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AUGIWorld

The Official Publication of the AUGI Design Community
December 2019

Insights and Observations

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- *Partnering with 3ds Max*



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Letter from the President



AUGI

GREETINGS!

It is hard to believe that we have reached the end of 2019. Looking back, it has been a pretty good year. My daughter became engaged, my boys are growing into fine young men, and my husband and I are celebrating 30 years of marriage this month. December has always been a month of celebration for us. I love the excitement that the holidays bring, along with a sense of closure of yet another year and the anticipation of a new one. Time flies!

In 2020, AUGI also celebrates its 30th year! It all began with a meeting in San Francisco in 1990, known as “North American Autodesk User Group (NAAUG)”. Over the years, NAAUG transformed into what we now know as AUGI. You can read our full history at AUGI.com. There is some pretty interesting stuff there. I wonder if our founders would have ever thought that this group would continue for 30 years, spanning the globe and connecting users in a variety of industries. We are certainly thankful that our founders had the insight to start this organization, and AUGI continues to be a driving force in the design industry. We are looking forward to leading AUGI into the next 30 years. Who knows what design technology will look like then!

Autodesk University in Las Vegas in November was once again a successful event for AUGI. Instead of our usual booth in the Expo Hall, we were invited to spend time in the new Community Zone alongside other Autodesk Community groups. We held our Annual General Meeting on Wednesday afternoon of the conference. We were able to kick off our 30th year celebration with a look back over the years. Thank you to everyone who submitted photographs for our slide show! We had a special recognition of our board members and management using their own photos from 30 years ago! It was fun to see our younger selves. We also recognized the hard work of all our volunteers and previous board members. Without you, the organization wouldn't exist. Hats off to all of you who contribute to AUGI!

We also announced that our name has been officially changed to AUGI, Inc. This was due to a revised agreement initiated by Autodesk. We have been an independent organization since 2009; however, Autodesk has released our trademark to us, making us entirely independent. The board of directors believes that this will be a positive endeavor in that we will continue to partner with Autodesk and promote their products. However, this will also allow us to engage with other vendors. Look for additional information as we move forward into 2020.

This month's articles focus on Industry Insights. As we look back over 30 years of AUGI, I have to think that everyone involved had the insight to see the need for an organization such as ours. Industry insights are important for not only industry leaders, but also everyone involved in design technology. Changes to our industry happen sometimes overnight, and keeping up with those changes is a daunting task. Our authors this month have been working hard to bring some of the latest insights to you. I hope their articles will help keep you on the cutting edge of technology.

I am looking forward to unwinding from the year's busyness and spending quality time with my family. I hope the holidays treat you well, and you have a fantastic end of 2019!

Happy Holidays!
Kimberly

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Partnering with 3ds Max



Companies utilize 3ds Max® for visual effects, game development, cartoons, animations, visualization for building/land development/transportation/products, movies, book illustration, and more. In addition, many applications developed around the world maintain a symbiotic relationship with 3ds Max to allow us to generate higher quality content quicker than ever before. Here, I present a few favored by 3ds Max professionals.

3DS MAX WITH LUMION

Real-time rendering for visualization is simple if you can afford it. For the highest quality, users rely on 3ds Max with extensions such as Vray or Redshift, but for daily tasks and quick, high-quality concepts, Lumion has dominated the arena. Lumion imports files from 3ds Max and Revit®, which allows us to populate our scenes using an extensive library of assets, easily add mass movement for people, vehicles, and animals while adding vegetation and furniture. It also gives us the ability to manipulate textures/materials of our objects inside the software, which means we only have to construct the bare necessities in 3ds Max and apply basic UVs. With Lumion, we import the scene, then apply and adjust the scale and

materials from the Lumion library. Also, the software lets us add tons of different effects, adjust visual styles, and much more. See Figure 1 for an example of images generated using Lumion.

3DS MAX WITH TWINMOTION

Epic Games' Twinmotion was dismissed early by critics who hadn't quite explored its full potential. Even in its early stage, I believe it's a very powerful competitor in the visualization market. Twinmotion imports files from 3ds Max and has many of the characteristics needed to provide high-quality, quick visualization for daily production tasks. With a plug-in to link directly to software like Revit, simple interface, and decent asset library, it may replace Lumion completely for many studios (depending on the final price). See Figure 2 for an example of images generated using Twinmotion.

Refer to Figure 3 for my rendering. It's not perfect, but generally acceptable, and I was able to produce the rendering in roughly 15 minutes after importing only the base building components without materials from 3ds Max. There are extremely powerful components inside Twinmotion that provide for a robust workflow between 3ds Max and Twinmotion that I'd like to point out.

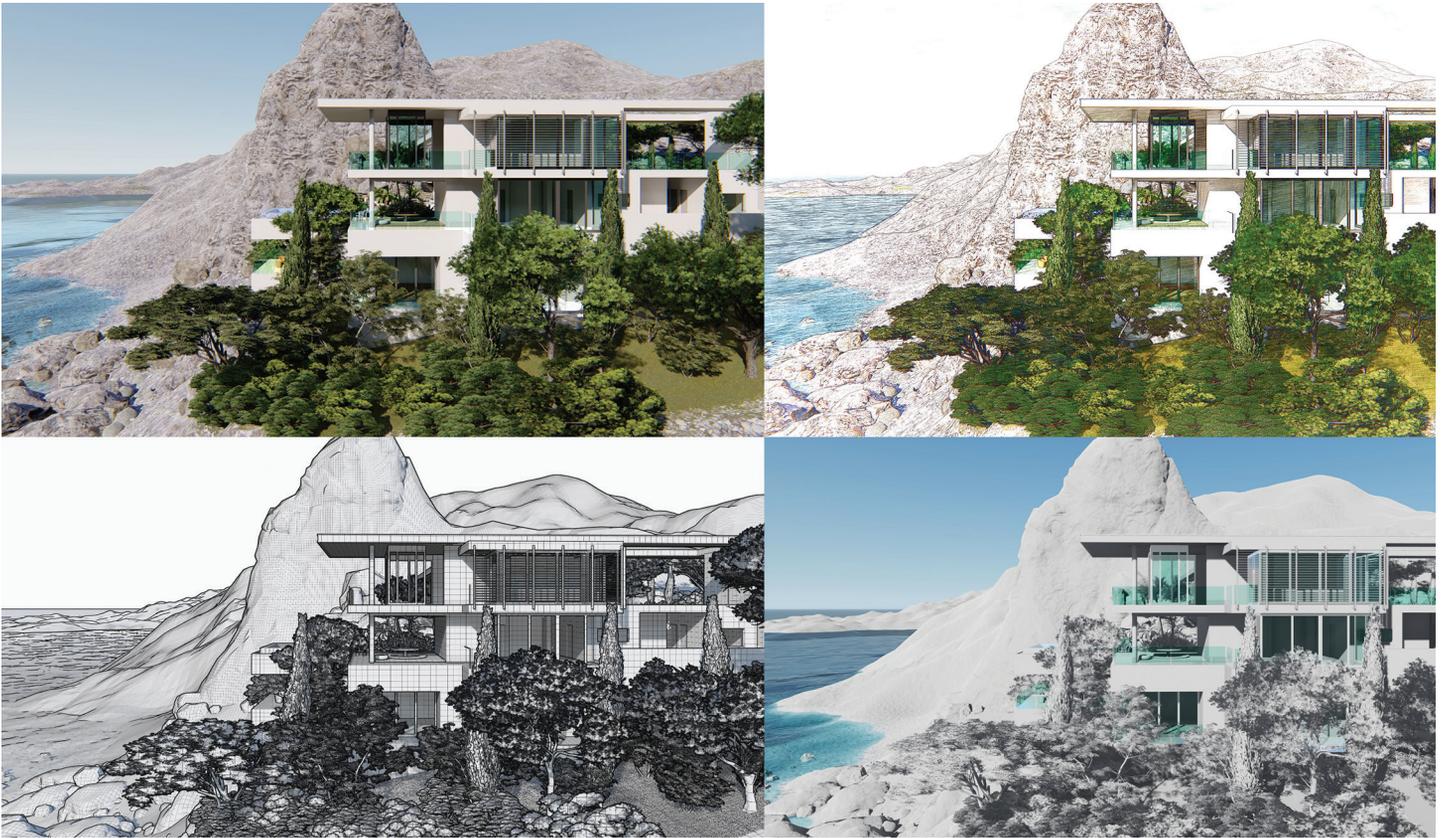


Figure 1: Lumion examples

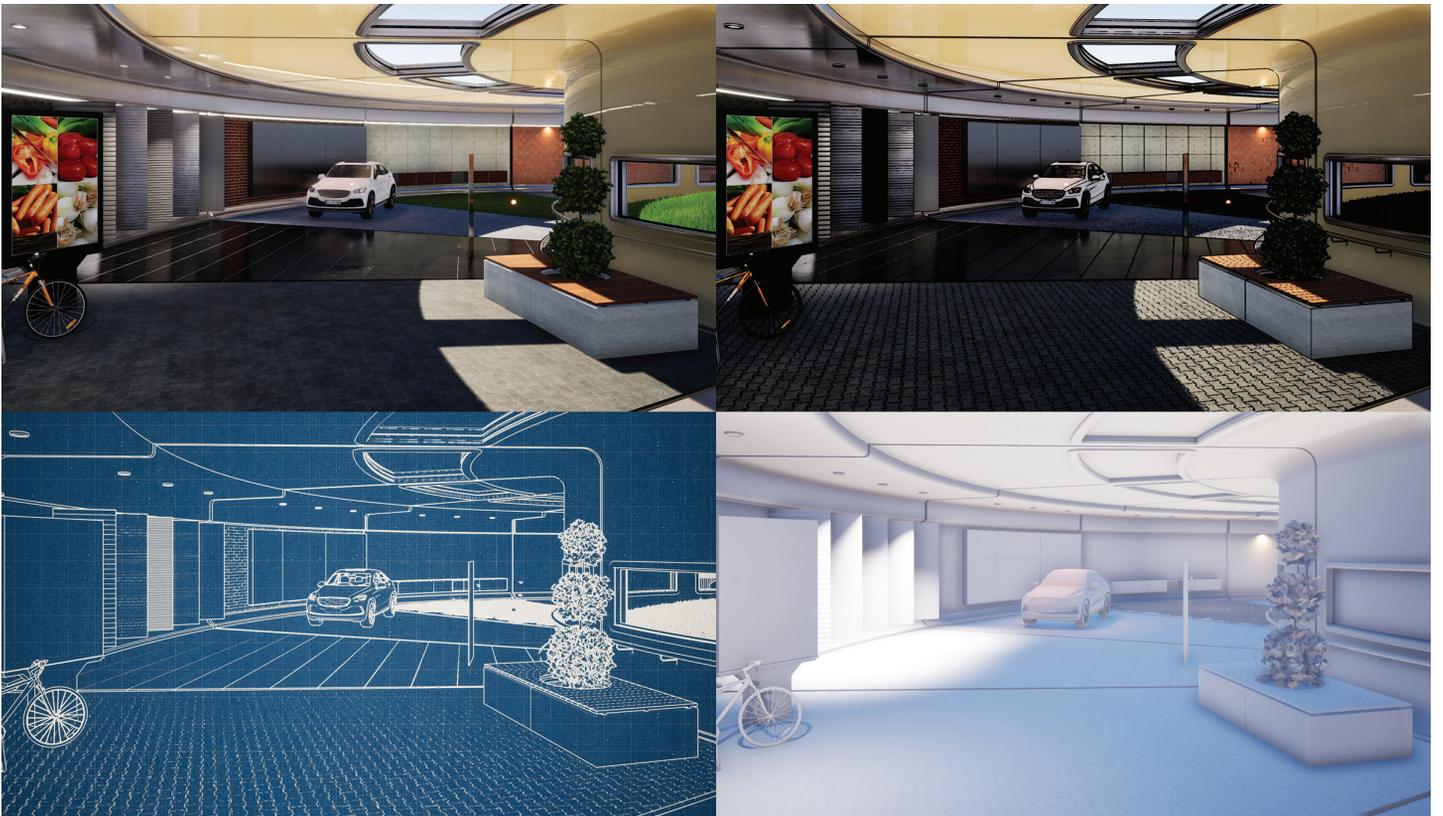


Figure 2: Twinmotion examples

- ✦ Dynamic vegetation reacts to weather setting (green during spring and leafless during winter).
- ✦ Easy-to-update user library through Windows Explorer.
- ✦ Easy to manage scene and user files on any computer drive.
- ✦ Visual effects including built-in color gradients and filters.
- ✦ Minor UV adjustment tools.



Figure 3: 3ds Max with Twinmotion scene



Figure 4: FlowScape example

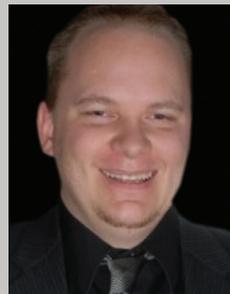
- The asset library (geometry and materials) is professionally developed and will continue to grow.

LetsDesign Studios shared a comprehensive comparison between the two different programs here: <https://letsdesignstudios.com/lumion-9-vs-twinmotion-2019/>

3DS MAX WITH FLOWSCAPE

Finally, I want to talk about FlowScape by Pixelforest. FlowScape is a procedural landscape generator that produces extremely interesting visual content and animations. For \$10, it's extremely powerful. The developer continues to work hard on the software, and each update provides something new and interesting. One of the more recent updates should excite 3ds Max users. The developer provided us with the ability to import obj files from 3ds

Max, which means we can use the software to present incredibly interesting illustrations in a very short time. It is the perfect tool for generating background, concept, or context material.



Brian Chapman is an Autodesk Authorized Developer, Digital Artist, Designer, and a CAD 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. Brian's email is procadman@pro-cad.net

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Tech Management on a Budget



In past articles I have taken you through the Start, Stop, Continue processes for a Tech Manager (CAD/BIM/CIM/CAM...). This was an intro exercise to develop a Strategic Plan. Once completed, you have a great foundation for developing your 2- to 3-year Strategic Plan or 12- to 18-month tactical plan. Then we went through a process that could be used to develop a Strategic Plan.

Once the Strategic Plan is in place, you need to develop an annual budget to make the plan a reality. Funding and budgeting processes may or may not be a formal effort at your firm. Most firms develop budgets, but some do not really include specific technology purchases and just handle them as they come. Either way, you need to develop a budget so you can communicate the needs and prioritize the spending. It makes your planning discussions seem very real when you plop down a spreadsheet of dollars needed and areas of focus.

Most people outside of tech do not know the cost of technology initiatives. They have no clue if what they dream of is a zero-dollar effort or a multi-year, piles-of-cash kind of expedition into the

unknown. Your budget helps define that. Once you put money next to an idea, it helps prioritize. Some initiatives might move higher in priority if they take less funding. Others may have to wait until a funding stream is defined before they can start.

So now I turn to the budget. Money is always a good subject for discussion. Budgeting is foundational to the success of a tech manager. You see it everywhere in titles of TV shows, “How-To” discussions, and best approaches such as “DIY on a Budget.” Taking a vacation without breaking the budget. Decorating within your budget. All of these things remind us of staying within our means, not breaking the bank, and getting the most bang for the buck.

But this article is not about how to save money, but how to spend it. The budget I am talking about should enable you to spend money wisely. Your budget should create a measured and planned determination for spending that takes you from reactive to proactive.

With technology, the bank can be drained quickly. Knowing how to create and manage a budget is key so you are not driving your

firm to the poor house, but rather getting the best from the limited funds you may have. And it will make it easier to adjust and refocus funds toward strategic goals.

SHOW ME THE MONEY

First you need to find out if others have defined how much you can spend. I start by asking about the overall revenue of the firm. It can be a general number and not exact. You just need an idea of your firm's gross profit each year. If they are secretive about it, no problem, you can move forward without knowing.

If you get a number, check on the spending habits by asking accounting what was spent by tech in prior years. You are just trying to get an idea for the boundaries of your reach. If your firm spent \$500,000 last year and \$400,000 the year before, then your budget needs to hover around that number unless there are dynamic upticks or downturns expected. Whatever the number is, you now have a target to keep in mind. Ask your boss what target number they want to hit on spending. If you are under someone else's budgeting oversight, you need to know that. Sometimes the developers of the company budget don't even ask tech staff what is coming. They just pick a number, usually based on what was spent last year.

GEOCACHING

Where is the buried treasure? Geocaching is a popular search activity/game where participants use a GPS receiver or mobile device to hide containers that others seek, called "geocaches" or "caches," at specific locations marked by GPS coordinates. Sometimes the money in your firms is hiding in a place that you need to seek out. It is not going to come your way; you need to go find it. Sometimes departments have budgets or projects get budgets. Many times I have been able to tap into these hidden "buckets of money" for some of my tech buys via geo-"cash" that I have uncovered.

GET OUT YOUR SPREADSHEET

Now start defining some of the hard numbers. These are funds that must be spent to keep tech alive and kicking for the next year. Start with hardware and software. List every piece of hardware you have and how old it is. In warranty or out of warranty? Will it need to be replaced? Do you need more?

I use a spreadsheet to define my budget. Along the left side in column one, I have the heading "Item." I have rows for each item/type of spending I think is needed. One line for laptops, one for desktops, one for servers, etc. For each row, I have a unit cost. If I buy differing laptops that have different costs, I make separate rows. Low-end laptop, midrange laptop, high-end laptop... you get the idea. Column two is Unit cost. Column three is Quantity (how many I need). Column 4 is Total (cost times quantity). Simple, right? It does not have to be complicated.

I divide the rows into sections, grouping them as hardware, software, training, etc. with a subtotal for each section at the bottom of the Totals column. At the bottom I have the Grand Total. By breaking out the groupings, I can see what percentage

of budget is going to what area. It can get more complicated (and mine does).

Along the top are columns broken out by Department, Site, Group, Project or whatever breakout you or someone might need to see what is being spent where. You will get questions like "120 new laptops—who needs that?" You need to be ready to answer it. That is what the breakout does. If I have it broken out, then the total for Quantity is a rollup of that column totals. You can quickly say, Project 21 needs them and the new satellite office gets 50.

So if you have low-end laptop as a row, then you have company sites as a column, like Chicago, Tokyo, Boston, Denver, London, etc. Under each column you have how many are needed by what site, then they all are added up under the Quantity for low-end laptops. $3+7+2+5+12 =$ (you do the math ☺).

If you lease hardware, then put in the annual lease amount, not the full price of the hardware. If you are on subscription for software, put in the annual cost of each license. This is an annual budget. Just add the costs for one year. If you have to buy items spanning multiple years, then include the entire cost, since you will be spending it all at one time.

Don't forget line items like training, conferences, travel, and hiring consultants. These things can add up and you need them in your budget. I always add some dollars for research and development. This is for exploratory spending. Sometimes you have to buy stuff to make sure it does what you think it might do. Then, when proven, you can ramp up in the next budget round.

Once you have a budget developed, you can parade it around for perusal and approval. Remind the reviewers of the Strategic Plan when you discuss the budget. This is not a new conversation; it is the next step in strategic thinking. Once the budget is in place, you can start spending in a measured and methodical way as you have planned for the items in your strategic plan and now in your budget.



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.

GIS Integration

 **G**eographical Information System (GIS) data is everywhere. There is GIS data for almost anything you want to display and analyze, as long as you can find it! Using GIS data within Civil 3D® (or Map 3D) has been around for a long time, and there are several ways of utilizing that data. And now with the latest Civil 3D 2020 version, it has become even easier to access data at any moment.

It is so simple inside Civil 3D that users at all experience levels can succeed in working with GIS data. This article looks at ways to utilize GIS data in Civil 3D by taking a look at some of the methods that have been around a while, and some of the latest updates in 2020.

FINDING GIS DATA

Being able to use GIS data is great, but where do you find it? First, I'll tell you what I tell my kid when she asks me how to do her math homework....GOOGLE IT!!

Pick the county you reside in and just Google, for example, "Utah County GIS" and see what comes up. I typically find that at the county level, you get more information such as building outlines, up-to-date parcel information, and land use info. From the State level, you get more imagery, topo, voter info, and so on. But this really all depends on the State/County and it differs all over. I usually begin my search, in order, by going to the County, then State, then Federal.

Here are a few sites for open source GIS data:

- ✦ USGS – <https://www.usgs.gov/products/data-and-tools/gis-data>
- ✦ Natural Earth - <http://www.naturalearthdata.com/downloads/>
- ✦ ArcGIS Hub - <https://hub.arcgis.com/>
- ✦ EarthExplorer - <https://earthexplorer.usgs.gov/>
- ✦ OpenStreetMap - <https://www.openstreetmap.org>
- ✦ GIS Lounge - <https://www.gislounge.com/data-warehouses/>
- ✦ Free GIS Data - <http://freegisdata.rtwilson.com/>
- ✦ OpenTopography - <https://opentopography.org/>

And probably thousands more!

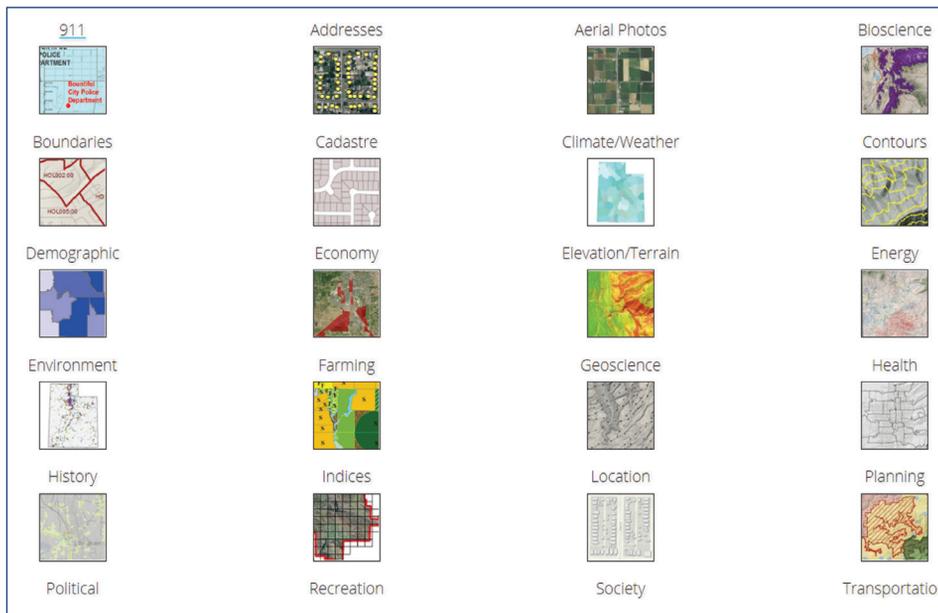


Figure 1

TYPES OF GIS DATA

There are many types of GIS data formats. I am a shapefile kinda guy—shapefiles are very powerful and can be used for many different things in Civil 3D and even more so in Infraworks®.

Several format options are described below.

- ✦ Shapefiles (SHP) – This is probably the most common data format, and almost any GIS-enabled software can read a shapefile. A SHP typically consists of four file types, and sometimes more. Each file is needed as they all do something different. The file types include:
 - ✦ .SHP – Contains the geometry.
 - ✦ .DBF – Contains the attribute data for the features of the shapefile. Can be opened and edited in Excel.
 - ✦ .SHX – Spatial Index file for finding features within the SHP.
 - ✦ .PRJ – The projection file. Contains the coordinate system and projection for the data.
- ✦ File GeoDatabase – Collection of files in a folder that can store, query, and manage spatial data.
- ✦ KML – You’ve probably been using this for years. KML is the Google Earth default file format. Many software programs,

including Civil 3D, can export to KML.

- ✦ GeoJSON – JavaScript Object Notation, a lightweight data interchange format. Can be converted to GIS/CAD pretty easily.
- ✦ Tab File – Very similar to SHP, and used by MapInfo.
- ✦ GeoTIFF – Most widely supported raster data format and is typically georeferenced (contains metadata) so that data imports property.
- ✦ CSV – Yes, CSV is a GIS option and can be used/edited easily across all CAD platform products.

MAPSPACE

Now that you have the data, how do you use it?

By far my favorite command in Civil 3D is MAPSPACE. One simple command can open the portal to utilizing the power of GIS data. You could change your Civil 3D workspace to the Planning and Analysis tab, but this gets you started with using the GIS data.

Once you type in MAPSPACE, you then turn on the Task Pane (Figure 2). The Task Pane gives you quick access to frequently used features and groups these features into task-related views. Use the Task Pane to create, manage, display, and publish maps. You’ll notice four tabs; in this case we will focus on the Display Manager.

In the Display Manager, you can simply select the DATA icon and connect to numerous data sources. Here you can import shapefiles, connect to external databases, and even bring in imagery.

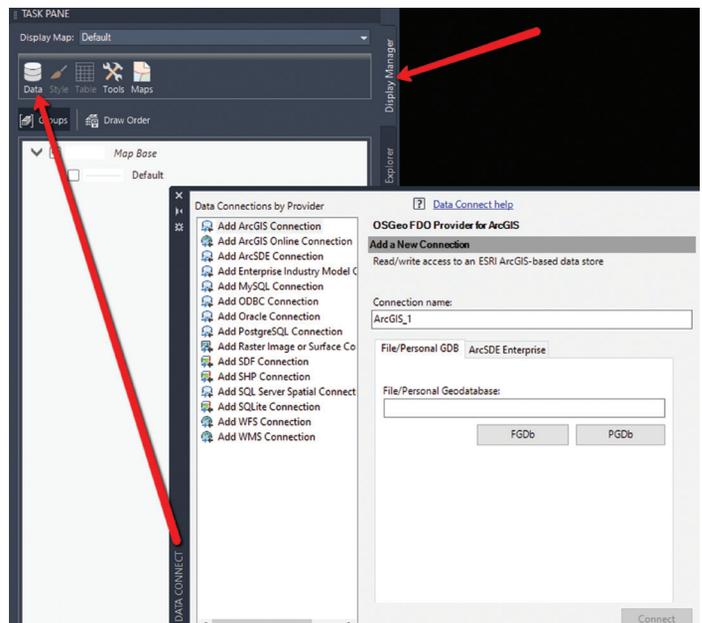


Figure 2

AutoCAD Civil 3D 2020

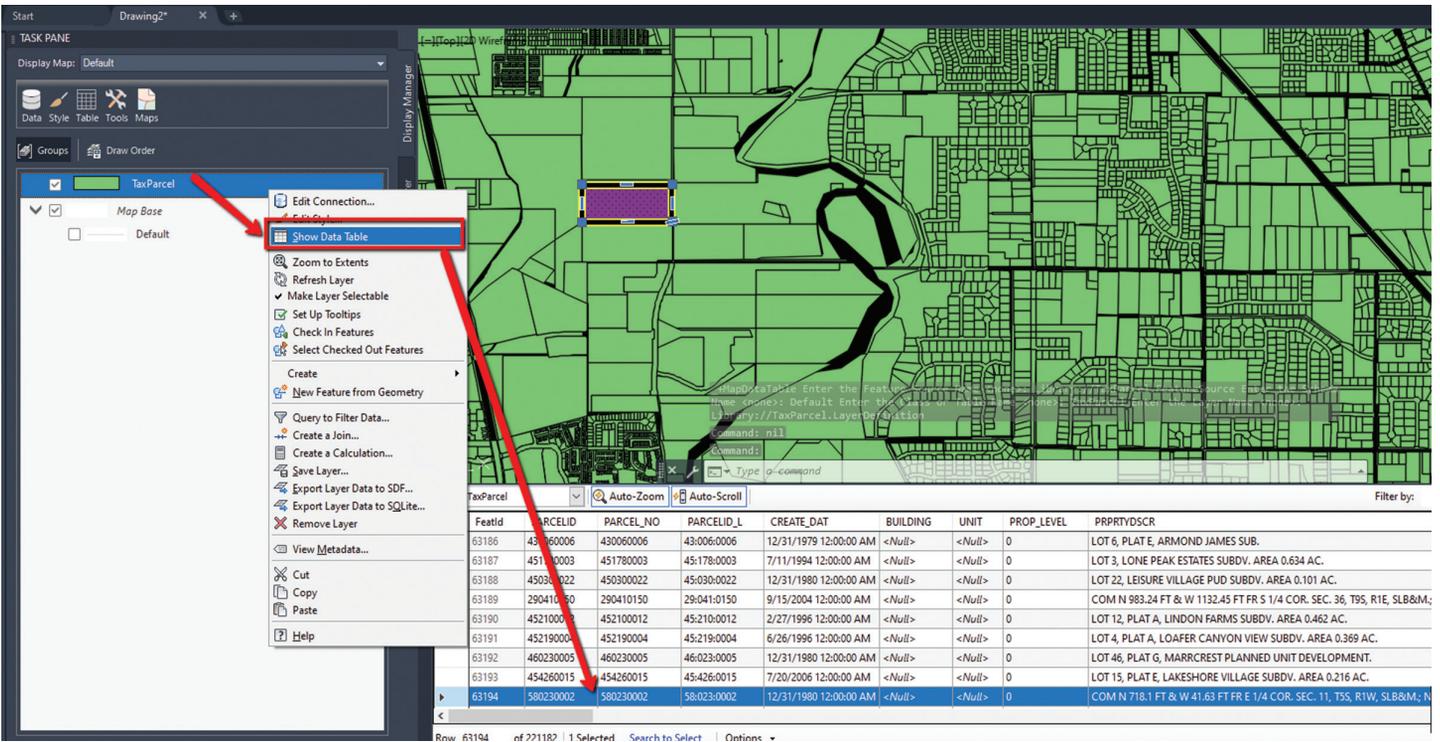


Figure 3

Did you know you can simply select your shapefile from Windows Explorer and drag and drop it on your screen? By far the easiest way to import GIS data! Once dragged onto your screen, the layer will show in the task pane where you can query, theme, style, label, and access all the attribute data within the DBF file. If your coordinate system is set, it will project to the correct location, or re-project as needed.

TIP: Need to do a quick concept plan? Drag and drop your parcel shapefile, select the property you wish to use, right click, check out feature and explode! This creates a polyline that you can then utilize the parcel features on. And if your CAD manager asks who told you to explode something in Civil 3D... it wasn't me!

Select the entire layer from the Task Pane, or even a feature from within model space, right-click and choose Show Data Table (Figure 3). This will display all attributes for that selected feature.

Right-click again on the layer from the Task Pane—you can perform all sorts of analysis and creation tasks right from here. Want to label and change the display? Simply select Edit Style.

In the style editor, you can perform many helpful tasks. You could, for example, theme the parcel shapefile and look for all parcels between 5-10 acres. This works great for soil types, utility line sizes, and many other uses. You could also edit the style (hatch pattern/polyline) as well as add a label based on the feature attributes (Figure 4).

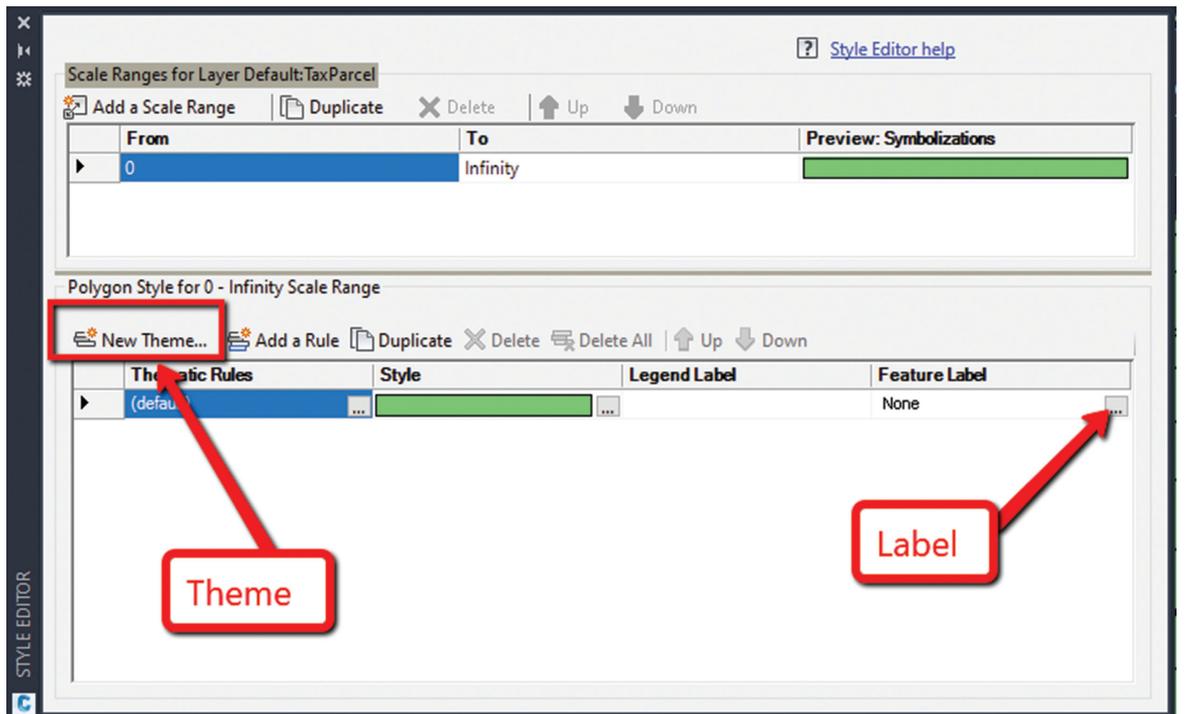


Figure 4

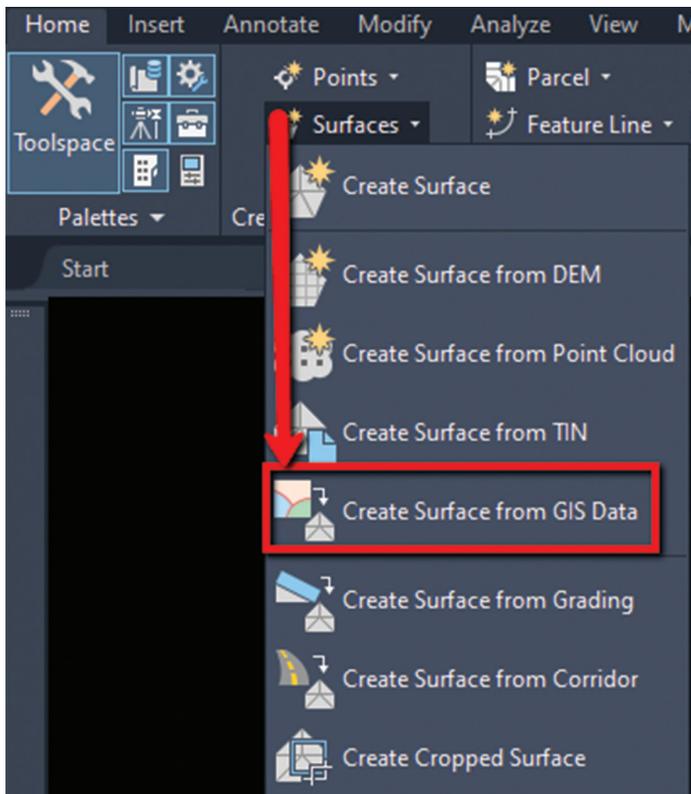


Figure 5

All this from dragging and dropping a shapefile and using the Task Pane! All without switching workspaces and great for just getting started with GIS data.

CREATE SURFACE FROM GIS DATA

I see a lot of people struggling with creating surfaces from GIS data, specifically large datasets with a lot of contours. Users tend to import as polylines and add the polylines, with millions of vertices, to a surface and then wonder why the slowdown or crashing happens.

From the Home tab of the ribbon, on the Create Ground Data panel, select surfaces, and about halfway down there is a Create surface from GIS Data option (Figure 5).

In here, you can connect to three different data sources:

- + ArcSDE
- + Oracle
- + SHP – Typically most common

When connecting to a SHP file, select the SHP as the source and path to the SHP file. Then select Login (no username or password needed) and Next (Figure 6). On the Data Mapping dialog box, simply map the elevation attribute to the elevation Civil 3D Property.

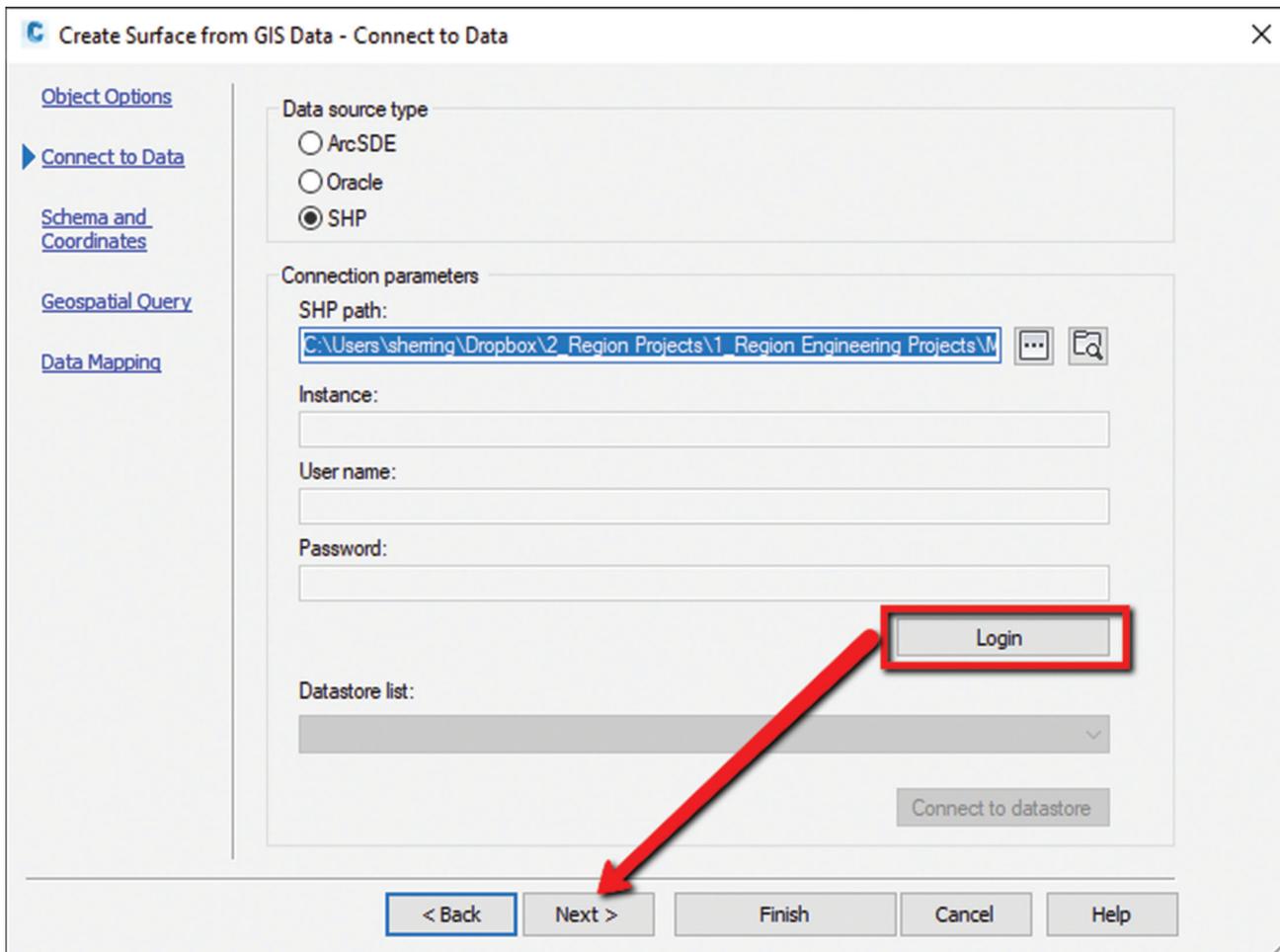


Figure 6

Use the Toolbox tab in Toolspace to access the SHP Import/Export commands.

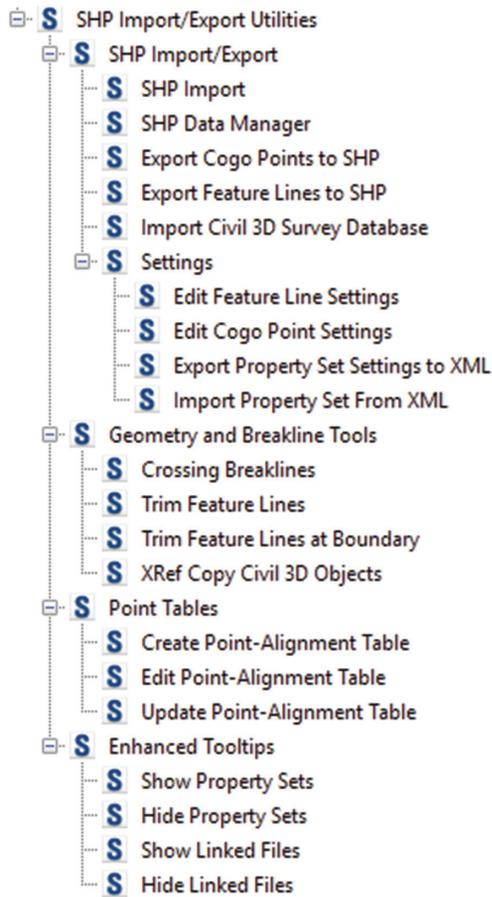


Figure 7

Use the Toolbox tab in Toolspace to access the SHP Import/Export commands (Figure 7).

AUTODESK CONNECTOR FOR ARCGIS

And last, but certainly not least, the latest version of Civil 3D takes working with GIS data to the next level! From the Insert tab of the Ribbon, you will see an ArcGIS pane with a new command called “Autodesk Connector for ArcGIS” (Figure 8).

Now, you first must have an ArcGIS Online account. Go to <https://www.arcgis.com/> and sign up for an account.

The Autodesk Connector for ArcGIS uses your ESRI ArcGIS login information to connect to your ArcGIS data. Once you’ve signed in, use the Autodesk Connector for ArcGIS to browse available datasets and add ArcGIS data layers into your map drawing.

You can create maps and upload content to ArcGIS online for future use in your Autodesk products. This article won’t go into depth about loading content, but feel free to reach out to me if you need more information.

Select the Autodesk Connector for ArcGIS icon. Once logged in with your ESRI account, you can select an area of interest and it will automatically find the data under My Content

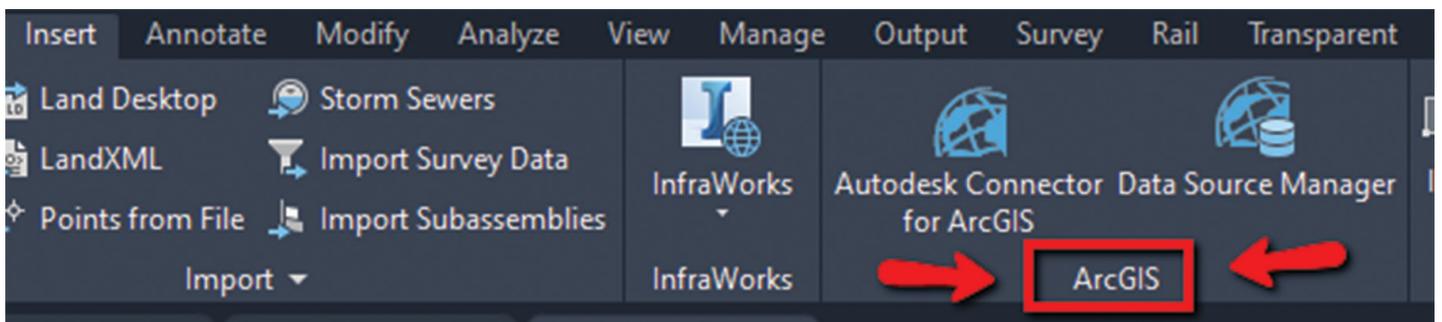


Figure 8

IMPORTING SHP SURVEY DATA

Survey data can be transferred from other software into Autodesk Civil 3D through shapefiles (SHP files). The SHP files typically contain only one type of geometric data: lines or points.

Unlike survey databases, when you transfer the information to Autodesk Civil 3D using SHP files, the survey information is contained within Autodesk Civil 3D drawings and is not linked to the survey database. To share survey data between drawings, the linework and points must be copied between drawings or reimported into other drawings.

(amongst others) and import directly into your file! All this without having to constantly search, download, and import (Figure 9).

Select the data you wish to import, tell it what layer type to import into Civil 3D (or Infraworks) and select ADD TO MY DESIGN PROJECT. Give it a moment, as it is performing many tasks, then see as the data you selected has created a basemap for you (Figure 10).

CONCLUSION

I told a joke at an ESRI event 10 years ago, and I still get flack for this, but here goes nothing!

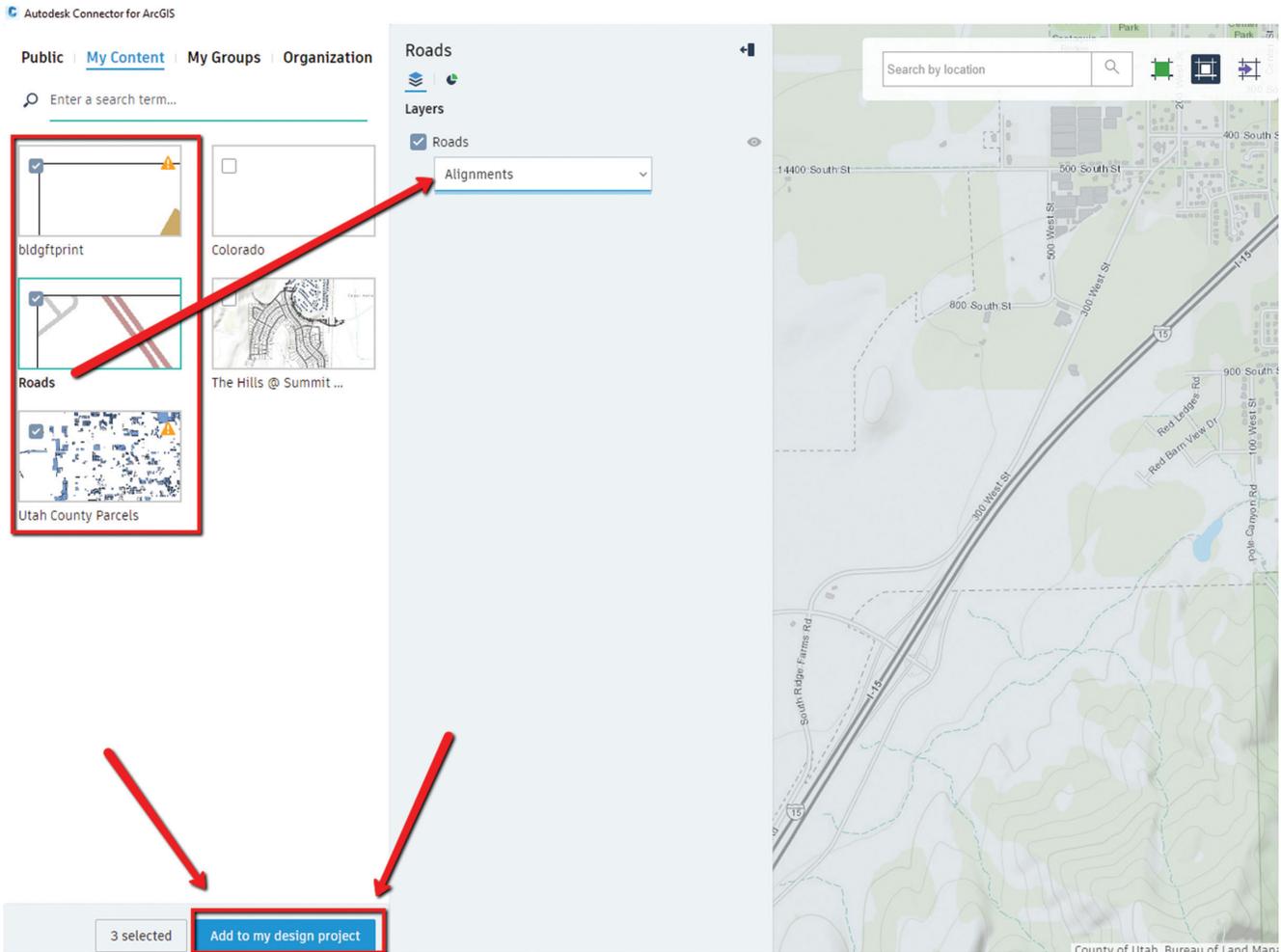


Figure 9

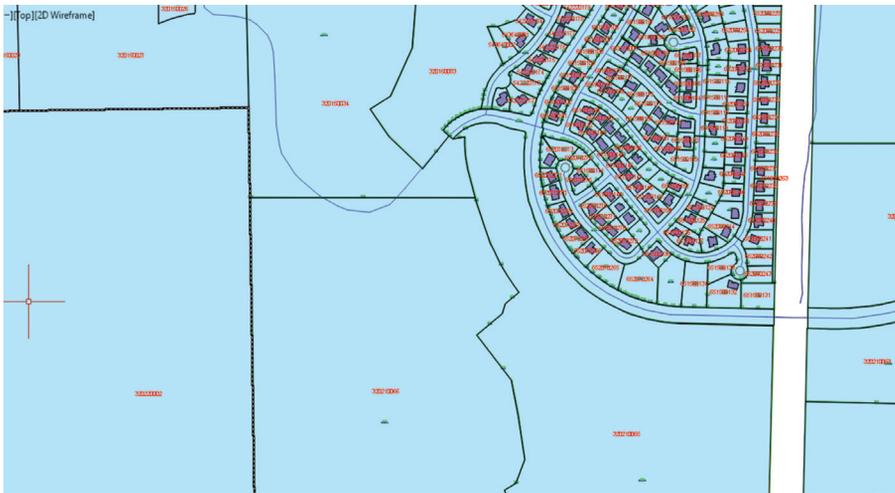


Figure 10

“What does GIS stand for? GET IT SURVEYED!”

That joke goes over much better with the survey audience. But I love working with GIS data in all my projects. I typically don't begin a project without using some sort of GIS data, and with Civil 3D and Infracore, most project utilize the GIS data from beginning to the end.



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

It doesn't matter if you're new to the GIS world or a seasoned vet, Autodesk makes working with multiple data sources easier than ever.

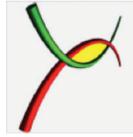
By the time this article comes out I'm sure new and exciting features will be in place. Autodesk and ESRI seem to be working hard together to make the user experience better and better as we go through the year and I look forward to seeing the improvements being made.

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

Drag Drop Interface 2020

Autodesk Revit: 2020

<https://apps.autodesk.com/RVT/en/Detail/Index?id=5182224803562633918&appLang=en&os=Win64>



The Software:

- Is intended to simplify “content load and insert” into Autodesk® Revit® models.
- Combines drag and drop from “Project Browser” with the ribbon “Load Family” into one interface.
- Features content list filter and sorting functions. Filter settings are stored between sessions.
- Features memory buttons with your stored filter settings.
- Features memory buttons with your stored favorite content folders.
- Displays preview image and selected content data.

The Interface:

- Topmost you will find the “info area.” This area holds the family preview image and selected content data. In the info area you will also find five memory buttons (Filter 1 - Filter 5), allowing you to quickly store and retrieve five different filter settings.
- Below the info area you will find the “in model family types” list, which initially displays all in model present family types. This list is updated when opening a Revit model. It is recommended that you filter this list to show only the Revit family categories relevant for your design work.

- Next is a thick list separator line. Drag up and down to adjust the list sizes.
- The lower list, the “content folder area,” is intended to display family content in your favorite content folders. Initially this list holds a few sample cupboard symbols you are free to use, modify, and distribute as you please.
- The bottom area holds folder selection button and programmable memory buttons for your favorite content folder paths.

The Family Exporter 2020

Autodesk Revit: 2020

<https://apps.autodesk.com/RVT/en/Detail/Index?id=4834514539681068496&appLang=en&os=Win64>

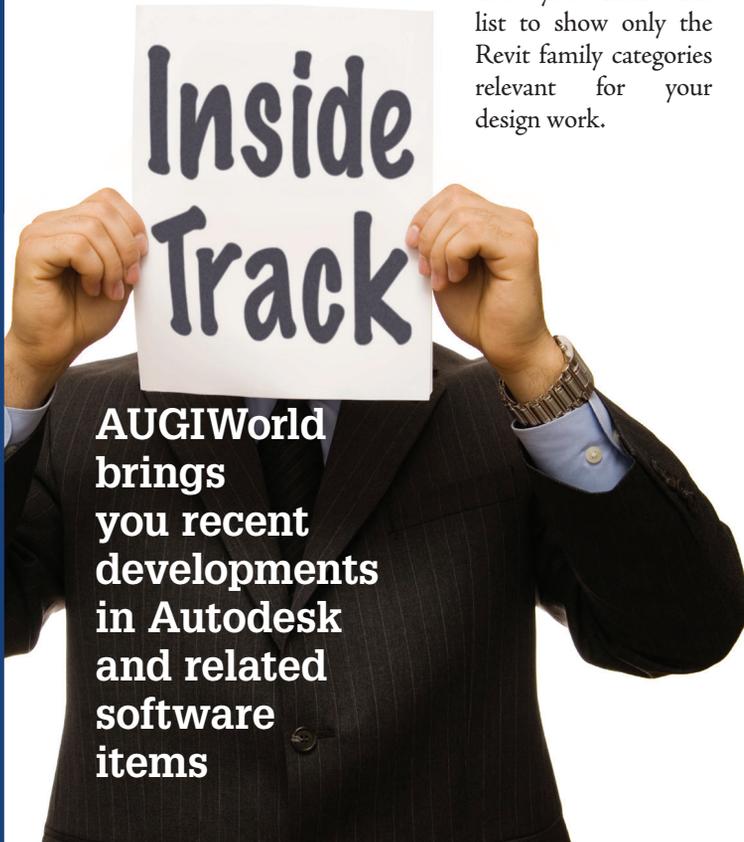


The Software:

- Is intended to simplify exporting current model families to independent content libraries.
- Exported content sorts into category subfolders.
- Features content list filter and sorting functions. Filter settings are stored between sessions.
- Displays preview image and selected family data.

The Interface:

- Topmost is the info area, which holds the family preview image and selected content data. Note: the preview image could be empty. The overwrite checkbox should be used if you want to re-export families. If left unchecked, you will get an additional popup warning at export time.
- Next you will find this model’s families list. Initially this list holds all the families present in the model, sorted by category and name. The list header has one checkbox intended for quick check/uncheck of all entries in the list. It also has filter-funnel symbols allowing you to filter the list both by category and by family name. Each list entry has a checkbox allowing you to select single families for export. It is recommended that you filter this list to only show the relevant Autodesk® Revit® categories. You could also filter this list by family name to simplify your further selection. Clicking the header will sort the list either ascending or descending. Note: light green checkbox indicates that the family already exists in the given path.
- The list separator line is next. Drag up and down to adjust the list sizes.
- The lower list is intended to show the family types in the currently selected family. Note: this list could be empty if no types are defined in the selected family.
- At the bottom, you will find the currently selected output path, the set output path button, and the export button. The export button is enabled when an entry in the family list is checked.



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What Do You Really Know... *Really Know About* BIM Workflows?



What is the biggest worry or fear you have about your current company, or job, or workforce? Is it fear of failure? Is it the press of time against meeting your goals and the lurking concern that you're not getting where you think you need to be, in order to be successful as a business...a manager...an employee? And how do you judge how well you're really doing... does the work you do now stand the test of time? Is it recognized as industry leading or are you relegating yourself to the middle of the road, based on a lack of interest in anything that initiates change?

IS THIS YOU?

I've recently read some great articles about the evolution of CAD applications, BIM, and seeing the history of Autodesk and its role in the evolution of computer-aided design and beyond. I keep stopping and remembering that what we do... what we've accomplished in terms of the tools we used and the design technology that's available has happened in the span of a single generation. The design tools have changed the way we look at the art of architecture, as well as the overall impact on our lives, our culture, and our worldview. It has expanded our view of the building itself, as well as our understanding about our approach to "building" as the construction process.

In the past nine years, I've been graced with the opportunity to support and lead an effort to implement BIM workflows and tools from Autodesk. We've grown with the evolution of Revit®, AutoCAD®, and vertical applications into industry-leading tools that improve productivity, boost accuracy, and increase

coordination. There have been good days, "Aha" moments, and dark days where the fights never seem to end. It's all part of the experience, and I wouldn't trade it for anything in the world.

As a client now, as opposed to the reseller channel, it's quite different than being on the selling end after 13 years. The critical part of the client-Autodesk relationship is that they are more committed to a two-way success, as we seek to gain more successful outcomes on our projects. It's a partnership that other software resellers really take for granted and they have no clue how important this aspect is.

As a part of this process, we recently held some in-house meetings with key Autodesk personnel. The topic revolved around the BIM workflow and its impact on linear design (or as we called it, *horizontal design*). And it was both enlightening and terrifying. We're not as good at the BIM workflow as we would like to think we are. So this article is about figuring out why, and how we get to where we need to be.

UNDERSTANDING THE DEFINITION OF BIM

There have been many misconceptions about what BIM is. What it is not, is software. Building Information Modeling is a workflow. It's a combination of three key items that occur during the design process. Starting with Building, this is not related to a specific structure, but the word actually as a verb—the action or creation of a building or structure. This includes a wide variety of construction types—retail, commercial, and industrial facilities. But it also includes dams, treatment plants, stations, and much more.



Figure 1

Revit 2020 – MEP

Information associated with the components created during the act of building something is where BIM differs from traditional CAD tools. The data associated with the components is not static, but interactive. As the design progresses, the information is constantly available and can be edited at any time. The data could be related to physical properties, such as the diameter of a pipe, the height of a wall, or the size of a beam. But as the design alters these components, the information can be updated in real time. Traditional CAD requires manual geometry, text and dimension editing, which adds steps to the process.

Modeling is the one part of the BIM process that’s actually consistent. In the past (and even today) architects and designers would build actual physical models from cardboard, plaster, and any materials that could be used to help visualize the design. 3D is not a new concept, but in the early days of AutoCAD, it required a lot of system horsepower that was either too costly to implement, or too slow to use effectively.

Gradually, the AutoCAD and Autodesk platform of 3D modeling tools has expanded, becoming easier to use and even an expected part of the design process. It has become a simple matter of extracting from someone’s head the idea of what the structure should be and converting it into a virtual world that is easier for even the most novice users to navigate and understand.

WHERE TOOLS AND WORKFLOW MIX

This is where we get into trouble as an industry. The biggest excuse I continue to hear is that “our clients only want AutoCAD and 2D, so that’s all we’re going to do.” This displays an incredible

misunderstanding of how today’s design tools work, and the automation they bring to the design workflows. Examples of how the tools and workflows are combined to automate and improve the design process involve model views, data harvesting, and coordination.

In schematic design, there are early diagrams that are developed for electrical schematics, process flow diagrams, plumbing risers, and more. Autodesk has been investigating how these different drawings can interact with the models themselves, but Revit already includes detail and annotation families that mimic traditional CAD dynamic blocks. By improving the drafting process, you reduce the excessive man-hours needed to complete each as individual drawings. And who knows... maybe one day we can link that diagram to the Revit model in a much more meaningful way.

Add this to today’s tools for capturing existing conditions with drones, photogrammetry, VR/AR, GIS, and mapping technologies, and we have a far better understanding and visualization of our built environment. These tools also reduce the environmental impact of the traditional means needed to research, measure, and quantify existing conditions with less personal intensive activities, making it safer to gain that overall view.

But the workflow advantages from scanning to drafting go far beyond the typical CAD project. As model derivatives, the plan, section, and elevation views are automatically created and updated as the model is changed. View templates provide a consistent look and feel to the documents, allowing for multiple views to be updated at once. This alone counts for the majority of productivity improvements over the traditional CAD process.

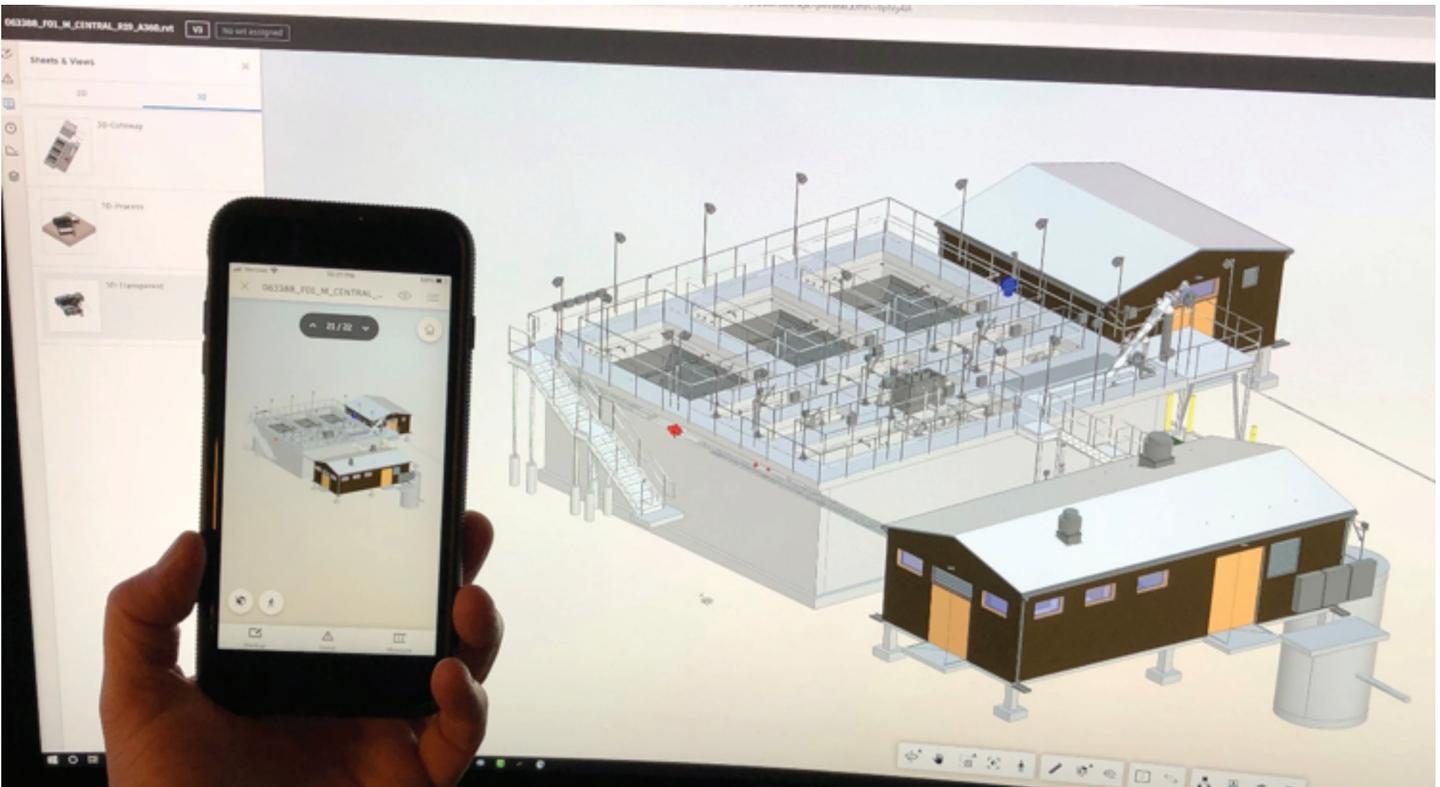


Figure 1

And as the project progresses towards the initial goal of getting the building constructed, tools such as BIM 360 change how we communicate in the simplest fashion. By including the owner in the BIM 360™ project, they can gain a clearer picture of what's happening in real time. The need to hold biweekly onsite meetings can be supplanted by leveraging the publishing and mark up features...from your phone...from your phone!!! Imagine that—and we all used to sit on those things for hours saying, “you hang up... no, *you* hang up first...”

The hardest part for traditional managers, designers, and engineers is taking that risk—that step away from your comfort zone—and taking the time to learn on your own how much things have changed. We tend to abdicate our own personal responsibility of growth in lieu of the safe space. But those who venture out to learn new ways and tools are almost always rewarded, when the appropriate level of effort is applied.

MOVING PAST DESIGN

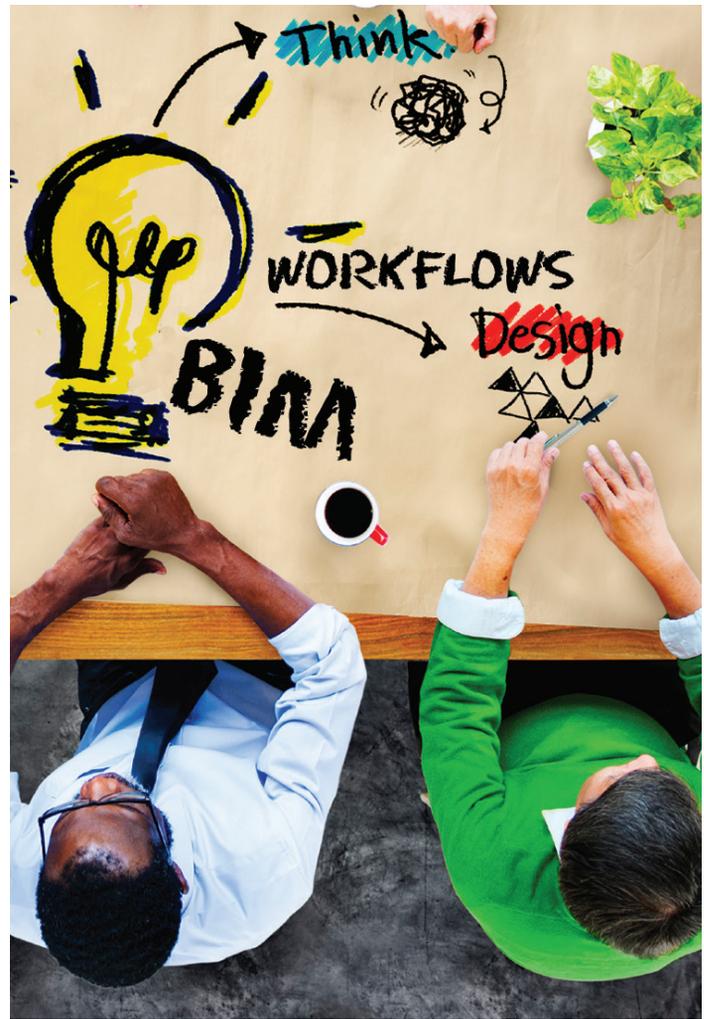
The building design is complete. PDF, DWG, and RVT models (along with Excel, Word, and several legal documents absolving yourselves of any legal liability or guilt associated with the things you missed) are delivered to the client. The biggest hole in the BIM workflow happens at this very point, and it revolves around the client's understanding of what BIM is and should be.

We've done wonders designing art in architecture, creating energy efficient structures in ways we never imagined, but abdicated our largest responsibility—educating our clients. The end users of what we do in most cases typically understand the engineering and constructability of the designs, but have little to no understanding of how we got there. The urges to protect intellectual property typically outweigh the risk taken by making your client not a client but a partner. We find it difficult to open up our design process, especially when great effort is made to gain a competitive advantage in a world of dwindling resources and budgets.

BIM in its very nature is based on trust—a collaborative process where the best gains are made by sharing information and responsibility equally. It's easy in tools such as BIM 360 to create rules to protect what needs to be protected, but that shouldn't stop or hinder the flow of information. In fact, it should celebrate it. Bringing the data and criteria into the process helps provide a more consistent outcome and allows changes to occur sooner, where the financial impact is lessened.

As the owner, their responsibility now changes. It's no longer going to be enough to take the DWGs and store them somewhere in a network drive that gets lost to memory. The “Sheet on a Stick” history (yes, that's an old drafter joke) becomes a dusty relic of days gone past—and yet you still see this in facilities around the country as the main source of information regarding their most valuable physical asset.

The owner has an equal responsibility to learn and own the building, information, and model combined. It's not that this doesn't happen. The asset management and database industry



has made many developers rich. It's the lack of consistency in the deliverable that causes the stoppage. So how does the owner fix this? By developing their standards to meet today's BIM workflows instead of yesterday's hard copies. By acquiring the same tools that update, maintain, and manage the model and its inherent advantages. Subscription licensing was key for this step to make it easier for the owners to take. You buy what you need, when you need it, and for as long as you need it. The notion of owning the hammer is long extinct in the world of the nail gun... or 3D printing... or robotic construction based on generative design.

UNDERSTANDING PROJECT INFORMATION MODELING

As I started to sit down and write this last section, some old cobwebs cleared out. I had been racking my brain about PIM... then remembered I had written an article on October 19, 2009—almost 10 years to the day I really started writing this article. Here's the link if you want to check it out:

<https://mep-cad.blogspot.com/2009/10/pimmin-design-world.html>

To me, PIMM stood for Process Information Modeling and Management and was, in my opinion, a better understanding of what BIM could and should be. In our recent meetings with



Figure 3

Autodesk, the topic of linear (or horizontal) design was the main topic of conversation. And then Autodesk produced this image (Figure 3) that explains the same idea in a much more comprehensive fashion.

So, where does this lead us? For years, all these tools—GIS, reality capture, and BIM—were competing technologies. Add the evolution of the Internet into the monster it is today, and all the information and workflows needed for complete design have changed. We now must be able to step back and look at how all of this—from the tools, to the data, to the physical representation of the act of building—takes new form. The ability to harvest these vast amounts of information and assimilate it into something that makes sense now requires a completely different approach.

That’s why PIMM comes back to me as what BIM really is—the process of understanding the project information, managing the model, and capitalizing on its inherent benefits are what can really change design for the better. The evolution of BIM 360 and the Forge platform from Autodesk as a workflow to PIM is where we want to be. It’s critical to make sure we, as an industry, don’t fall back to the same old habits and excuses, but instead lead the way to better designs through modern technology. Project Information Modeling is, in fact, the natural extension and result of understanding what the BIM workflow is all about.

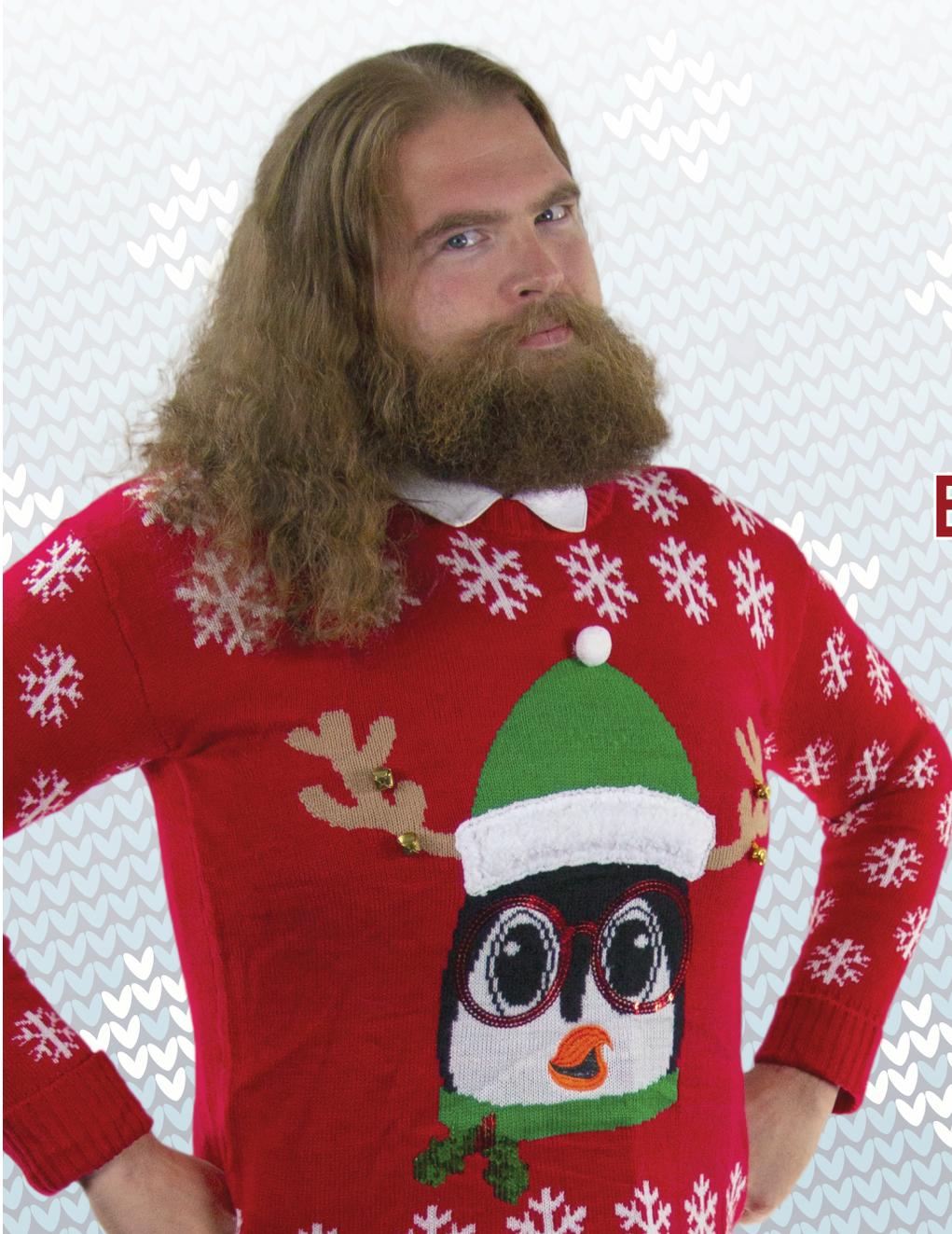
If you find yourself believing your only responsibility is delivering what you think your client still wants as 2D... do you still believe

this? With the state of the current technology, where do you think you should be? How much do you really know... really know... about the BIM workflow?

Think about it.



David Butts is the Engineering Technology Manager for Gannett Fleming, an Autodesk Expert Elite program member, and subject matter expert for BIM technology. Based in Raleigh, North Carolina, David has more than 34 years of BIM/CAD management, design, training, and consulting experience. His product specialties include Autodesk Revit, AutoCAD, Plant 3D, and other AEC tools. As a speaker and mentor at Autodesk University for the last 16 years, David has won three Top Speaker awards (2011/2016). Prior to Gannett Fleming, he was a training manager for an Autodesk reseller as well as architectural and engineering designer for other design firms, with broad industry experience.



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Ask yourself a quick question: How do we design our structure, exchange information, and coordinate our model? If your answer has not changed from what it was 10 years ago, chances are you are just using Revit® and not fully embracing Building Information Modeling (BIM).

From design software, 3D scanning, and Dynamo scripts to 3D modeling, BIM has, over the last decade, become more than just the structural model. It has become about the information within the model, how it gets there, how to get it out of the model, and how it is shared and used to allow easier distribution of the information around which you are building the model.

BIM can be scary place for small to mid-sized companies if you are not ready or do not have the pieces in place for implementation. With time, patience, the right people and software, you can not only survive but thrive.

BIM IS FOR THE BIG DOGS

Wrong! BIM is the perfect fit for small structural firms. Not only does it allow you to keep pace with the big dogs on the block, it also gives you the chance to come out ahead and land those larger jobs that for years owners thought had to go to the bigger companies. Now you will not only keep pace—BIM allows you to have the chance to outshine the bigger companies.

BIM lets small companies organize staff in a way that allows them to put their best foot forward. Through collaboration tools such as BIM 360™, modeling software like Revit, and the ability to round trip between modeling and design software, any size team with the right people having the right skills and the right tools (software) can be front runners in their design community.

BIM is the same for everyone. The key is to not be afraid to jump in and just do it. There is room for everyone in the truly collaborative environment that BIM allows us to work in. It does not matter if you have a design team of 100 with a fully stocked IT department to back you up, or if you are a small, skilled, forward-thinking team of 15 that can, does, and will do it all.

IT SEEMS TO TAKE A LOT OF TIME

To be honest, yes it does. I am not talking years here, but, as they say, good things take time. But do not follow the adage of “good things come to those who wait.” If you wait, you will be left behind. To do it right you need to put a bit of effort, research, time, and money into it. Waiting will only put you behind and you can not lead and be productive if you are playing catch up. You want to be the company that has the answers—the company other consultants look to for results and forward-thinking workflows and design.

Expect to fail at times. It might not be a big step back, or one that will be seen by anyone outside the walls of your office. You will have setbacks that are frustrating, making you wonder if the hard work

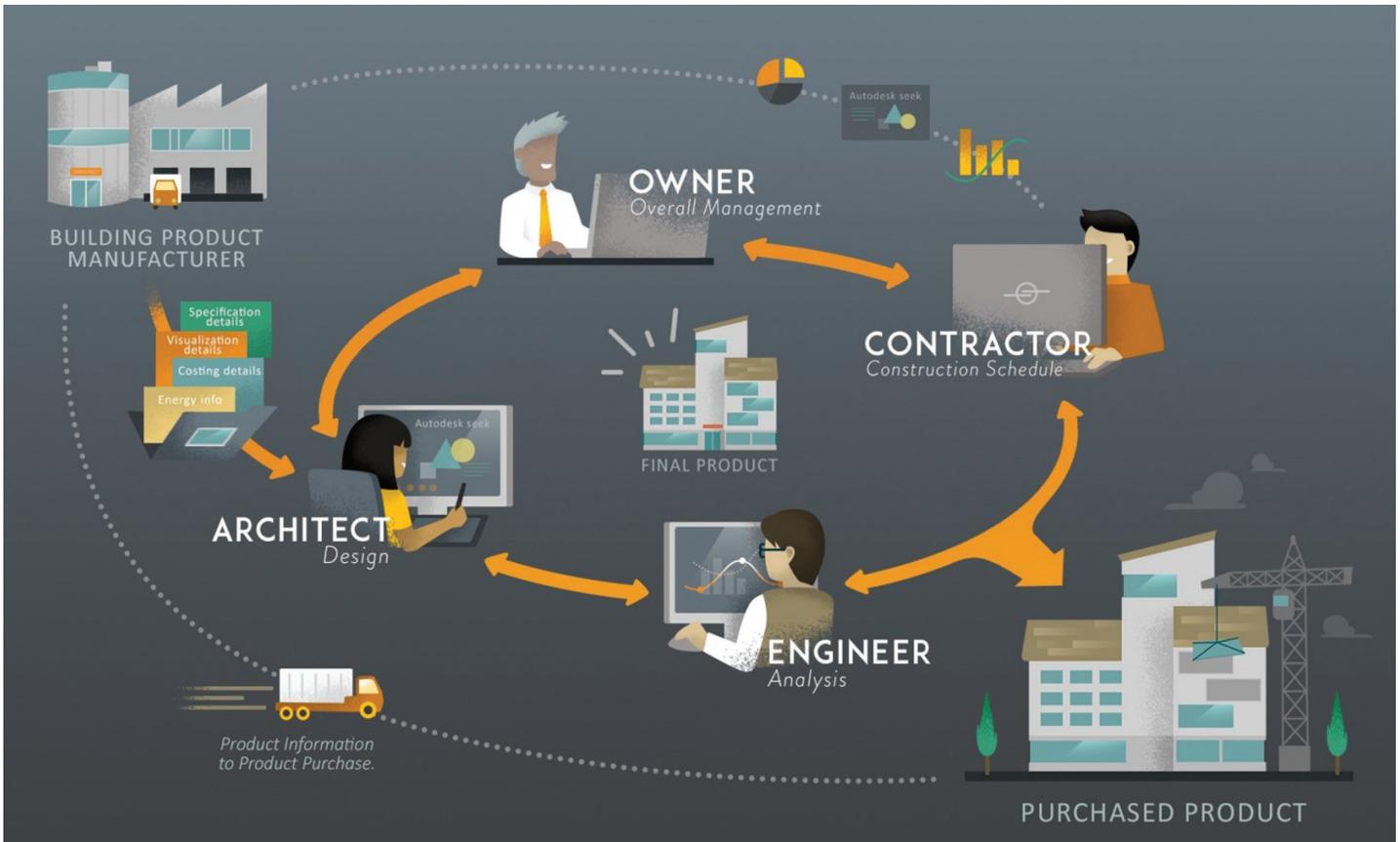


Figure 1: BIM looks the same regardless of size

and time are worth it. Trust me when I say you will learn from those mistakes and setbacks. It will be easier once you see that you come out ahead on the road to BIM if you keep at it and keep learning from mistakes and sharing your experience and new knowledge.

BIM is a new way of thinking and has lots of moving parts and pieces. It is very true that you get out of it what you put into it. If you are just going to get Revit and say you are “BIMing,” then you are going to get what you put into it, and that is a nice model and nothing else. Well, hopefully you get a nice model. If you are willing to take the time, invest in people and their skills and the tools they need, you will see the benefits ten-fold.

It will not happen overnight, and there may not be that big moment where you say, “Hey, look, we are doing it,” but it will happen. And when it does, you look back and say, “That wasn’t so bad.” The time you will save, the work you will create will be the way you define the milestones of your journey into BIM.

You may not see a giant increase or any increase in your project fees. You will, though, spend less time on reworking projects, doing less post tender coordination, and so on, meaning the money you spent on a new computer, a new piece of software, and the ensuing eight-hour training course has just repaid itself by cutting down on production hours on not just one job, but every job going forward. Seems like a pretty good return on your investment. BIM will not only save you production hours, but also allows you to go get the next big and exciting job you now have the time for, a job that you

also are fully capable of doing and being a team leader on because you have invested in yourself and your team.

WHAT ABOUT A BIM MANAGER?

BIM Manager, Lead, Coordinator, Dude... whatever you want to call it, you need it. You need that one person who can answer the questions or at least find the answers—who will organize everything that BIM involves. That one person to help put the moving parts into place, who understands it all—design, modeling, administration, coordination. There is a lot that goes into BIM and it needs to be organized and sorted out.

Find that person who not only loves what they do, that is great at the job, but also sees the vision and the road ahead that you want to travel. Someone who has the knowledge and ability to use the software, knows how it will affect your office, and can manage not only the software but people as well. By that I mean someone who can let go and allow the young gun right out of school to create the families for you. Yes, the BIM manager knows how to do it, but nowhere does it say they have to do it. Admit it, there is a good chance the young gun can do it in less time and in some cases better than the manager. Put that one person in place who can go to a senior engineer or designer and help guide that person in a new direction and the new way BIM makes us think and work.

Even if you don’t give the new BIM manager the title or a title at all, make sure everyone knows—employees, clients and the individual—that there is one person who everything and everyone goes to and will help guide them. This will allow them to bring in

Revit 2020 – Structure

new ideas, new software, and new ways of doing things that are needed and will help the company move forward as well as making sure there is a contact person for clients and other consultants. BIM is evolving and changing as we speak, and without someone keeping up, you will get left behind.

Let your new BIM champion dive into creating a BIM execution plan, a LOD guideline, decide what families you need, how to set up the analytical model etc. You will be surprised at how much they start to see the big picture by placing all the pieces together to create your new BIM plan. An overall plan is a must to move forward and will only benefit you and your company.

WE HAVE NO IT DEPARTMENT

This should not stop you. There are many qualified IT companies that can give you as much or as little IT support as you need. The upside is software has become so easy to install that most software companies will even list the system requirements you need before you download it. And they usually provide free phone support or, in the case of Autodesk, a great online knowledge network, making it much easier now to get up and running on your own.

This also might be the chance to give the young computer genius who sits two cubes down from you more to do than setting up email on your phone. Send them to a few courses and next thing you know you have your own small in-house IT department.

BIM is also very coordination and collaboration driven, so most aspects of your new daily workflow can and will be cloud based. Software such as BIM 360 means not needing to invest large amounts of time and money into a large on-site server system.

Let the tools work for you, and you will have more time to invest in your own education and on bringing in more work.

MY DESIGNER DOES NOT KNOW THAT PROGRAM

Some days it seems that every software company is coming out with new or better design software. Lucky for us, most of them realize that and have their software somewhat compatible with other design and current modeling software. From exporting or importing an IFC file to using add-ins for Revit, there is no reason to not continue using your current software.

I would recommend, though, exploring your options with other software out there. For example, Autodesk has a full toolbox of project-ready software that will cover all the bases with the AEC Collection. If you have the AEC Collection, there are a few design options that may make you wonder, after you have used it for a while, why you hadn't used it before.

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System requirements for Autodesk Advance Steel 2019

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By:  **AUTODESK**.Support
Apr 15 2018

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Issue:

This article provides the system requirements for Autodesk® Advance Steel 2019.

Note:

- A 64-bit version operating system is required starting with the release of Advance Steel 2015.
- When installing the software using the Autodesk Desktop App, make sure that at least 9 GB of free space are available on the drive you specify in the Autodesk Desktop App content path.

Solution:

System requirements for Autodesk Advance Steel 2019	
Operating System	<ul style="list-style-type: none"> • Microsoft® Windows® 7 SP1 (64-bit) • Microsoft Windows 8.1 with Update KB2919355 (64-bit) • Microsoft Windows 10 Anniversary Update (64-bit) (version 1607 or higher)
Processor	Basic: 2.5–2.9 GHz processor

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Figure 2: Easy to export and import

If you are struggling with something in Revit, maybe try Advance Steel for your connections. This also gives you a chance in the comfort of your own office to see how easy it can be to export and import from other software. Have a smaller job that you want a program-savvy technician or up-and-coming designer to start? Why not let them start it in Robot Structural or another design software option you have been looking at? Many software providers provide a 30-day free trial. The worst that can happen is you realize the software does not fit into your workflow. Or you may learn new software and get to train a staff person at the same time.

TAKE THE NEXT STEP

Try not to be worried about trying something new. If you see something out there that might help your design process, drawing production, or even advance what your company can offer, try it. The worst that can happen is you find out it is not for you. Best case is you will come out of it with a new service to offer a client or new workflow to cut back production hours.

3D scanning is one of those things you should try. It is a big step, I know, but so was moving from the drafting board to AutoCAD®. It is not just for field verifying the as-build condition, but can take the place of existing drawings for renovations. Have a large amount of site verification to do before replacing a piece of rooftop equipment? Why not scan the existing conditions? Not only will you have something you can do site measurements on while not being on site, but also something you can use in your model.

Dynamo, what LISP routines were to AutoCAD, is a graphic programming tool for Revit. This is another tool that is making headway. BIM managers do not have to know how it works inside and out, but you will need someone on staff who does. It may take a bit to get accustomed to and to get everyone up to speed, but just think about something as simple as not having to ever fill out a title block over and over again. That's what Dynamo does—it takes the time out of doing things.

JUST JUMP IN

Do not let BIM and all the other TLAs (three-letter acronyms) of the AEC world get in your way of moving forward and taking advantage of the workflows, technology, and advances that are offered to us. The small, close teams that smaller companies have are a perfect fit for today's BIM workflow. Now is the time to take charge of the type of work you do—now and in the future. Use the tools provided and keep looking ahead to the next one. Do not be happy with just keeping up, but with drive and passion become the leaders in your community

and help make the change to a better BIM environment.

The worst thing you can do is wait to see what happens. If you are seeing others doing it and succeeding, chances are you are already behind. Join a BIM community, talk to other consultants, and arrange for demonstrations. The future of the BIM road you are taking may not always be easy or straightforward, but it will be exciting and beneficial as long as you are willing to try it. The next thing you know, you will be doing it.



Jason Peters is the BIM Manager at Lavergne Draward & Associates, a Structural Consulting Firm in Winnipeg, Manitoba Canada. He has 20 years of experience in Structural Consulting using AutoCAD and Revit as a drafter, modeler, coordinator, team leader, and CAD Manager. In his current role as BIM Manager, Jason is responsible for implementing and maintaining BIM and modeling standards as well as providing technical support and training for both AutoCAD and Revit users. He works closely with Architects, Mechanical engineers, and other members of the AEC and MEP team, working on projects ranging from small residential additions, world class sports facilities, a one-of-a-kind museum, education, and health facilities. Jason's experience and depth of knowledge exemplifies a well-rounded member of the AEC community.



Figure 3: AEC Collection

3D Grids in Revit: An Oldie but Goodie Done Again (Again)

So ya may not (think you) need (or want :-)
to use a Grid represented in 3D in Revit®
(though some (you) do... like me ;)

While Navisworks® represents levels and grids in 3D, Revit only reveals levels and not grids (yet?). IMO the grid representations in Navisworks are useless at best, but that's me. So if you're still reading and would like 3D grids in Revit and Navisworks, here you go.

A long time ago I hoped to find BIMfriend (John Raiten)'s 3D grid. I know he had a nice one from our younger days (lol) and he was the inspiration for this all those years ago, yet it's still relevant! But because I couldn't find his, I had made my own. You can still d'load it via: <https://app.box.com/s/88m6ehm9x6giew7vyim3>

I am not going to do a full how-to-create since it is ready to go for you, but I will go into a few things that one may want to be aware of for "proper" (?) use, so on with that show.

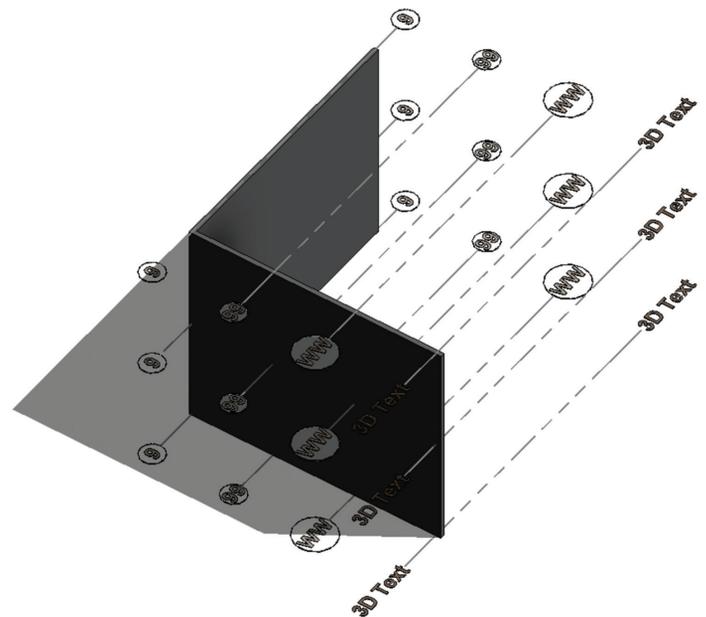


Figure 1

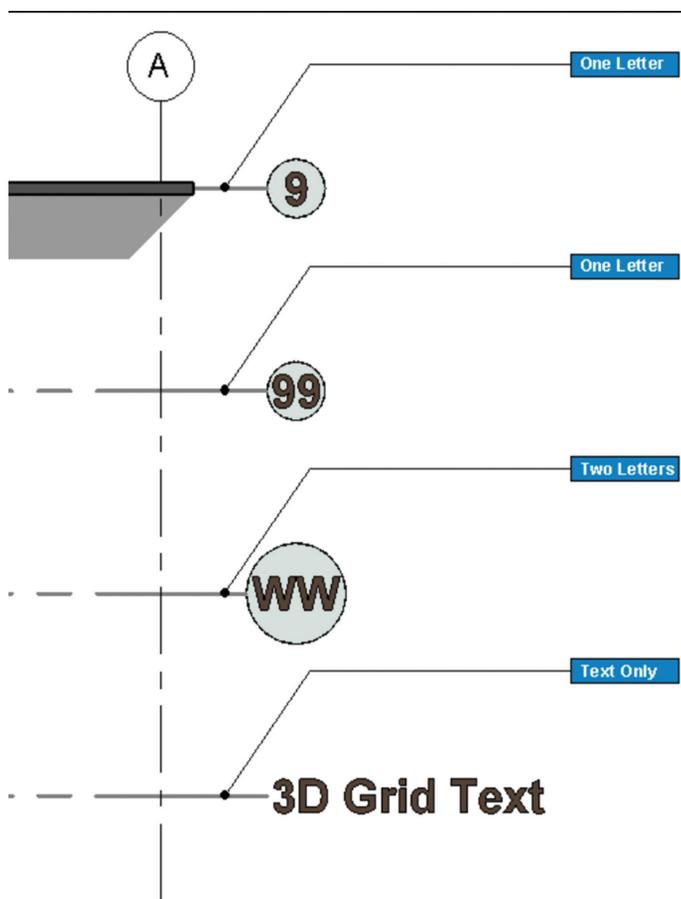


Figure 2

Figure 1 shows what the three types of the Line Based Generic Model of 3D Grids look like (in 3D, obviously).

I made the “line” portion quite thick and grey, so it pops but is distinct from other graphics.

The “circle” is an extrusion with thickness and material control. Size is only recommended to be changed at the family level, not from the project!

In plan, Figure 2 illustrates them alongside a standard OOTB grid for reference. The Type Names are specified with blue tags.

I realized a bit of a naming gotcha: I should have Type-Named “One Letter” something like “One Letter and Two Numbers,” but since it also works with many (not all) pairs of double letters, AND it was already finished when I realized that, it is simply Type-Named “One Letter.” Though, as you can see, it IS still useful for double numbers and some double letters.

The “Text Only” Type is really my preference so you can all consider the ones in “bubbles” as an added gift, I guess.

The parameters are quite formulaic (attempt at, lol). It’s just that they do rely on some basic formulas as you have seen in the preceding image.

The “Two Letters” Type is not very much to my liking, because in order to fit the larger letters in pairs (if needed) like “MM” and

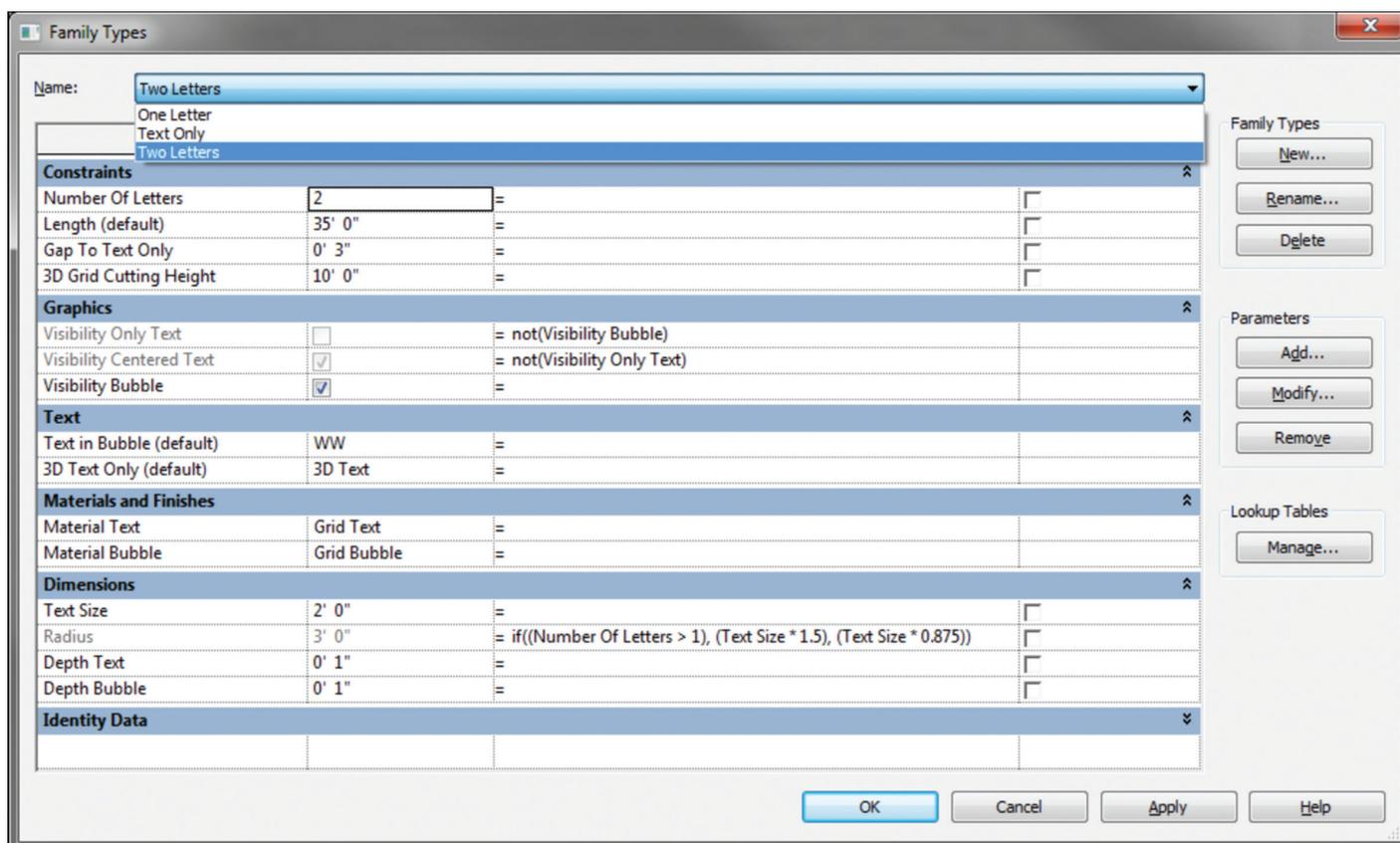


Figure 3

Revit 2020 – Architecture

Category	Line Weight		Line Color	Line Pattern	Material
	Projection	Cut			
Generic Models	1	3	Black	Solid	
Grid Bubble	1	1	Black	Solid	Grid Bubble
Grid Line	4	6	RGB 128-128-128	Triple dash	
Grid Text	1	1	Black	Solid	Grid Text
Hidden Lines	1	1	Black	Dash	

Figure 4

“WW,” etc., the bubble needs to be too big for my taste, but there you go. Choices, always choices... and your choice is yours.

As you can possibly guess, if you change the sizes of the bubbles or the number of bubbles from the project (instead of simply choosing the correct Type) you will probably blow these up! So, don't do that.

Finally, Figure 4 is of the Object Styles, Sub-Categories from the project environment. I set these up from the family to allow easier, more flexible choices for the glass materials I built them with.

Revit to Navisworks process HINT:

- Create these on one level.
- Group 'em.
- Copy the group to all other levels.
- Create a filter that finds the families.
- Set the filter to render them invisible in all views.
 - It is suggested to include the filters in View Templates.
 - Some folks have placed them into a workset that is “off by default” and managed their visibilities that way; this is less than optimum.
 - Note: some BIM teams disallow worksets to be used for these matters.
 - Please consult your local BIM management unit before implementing.
- In a Management 3D View, remove the filter that turns these invisible.
 - Isolate the 3D grids.
 - Export for Navisworks.
 - Export all 3D grids as one separate NW* file.
- Do not include that file in any Navisworks clash tests ;)

Now, if you want to mess with your own copy of these, feel free to download from the link above, use, share, complain about, and get your #D Grids on.

Cheers!



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

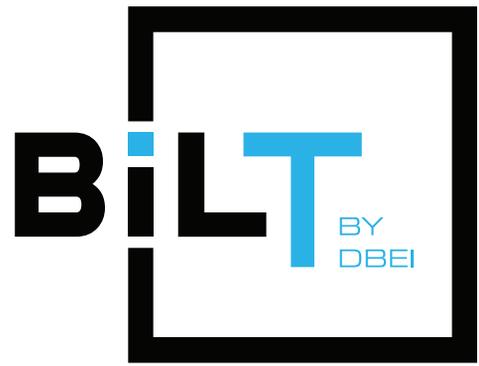
Jay brings wide-ranging Design, Delivery, Management, Mentoring and Teaching experiences to the readily changing AECO industries, founded on an expansive 35 plus year career.

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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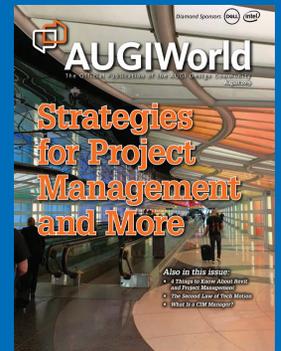
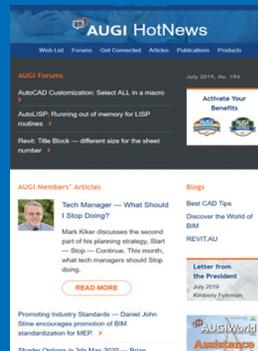
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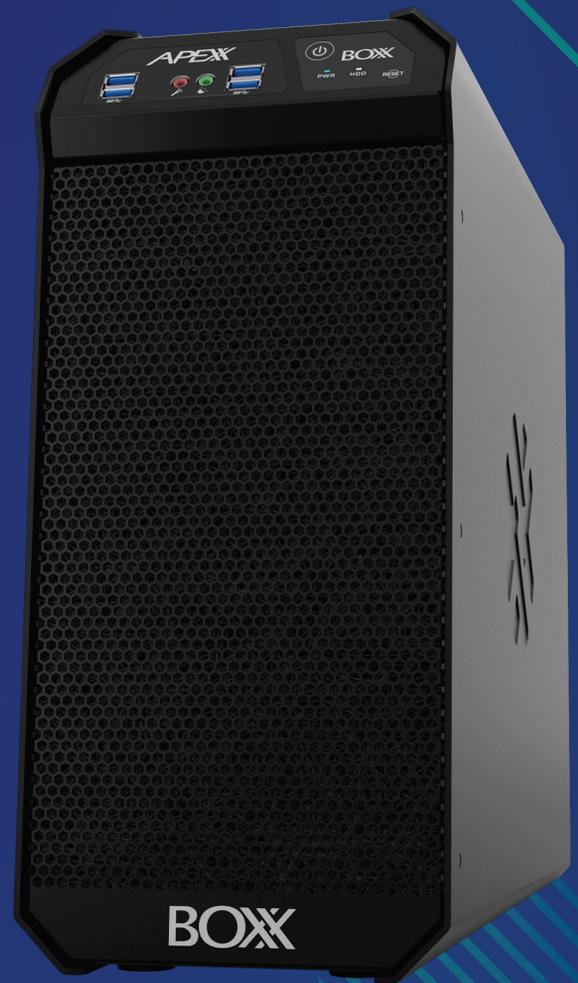
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