting under the Customize Menu -> Preferences -> Viewport Tab. See Figure 7.
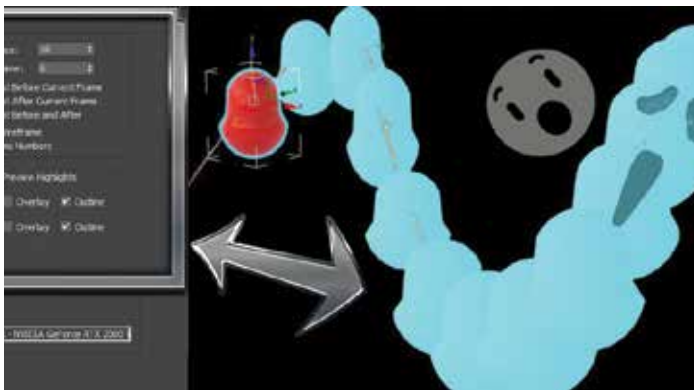

Figure 7.

Tip 9: We can increase the size of the text in the Script Editing window by holding CTRL and scrolling the middle mouse button.

Tip 10: Spacebar in the viewport brings up play animation and maximize viewport.

Tip 11: We can create groups in the material slate editor, and by dragging that group to the top, they become the first items accessible when we right-click in the view. See Figure 8.
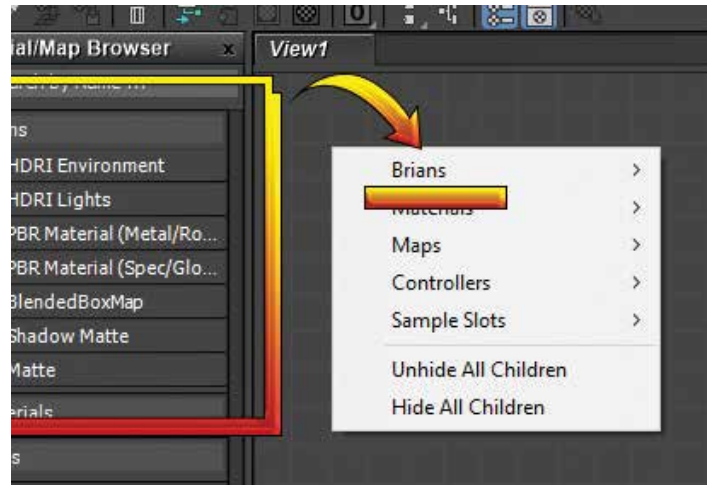

Figure 8.

Tip 12: We can assign the default program to edit bitmaps when right-clicking over them in the material slate editor. Select Tools->Preferences and then set the path accordingly.


Figure 9.



*Brian Chapman is an Autodesk Authorized Developer, Digital Artist, and Application Specialist for an engineering firm located in Las Vegas, Nevada. Brian shares tips and tricks at procad.blog with a portfolio of digital artwork and renderings at emptypawn.com. He can be reached at procadman@pro-cad.net.*

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# Civil3D Annosensations – Unique Ways to Leverage Labeling Functionality for Better Plan-Production

**"W**hy is this leader not pointing to anything?" exclaims the Project Manager to the frustrated designer that has spent countless hours validating the design, only to discover the plan-production effort was not the smooth-sail envisioned. "And this label is contradicting what's been presented on the previous sheet. And over here, the text is upside down!"

Love it or hate it, labelling plans will be around until the entire design delivery mechanism moves away from plans as we know it (looking at you AR guy, moonwalking around the room to the beat of Thriller while orchestrating the model with sign language). Until that hits mainstream – today it is labels. There could be thousands of them in a plan set. How do we better ensure every one of them is the way they should be and in a quicker timeframe? Thankfully, the tools available are getting better at providing designers the means and methods for such. This article aims at some unique use cases utilizing Civil 3D functionality within this realm.

## OVERVIEW

Overall, the practice of placing old-school text, mtext and multileaders is fading quickly and for good reason. These annotation objects are entirely independent of (or unlinked from) the object for which they are supposed to reference. This is often the cause of the issues illustrated in the first paragraph - contradictory labels sheet to sheet, the notorious "floating" leader head pointing to a patch of white space and overall excessive time spent reproducing the same thing.

Enter the *Civil 3D label* – the superior alternative that, instead, reads information that is attached to the root object itself and is married unequivocally to it unless, heaven forbid, the explode command do it part. Understanding that many already utilize Civil 3D labels in some capacity. Let us focus on some unique gymnastics they can perform, with the ultimate goal of adhering to the "data at the center" ideal.

## PROPERTY SETS – THE UNDERUTILIZED KINGPIN OF PRODUCTIVITY

Even with the abundance of Civil 3D objects available, there is still some primitive linework hanging out inside drawings that need to be labeled (lines, polylines, 3dpolys, etc.). Hold that finger! Do not reach for a multileader just yet. The same Civil 3D functionality for labeling can be applied to these objects via property sets. And

I assure you, it is as easy as Alabama's win over Notre Dame in the college football playoff this year.

Property sets allow for a wealth of additional information to be attached to any object in Cadland, and for this example, we will (1) add a property definition (or field) arbitrarily called "Label Text" to all polylines in the drawing and (2) create a single line label style called "Read Property Set Data". That is the one-and-done setup, and it is a matter of utilizing typical selection tools/commands to enter text directly into the polylines' properties and labeling all with the single label style that reads that property.

Note that property sets live within the drawing itself and carry with the source drawing on XREF into another drawing. This enables the placement of labels in different drawings, at different locations along the same object – all reading the same information. It is a flexible alternative to displaying labels through an XREF if necessary. Moreover, there can be multiple properties assigned to the same object in the source drawing, so that labels read differently from one drawing to another if desired.

**Drawing Set Up**

1.  **Define a new property set** and apply it (or "make it available") to the object types wished - polylines in this case. This simply allows for the property to exist in Properties-Extended Data tab of object types.

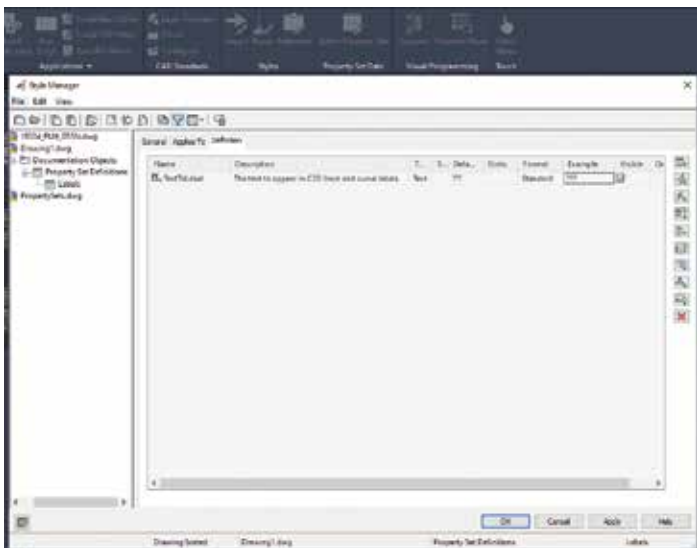2.  **Create a manual property** within that property set definition (far right tab). Set the type to text



*Figure 1. Property Set Configuration*

and enter "???" as the default. This will make it apparent when a label is placed on an object with no text entered in its associated property.

3.  **Set system variable AECPSDAUTOATTACH** to 0 or 1. We will set it to 1 so that with every new polyline created, it automatically makes the field available within the object's extended data tab of properties. Else, the property field needs to be manually added to every new object in that tab.

4.  **Create a single Line Label Segment Style.** This one is arbitrarily called "ReadPSData". Insert the property set syntax made available in the property set tab of the style dialog. This tab only appears if there is property sets within the drawing. To label curves (within a polyline or another object) this style needs to be replicated under curve labels.
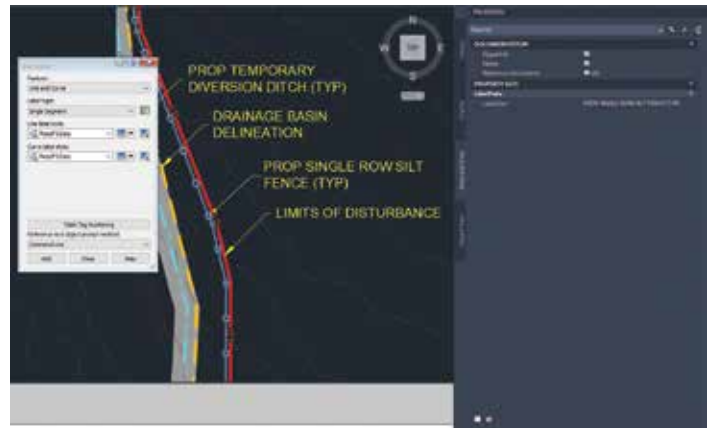


*Figure 2. Line and Curve Label Style*

**Labeling Workflow**

1.  **Fill the fields** within the polylines' Properties-Extended Data tab with the text to display in that object's label. The weapon here is to utilize typical mass-selection commands – Select Similar, Isolate Layer, and the "select similar on steroids" – QSELECT. For example, if I wanted every polyline on layer C-EROS-SILT to read "Proposed single-row silt fence. Refer to detail 2 on C3.08" I'd select all on that layer, and simply type that string into the Layer Text property.

2.  The magic part – **simply place labels**. The figure below shows the label text field within the extended data of a polyline. A line and curve label is placed on that polyline reading that string of text. Of course, the label's text is dynamic – so change any field and upon REGEN, the label will update.
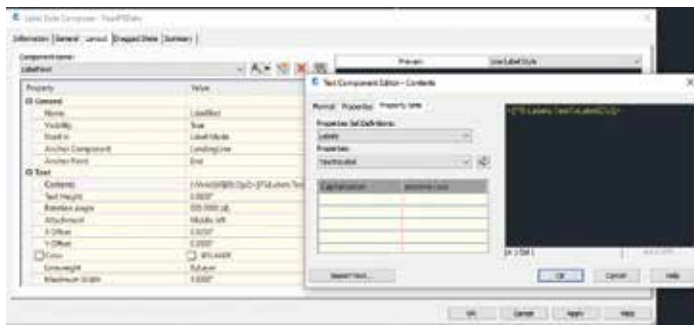
*Figure 3. Labelling*

## CODE SET STYLE LABELLING

There is one tedious element missing from the mostly automated capabilities of cross section production – dimensions. Luckily, with some creative rigging of Civil 3D link label styles assigned within the corridor code set style, it's possible to have Civil 3D produce and package the dimensions apart of the corridor section itself.



*Figure 4. Section with dimensions embedded*

A single link label style can house all annotation of the link. In the figure above, a single style displays the dimension, offset/elevation, and grade. Granted it does take some effort creating the style itself, it is a one and done procedure with the style available for use onward.

Within the label style are 7 components that amount to what represents the dimension because each component needs to have its own restricted "freedom" to stretch. For the sake of conciseness, this is an overview of the main properties of each:

- **The dimension text** - anchored from the feature at "Section View Top- Middle".

- **Two vertical lines** – the first line anchored at the feature start (the link start) and the "Section View Top – at Start". The other vertical line is just the opposite.

- **Two horizontal lines** – the first line anchored from the dimension to "Section View Top – Start" and dimension to "Section View Top – End" respectively.

- **Arrow blocks** anchored to the end of both horizontal lines and rotated appropriately.
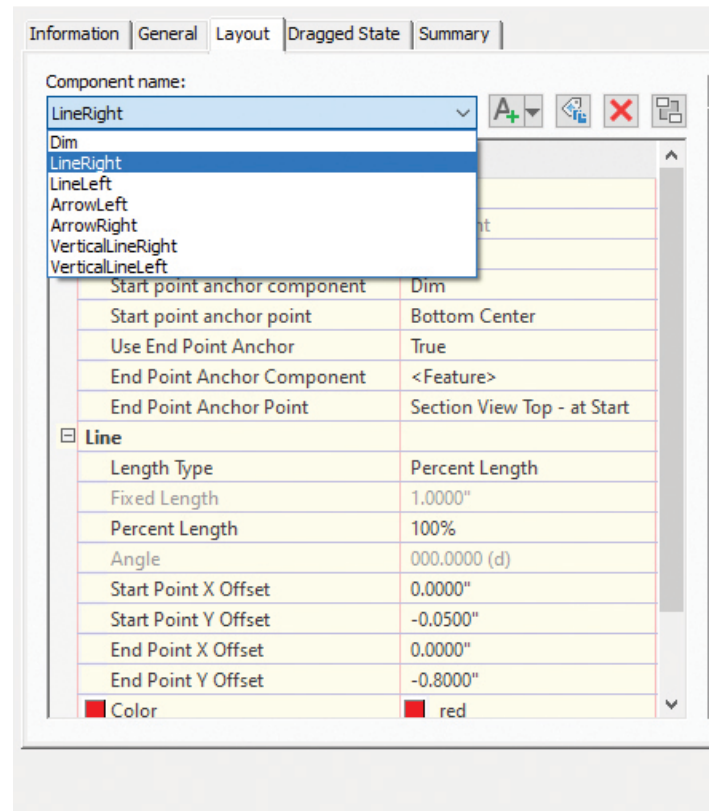


*Figure 5. Link Label Style displaying link dimension*

The Y offset of each components section view anchor is then set to a value where the horizontal lines are orthogonal to the section axis and the dimension text is placed in desired proximity to them. Note the
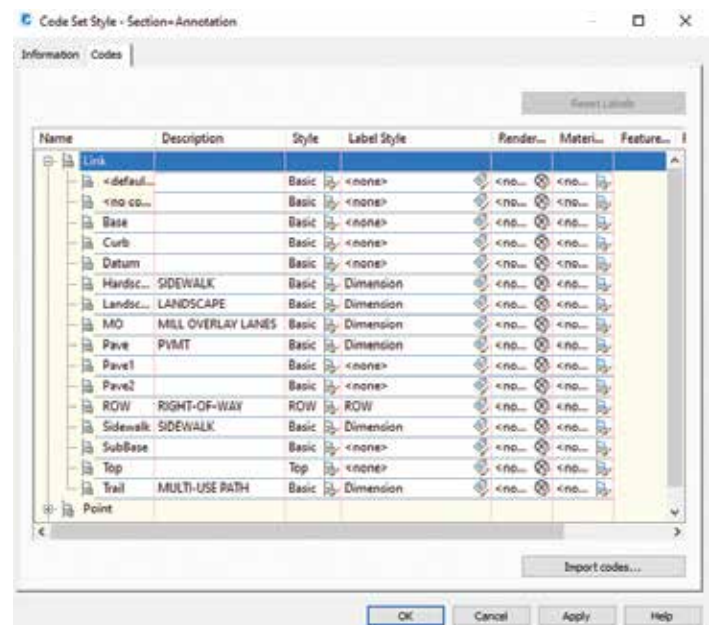


*Figure 6. Code Set Style*

possibilities of what can be shown within the label style. The figure above leverages the text within each code's description as well. There is also a "ROW" label style assigned to its associated code that displays a vertical boundary line block with associated text. Only links needed for the annotation are assigned the label style within the code set.

There is a dose of reality that also comes with this. This solution provides maximum congruency at the cost of flexibility. It is not possible to drag/move labels within the section corridor object. Likely there is some sections that may have small-width links that force the labels to overlap. In those cases, you may be forced to create a new label style for alternate offsets of text components, or perhaps override the code set style in that particular section to one without annotations – annotating manually there. Of course, there are more flexible ways to label utilizing section view offset and grade labels, but those will require their own special maintenance with label weeding factors, etc. (and cannot display corridor link widths/dimensions).

## "DEFAULT" DRAGGED-STATE LABELS

Often, it is necessary to label every entity of a particular type (perhaps storm structures) with a leader regardless of circumstance. It can be very taxing to drag every label away from its default location to trigger the leader components in the dragged state. A simple solution like the one presented in code set styles: Create a leader block and insert that block as a definition of the style within the layout tab – perhaps a leader block that is identical to the settings you prefer in the dragged state tab. On initial label placement, congruent leaders in angle and leader lengths will be shown. On move of a label, the leader style is identical. Be sure to set the dragged state components to "Stacked Text" to replace the
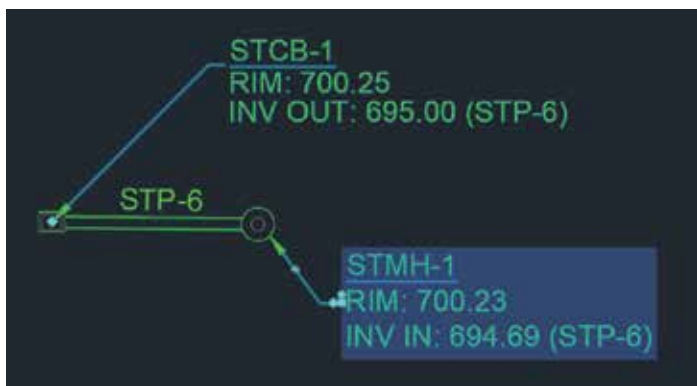


*Figure 7. Label in its initially-placed state (top) and dragged-state (bottom)*

static leader block with the dynamic dragged state leader when label is moved.

## SPOT/GRADE LABELLING BREAKLINES

Spot or elevation labeling the surface object itself requires a level of placement precision that introduces user error, particularly on areas of steep grade or where the surface is triangulating around curves. Misplace a spot label just a fraction on a curb or wall and that equates to large error in the elevation readout. Similarly, placing surface slope/grade labels requires extreme placement precision, particularly for cross-slopes.

Instead, consider *labeling the breaklines that make up the surface definition itself*. This guarantees accurate spot and grade labels, even if the surface itself has minor inaccuracies. This will also boost CAD performance because there is no need to have the surface on to label.

General Line and Curve Label Styles read feature lines, polylines, lines, arcs, and 3dPolys. And while any of these objects are valid breaklines and can be inserted as part of the surface definition, we are labeling feature lines for this example.

### Create the spot and grade label styles

For spot grades that display elevation of a feature line PI or elevation point, two styles are needed – one that reads the segment start z



*Figure 8. Spot Elevation Label Style*

elevation and one for the end z elevation. If only one existed, either the start or the end of the feature line would not be labeled. Line and curve 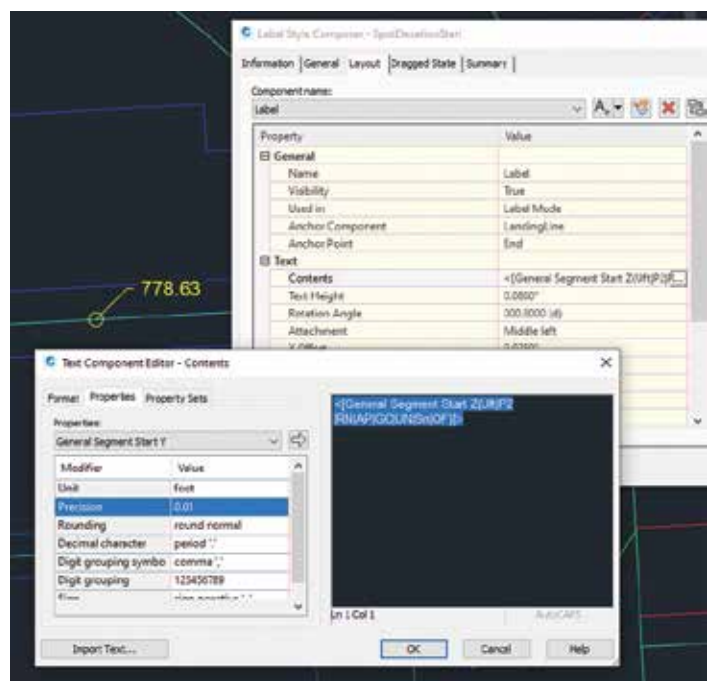labels read the objects underlying line and arc segments. *The critical property here is the labels anchor point on the object*. Ensure its congruent with the text property the label is reading so the label is forced to the correct location. The figure below utilizes the "Default" dragged state leaders illustrated previously.

For grade/slope labels, simply add General Segment Grade to a single style and assign insertion point to middle. Now the drawing is set up to pepper-label the feature lines utilizing those label styles.

## EXPRESSIONS

Labels can read numerical object data, calculate, and display the result by way of expressions that live at the bottom of any given label type in Toolspace-Settings. A common expression leveraged to pipe label text is the Manning's equation for velocity and flow. Expressions can also calculate label components' rotation, as is used for the grade arrow's orientation in the grade label previous. Note that expressions use radians for angular input, so below translates to "If the grade is positive on that segment, rotate the arrow opposite to point it downhill (pi = 3.14 rad = 180°). Else, it is correct and leave it be.
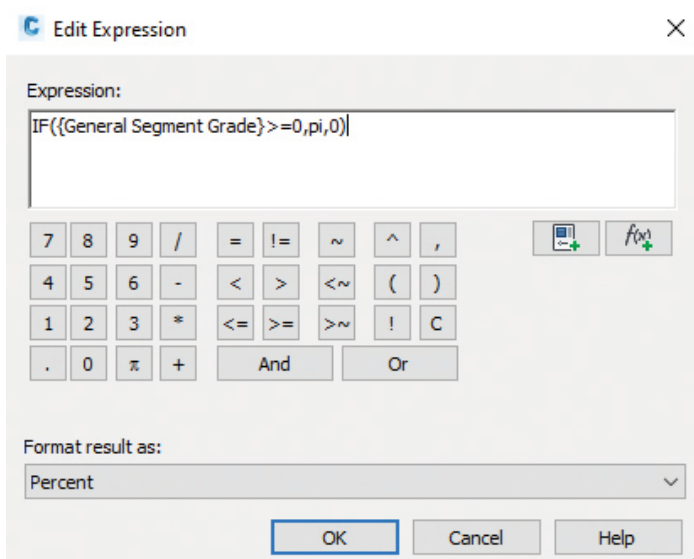


*Figure 9A. Rotation Expression*
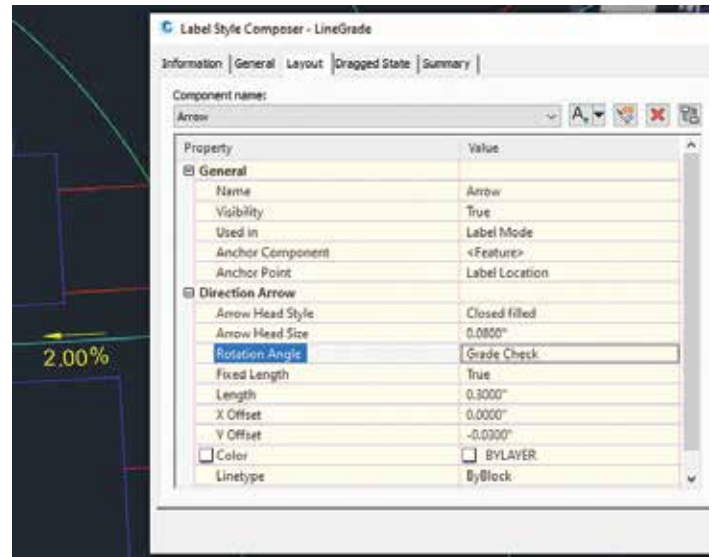


*Figure 9B. Grade label style arrow rotation*

## ODDS AND ENDS OF LABEL STYLES

A few handy tidbits on general functionality, behavior, and performance of Civil 3D Label Styles:

- **Labels shrink to valid information.** For example -if two property set fields exist within a label style but the associated object does not have any data present for the second field, the label will shrink to fit the only thing it finds. This makes for a great diet of concise styles within a drawing.

- **Plan readability** tells Civil 3D at what degree it should invert the text when the view is twisted.
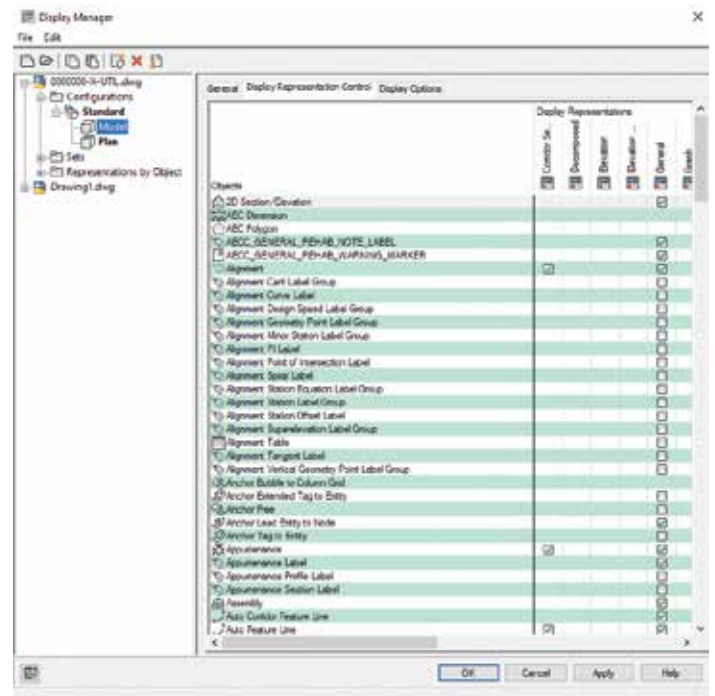


*Figure 10. Display Manager*

Labels for road names placed on centerlines is one example. If they read upside down, adjust plan readability in the label style.

- **AutoCAD's Display Manager can aid performance** and clarity by controlling *visibility of object types per view type (plan, model, profile, section)*. This one is often overlooked in-lieu of the layer manager and Civil 3D object style visibility control. *Unlike Civil 3D object styles, label styles' visibility per view type cannot be controlled within the style.* For view types (3D model view particularly) that do not need labels visible (or any other object type), simply uncheck that object under model in DM.

## MAP 3D LABELS

This article, void of a Map 3D mention, would be a disservice. Map 3D's full functionality lives inside the Civil 3D application and while the two do not necessarily talk to each other much at the playground, they do coexist peacefully and can complement each other in the same space – with a couple nuances. The Map 3D functionality exists with the Planning and Analysis workspace – or by commonly calling the MAPWSPACE palette.

One aspect where Map 3D shines: Its ability to label areas, or closed boundaries dynamically. It is particularly helpful when the plan just needs some context outside of the surveyed bounds or the project area. Perhaps there is a need to label numerous adjacent property owners/deed info/etc. Sure, parcel objects could be used but that requires manual entry of each text property to be shown in the label. If GIS data is available (shapefiles, sqlite, etc. often provided by public municipalities), it's a drag-and-drop operation with the data into model space, then configuring the Map 3D label style to read GIS attributes. It may be beneficial to create a map template for large scale areas of frequent work, harnessing all the linked data styled and annotated to a standard.

The other brilliant functionality unique to Map 3D labels is dynamic visibility/positioning. Given a viewport in a layout, every Map 3D label will attempt to show in its entirety within the bounds of its reference. If it cannot do that, it simply does not show.

A couple caveats to mention: (1) On plot, Map 3D does not read AutoCAD plot styles. It prints as the screen displays. Keep that in mind when styling

colors and applying line widths to those objects within the Map 3D style. (2) This functionality reads database information. Edits to geometry using Map 3D tools edit the source data that may be read into other drawings and projects. There is a "Save as AutoCAD Drawing" within MAPWSPACE Task Pane - Maps that will copy the map objects on screen to static AutoCAD objects should that be needed.
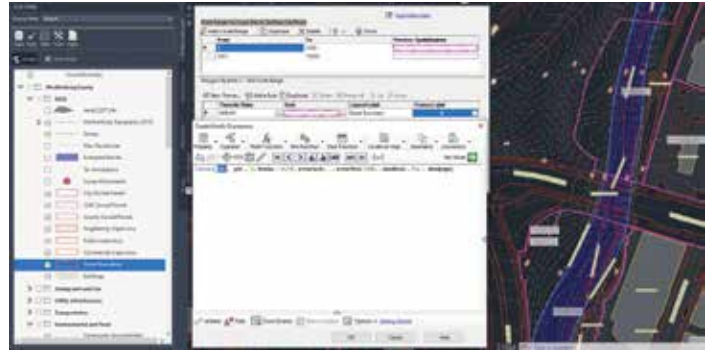


*Figure 11. Map3D Template Drawing.*
*Source GIS Data Credit – Mecklenburg County, North Carolina*

## CONCLUSION

I hope this sheds light on some new and exciting ways to up your plan-production game. The underlying premise of "data at the center" or "at the source" being the main important point. Annotations that read object data in lieu of housing it within become more a simple byproduct of the model itself, aiding the foundation for the next generation of design deliverables. I would love to hear your ideas and field any questions you might have via the contact info below.

Onward!

*Matthew Grigsby is the Design Technology Manager for LandDesign in Charlotte, NC - an Autodesk Certified Professional, professional engineer and avid developer/ student of .NET. Previously he spent 8 years as a designer and technical lead within the private mixed-use, multifamily, retail, and industrial design-space. Matthew can be reached for comments or questions at www.linkedin.com/in/ mdgrigsby*

# Modeling Stage Rigging in Revit
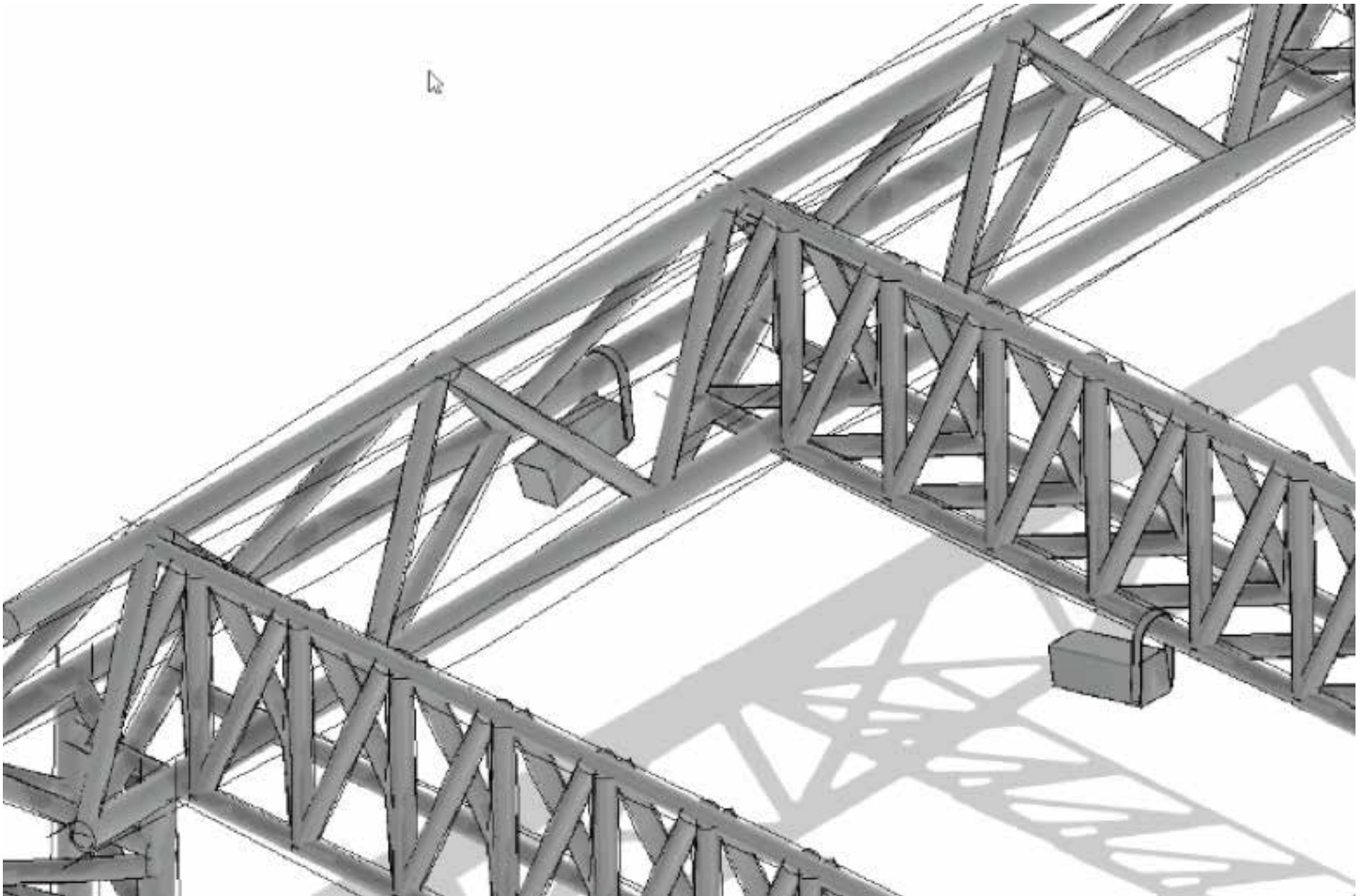


**T**his month is basically going to read like a technical book. Just the way I like it. So to model rigging as shown above, follow these steps:

1. Open Revit and Under Families click New…

2. Find Generic Model, and click Open

3. Right Click on one of the green reference planes and select Create Similar.

4. Offset the reference planes 1'-6" right and left then above and below as shown in Figure 1.

5. Add the dimensions and add the parameters shown in Figure 2.

6. In the Project Browser, In the Elevations (Elevation 1) category, go to the Left elevation.

7. Create a reference plane 3'-0" above the Ref Level.

8. Dimension the Reference plane starting from the level to the new reference plane

9. Add a parameter called Height.

10. Go back to the Ref. Level floor plan and create the reference planes, dimensions and parameters as shown in Figure 3.
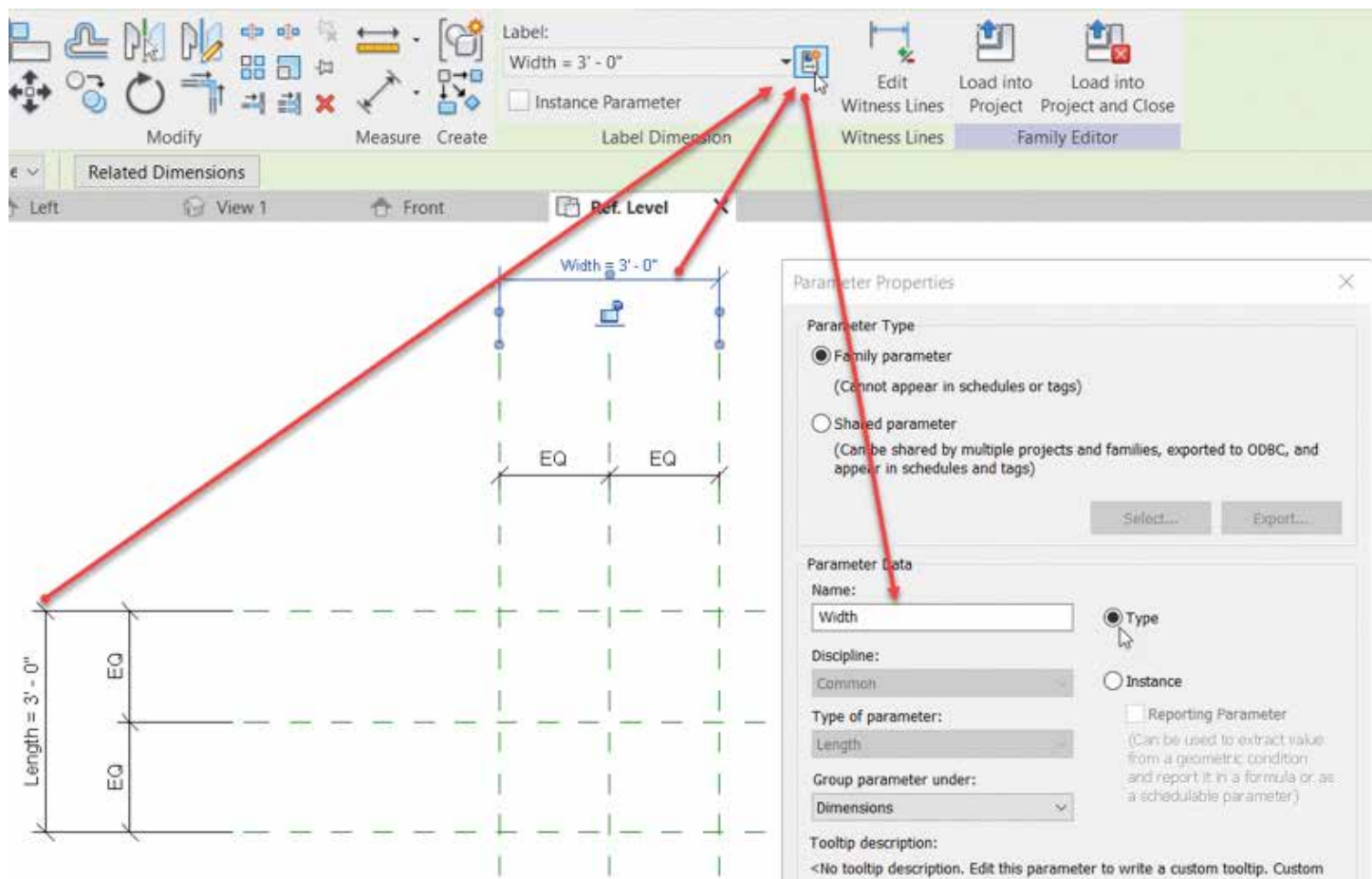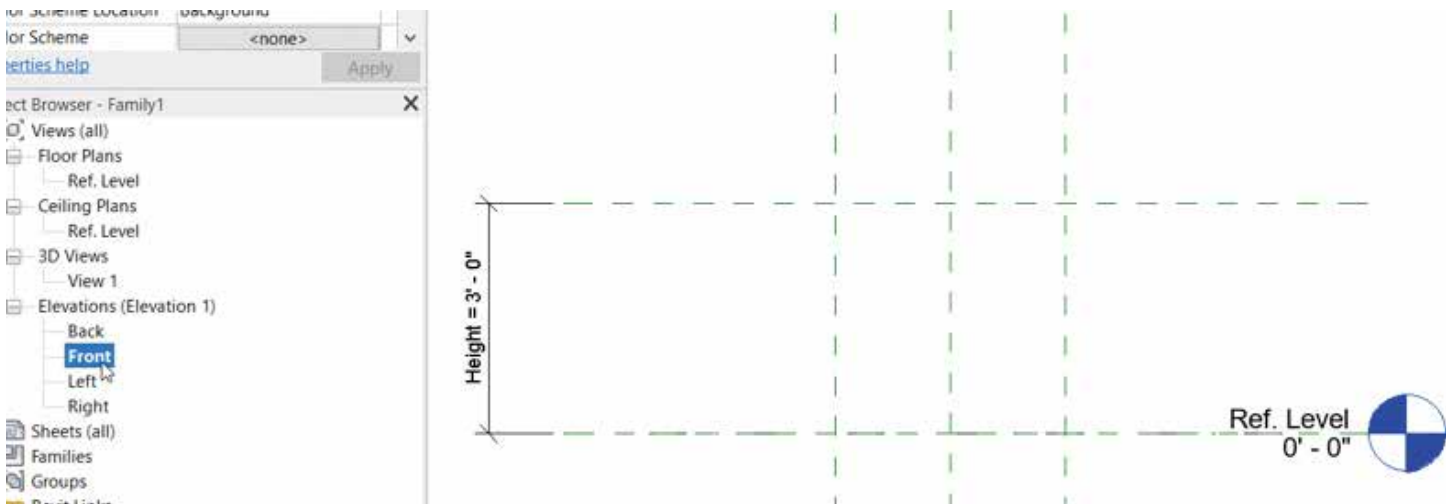
*Figure 1.*



*Figure 2.*
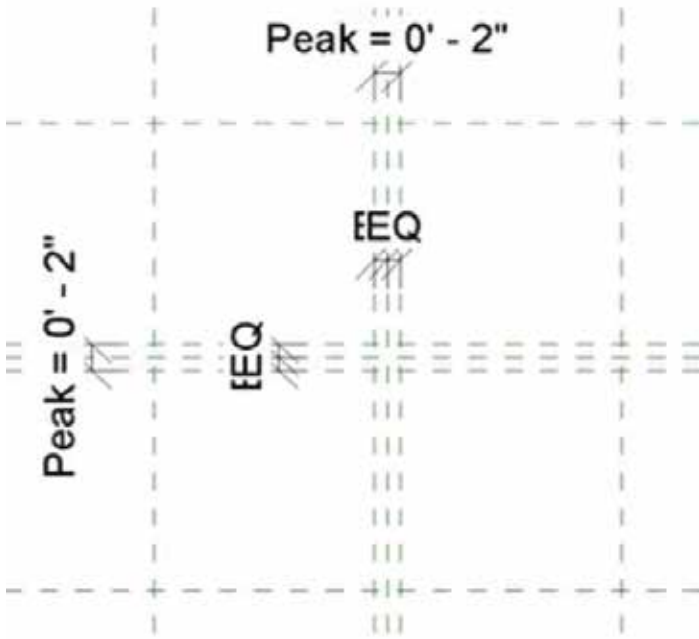
*Figure 3.*

## ADDING A SOLID BLEND

1.  On the Forms Panel, click the Blend button.

2.  Select the Pick Lines button and make sure the Lock button is checked

3.  Pick the outer reference planes (This will be the bottom of the Blend)

4.  On the Model Panel, click Edit Top and pick the four reference planes that indicate the Peak.

5.  Click the Green Checkmark for Finish Edit Mode

6.  Go back to the Left elevation.

7.  Align and lock the top of the blend to the top reference plane. See Figure 4.

8.  Go to a 3D view

9.  On the Create tab, Click the Sweep button
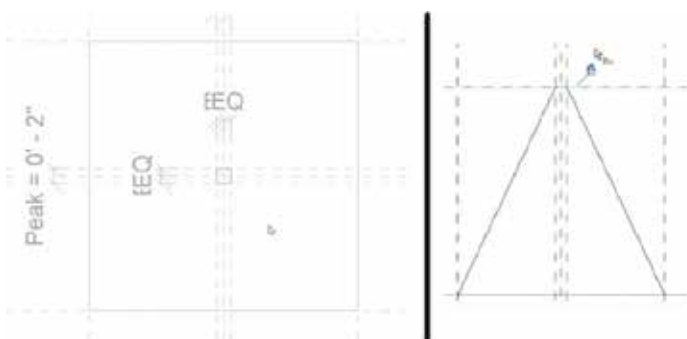


*Figure 4.*

10. Click Pick Path

11. Pick one of the four lines connecting the base to the top

12. Click the Green checkmark

13. Draw a 2" Diameter circle and pick the red dot on the middle of the line

14. Add a Diameter dimension and label it Pipe Size as shown in Figure 5.
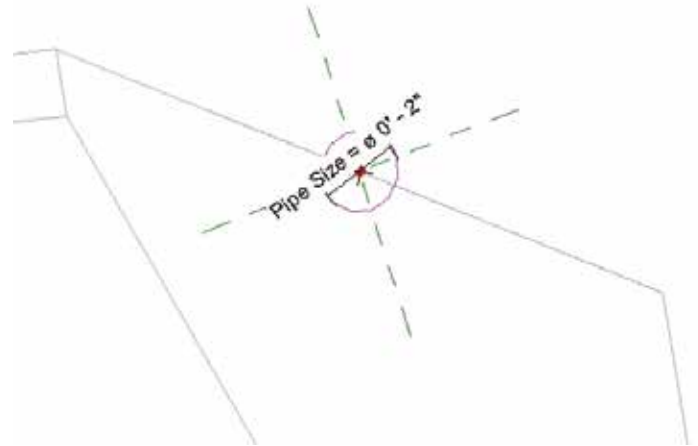


*Figure 5.*

15. Do the same for the rest of the lines so there's four pipes.

16. Select the solid Blend and uncheck Visible in the properties

17. Save the family as Truss Bars.rfa

## LINE BASED FAMILIES

In this portion, we will model the actual framework of our truss. Then, we will load in the Truss Bars family and create an array which will calculate the number and spacing of the bars.

1.  Start a new family using the template called Generic Model Line Based.

2.  Click the Sweep button.

3.  Click Sketch Path.

4.  For the first point, click the left most intersection, for the second point, click the right intersection.

5.  Click the green finish check mark.

6. In the Project Browser, go to the Left elevation

7. Click Edit Profile

8. Add the three 4" circles, the reference planes, dimensions and parameters as shown in Figure 6.
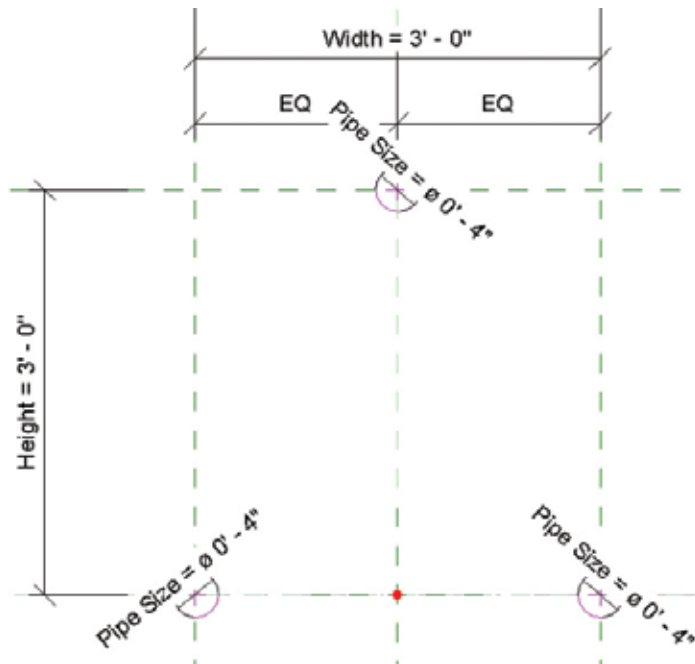


*Figure 6.*

9. Click the Green Finish checkmark button.

10. Go back to the Ref Level floor plan.

11. In the properties, change Length to 10'-0".

12. Go to Insert, then Load Family and select your Truss Bars family.

13. Click the Component button.

14. Hit the space bar once to flip it as shown below.

15. Place it in the model approximately where shown. Below to the left.

16. Align and lock the left side of the family to the left reference plane, and the centerline of the family to the middle reference plane as shown below to the right.
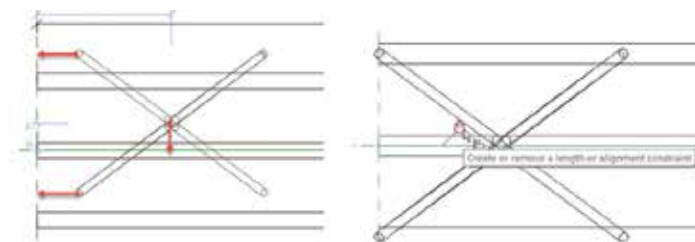


*Figure 7.*

17. On the Properties panel, click the Family Types button

18. Create the following parameter below making sure your settings are identical:
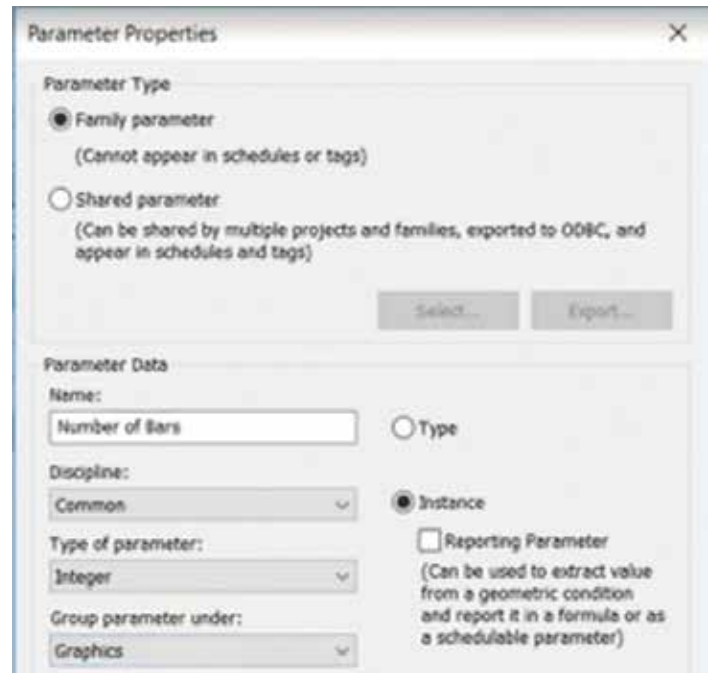


*Figure 8.*

19. Now create the following parameters as instance parameters, and the Type of Parameter as length. Also add the Values and Formulas as shown:



*Figure 9.*

20. Select the Truss Bars family

21. Click Edit Type

22. Click Associate Family Parameter with the corresponding parameters you just made as shown in Figure 10.

Figure 10.

## CREATING THE ARRAY

Here we will tell Revit how we would like to array our nested family.

1. In the Project Browser, go to the Elevation: **Front**

2. Select the Truss Bars Family and click Array

3. In the options, the **Number** will be **2** and **Move to**: is **2nd**.

4. Pick a point anywhere on the first family and pick a second point to the right about 4'.

5. Hit Esc. Add a dimension from the center point of the first family to the center point of the second family as shown.

6. Select the dimension and add the parameter Bar Spacing to it as shown to the left below:

7. Select the family to the right. You will see a small number 2. Select that, and add the parameter Number of Bars (Shown on the Right below).


Figure 11

You've done it! Load this family into a project and click Component and start drawing it. Change the overall size parameters as needed. If you need further assistance with this, let me know at ewing@cscos.com or message me on LinkedIn, and I will give you access to my LinkedIn Learning videos which might clear some of this up!

*Eric Wing lives in Syracuse NY where he is the Director of BIM Services for C&S Companies. Eric is a popular speaker at events around the country speaking on many BIM-related topics.*

*Eric has authored several books including Autodesk's official training guide for their BIM solution "Revit" called Revit for Architecture No Experience Required. Eric is also an author for LinkedIn Learning where he has authored around 60 full courses on BIM management, Revit, AutoCAD MEP, Navisworks and Virtual Design and Construction (VDC)*

*Eric has truly been a leader in the architecture, engineering and construction industry since the conception of BIM and 3D design, and has specialty skills in BIM coordination, training and development of technical staff along with daily application of these tools on multi scale, multi-disciplinary projects.*

*Eric is also currently a Professor at Syracuse University teaching BIM and Advanced BIM at the School of Architecture, and at the School of Engineering.*

*Eric has also taught courses at the Rochester Institute of Technology and Clarkson University on the subjects of Analytical tools for Facility Management, BIM, and Integrated Project Delivery.*

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# Great Expectations

In a very good book by Charles Dickens, young Pip has a series of life changing expectations about events in his life, in which most of them do not play out as he thought they would. We can be like Pip in that we also have preconceived ideas about what outcomes may come from our planning.

As a follow up from the last two articles on pitfalls, I thought of another area that deserves some focus. It is our expectations and the expectations of others. Everyone usually expects something. They may expect a little more or less than what actually happens, or they may be way off. When reality does not meet the expectation, then there is a disappointing moment that might taint the outcome of an event, a milestone, or a transition.

I combine two perspectives into one article because it is a balancing act to get it right. Expectations are difficult things to get right. They can provide motivation toward good outcomes or they can provide disappointment in missed targets. I have seen people's satisfaction levels go down because they were expecting one thing and received another. They anticipated more and got less. I have also observed unexpected outcomes bring a smile to many faces when something goes better than they had hoped.

You need to manage expectations, your own and others, so that when something happens, it is met with enthusiasm and satisfaction. Matching outcomes with expectations, bring great satisfaction. Expect too much or too little or just something different and things can go sour.

## EXPECTING TOO LITTLE

Sometimes we expect too little from people. Sometimes people expect too little from us. When we expect too little from others, we tend to slow down the timeline. We give them more time, even if they do not ask for it. This delays project completion and stretches out timelines unnecessarily.  It also causes us to not delegate tasks to others because we think they will underperform. Things that could be passed on to others stay on your plate and cause more delays.

When people expect too little from you, some of the same things happen in reverse. They do not let you work on some efforts as they think you will not be able to handle the work. You do not get that promotion. You miss out on the project leadership role.

## EXPECTING TOO MUCH

Equally impactful can be an attitude of thinking others are better at what they do or are faster than they really are. You are giving them more credit than they actually deserve. This can mean that you are disappointed and maybe even left high and dry when others cannot complete a task or project that you gave them. Maybe their level of effort is not as high as you had hoped. Or the quality of their work did not meet the needs or desires of the client as you had envisioned. It may have to be redone. It may be criticized by the client and reflect badly on the firm. It may not be their fault; it may be that you gave them a task that was beyond their skill level.

It may also be that you are expecting too much from others and too much from yourself. This is just being too demanding. You are asking them to do something at a pace they cannot achieve. Or to task them with too much work and they are overloaded. This could be you taking on too much also. Overloading yourself. You cannot even do everything you have taken on. You expect too much from yourself.

## EXPECTING THE WRONG THING

There are times when we just think that something totally different will happen. Think of a surprise birthday party that lands on the same day that, unbeknownst to you, the person has a terrible day. They bring grumpiness to the party that you thought would be fun. Sometimes you think a tech fix will get you back on track, but it ends up making things worse. Sometimes you think you are on the same page with the client and they are thinking something totally different.

## EXPECTING THE BEST

How do you get it just right? How do you get clear expectations from all parties? You have a conversation. With others and with yourself. I call it Expectation Management. You do this by clarifying the timeline, level of effort, outcome, and end product. It sounds like a grand conversation, but it can be fairly quick.

When you give a task to someone, you need to define a due date. Rather than just giving them one (unless others have already defined the due date), ask them how long it will take. If their answer matches what you were thinking, all is good. Now ask about the end product (how many, what detail level, etc.). Again, if it matches your thoughts, all good. But if they do not match, then start a quick negotiation. Start first by asking why. Why so long? Why so few? Make sure you understand their perspective on what it will take to get things done. You may think you have a good idea on what it will take, but they may think it will take longer because they have concluded that you want more completed than you are actually asking for. Clarify your targets and ask again. "If we only need 5, how long would that take?" Keep going back and forth until you get an agreed upon approach and understanding. You may need to bring others in to help do the hands-on portion if the workload is really taxing or lower your expected outcome if you are asking too much. Either way, when the expectations match and the task is done, you will get predictable results.

When you are given a task or are starting one on your own, ask yourself some of the same questions. Can I get this done in time? Have I done it in the past? Is this too much for one person? Would I have to set something else aside that is a priority? If you have concerns, communicate those concerns to others that are anticipating a certain outcome. Have the same back and forth conversations until you get an agreed path forward.

By managing expectations, talking it out to an agreed upon plan, you can heighten success, improve moral, increase output, and avoid misunderstandings. It can all be a win-win if you get those expectations in line.

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

# Value to Virtual Interactive Meeting and Collaboration Technology
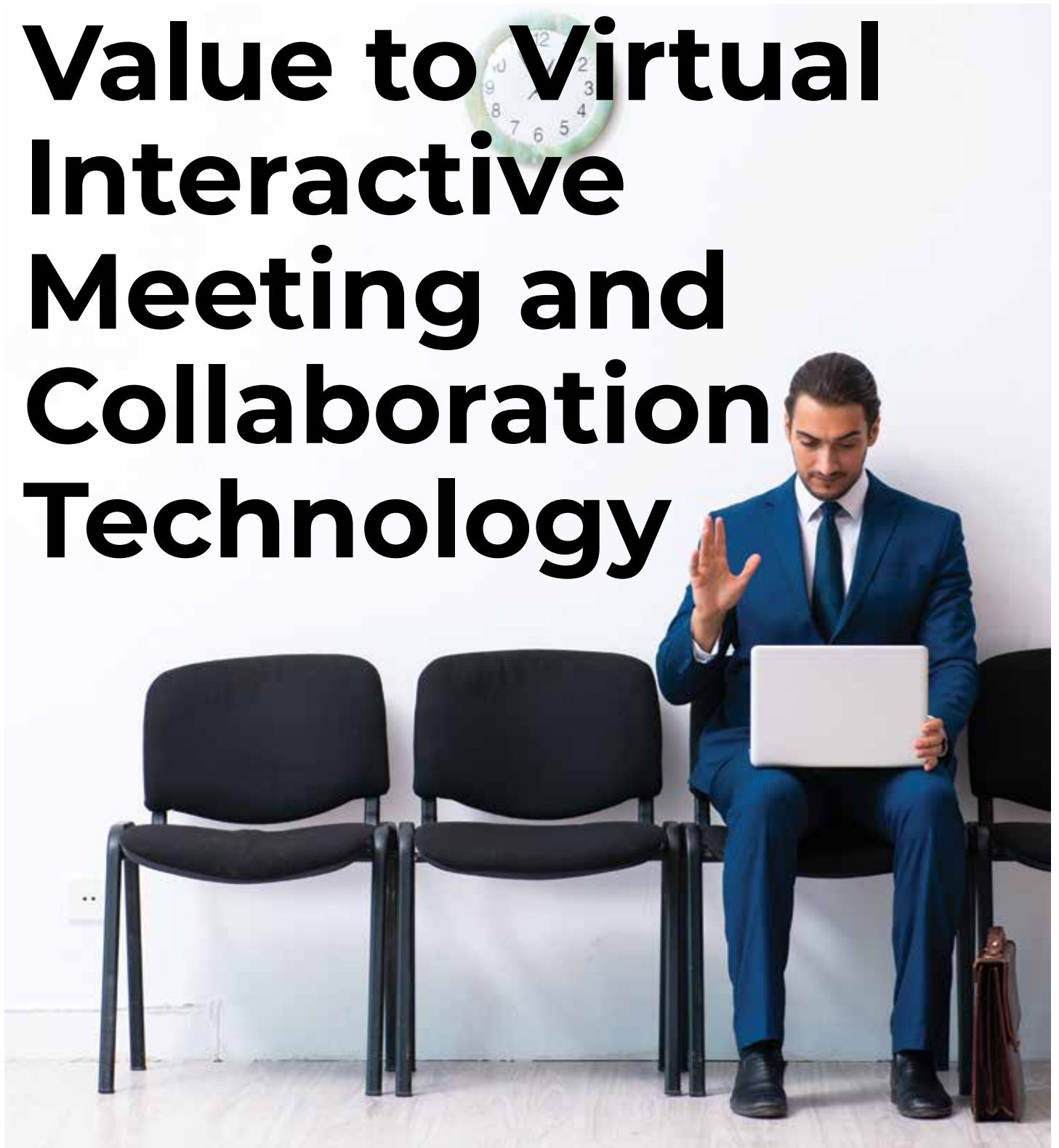
**T**he AEC Industry has historically relied on printouts and paper processes to manage design reviews, design submittals, and project workflows in general. Since the introduction of BIM and CIM technology, firms have gradually shifted into this "Connected Design" environment where all design communications are being performed via computers, tablets and even phones. Having seen the impacts of how the Digital Era is transforming the way AEC firms operate on a daily basis, there is a plethora of new concepts, ideas, and technologies we are now able to leverage in our daily workflows and streamline our transition into this connected environment.

## THE CHALLENGE

Due to recent developments with regard to the COVID-19 outbreak seen throughout the world, AEC firms were caught off-guard and left scrambling to figure out best practices to maintain close interaction and communication with project teams, clients and contractors. A lot of firms were forced to play catchup, with many on their staff working overtime, to run necessary testing and implementation to allow for communication channels to be maintained. As you can imagine, these recent events have had a major impact on the AEC industry across the world.

Although virtual interactive meeting and collaboration technology has been around for quite some time, there has not been a need for us to rely so heavily on it previously. In the AEC Industry, we are constantly adapting to our environments to stay ahead of the technology wave in order to maintain that competitive edge. A lot of the existing communication technology we have relied on in the past, have been focused on that 1-to-1 live feed where we can discuss project initiatives, design development, phasing, etc.

Within these live meetings, whether it be through WebEx, Zoom, Skype, etc., we are able to share screens within this environment with all project stakeholders to display flythroughs of our project design development and verbally communicate our design intent, as well as compare alternative designs on the fly. These platforms can be limiting in the way we interact and communicate, where these solutions are really contingent on the end-user's network and overall capabilities. Often times, these video conferencing platforms can also be a bit choppy and can leave the end-users in the dark if they are missing specific conversations and designs being displayed while hosting these meetings.

## THE SOLUTION

Due to these challenges facing AEC firms world-wide, we have an opportunity to continue pushing this technology to streamline these communications even more. There are a number of vendors currently supporting the AEC industry that have recognized some of these shortcomings with meeting technology resources, and have identified ways to improve communication and design intent.

To enable all stakeholders on a project to streamline communication of design intent, overall design collaboration, and make faster/smarter decisions, we need to look outside the box a little and determine how best to virtualize and streamline our communication channels. By virtualizing communication, we can now incorporate new technologies to engage with our teams, where all stakeholders can be inside our design model all at one time.

## BENEFITS

### DESIGN REVIEWS

As we transition from a paper to digital design review process, we are opening ourselves up to incorporate new technology into our workflows that will set us ahead of our biggest competitors. PDF applications have officially replaced our paper QC Review process. For several years now, we have been leveraging 3D Model viewing tools (i.e., Navisworks, BIM360, Bentley's Design Review, etc.) to showcase and communicate our design intent to our Clients and Project Teams. Taking these concepts and tools already being leveraged during our Digital Design Reviews, we can easily transition into this Virtual Interactive Meeting and Collaboration Technology environment to give us the ability to engage with our Clients and Project Teams in a fully immersive environment that everyone can independently control, review, and collaborate. Leveraging this technology allows all stakeholders to independently navigate and review models, incorporate verbal and written notes, swap materials, adjust/perform design modifications to the models, and generate customized reports of design reviews.

### PROJECT SITE WALKTHROUGHS

Project Site Walkthroughs with project teams, clients, and contractors to discuss various project components has always been part of the design process. By leveraging Virtual Interactive Meeting and Collaboration Technology, we can now place our design models on the site

using Augmented Reality Technology and truly visualize and communicate our design intent. Additionally, to ensure that all stakeholders are social distancing, this technology lends itself the opportunity to bring multiple stakeholders into the same environment, regardless of physical location, to continue collaborating and communicating designs and comparing to existing site elements. As an example of how leveraging this technology can streamline communication and collaboration, teams can have an Engineer on site immersed within the design via Augmented Reality, a Client back in their office navigating the model on their computer, and a Designer back in the office viewing the design in Virtual Reality. In this scenario, all stakeholders invited into this environment can discuss the design, make notes, leverage inquiry tools to view BIM data, and update/perform modifications to the design model itself, while all stakeholders can view real-time updates in all respective viewing environments.

## STREAMLINING WORKFLOWS RESULTS IN COST AND TIME SAVINGS

The ability to leverage Virtual Interactive Meeting and Collaboration Technology throughout the entire projects' lifecycle will give firms a competitive advantage to stay connected at all times, where we would previously have gaps in time between communication and application/implementation. These gaps can be costly and risky to all stakeholders, as communication tends to be trimmed down, misinterpreted, and occasionally lost prior to proper application/implementation. This type of technology is able to be integrated with various document management systems currently in use and supports many design model formats being developed. This connection allows us to not only communicate with all stakeholders involved on a given project, but also provides the ability to consistently view the most current state of the design model from conceptual design all the way through construction and asset management phases of the project.

## CONCLUSION

One thing that I have always said and stood by, is that to be in AEC, you really do need to be adaptable to various situations and solutions. If recent events have taught us anything, the world can sometimes be a very unpredictable place. Technology, on the other hand, continues to evolve and we need to be a bit more prepared, aware, and adaptable to these new environments and technologies. There has recently been a very big shift in focus to the Digital Twins concept/environment. Although some aspects around Digital Twins are attainable, there are many aspects around Digital Twins that seem a bit futuristic and out of reach at the moment. Either way, Digital Twins will be here before you know it and will become the new norm. As we start embracing and implementing next level technology solutions, we are essentially preparing ourselves for that next leg up and new norms.



*Stephen Walz is the Digital Design Lead for Civil Infrastructure at HDR, a global leader in Engineering, Architecture, Environmental and Construction services. Stephen has been in the AEC Industry since 2003, and with HDR since 2004 working in its northeast and southeast regions. In Stephen's current role, his primary focus is to work with HDR's Business, Technical and IT Leadership, as well as our technology vendors, to identify, evaluate and implement new platforms/tools/technologies as it relates to Civil Infrastructure, drive consistency with how HDR is leveraging the various tools and platforms, and identifying ways to build skillsets and overall awareness across HDR to better serve their clients. Stephen can be reached for comments or questions at Stephen.Walz@hdrinc.com.*

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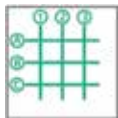
### GRID LINE

https://apps.autodesk.com/ACD/en/Detail/Index?id=6420373725165012225&appLang=en&os=Win32_64

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

The Grid Line Add-In draws a grid line with automatic labeling. This add-In allows you to specify line extension length, label indicator, label frame dimension and label high. For parameter selection, follow command line prompts. It has options for labeling start, end, or both of the grid lines.

### ANALYZER CAD

https://apps.autodesk.com/ACD/en/Detail/Index?id=5718214533534600353&appLang=en&os=Win32_64

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

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https://apps.autodesk.com/INVNTOR/en/Detail/Index?id=6279469965744454408&appLang=en&os=Win64

**Autodesk Inventor: 2021, 2020, 2019, 2018**
**Autodesk Inventor Professional: 2021, 2020, 2019, 2018**

This add-in uploads the currently active Autodesk® Inventor® document to Configurator 360, truly making it "absurdly easy" to publish configurable models to the web. An Autodesk ID is required.

Parts and assemblies can be configured using the model and user parameters and iLogic rules. Assemblies can be driven from a skeleton part. For assemblies, drawings that contain a view of the assembly will be included in the upload.

### SPOOLS TO SEARCH SETS

https://apps.autodesk.com/NAVIS/en/Detail/Index?id=1190109394822676384&appLang=en&os=Win64

**Navisworks Manage: 2021, 2020, 2019, 2018**
**Navisworks Simulate: 2021, 2020, 2019, 2018**

Search sets can provide useful tools to help the personnel in the field locate a piece of fabrication in the model. In order for this workflow to be used, the spool names must be located on a property that is exposed in Autodesk® Navisworks®. An example of this would be on Fabrication CADmep+ parts.

The actual "Spool Name" data is not exposed in Navisworks as a property, but the "Notes" data is. The same workflow can be used for Revit Elements or any other part that has the spool name on a property exposed in Navisworks.

For more on how to make this process work for you, see the post "Creating Navis Spool Search Sets".

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