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# AUGIWorld

The Official Publication of the AUGI Design Community

April 2020

## Sharpen Your Management Skills

### *Also in this issue:*

- 3D with AutoCAD
- Finding Work-Life Balance as a 3ds Max Artist
- Closing the Gaps in Coordination





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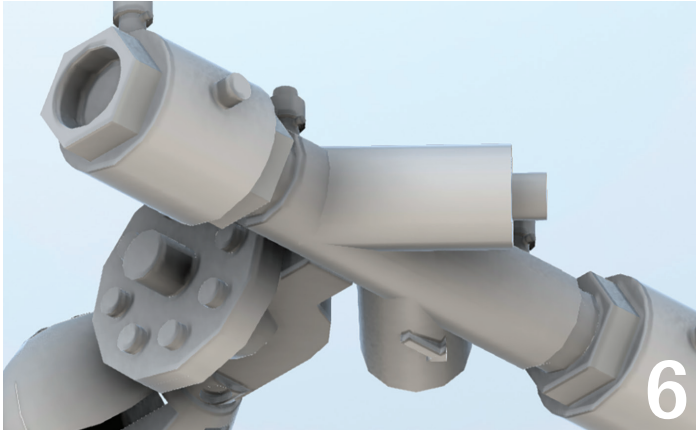


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# Letter from the President



# AUGI

## GREETINGS!

**A**pril brings refreshing thoughts of spring - baby animals romping in the fields, flowers blooming, landscapes turning green. Spring is one of my favorite seasons, especially after a long northeast U.S. winter! (As I am writing this on Leap Day, it is 27 beautiful degrees here!) It is time for spring cleaning and I cannot wait to open the windows and air out the house. I have two grown boys and a dog...enough said!

Recently I purchased a planner to help with household management. I am no domestic goddess, by any means. But, I do like to make lists. Just ask my husband. Taking a trip? I need a list of what to pack. Trying to figure out weekly schedules for our family? I need to make a list of our activities for the week. Meal planning for my family of five? You guessed it, I am making a list! Lists help to keep me focused and accountable. It is also something I use with my business to meet deadlines and keep happy clients. I have a monthly list, a weekly list, and yes, even a daily list. My daily list is broken down into blocks of time for each task. This is just another way that I create my own deadlines and stay focused. There is something very satisfying about checking off an item on my list!

This may sound rather extreme, but I know myself. I know how easy it is to get distracted. Especially since I work from home most of the time. I try to run my business as if I would in an office setting, with set hours and obligations. Of course, I may take a break to see what the dog is barking about! I enjoy control and flexibility of my schedule knowing what needs to be done, and how long it should take.

All of this leads into this month's AUGIWorld topic, which is Management. Whether you are considered "management" in your company or not, you ARE a manager! You are a manager of your life, your time, your job - whatever that may be. This month we are taking a look at how we manage our software, and our authors have put together their best management advice to share with you. I am sure you will learn something from these articles that you can apply to your own software applications.

This month, we welcome our new AUGI Board of Directors member, KaDe King as an appointment to replace Sam Lucido who stepped down for personal reasons. We will certainly miss Sam - thank you, Sam, for your contributions to our board over the past year! KaDe we look forward to working with you and for the exciting journey we will continue with AUGI.

Now to check this letter off my list...

Cheers!

Kimberly

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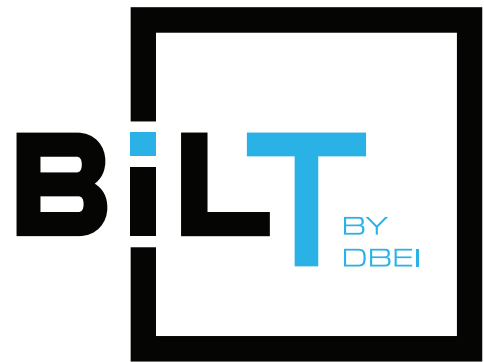
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# 3D with Autocad

An abstract 3D rendering featuring a complex arrangement of red and white geometric shapes. The red shapes are solid and have a fine grid pattern, while the white shapes are semi-transparent and also feature grid patterns. Thin, dark grey lines radiate from various points, creating a sense of depth and movement. The overall composition is dynamic and modern, typical of high-end architectural or industrial 3D modeling.



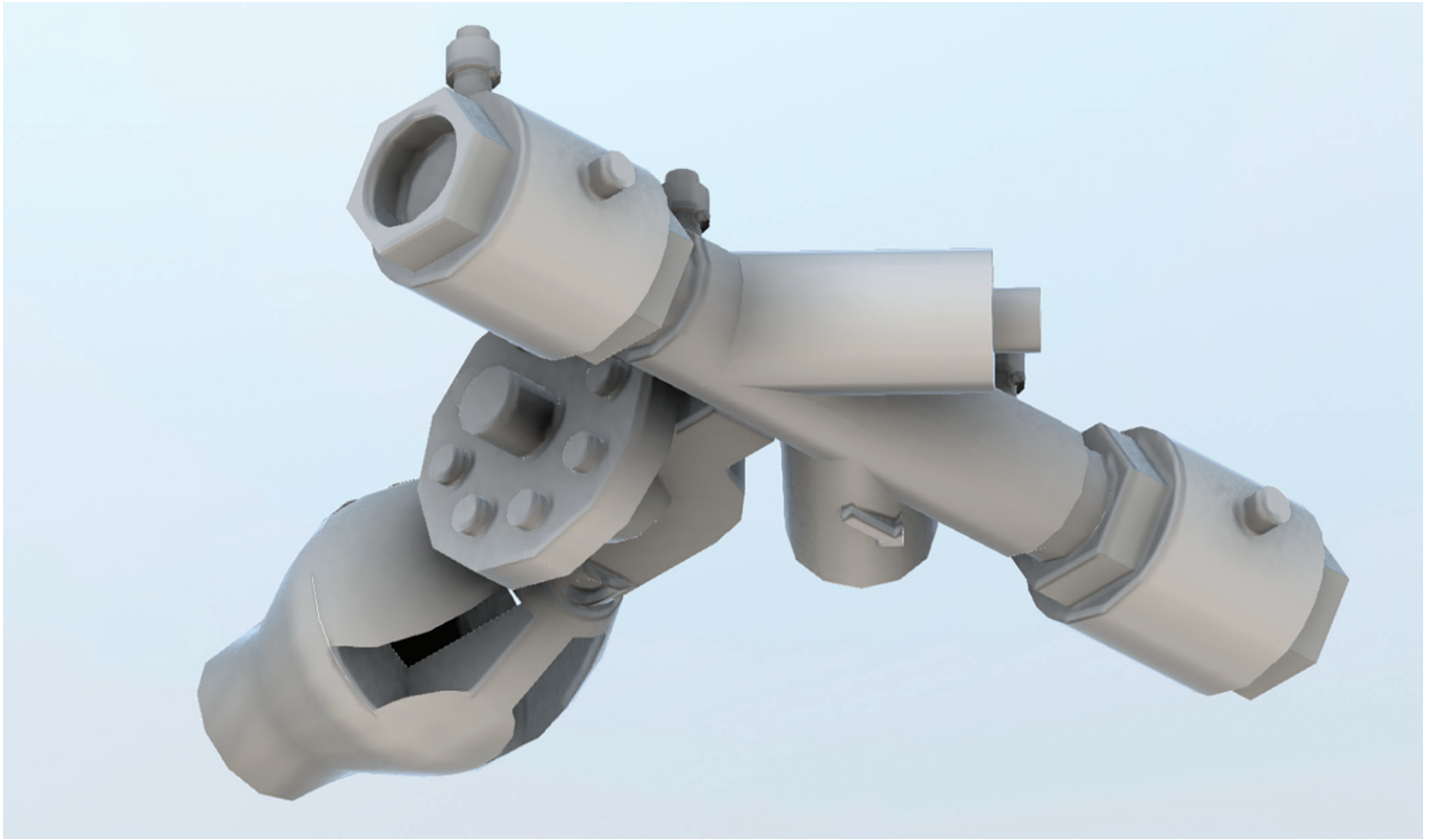


Figure 1 – 3D Solid Object

**A** core function of AutoCAD is to design, and detail 3-Dimensional objects. It's useful for a variety of applications, including patent submittals, manufacturing, production of mechanical parts, development of aerospace equipment, architectural objects, computer graphics, theater stage construction, interior planning, and even special effects to assist with scene and background elements. AutoCAD's 3-Dimensional tools have such a wide range of uses because the software is relatively inexpensive and simple to learn. So this month, I'd like to share some of the basic functions used in the design of some of the elements mentioned.

First, with the construction of 3-Dimensional objects in AutoCAD, it's simplest to start with 3D Solids. A 3D solid can consist of one or multiple parts to construct a 3-Dimensional object. See Figure 1, for example.

To build and detail 3-Dimensional solid objects, we need to begin with a closed polyline and understand some basic commands. There are six essential commands to learn. These include EXTRUDE, REVOLVE, SLICE, ROTATE3D, UNION, SUBTRACT, SOLVIEW, SOLDDRAW. We also need to understand both changing the views, and one of the functions of the UCS. I'll explain as we continue.

## VIEWS

There are multiple ways to work in different viewpoints to construct objects in 3D, but I've always found the prebuilt configurations more than sufficient. These configurations allow us to switch

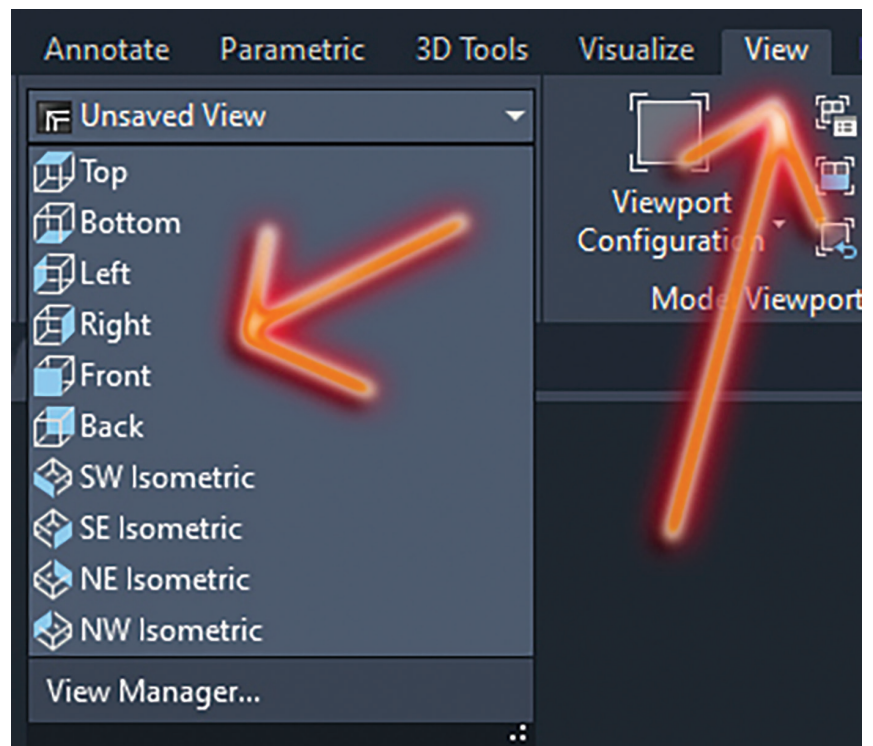


Figure 2 – Views



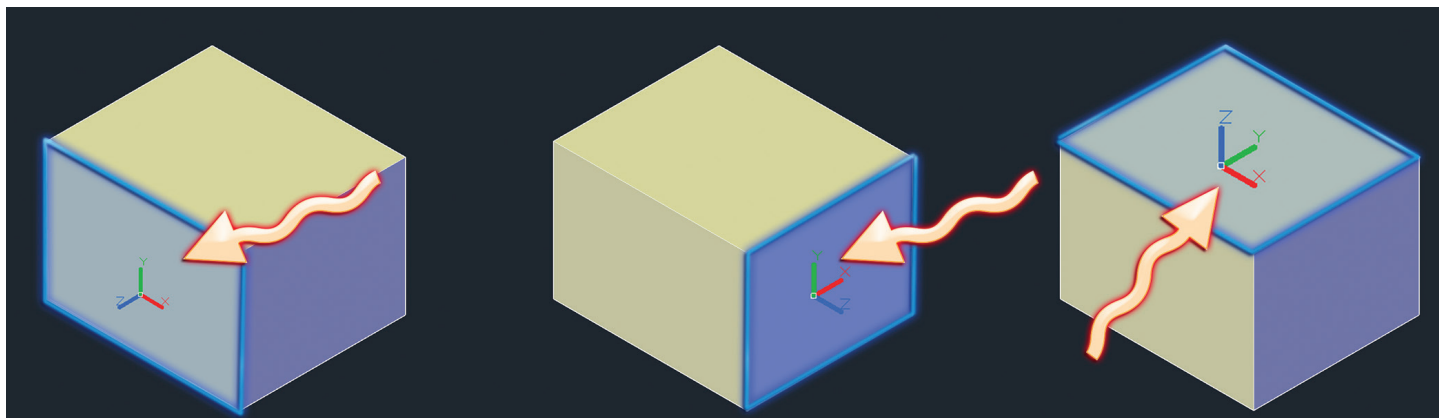


Figure 3 – Manipulating the UCS

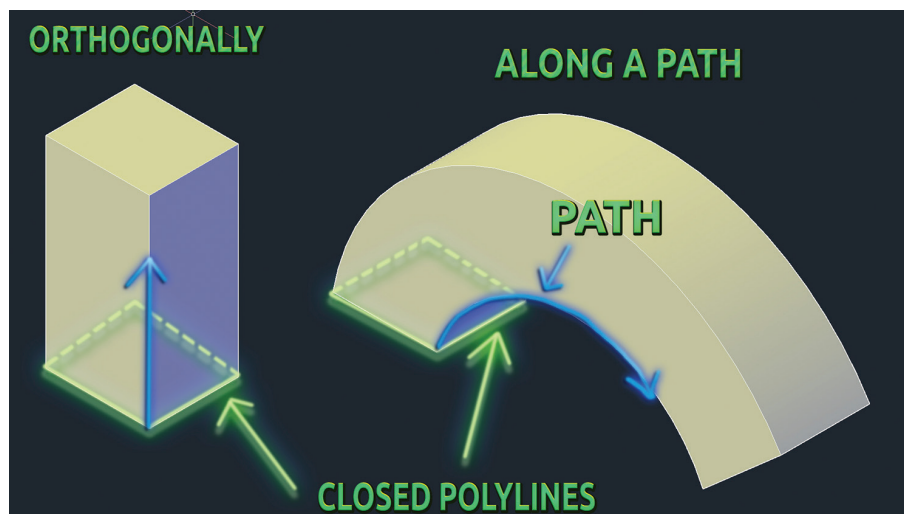


Figure 4 – Extrude Command

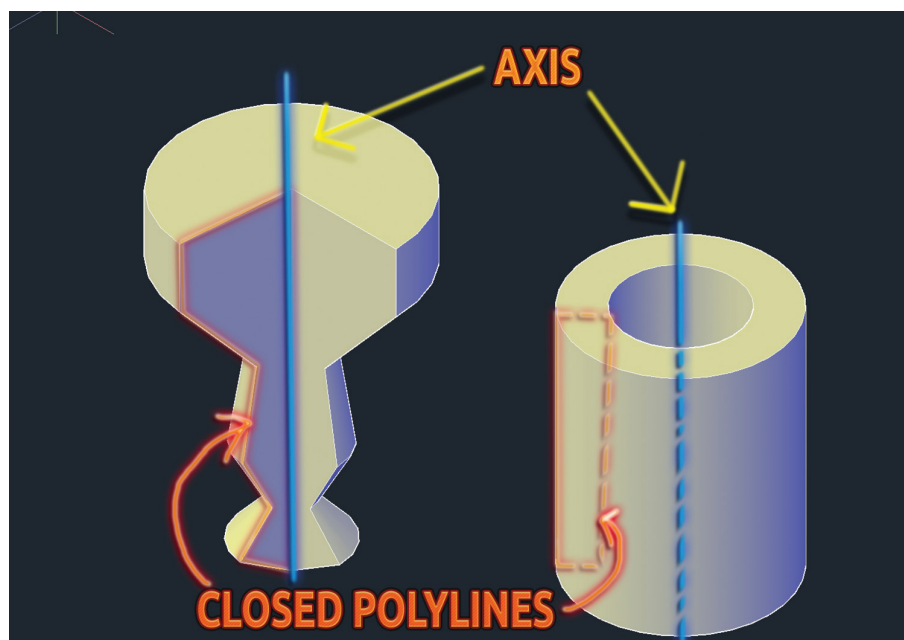


Figure 5 – Revolve Command

between Top, Right, Left, Back, and Isometric views to build our objects. To locate them refer to Figure 2.

## UCS

Manipulating the UCS allows us to place our working plane anywhere on an object. Picture it like a table sitting on a floor. The plane of the floor would represent the UCS. Everything sits on, or constructed on top of that floor. In the world of AutoCAD though, we can manipulate that plane. We can change it so that it aligns with the wall rather than the floor, allowing us to build off of that plane. There are multiple options to change the location of the UCS to work on the object we are building. In Figure 3, I typed the command “UCS” and selected the “Face” option, allowing me to set the UCS to match any face I select on my 3D object.

Now to introduce some of the best commands AutoCAD has for the construction of 3-Dimensional objects.

## EXTRUDE

We can extrude a polyline orthogonally or along a path. With a closed polyline, we type “Extrude” then select our polyline. If we want to extrude the object orthogonally, we drag our mouse, or type in a number to represent the distance. If we want to extrude a path, we need a second polyline representing that path. See Figure 4, for example.

## REVOLVE

The “Revolve” command allows us to convert a polyline into a 3-Dimensional object by revolving it around a center axis. Using the command, we select 2 points representing the axis our polyline will revolve around. See Figure 5, for example.





Figure 6 – Slice Command

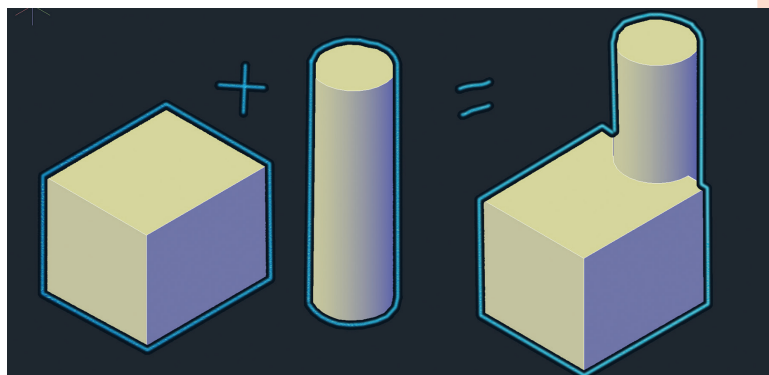


Figure 7 – Union Command

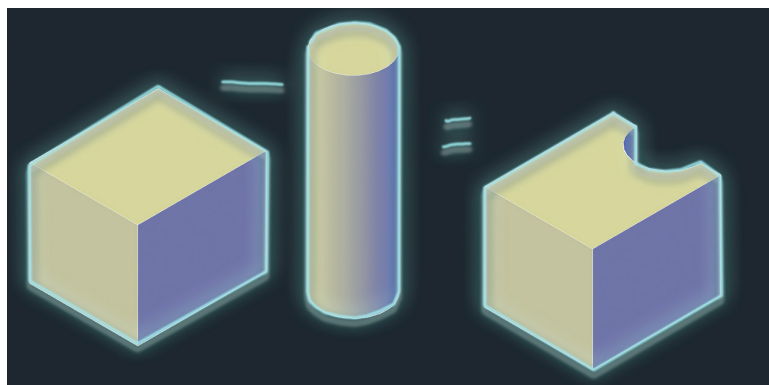


Figure 8 – Subtract Command

## SLICE

We can slice an object, similarly to cutting a stick of butter with a butter knife, using the “Slice” command. See Figure 6.

## ROTATE3D

The “Rotate3D” command allows us to rotate objects around an axis by selecting 2 points that define that axis.

## UNION

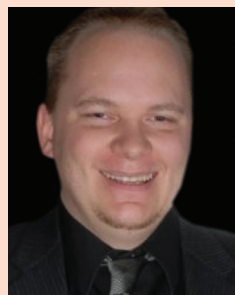
Union allows us to join two different 3D solids together to create a single object. Figure 7 is a good representation of several objects joined together similarly.

## SUBTRACT

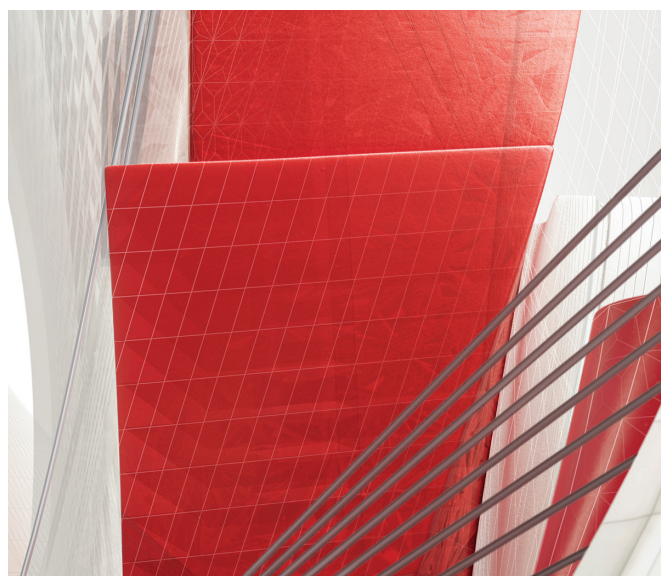
Subtract allows us to subtract the volume of one 3-Dimensional object from another. See Figure 8.

## FINAL TIP

If you plan to use AutoCAD for 3D, you might want to learn the “SOLVIEW” and “SOLDRAW” command. These commands help us to create 2D linework from our 3-Dimensional objects, placing hidden linework on appropriate layers, making it easy to detail and dimension them.



Brian Chapman is an Autodesk Authorized Developer, Digital Artist, and a CAD Applications Specialist for Westwood Professional Services. Brian shares tips and tricks at [procad.blog](http://procad.blog) with a portfolio of digital artwork and renderings at [emptypawn.com](http://emptypawn.com). Brian’s email is [procadman@procad.net](mailto:procadman@procad.net)





# Civil 3D – Manage... Manage... Manage





As we all know, there is a ton of data to manage when it comes to Civil 3D. Not just data, but files, best practices, styles, folder structure, etc., etc., etc.! At times it can be a bit overwhelming, especially if there has been no management over these items in the past. But for those looking to get a better handle on things, I've outlined several of the topics I'd make sure to spend a bit more time getting up to speed on. There are obviously many more things that help in project management, but these are some of the things I see being underutilized.

## MANAGING DATA IN PROSPECTOR

Did you know you can create folders within Prospector for things like alignments, surfaces, and pipe networks? This can be extremely helpful when managing large projects.

Take surfaces for example, on large projects you probably end up with several surfaces that represent an overall finished grade surface, or several surfaces to build your existing ground surface.

This can get a bit messy and confusing at times, as shown below in this simple example. Right-click on Surfaces, and simply select NEW FOLDER to make your life easier!

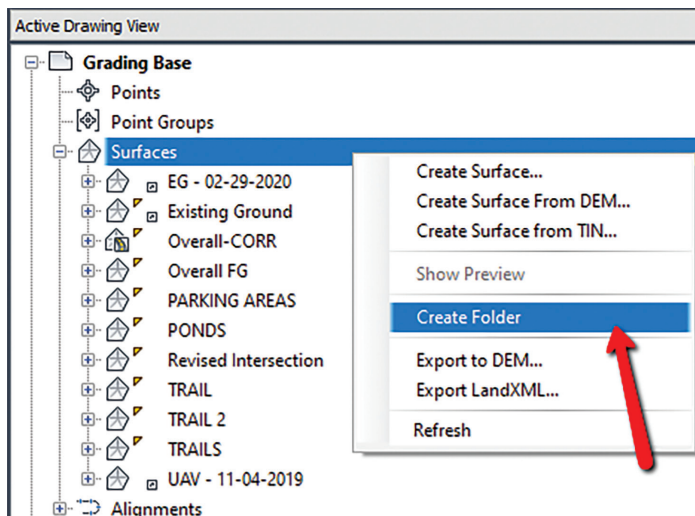


Figure 1

I typically leave 2 surfaces outside of the folders; one for my existing ground, and one for my overall finished grade. Once you've created the folders, simply drag and drop your surfaces in the correct folder.

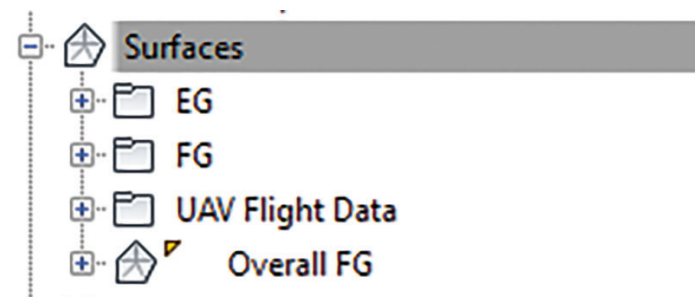


Figure 2

## MANAGING DATA SHORTCUTS

Use them! This is a very overlooked, and often misunderstood function of Civil 3D. Even for simple projects, data shortcuts can really help production and speed up time to completion. But, what do you do on these larger projects, when you literally have hundreds of data shortcuts??!! Well...I think we are all still trying to figure out the best practices, but here are some tips I've found to be helpful.

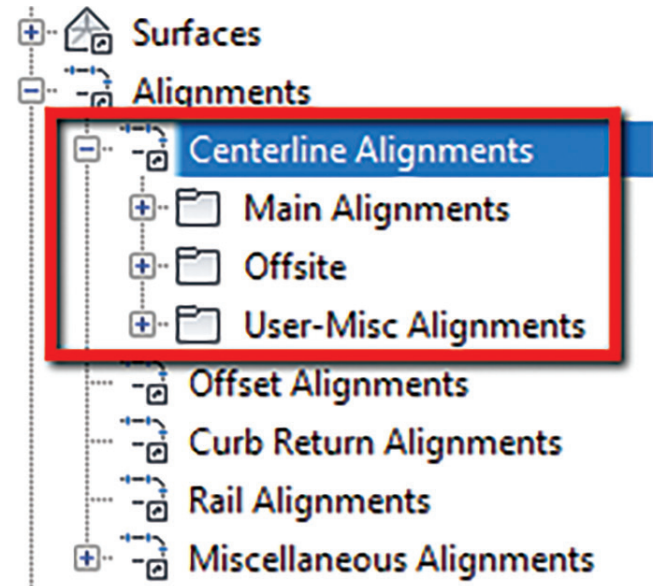


Figure 3

Tip 1: Just as we can create folders in the Prospector, as mentioned above, you can also do this for data shortcuts! Throughout a typical project, you have main alignments (i.e. road centerlines), but you also end up with miscellaneous alignments (offsite utilities, cross section alignments, etc.). I would create a couple of folders within the folders in data shortcuts, one for "MAIN" alignments, and one for "USER" alignments. This will make it easier for users to find exactly what they are looking for much quicker.

Tip 2: Did you know there is a Data Shortcut Manager? You can use this to replace drawing objects with shortcuts or repair broken references. This is helpful in managing multiple shortcuts at once. At times, the need to replace an associated shortcut may arise. This is the simplest way to handle that.

**DID YOU KNOW YOU CAN CREATE FOLDERS WITHIN PROSPECTOR FOR THINGS LIKE ALIGNMENTS, SURFACES, AND PIPE NETWORKS? THIS CAN BE EXTREMELY HELPFUL WHEN MANAGING LARGE PROJECTS.**

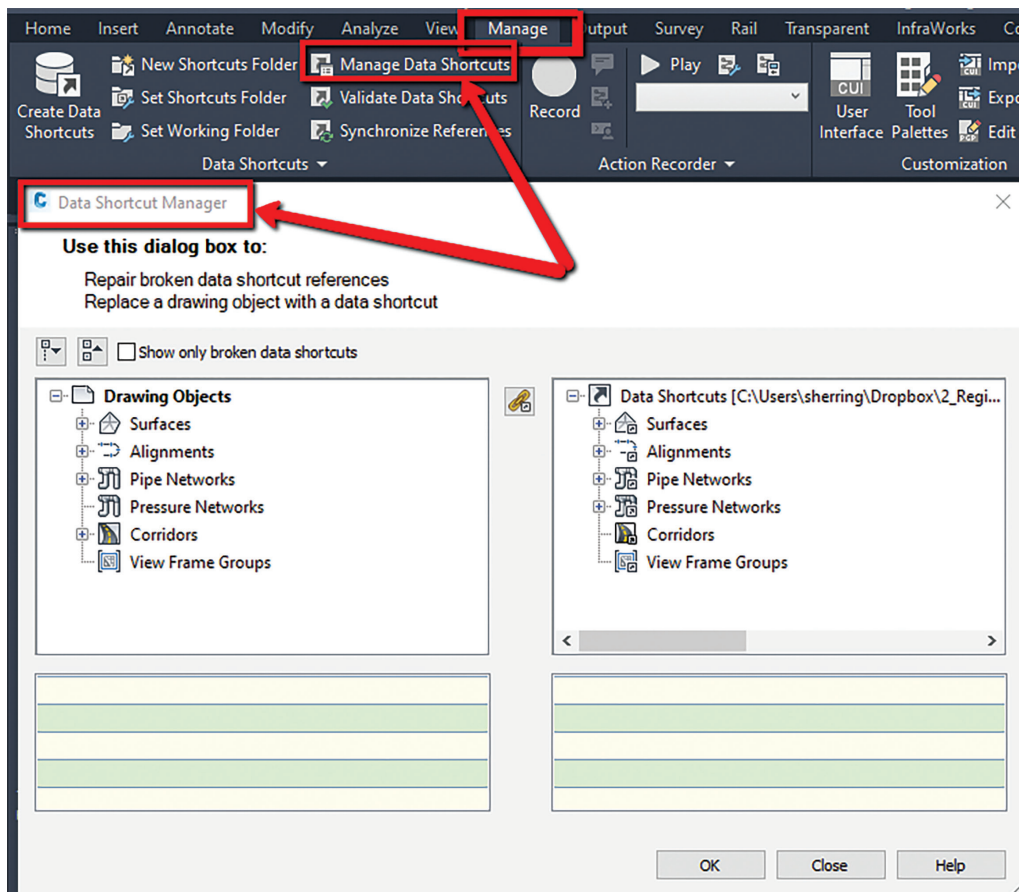


Figure 4

Tip 3: I didn't know this until I saw something from the great Brian Hailey, but you can select multiple shortcuts at once and either right-click and "Create Reference", or drag and drop them on your screen to import them all at once!!

Tip 4: I may not condone this one, but it is actually pretty helpful!! I'm not one to promote data shortcuts, but if you need to send out a Civil 3D file to someone, you can promote all shortcuts at one time! Talk about a time saver.

Go to the Manage tab of the ribbon, drop down the Data Shortcuts panel, and select Promote All Data Shortcuts.

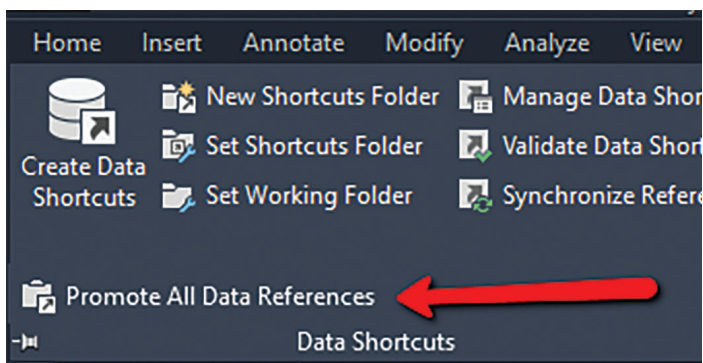


Figure 5

## MANAGING PALETTES (SUBASSEMBLIES)

Let's be real, how many of us use 5-7 subassemblies for almost ALL subdivision roads? OK, maybe it's just me? You have lanes, curbs, asphalt, sidewalk and end sections. Simple, right? So, why do we need 40 tabs on our palette, and constantly go through several to find what we want? Why change a curb & gutter setting every single time you use it? I do that and drive myself nuts!! Adding the curb to a new palette and changing the properties, once, will save you a lot of time.

Creating a custom palette is super simple! You have the ability to add individual assemblies, blocks, script routines, and much more. Palettes can be on your local machine, or preferably shared throughout the company on a server (or both!).

First, I'd remove any palettes you never use. You can right click on the heading of your palette and go to Customize Palettes.

Now give this a shot. Right-click on any tab of your Tool Palette and select New Palette, then name your palette.

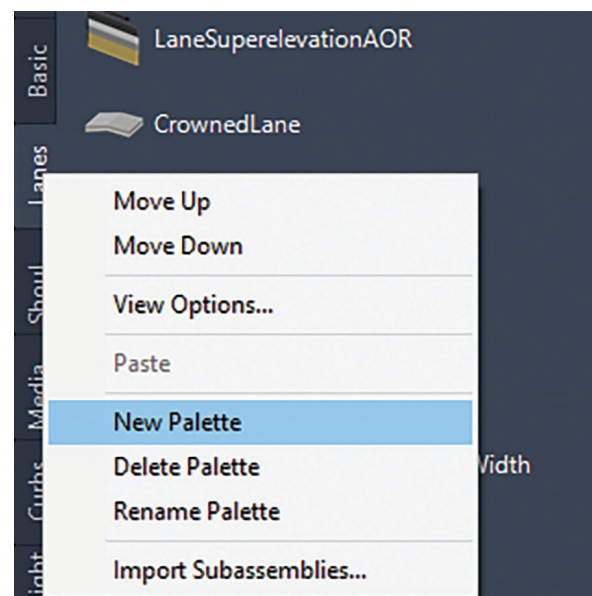


Figure 6

Now, for this example, we will add a few subassemblies to the palette. You can select any subassembly, right-click, then copy and paste it to your new palette. You can add things like text and line separators to help clean it up a bit.



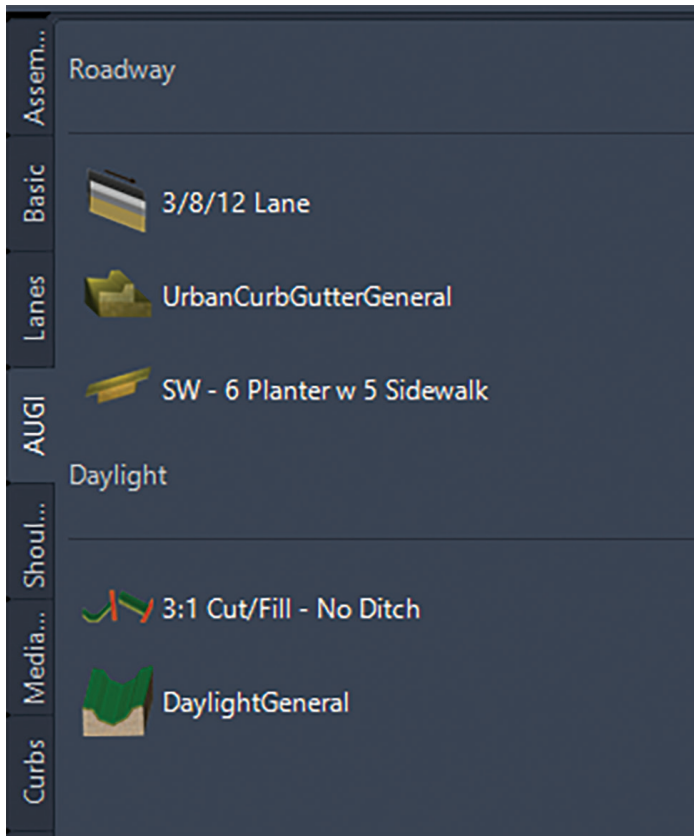


Figure 7

## MANAGING STYLES

Maybe the toughest thing to manage overall? Who is in charge? Who can make template changes? Many companies are pretty relaxed on this, but many also have very strict CAD standards they must adhere to (either self-imposed or client). Some projects drag on for years. And how do you know that they are using the most updated standards?

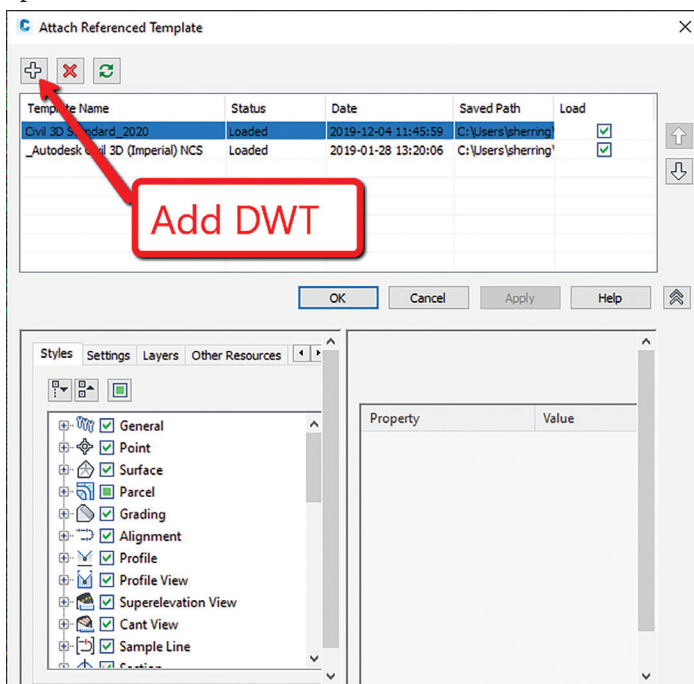


Figure 8

How about referenced templates? This came out in circa-2017 (or 18). From the Manage tab of the ribbon, to the far right on the Styles panel, choose Reference.

This will allow you to add in your template, or multiple templates! (Figure 8)

When a user goes to edit a style, they will get this warning! This is a great way to manage styles as you will have one source file of styles to edit.

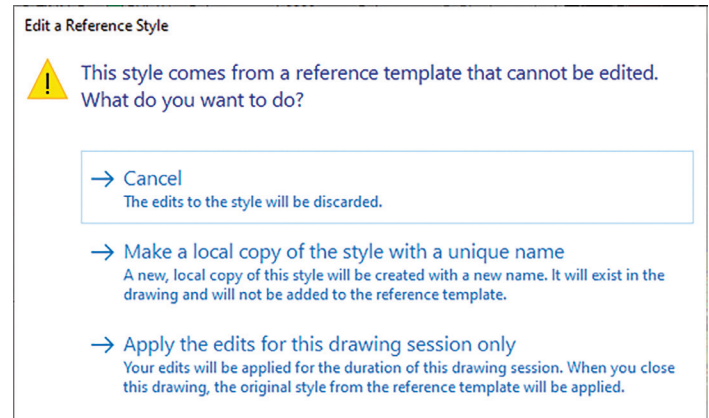


Figure 9

Now, if only Autodesk would add in a pushback button where you can edit styles in a current drawing and push it to the master template!!

## FILE MANAGEMENT / CLEANUP

Keeping files clean, clear of corruption, and working smoothly throughout the project lifecycle is next to impossible with Civil 3D. And please...please let me know of any solutions you may have! Here are a few things I do to help manage file size and stability. Just type in some of these commands on those troubled files.

- **-PURGE (Regapps)**
  - XREF CONTAMINATION - Purge them, save, close, and then reopen the DWG. Those REGAPPS will be back if they are in the xref'd file.
- **PURGE**
- **OVERKILL**
- **WBLOCK**
  - This is the number one way to really purge unused layers, blocks, REGAPPS, and any other funky junk that someone has done to that drawing. It will even remove bad settings that a user has changed! The Entire File option will take drawing layouts with it, which is great if you have a corrupt Sheet file.
- **AUDIT**
- **RECOVER**
- **MAPCLEAN**
- **Drawing Purge Add in**

# AutoCAD Civil 3D 2020

- [https://apps.autodesk.com/ACD/en/Detail/Index?id=3773138176974634673&appLang=en&os=Win32\\_64&autostart=true](https://apps.autodesk.com/ACD/en/Detail/Index?id=3773138176974634673&appLang=en&os=Win32_64&autostart=true)
- **LAYOUT TABS**
  - Autodesk recommends no more than seven layout tabs per drawing. I recommend no more than 3-5. Technically, you can add 256...AND I HAVE SEEN THIS BEFORE! Most people on the forums say between 5-10 layouts are the max they will use.
- **CIVIL 3D LABELS**
  - Use data shortcuts and label live in the sheet files. Try not to label a really long profile, corridor, or large surface that spans multiple sheets. This can really slow down the performance because AutoCAD and Civil 3D will process/cache every object whether you are viewing it or not. Also, use XCLIPS.
- **TURN OFF THESE SETTINGS**
  - Hardware Acceleration
  - Smooth Line
  - HPQUICKPREVIEW
    - Controls whether a hatch preview is displayed when specifying a hatch area.

## MANAGING SURFACES (DXF/POINT CLOUD)

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 wonder why the slowdown or crashing happens.

Did you know that if you create a surface from contours (polylines) you can delete those polylines and keep that surface in place!! A CAD file with millions of vertices of a polyline can be very slow. Simply go into your surface properties, BEFORE YOU ERASE THE POLYLINES, and change the build definition as shown below!



## CONCLUSION

Create a plan and stick to it! All the management best practices in the world won't help if it's not documented, reviewed regularly, and most importantly, ENFORCED!

Other items such as sheet set manager, file organization and best practices can be documented easily in some sort of a CAD Manager handbook. Monthly, or quarterly meetings to review best practices and even items such as template changes are also a good idea. If I only followed half of the stuff I mentioned above, I'd be in much better shape!!

Thanks for reading.



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

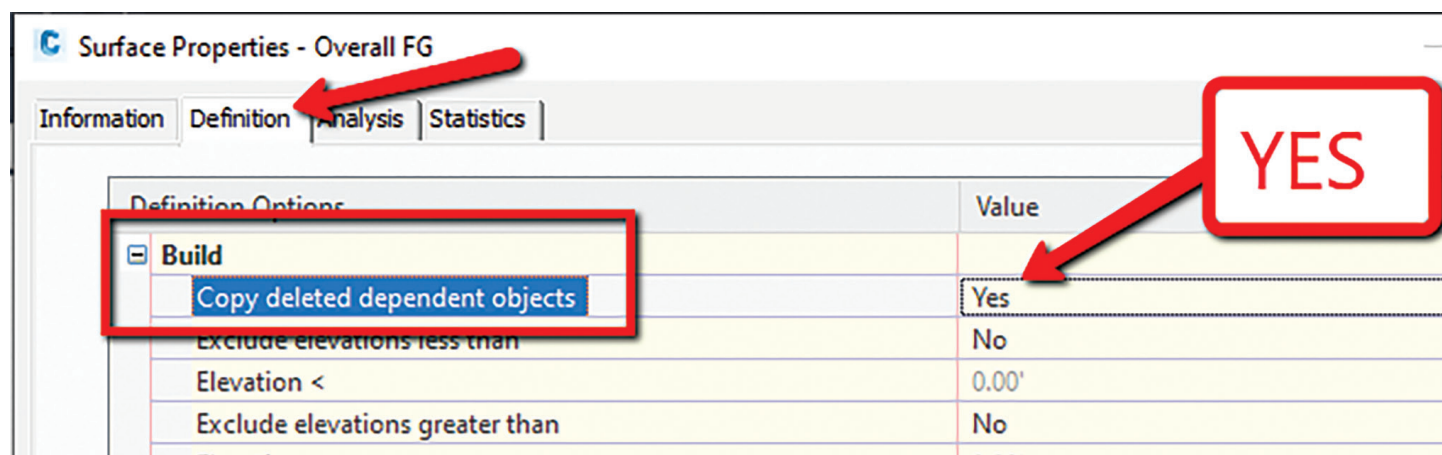


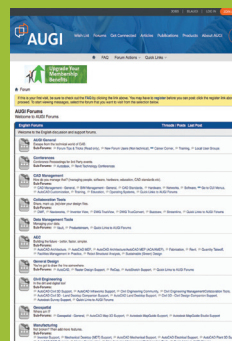
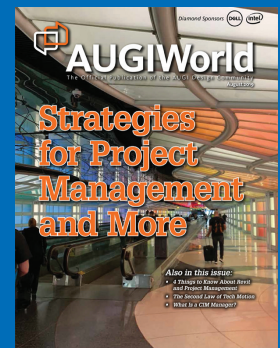
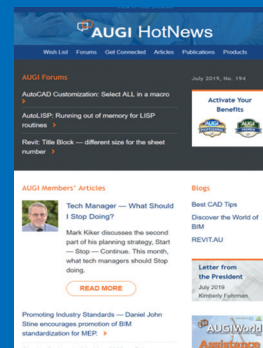
Figure 10



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# Your Career Path—Take control of your Management Career

**W**ay back in late 2007 I wrote down my thoughts on my blog about career advice for BIM and CAD Managers. At that time, the US and the world was heading into a major economic downturn. Today things are looking much better. I wrote about career planning in a time where most just wanted to hang on to their jobs. Now most are employed and stable.

So back to my subject, planning your career. At some point in most people's work path, there will come a time when decisions need to be made. What school to attend, where to apply for a job, what job to take, and when to move from one company to the next. One of the most decisive choices you need to make is the one about which career to pursue. But, for most of the CAD or BIM Managers, there is no career track to start going down right out of school. It comes at you broad side or sneaks in the back door.

For the CAD/BIM Manager, career choices come later in life than most careers. This is because most CAD/BIM Managers do not set out to be managers of technology. This may not apply to IT Managers. They start early and get things moving in IT roles by maybe starting with Helpdesk and moving from there. But with

CAD or BIM Managers, they start their career in another field. They may have gotten a four-year degree and started down the road of an engineering field. Or they may have started in a career without finishing the degree and are working into a field by going up through the ranks. Either way, the decision to focus on CAD or BIM "management" comes later than some of the more traditional options. It is closer sometimes to a mid-career change.

For most, the decision point may be asked of them before they really have a chance to think it through. I recommend that you not let that happen. Take control of your future and your career. Start thinking about it when others are not. Start thinking about it before your firm does expect it from you.

Here are a few things you should do to take control of where you choose to go in the future:

## 1. DECIDE WHAT YOU WANT TO DO BEFORE SOMEONE ASKS

This means that you will think about your future when people start asking you to help with CAD issues. It may be that you have been doing it for some time. Everyone should help others every



chance you get, but fledgling CAD/BIM Managers seem to have a knack for it. You like doing it. And, the pleasure that you get from helping others actually may work against you.

This is because helping more than others slides you into some of the duties of CAD or BIM Manager, but without the title, respect, recognition, appreciation, reward, or salary adjustments. Helping others also may sometimes come with increased expectations, accountability, and blame. This might derail your plan for advancement.

By sliding into a job duty, you lose the leverage that you may have had before you started down this road. Getting that leverage back is difficult. Since you are already doing some of the tasks of a manager of technology, people expect you to continue or expand. No one is going to like it if you stop helping (you won't like it either). But if you keep helping without the title or compensation, it is tough to negotiate those things. You need to help others to prove your worth but keep some things back so that you have some leverage.

By taking stock early and placing limits on what you will do for others in the office, you can have a meaningful conversation with management about your efforts and where you want to take your progress in management.

## 2. PLAN OUT YOUR CAREER PATH AND PUSH IT FORWARD

Map out where you want to go and then move progressively toward that goal. Write the plan down if you need to. Sometimes this helps. It shows you the steps on paper. You may start with trying to move from User to Super User to Department Tech Lead, and so on.

I think there are some rungs in the Tech Manager career ladder that have become prevalent in the process of moving forward. It looks like the list above that eventually leads to Manager and Leader. I first wrote about this in May of 2005 and it was published in AUGI World magazine. See if you can dig it up and read that article online.

## 3. THINK THROUGH THE PROS AND CONS

You could even make a list of the positives and negatives about each path. Some of the things that others may think of a negative, may be a positive to you. You need to look at it with your own perspective.

Here are a few of things I have heard others say that they thought of as negatives.

- You will no longer be directly involved with design work. You will be supporting it but not actually providing input and decisions that drive the design.
- You will eventually lose your knowledge of the trade you leave behind.
- You might end up with a split resume if you lose your job.

Not enough design experience or CAD/BIM Management experience to carry you naturally to the next level.

- You could end up going backwards if a staff reduction takes you out of the manager role at one firm and does not lead to the same role at another.

Here are a few positives I have heard

- You will influence more projects than you have before.
- You will be marketable beyond your own industry.
- You will make a difference in the quality of all design data at your firm.
- You will be able to bring others up a notch in their use of CAD/BIM tools.
- You might make more money.
- You could supervise other staff.

## 4. CHANGING JOBS MAY BE NEEDED

Not every rung of the career ladder is available at the firm you are with now. You may have to go somewhere else to be seen as the manager you know you are or can become. Now is a great time to look for another gig and lock in a career advancement. You have the talents, skills and experience to make it happen. Get on it.

## 5. DON'T LIMIT YOURSELF TO ONE TECHNOLOGY

You need to be an expert in one tool but knowing just one may limit you. Your firm may not have a wide variety of design tools, but you need to know them all and more. You need to know what others use outside your firm. You need to compare notes of features and functions at User Group Meetings and trade shows (you do attend those – right?). You should download trial software to see what it can do. Anything that expands your scope of technology is a plus.

When it comes to your career, no one is more concerned about it than you (except maybe your spouse). No one will take an interest like you will. No one can plan or execute the career path you have in mind but you. Plan it out. Write it down. Make it happen.



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

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### Quick Section View



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

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

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

This app creates a half section view in 1 or 2 clicks.

It works the same way for both assembly and part modeling environments. One button has many uses:

1. Just press the button and get a section view through one of the origin workplanes. The workplane is automatically selected depending on how you look at the model.
2. Press the same button to end the section view.
3. Preselect part or assembly occurrence and then press the button to get a section view through one of the occurrence origin workplanes.
4. Preselect circular or conical face (circular edge) to get a section view through the axis.
5. Preselect a straight edge to get a section view perpendicular to the edge through the center point.
6. Preselect a workplane or planar face to get a normal half-section view.

#### PLEASE NOTE:

Without preselection, the app works only with origin workplanes which are selected automatically! It is possible that the section gives a blank result because nothing is left behind the selected plane. If so, then just run the app button again to restore the full view. Then, look at the model from a different angle so another section plane is selected.

**Trial Description:** This is a trial version, executable 30 days after installation. If you are interested in a full version please contact [artemglushchenko21@gmail.com](mailto:artemglushchenko21@gmail.com).

The full application cost is \$5.

### Solinas for Fabrication



[https://apps.autodesk.com/ACD/en/Detail/Index?id=9973605662803305&appLang=en&os=Win32\\_64](https://apps.autodesk.com/ACD/en/Detail/Index?id=9973605662803305&appLang=en&os=Win32_64)

**Autodesk AutoCAD: 2020, 2019**

Solinas was born out of need to manage the piping fabrication process in an effective manner. Oil & Gas, Chemical and Petrochemical plants all involve piping extensive projects. Underestimating the facts can drive the piping activity to directly impact the critical path. Thus, making or breaking a project.

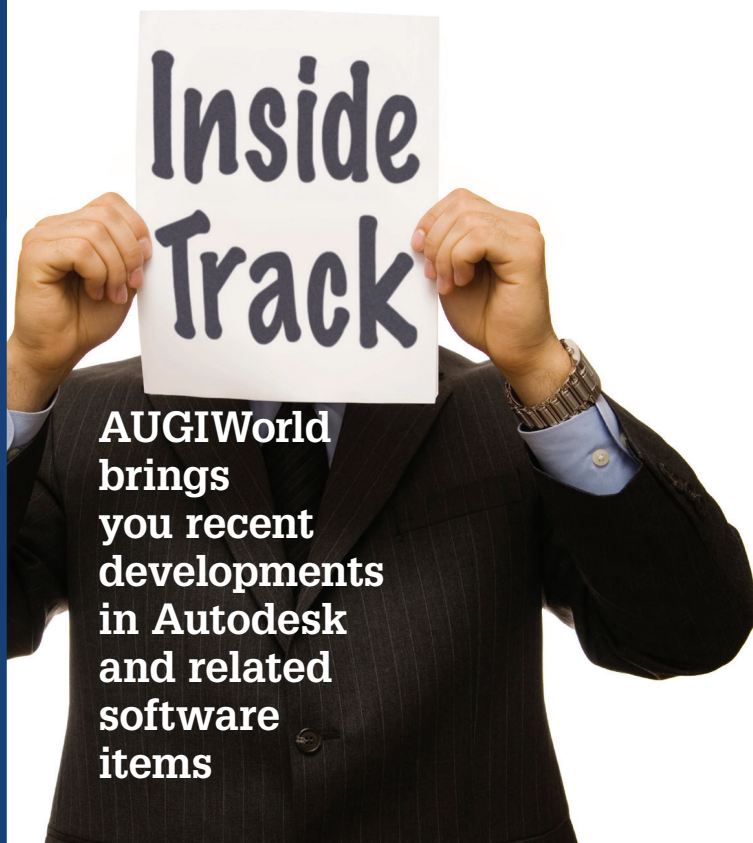
#### Solinas Features Include:

- Reads industry standard piping isomeric formats.
- Autodesk® AutoCAD® based UI.
- Versatile to meet varying piping business requirements.
- Simplifies work-packaging of piping in-line with workplace planning, and lean construction.
- Interfaces with 3D visual controls, ERP, EDMS applications.
- Supports jacketed drawings which can be merged for more comprehensive isometric fabrication.
- Bend elements can be measured based on bending machine specifications.
- Changes and modifications are handled with construction in mind. For example, welded components cannot be renamed; scrapped material can be tagged, etc.
- Solinas handles non-modeled scope in a plant, scanned copies, etc. PDFs can be integrated to produce the relevant weld maps and materials.

**Trial Description:** This is a TRIAL version of the application with a limited 30-day evaluation period.

- Parser optimized.
- Placement algorithm for markups optimized.
- Bug Fixes and UI improvements.

If you have some news to share with us for future issues, please let us know. Likewise, if you are a user of a featured product, or news item, and would like to write a review, we want to know. [brian.andresen@augi.com](mailto:brian.andresen@augi.com)



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# Revit Build Machine (Part II)



**I**n my previous article, I discussed how you can build a fast Revit machine yourself using parts from local or online retailers for only \$1000 to \$1100, as opposed to the \$4000 they might cost you to buy an equivalent machine from a computer manufacturer that specializes in Revit machines. In that article, I listed out the parts you would need and some things to look for. But, I assumed the reader had some prior knowledge of computer parts and how to put them together.

In this article, I'm going to speak more to those who aren't as comfortable with computer parts and building a machine themselves. I'll go into much more detail on things you need to look for and consider when stepping off into these uncharted waters. Hopefully, after reading this edition, you'll have everything you need to know to take the plunge and build your own Revit workstation, and save a bunch of money doing it.

So, let's get back to the list of parts you'll need, and let's get a bit more specific on each.

## PROCESSOR

The most important characteristic of your processor for Revit is the clock speed. That's why we need to go with Intel's Core I7's or Core I9's. I choose I7's over I9's. But, if you end up going with an I9 instead, that's quite alright. Just make sure you adjust the model numbers and specs for other items accordingly. For the rest of the discussion, I'll stick to the I7's. But everything will be pertinent to each.

Now, to increase the clock speed as high as possible, we need to be able to overclock that processor. Overclocking means boosting the clock speed even higher than the max speed the processor is rated for. And for that, you need to go with the processor models that have the letter "k" at the end of the model name. For instance, on our current builds, we might go with the Intel i7-9700k processor. The "k" means its clock speed is not locked to a specific value on the high end, but can be "overclocked" to a higher max speed than the equivalent processor that isn't a "k" type (I7-9700, for example).

One other characteristic of the processor that you'll want to pay attention to, is its "socket" type. That refers to the specific type of



“socket” on the motherboard that the processor fits into. There are multiple types, depending on the specific processor manufacturer and model line. The Core I7’s have been using the same socket type for quite some time. You’ll see it listed on the motherboard specs as socket LGA115x. The Core I7-9700k uses the LGA1151 socket specifically, and so does the I9-9900k. So, make sure you get a motherboard that has that socket type.

Figure 1 shows what the processor socket for an Intel i7 processor looks like:

(Currently there’s not a processor installed. This gets covered up by the liquid cooler pump, as you’ll see in later pictures)

## MOTHERBOARD

The motherboard, or mainboard, has several features that you must take into consideration when choosing which one to go with. First, you have to choose a motherboard that is made for your processor that you’ve chosen. That’s usually not that difficult, as motherboards are designated specifically for either Intel processors or AMD processors. You’ll be able to either sort for that online, or easily find that information in the description. And, as we mentioned in the processor section, one of the important things you’ll need to look for first is the socket type the processor you’ve chosen uses. I already went into detail about the number of memory slots and the Northbridge chipset in the prior article.

Now, you’ll have to decide what size class you want your motherboard to be. There are basically three sizes: ATX, mATX, and ITX. Motherboards are basically designed by all manufacturers to be as standardized as possible. ATX is a design of motherboard that’s been around for years. It’s the largest size/style of consumer-grade motherboards. The mATX is very similar in layout design as the ATX, just with some extra expansion features removed to be able to make the board shorter in length. ITX boards are for very small compact builds and really not useful for this. Whether you go with the larger ATX or the smaller mATX boards will depend on how large a case you want and what type of cooling you decide to use. Both of those we’ll talk about later.

Now for hard drive connections. All motherboards these days are going to have multiple SATA type cabled hard drive connections. If that’s all it has, that will be fine. However, if you can spare a few more dollars in your budget, get an M.2 PCIe SSD as it will be a lot faster than a standard SATA

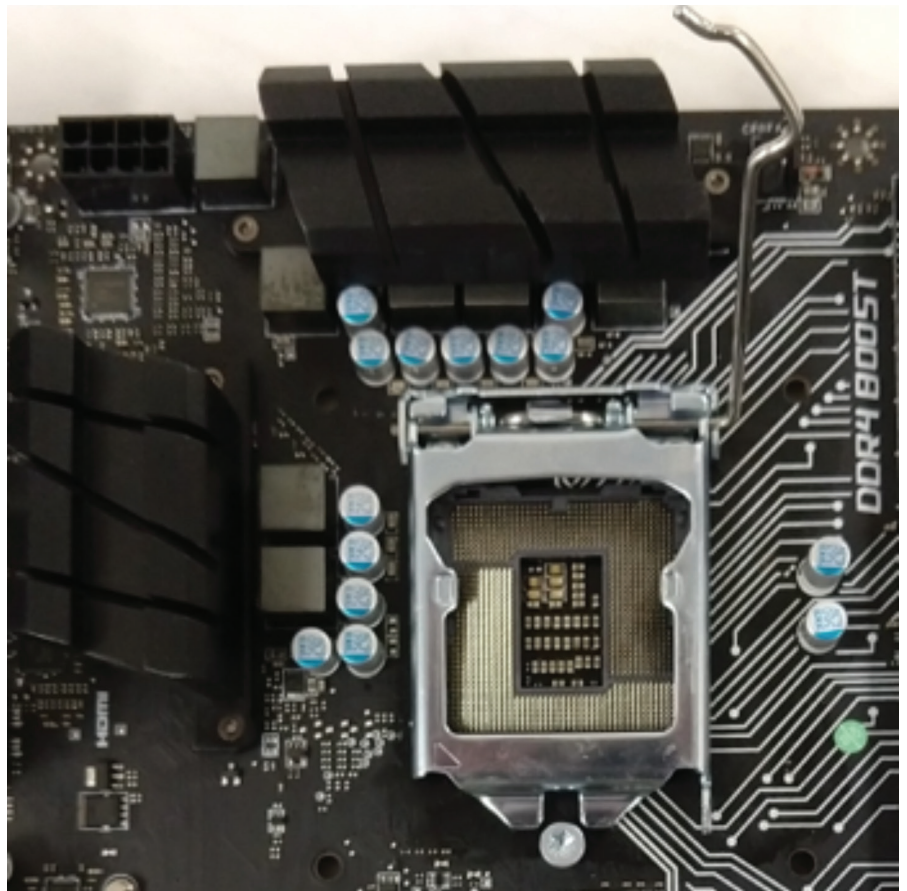


Figure 1



Figure 2



# Revit 2020 – MEP

SSD. But they can be up to \$100 more than a comparable SATA SSD, and it's well worth the extra money. Check the motherboard specs and see if it has an M.2 drive slot, and that it supports the faster PCIe M.2 type. We'll talk more about hard drive considerations later.

Make sure you get a motherboard that has at least three fan headers. Fan headers are typically labeled "CPU Fan" or "Sys Fan". CPU Fan headers are for exactly that, the CPU cooling fan, and the Sys fans are for extra cooling fans that are mounted to the case to bring in cool air or to push out hot air. If you can get a motherboard that has two CPU Fan headers, that will be even better for liquid cooling (more on that later).

Figure 2 shows an example of a mATX motherboard.

## MEMORY

Memory is incredibly important where Revit is concerned. The more memory you can afford, the better. It's also wise to provide the memory in the form of two equal size memory sticks that are the fastest speed the motherboard will support. Also, get a motherboard with four memory slots to provide space for adding more memory in the future. Memory is generally the least expensive and the easiest upgrade to do, especially if you have extra memory slots on your motherboard to add to. In the motherboard pictured above, the four memory slots are the long vertical black strips to the right of the processor socket.

Memory operates better and faster in a dual channel configuration, which will happen automatically if you put in two sticks that are

exactly the same (brand, model, timing, size, etc.). You're usually best to find memory kits that come with two identical sticks that combine for the total size you want. That way you know everything between the two sticks is identical. For example, get a kit with two 8GB sticks for 16GB total, or two 16GB sticks for 32GB total. To have the memory sticks operate in dual channel mode, with four memory slots on the motherboard, you'll have to put them into alternating slots. For example, slots 1 & 3 or slots 2 & 4 (or as they are sometimes numbered from 0, it would be 0 & 2, or 1 & 3). Figure 3 shows a motherboard with the two sticks of memory installed in two of the four alternating memory slots.

(Here you also see the liquid cooler pump with the coolant tubes running off to the radiator, and the multi-wire power supply connector to the right of the memory slots)

## HARD DRIVE

The hard drive is where all of your data and Windows itself resides. Hard drives are basically of two main types: (1) Old style magnetic rotating disks hard drives (commonly abbreviated HDD), and (2) solid state drives that have no moving parts and are made up of different types of memory chips (commonly abbreviated SSD). Spend the extra money for an SSD. The speed difference between a solid state drive and a traditional magnetic hard disk drive is huge. No matter how much you spend on the fastest processor and memory, it will mean nothing if you put a magnetic hard disk drive in it. So, SSD all the way.

SSD's come in multiple different types. The most common and least expensive type is a 2.5" wide, flat rectangle that has connectors on one end for a SATA power cable, and a SATA data cable. Those are usually referred to as a "2.5 inch internal SATA drive". SATA is the most common type of drive connection. Your power supply will have SATA power cables for the power connection, and your motherboard will have SATA data connectors that will come with one or two SATA data cables to connect the drive to the motherboard. However, you can get an even greater speed increase, for anywhere between \$50 and \$100 dollars more, by going with a "PCIe M.2 SSD". M.2 drives have the added benefit of not needing a SATA data cable or a SATA power cable because they attach directly to a dedicated M.2 connector on the motherboard. I talked more about M.2 drives, as well as drive capacity, in the previous article. Figures 4 & 5 show an example of what an M.2 drive looks like.



Figure 3



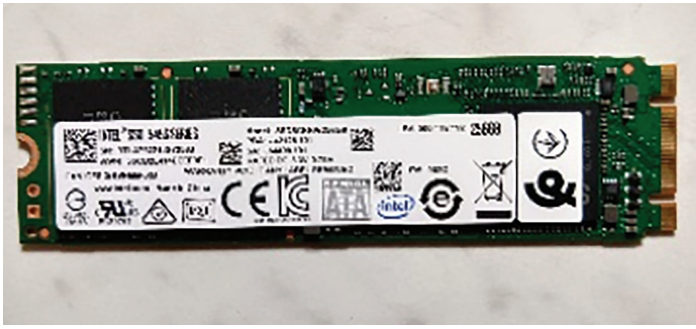


Figure 4

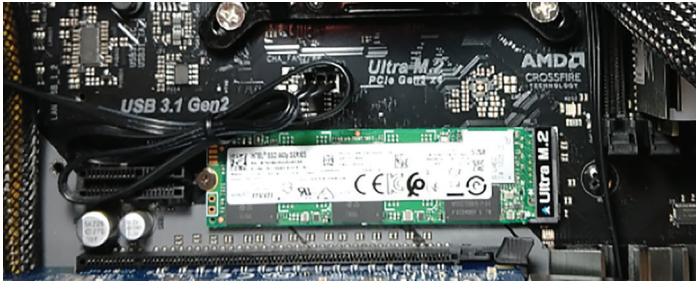


Figure 5

## COOLER:

Heat is the bane of all computers, and much more so for Revit. For that reason, I chose to go the route of liquid cooling as I felt it would get me the most cooling power for my money. Now don't panic! I'm sure you're conjuring up images of those display builds you've seen for full-time gamers, with tubes and canisters all over the place. All filled with dayglow-green antifreeze. No, I'm not talking about that. I'm referring to All-In-One liquid coolers (AIO for



Figure 7



Figure 6

short). None of the tubes are clear on these (they're black or grey typically). So, unfortunately, you're not going to get that cool dayglow antifreeze look. In some of my other pictures in this article, you may notice that you can get liquid coolers with colored led lighting effects on the pump and on the radiator fans. But, it's completely unnecessary, and absolutely optional. Figure 6 shows what one looks like installed.

I talked about liquid coolers at length in the previous article. So, I won't go back over all that ground. When putting in a liquid cooler, great care has to be taken to make sure the radiator fans are mounted correctly to get the right airflow (Figure 7). The fan has to be mounted so that the airflow comes from the outside of the case and flows across the radiator to the inside of the case. The radiator will not remove the heat off of the processor if hot air from



# Revit 2020 – MEP

inside the case flows through the radiator to the outside. Also, notice in the picture that I have the fans installed on the interior side of the radiator. That's because the air will flow more efficiently through the radiator if it's "pulled" through by the fans from the inside, rather than "pushed" through from the outside. Yes, the air coming off the radiator into the machine will be hot, but that's why you'll have at least one other case fan to pull the hot air out. More on cases later.

It's undoubtedly possible to do overclocking on the processor with a more traditional air cooler instead of the liquid cooler. And, possibly spend a little less money. But I didn't go that route, so I don't have any recommendations on those. Just don't try to do it with the stock cooler that comes in the box with the processor. That one's not going to cut it.

## VIDEO CARD

I talked about the need for a separate video card in the last article, and some recommended types and specs. Your motherboard will have at least one long PCIe slot specifically for the video card. See Figure 8.

Since there are three or four various different types of video ports used in the PC industry (HDMI, Display Port, DVI, and VGA) you'll have to make sure you get monitors that have the port type your video card has on it, or get adapters. Video cards typically have at least two or three ports on them. Again, any combination of the four I mentioned above. What I typically buy has one HDMI, one Display Port, and one DVI. So, pretty flexible.

When you buy a video card, one thing to note is whether it takes a separate connection from your power supply, and how many connection pins it has. If it does, it will be either a 6 pin connection or an 8 pin. This will come into play when choosing a power supply below.

## CASE

Cases come in all kinds of sizes, colors, materials, and configuration. Do you want a traditional all black steel rectangle case, or do you want the cool flame-red designer case with glass panels? You can decide for yourself on color & style. For our discussion, I'm sticking to discussing sizing and configuration. Since I already talked about most of that in the previous article, I'm only going to add a couple of things here.

The size mostly hinges on two things: the size of the motherboard, and the size of the AIO liquid cooler radiator. Just like the motherboard comes in ATX or mATX sizes, so do the cases. So that one is fairly easy. ATX cases are larger, and mATX cases are smaller. You'll find more ATX cases that will fit a front mounted 240 radiator, but I've been able to find some in mATX also. Just not as many. I like getting a smaller case. So, I tend to go for the mATX size, but I've done both.

As stated earlier in our discussion of the liquid coolers, you want the fans mounted to the radiator so the air flows from outside the case to inside the case. And, the fans work better pulling the air across the radiator than pushing it through. So, I like to have the radiator mounted farthest to the outside and the fans mounted to the radiator on the inside, pulling the air in. And with front mounting the radiator, if you go with a mATX case, you'll probably want to avoid cases that have an external drive bay for an optical drive. Even if the case has front mounts that would seem to fit the 240 radiator, the drive bay mount on the inside usually interferes with the radiator.

Another important thing to consider when doing a computer build is cleaning the case. As I've discovered over the years, 120mm fans pulling in air across your radiator tends to also pull in dust, and you don't want that dust to coat the intake side of your radiator, because that will eventually block the airflow through the radiator which will cause your processor to overheat. So, I've found that



Figure 8



you have to periodically clean the dust from your radiator intake. You can find cases that provide a dust filter to cover the radiator/fan mount areas at the front of the machine, making it much easier to vacuum the dust off. Sometimes those filters are even removable, making it that much easier to clean the dust out without having to remove the front cover from the case.

## POWER SUPPLY

Every computer has to have a power supply. It's a box that takes your power cord from your wall outlet and splits the power up into separate cables that supply power to the different internal components. The things you'll need to decide on in a power supply

are the power capacity, power cable types and number, and then how efficient you want it to be. I already talked about the capacity in the previous article, so I won't rehash that here.

Power supplies also come in what's called an 80 Plus efficiency rating. That means how much above 80% power efficiency rating they are. No power supply supplies 100% of the power they receive from the wall to the computer. Some wattage is lost inside the power supply due to various factors. If a 500W power supply is 80% efficient, that means if all 500W is needed by the computer, it will have to draw 625W from the wall outlet to provide 500W to the computer. The higher the efficiency rating, the closer to 100% that efficiency will be. The efficiency rating is listed in Bronze, Gold, Platinum, and Titanium ratings, from least efficient, to most efficient. That is really just a preference on your part. How much do you want to spend on the power supply to minimize the power used by the computer?

Next, you'll have to determine the power cables needed by the components you've chosen. There are three basic things to consider here. Most motherboards these days have a large 24-pin power connector. So, most power supplies have either a 24-pin main power connector, or a 20+4 split connector for older boards that use the older 20 pin connector. Either will be fine for modern boards with the 24-pin connector. Your board is also going to have an extra 8 pin power connector. And, most power supplies have that cable also. Just make sure yours does. Figure 9 shows the two different power connectors (yellow and black wires in upper left, and multi-colored wires in center right).

If your video card requires a power connection, make sure the power supply you choose has a PCIe power connector that has the



Figure 9

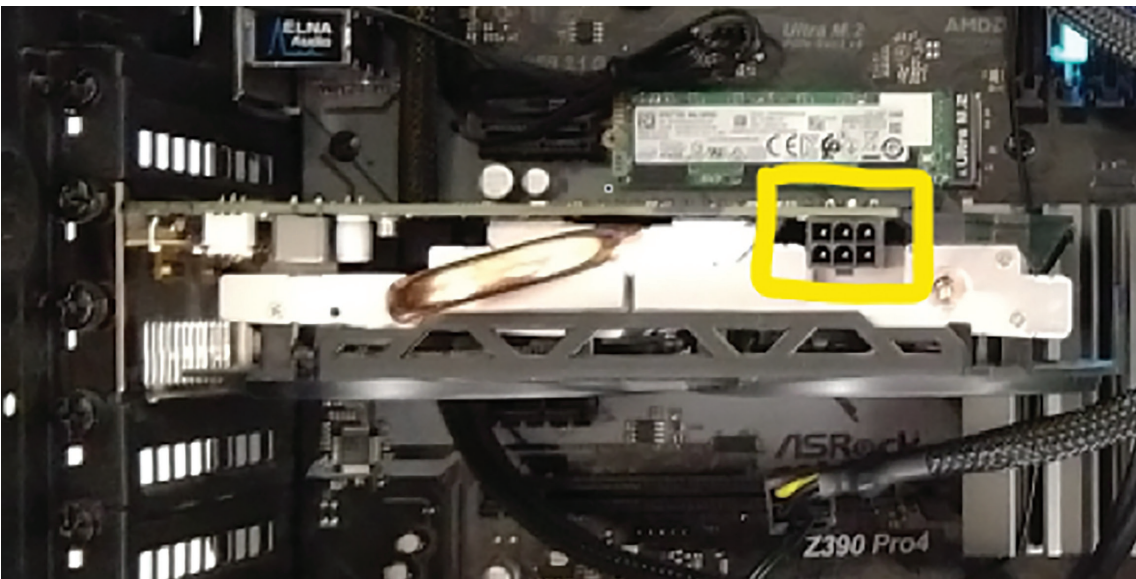


Figure 10



# Revit 2020 – MEP



Figure 11

number of pins that your video card requires. These will either be 6 pin, or 8 pin. Power supplies will either have one or the other, or both, or, one or two 6+2 split pin connectors. Any will work as long as one of the connectors has the total number of pins your video card needs. Notice the 6-pin power connection on the side of my video card in Figure 10.

There's one last consideration on power supplies, and that's whether to go with a modular or non-modular style. That refers to whether all the power cables that come with the power supply are pre-wired into the power supply, or if they are separate and can be plugged in to the power supply as needed. See Figure 11 for the cables coming off of a non-modular power supply.

They can create a mess inside your case.

Going with a modular power supply will cost more, maybe \$30-40, but will be a lot cleaner on the inside of your case, as you will only need the cables you actually will use. The lower cost non-modular power supplies will end up with a lot of cables that you won't need, and you'll have to do something with them inside the case. A prime example of this would be the many old-style Molex power connectors that most lower-cost power supplies have that we mostly don't use anymore. On non-modular power supplies, they are hard wired into the power supply and you can't remove them. But, a warning: if you do go with a modular power supply, make sure you hold on to all the extra cables and make sure you know which machine they go to so you can find those cables later if you need to add something.

That's basically what you need to know to build a Revit machine yourself from components you can buy at any computer parts

retailer for around \$1000. For specific mounting and assembly instructions, most of these individual components come with detailed installation instructions. The last part will be to talk about BIOS settings, but that will be a conversation for a later article.



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*For the past 11-1/2 years I have been the entire IT & Network Administration Department, and CAD Department Manager, for a 55 person MEP Engineering firm in Dallas, Texas. Prior to this position, I worked as the IT Manager, the Autodesk Software Coordinator, and an Electrical Designer for another small MEP firm, also in Dallas. I've been responsible for the initial Revit implementation, installation, setup, and training at both companies. I've been building Windows PC's for over 20 years and have been building overclocked & water-cooled workstations for Revit for the past 5 years.*



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# Closing the Gaps in Coordination







**Y**ou've read the articles, heard the presentations, listened to the podcasts, the future is now. Generative, Computational, Iterative, Automated, Offsite, Connected,

IoT: the world has figured all the simple things out and now it's about letting the computers do the heavy lifting.

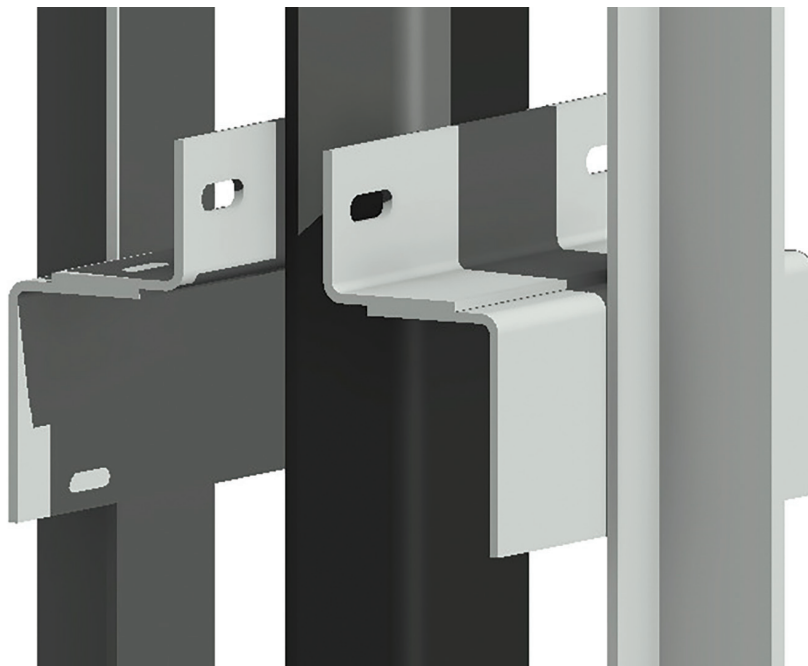
Not so fast. While the future is becoming clearer, or at least the bellwethers of the future are becoming clearer, we cannot take our focus away from closing some of the gaps that exist in the process of collaboration and coordination today.

These gaps, which are often purposeful yet not well understood, need to close so that all the promise of future optimization and automation can be realized.

## HOW WIDE IS THE GAP?

To illustrate my point, I'll tell you about the very first coordination meeting I attended as an "elevator guy".

We were early in our implementation, the resources we had tapped to deliver BIM to the customer were still learning and I would often attend virtual coordination meetings as backup just to hear the types of things that were worked through.



*Figure 1 – Close-up image of elevator guiderail brackets correctly interfacing with structural steel.*

The very first meeting was with a well-respected general contractor from the southeast US coordinating a corporate headquarters project. We found a couple of things right away; we had guiderail brackets that required some extra steel at intermediate locations. The connection of the lifting beam needed to be clarified. We pointed out some areas of concern at the door fixings points. We were quickly resolving things that would have been a pain to find out in the field. Everything was going well.

Then the topic turned to ways in which we may be able to reduce the size of the elevator shaft. The customer had an idea and asked, "Is it possible for us to just weld the guiderails directly to the structural steel?" The answer was "No", and from an elevator engineer's perspective, a ludicrous suggestion. But I loved the fact that they asked. I bet that contractor had done dozens of projects with elevators yet still thought that may be reasonable. It demonstrated how far away our shared understanding is of such large and important systems in the building (i.e. the gap).

Now, look around the room you are in, think about what is within, inside of and behind those walls and the systems, then try to come up with several trades involved in delivering that building output. I can easily count 12 from my workspace. If you consider the manufacturers and distributors that are involved, that number grows to more than 30, and possibly many more from where you sit.

Now think how many trades and suppliers take responsibility for the digital asset (read: BIM) that helps plan and manage the building project delivery and operation. Best case, that number is between 5 and 8.

Point being, collaboration cannot just stop with the trades and stakeholders we deal with today. There are a lot more than "major" trades that should be consulted and who need to take responsibility for their specific digital assets.

If proper responsibility was bestowed upon the manufacturers, vendors, and technicians, then this should decrease rework/redundant work and eliminate the false sense of predictability ambiguous design conveys. This chain of responsibility is foundational to building value in the digital asset at every phase of the building's lifecycle. We need to find the trades in the building that we don't collaborate with today and get started.

## BRIDGING THE GAP

How, should you collaborate with them? Good question! Just...you know...collaborate. Okay, most people agree that we should collaborate as much as we can, but the reality is there are real barriers to collaborating. We need some useful and simple mechanisms that we can start using today.

Partnership. This is by far the most important concept and really needs to be in the organization's culture.

Partnership is the first step in the assistive stakeholder relationship. Partnership does not exactly mean exclusivity – we all must exist in the building ecosystem and thrive through multiple symbiotic partnerships while making offerings clear and equitable.

Think back to the rise of design-assist over the past 15 years. Specialty contractors began assist with design, and in doing so, improved both their sales hit rate and project constructability/predictability. At the same time, design engineers had to transition out of diagrammatic representations of their systems and started

to model things they never used to take direct responsibility for. They needed help to do this from the specialty contractor. The gap was closed through that assistive partnership.

**Accessibility.** It is not about the manufacturers and distributors providing access to all models and data. It is the ability to generate the right solutions at the right time. Designers, constructors and owners need access points for content and engineering information that fit within their expertise or engagement level. These access or cross-trade-touch points are where the opportunity exists to increase our shared understanding of the building project and improve its outcome. Here are a few examples that we have some experience in:

**Online Content Library** – This is the most common and easiest to implement. It usually has no bearing on purchase decision or connection to technical reviews or assistance. This is like a closet of objects you provide to a potential customer, no downstream insight or control.

Really, this is no different than when putting CAD details on your website. Designers and specifiers download the details and blocks they think they need and hopefully that manufacturer becomes the basis of design. Also known as the “spray-and-pray” strategy.

**Design Application (Revit) Add-In** – Many manufacturers have opted to provide an add-in to the design application environment. This is important because project information can be extracted to eliminate manual input. Unfortunately, not all users can use add-ins due to IT or BIM management protocols.

In the case of KONE, after lengthy exploration with our customers, an add-in was deemed too specific for equipment configuration. I mean, how often would you be configuring an elevator? Once every 6 months? The screen real estate doesn't really have room for a permanent add-in in the Revit interface.

There are some other uses we could imagine for an add-in leveraging analysis of design or construction models for

**KONE MonoSpace® 500**

LANGUAGE

GLOSSARY CONTACT

**SELECT YOUR OUTPUT FILES**

☐ Select all output files

☒ CSI construction specifications (docx) ☐ Elevator configuration summary (pdf)

☒ CAD drawing (pdf) ☐ CAD drawing (dwg)

☐ BIM (IFC) – Industry Foundation Classes ☒ BIM (RFA) – Revit Family

**CHOOSE LEVEL OF DETAIL**

☐ Space reservation (LOD 100) ☒ Design model (LOD 200)

**Expand all sections**

**Building**

Please define the building characteristics.

**Landings**

2 Landings

**Seismic**

Non-Seismic

**Floor Height, Openings & Travel**

Calculated total travel: 10'-0"

**Additional Power Supply**

None

**Key Values of KONE MonoSpace® 500**

Shaft Size (w x d)	7'-6" x 5'-9"	Capacity	2,000 lb
Minimum clear overhead (under hoist beam)	13'-0"	Group Size	1 Elevator
Minimum 8" required above clear overhead		Speed	150 FPM
Pit Depth	5'-0"	Calculated total travel	10'-0"

**Elevator**

Please find all aspects related to the configuration of the elevator in the section below.

Figure 2: KONE Equipment planning toolbox available through KONE.com includes where models, layouts, and specifications can be configured directly by the designer.



deeper insights into installation and post occupancy performance.

**Online Public Configurator** – If you know what you want and make all the regulatory, performance and amenity decisions you can create a highly educated guess of your basis of design. A manufacturer specific configurator can help with this. These configurators often have options for multiple output types including specification text, models, and printable layouts.

In the same way as the configuration that can be derived from an Add-in (above), you can generate a good guess. But any ambiguity in the basis of design and specification will mean rework. Just because it is shown doesn't always mean it is "fully cooked". This is the primary risk in relying on manufacturer content – the false communication of a final decision when it is yet to be made. The best thing for manufacturers to do is provide the lowest geometric detail corresponding with the decisions that have been and are yet to be made and communicate that in LOD. I'll speak more on this later.

**Online Chat** – Architects entering the profession today expect expert answers at their fingertips. While BIM and associated technologies go a long way in increasing shared understanding, the most important thing we can do to enable access to dynamic expertise is to provide our customers the ability to ask questions directly to a KONE engineer.

Technology should be second to people and their processes; that sometimes means providing human "patches" where gaps in knowledge can negatively impact project outcomes.

**Ordering Configurator** – No matter where you start, it should ultimately turn into an order for a product. Thousands of orders are made to complete a building project. These configurators in manufacturing organizations create the bill of materials based on a detailed specification of a completed design.

At KONE, when a tender offer is made and accepted, we can configure a model to be used during coordination. In our case, this is an automated service we run for standard products. If it is a project that requires special engineering, the BIM is generated by our engineering supply line where the equipment is manufactured.

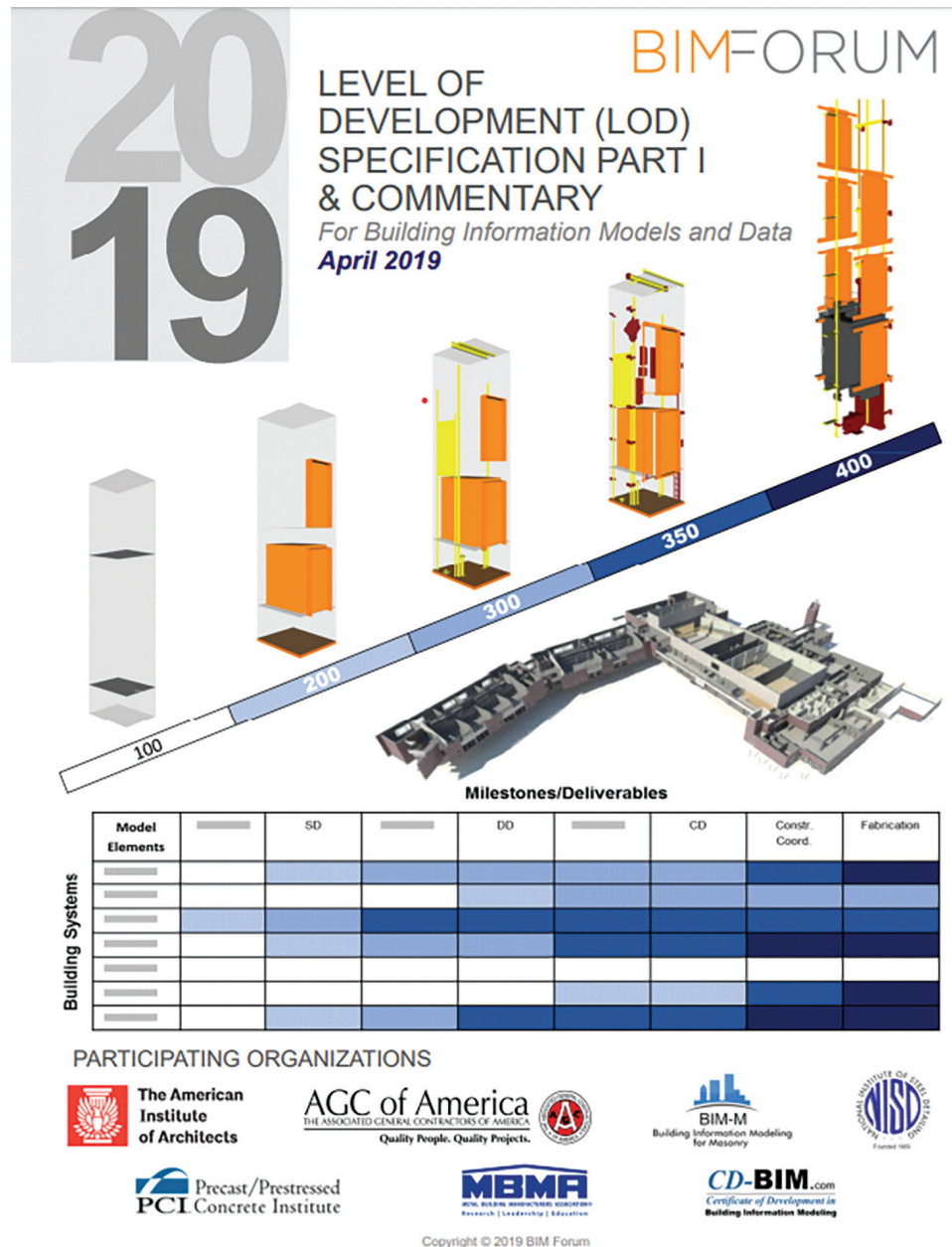


Figure 3 – BIMForum LOD Specification is the best reference we have as an industry for the geometry minimums LOD communicates.

**Clarity.** Improving communication in design and construction leads to improved productivity. BIM was a big step forward in communication but there is a real challenge in communicating decisions that have been made versus those that haven't been made. If it looks real, the assumption is that it must be real.

In steps LOD to "clarify" all this. But, as is similar with BIM in general, it is not the mere existence of LOD that solves this. It is the "how" you apply the concept.

LOD has been defined and redefined, acronym-ed and re-acronym-ed. The value of LOD is apparent but a practical application of the concept is elusive. As a building product manufacturer that works with architects and sells to general contractors and owners, we must do more than define geometric detail at certain levels. We

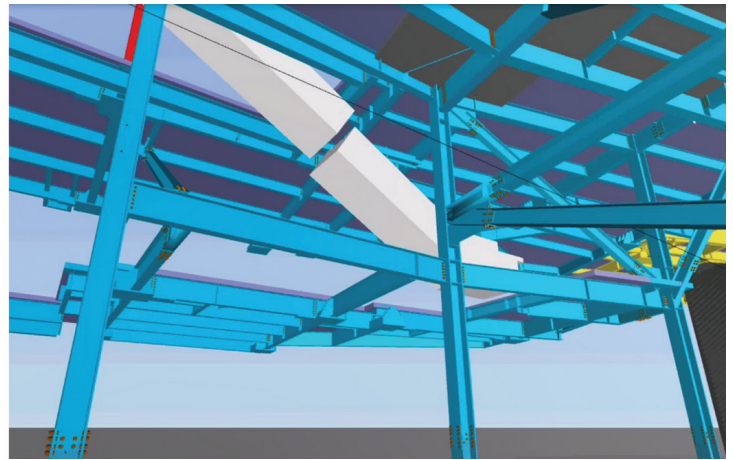
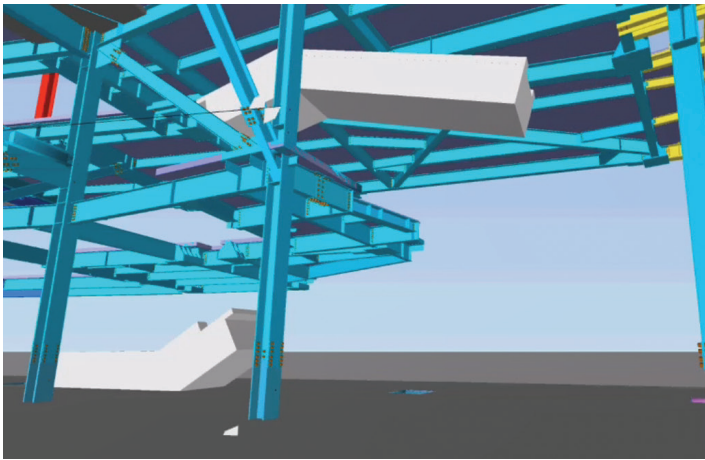


Figure 4 – Equipment routing animation example (4D) showing how animating large equipment installation helps ensure onsite predictability

need to build interactions with our customers that result in the detail that they need and no more.

To this end, we consider the ‘D’ of LOD as Decision. We want to give our customers models that correspond to their decision point.

Early on, a designer may know the overall travel, floors served, if the elevator will have 1 or 2 openings, and the codes that apply. But, may not be able to decide on finishes or controls. They should be able to get a model that guides their design without locking in other decisions.

Also consider, a designer will use a “basis of design” that commonly has little to do with the equipment ultimately procured. We have experienced this in the past when an escalator from a competitor was used during initial GC-run coordination because it was included in the architect’s model. It was the basis of design, but it differed from the purchase decision and was not updated or noted. It looked real so it was treated as able to coordinate.

Once a decision to purchase has been made, the detail of the model needs to become real, not beforehand. Only then can a complete equipment configuration be generated.

## THE RESULTS

It’s all too easy to take a shoot from the hip approach to a complex problem. Recently, one of our local field teams had a predicament where they had to install two large escalators in a place. Delayed decisions in the final look of the product meant by the time the escalators had shown up on site, the roof was in place. That meant lowering in place with a crane was not an option. Moving these mammoth pieces of equipment required a detailed procedure, using the building structure as support, and moving each escalator in two separate pieces.

However, we had the solution at our fingertips. With our existing models, we emulated the installation condition of the escalators. In a meeting with our field team and the general contractor, we were able to confirm the progress of the jobsite and emulate the job site conditions at the time of construction. Thus, a static model

for clash detecting becomes a living installation document for a unique environment. The general contractor had faith in our plan, the installers knew exactly what to do before stepping on the job site, our engineers verified the structural integrity based on the elements in the model, and government agencies were able to sign off on our plan.

## IN CONCLUSION

There is a growing community of interested and willing building product manufacturers and specialty contractors that can add a lot of value to your coordination process. It is critical that we continue to enable people, processes, and technology to bridge gaps with those often-overlooked trades to improve project outcomes.



*Ken Flannigan is responsible for KONE’s global BIM solutions for designers, builders, and owners. Headquartered in Finland, KONE is an innovative leader in elevators, escalators, turnstiles, and IoT. KONE BIM delivers equipment models, project coordination expertise and BIM handover services to projects of all sizes. Prior to joining KONE, Ken was an integration expert working for the largest Autodesk partner in North America delivering training and process improvement consulting to design, construction, development and facility management firms. Ken serves on the BIMForum LOD Committee and is a LEED Accredited Professional.*





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# Finding Work-Life Balance as a 3ds Max Artist

➡ If we want to be the most effective we can be in our lives, and at work, it is essential to understand a few things:

1. Time considers all things equal.
2. We have to consider work and life equal.
3. Work-life balance is unattainable without time management.

The way we manage our time has a dramatic effect on our ability to succeed. So, this month, I'd like to share a simple system to manage our time as design professionals effectively.

By treating work and life equally, we can begin to prioritize our tasks properly. We'll begin by developing a list of tasks and priorities. Don't think about the order. Just list the tasks you want to complete for the day (this system works for weeks or months as well). See Figure 2 for example.

Assign a level of importance to each of them from 1 to 3. 1 being urgent, 2 being not as urgent, and 3 means it can wait. See Figure 3, for example.

Finally, assign a letter to each task based on how complex the task is to you using letters A, B, and C. A would be very complex, B would be not as complex, and C would be very easy. See Figure 4, for example.

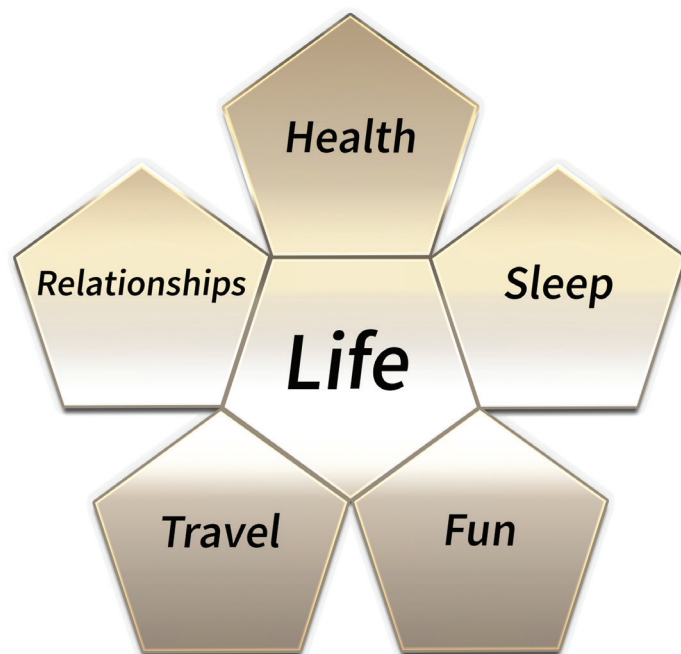


Figure 1 – The Balance



- Check exam results
- Render Buzz in V-Ray
- Check Non-Quads on S133 Model
- Schedule flight
- Take out trash
- Revise Monst-U Concept and Print
- Call Mike Wazowski
- Clean up Google Drive
- Feed fish
- Feed cat (not the fish)
- Clean mouse

Figure 2 – The List

- Call Mike Wazowski <sup>2</sup>
- Clean up Google Drive <sup>3</sup>
- Feed fish <sup>1</sup>
- Feed cat (not the fish) <sup>2</sup>
- Clean mouse <sup>3</sup>

Figure 3 – Level of Importance

Now, rearrange the tasks in ascending order based on the numbers and letters. See Figure 5, for example.

Rearrange each of the items in the same categories. You can arrange them more suitable to your preference, or combine tasks. For example, in the list shown in Figure 5, since “Feed the cat” and “Call Mike Wazowski” are both categorized as 2C, they could be done at the same time. Or, since “Clean mouse” and “Clean up Google Drive” are both category 3C, a person could decide to clean the mouse first so they can have a clean mouse when working on their Google Drive.

- Check exam results <sup>3</sup> <sup>B</sup>
- Render Buzz in V-Ray <sup>1</sup> <sup>B</sup>
- Check Non-Quads on S133 Model <sup>1</sup> <sup>B</sup>
- Schedule flight <sup>2</sup> <sup>B</sup>
- Take out trash <sup>2</sup> <sup>B</sup>
- Revise Monst-U Concept and Print <sup>2</sup> <sup>A</sup>

Figure 4 – Level of Difficulty

- Check Non-Quads on S133 Model <sup>1B</sup>
- Feed fish <sup>1B</sup>
- Render Buzz in V-Ray <sup>1B</sup>
- Revise Monst-U Concept and Print <sup>2A</sup>
- Schedule flight <sup>2C</sup>
- Take out trash <sup>2C</sup>
- Feed cat (not the fish) <sup>2C</sup>
- Call Mike Wazowski <sup>2C</sup>
- Check exam results <sup>2C</sup>
- Clean up Google Drive <sup>3C</sup>
- Clean mouse <sup>3C</sup>

Figure 5 – Organized List



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