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May 2015

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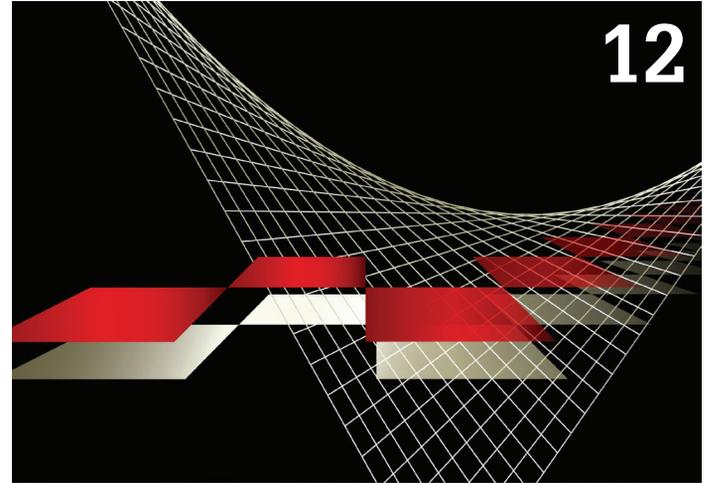
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Letter from the President



THE FUTURE OF MAKING THINGS

I will be attending the Congress on the Future of Engineering Software (COFES) in just a few days. As part of the conference I was sent a book called *Hieroglyph*, edited by Ed Finn and Kathryn Cramer, which is a collection of short stories from science fiction authors. Those of you who know me won't be surprised that I am enjoying this book.

The idea behind the book is a challenge to engineers to push the boundaries of what is possible today by writing science fiction about things that could be possible in the near future, hopefully inspiring engineers to work on such ideas. Neal Stephenson, a well-known science fiction author, was wondering where all the "cool" engineering had gone, which echoes my own sentiment. I recently watched "Blade Runner" again, and the date the movie is set in is late 2019! I was promised flying cars as a kid. Where is my flying car? I might want to switch to being a cop if I could have a flying car like that in "Blade Runner." And 2019 is only 4 years away. (Granted, I'm relieved that most of the rest of the movie has not become reality!)

The interesting thing about most of the stories I've read so far (I'm about halfway through the book) is that these stories involve things that you and I could be working on *right now*. Many of the stories either talk directly about engineering (building a 20KM-high tower) or involve the maker movement (3D printing, etc.)

And then I heard the theme for this year's Autodesk University: The Future of Making Things.

Folks, we are living in interesting times. If we have the vision, if we have the drive, we can be doing some amazing things right now. And we can be doing some incredible things in the near future. Doesn't that make you proud? Doesn't that make you want to break out of the shell of just doing things the same way and reach for sky? I know that it does for me.

I encourage you to check into the book and even the associated Project Hieroglyph and Arizona State University's Center for Science and the Imagination. Make plans to attend at least one conference this year that you know will challenge you to take the next step. Revitalize your imagination and look at the new tools available for helping you realize your vision.

R. Robert Bell
AUGI President

AUGIWorld

www.augiworld.com

Editors

Editor-in-Chief

David Harrington - david.harrington@augi.com

Copy Editor

Marilyn Law - marilyn.law@augi.com

Layout Editor

Debby Gwaltney - debby.gwaltney@augi.com

Content Managers

3ds Max - Brian Chapman
AutoCAD - Walt Sparling
AutoCAD Architecture - Melinda Heavrin
AutoCAD Civil 3D - Shawn Herring
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Published by:

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AUGIWorld (San Francisco, Calif.)
ISSN 2163-7547

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Managing the Expectations of a Move Up



I have written and spoken much on the topic of career timelines and transitions. In those writings, I shared the general flow of a career in CAD or BIM where you move from tech worker to tech superstar, then on to tech manager. Many times this happens within the same firm. You hire in as one thing and advance within the company to other levels. It is a natural progression. This career path can and should be managed and not just allowed to happen on its own. Too many times I have seen people stall at one level for too long because they are waiting for management to recognize their talents and “give” them the next opportunity. They just sit and wait for it. I encourage a more proactive route of looking for opportunities and seeking out projects.

For you, it has worked out well. You finally made the move. You have been offered and accepted a promotion from within your firm. You now embark on the desired career move that you have sought for some time. No matter how you make a move, whether it is given to you or something you strive for and achieve, you have to make a transition in order to succeed in the new position. It is beyond the scope of this article to trudge through the issues of having the position forced upon you and you reluctantly take on the role. That is a whole different topic. In this article we will assume that you wanted and sought the position of CAD or BIM manager.

First, let’s assume that you were offered the position after proving yourself at your firm. You have worked hard, thought it through, and accepted the promotion. There may have been a formal process or an informal one, but you weighed the options and decided that taking on the new role was a good thing.

MANAGE EXPECTATIONS

Everyone is going to expect something from this transition. Your boss and the firm may think that you will clean house and make things hum within six months. Your coworkers may think that you will tell management to stop making ridiculous deadlines and cut them some slack. You have your own expectations on how it might work and so do others. I encourage you to start off by finding out what you and everyone else expects. This is done via individual conversations with each party. Some of this may have happened in the process of defining the role, but you should circle back and get more details now.

MANAGE YOURSELF

We all have expectations. They usually are derived from unspoken assumptions. We may assume something that was not explicitly stated. When something is assumed, it may or may not have roots in reality. We set our sites on hitting a target that others may not have defined and wonder why we are not celebrated when we hit it. We expect authority that we are not granted. We outline parameters that are not shared, work within them, and

then are puzzled by the lack of agreement on outcomes. All of this has its beginning in unstated assumptions and expectations that need to be managed.

To begin with, you need to understand your own framework that surrounds the move up. Are you thinking that you will have greater financial rewards, more authority to make things happen, get invited to management meetings, etc.? The list could get quite long. I suggest that you define your expectations and then validate them by asking others for input. Even before you start asking questions, you can consider other situations that you have observed. Have others at your firm taken on greater roles and gotten the recognition for their efforts? Have you seen staff move from one division to another and get the respect they deserve? Has there been a track record of the firm asking way too much from staff that moves up the ladder?

You should define the scope of the job prior to taking it. Is there a formal written job description in place? Make this “job one” prior to taking on the role. This will define so many areas of oversight. Do not assume that others share the exact same framework that you may have in your head. Get it in writing.

Beyond the job description, discuss staff interactions, meeting attendance, reporting, project workload, and CAD/BIM production involvement (how much CAD or BIM design will you still be doing?).

By getting these things out in the open, you can adjust your expectations to be closer to what others might be thinking. During these conversations, you can also adjust their expectations of what you think should happen. I encourage you to keep your expectations as low as possible, plan on how to garner more impact and influence, and then move in that direction.

THE BOSS

After reviewing your own point of view, your boss is next. If the position came in with a whimper (no announcement, no title change, no pay increase) then ask questions to find out why such a low-key approach. You may find out that a coworker was quite upset with the offer going to you and your boss does not want to upset him or her. You may have to ask some tough questions. Do not shrink back from asking and be ready for disappointing answers. It is better to get a clear picture of the entire landscape of the decision and the expectations than to sit around and guess.

You may find out that there is a gigantic new project coming that was not announced yet and they expect you to make it run smoothly. There may be layoffs on the horizon that will impact production. There could be so many things that were left unspoken and now is the time when you can and should ask for more info. As a manager, the management team should embrace you and share more information than what is given to the line workers. It is not something that they may do easily until they know they can trust you with confidential data.



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When talking to management about your new role, ask them why they chose you. If they have encouraging words of respect and how your efforts have been noticed, then you have a good foothold on making progress. They hopefully will reinforce the items that made them select you. Items such as organizational skills, integrity, drive, and diligence are great traits to build a career on. Be prepared, though... they may also say that “no one else would take the job” or “you better get things done or you’re out on the streets.” I would not think that would be the case, but don’t be overly shocked if you hear something like that.

Defining what is expected is partially done, but you need to add the “when” question. You probably have the best vantage point to define timeline expectations, and management may have accelerated thoughts. Find out what they think needs to change and when they think it will take place. Then bring some facts to bear if they are expecting too much. Do not say that what they are asking cannot be achieved; just that it may not be completed by the deadline they have in mind. Then work your tail off to make it happen.

THE COWORKERS

Next talk to your coworkers. Things have changed. Do not think that your relationship to your coworkers can continue like nothing happened. Everyone will have a new framework in mind for the way you will act and none of them may be spot on. You may not share the same openness and critique of the company with coworkers now. By becoming a manager, you take on a company role that differs from other employees. You will have access to more information that should not be shared with everyone. You may share more insights with management that your coworkers may not appreciate. You are not turning your back on them, but you now have a foot in both camps. It is not the same. Your individual situation, staff attitudes, and company demeanor will define the playing field. It is never the same from one transition to another.

Your coworkers may pick on you and say that you are a turncoat. They may think you have sold out and do not think like them any longer. Hopefully this is all in jest, but there is always some truth behind the words. They will see you going to meetings with management behind closed doors. They will know that you have information and they will try to find out what you know. They will make jokes and may even leave you out of some conversations. You may start feeling like an outsider. Some may support you, some may be ambivalent, and others more negative.

Let them know that you will share as much as possible, but there will be some confidential information that is not open to share. Let them know that you are still concerned with their troubles and issues and hope to make management aware of those concerns.

By keeping open conversations going and talking to all involved you can stem the tide of negative impressions that may not be warranted. By managing expectations—your own and those of others—you can and will succeed in your new position. Work hard, play fair, make a plan, and move forward.



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.

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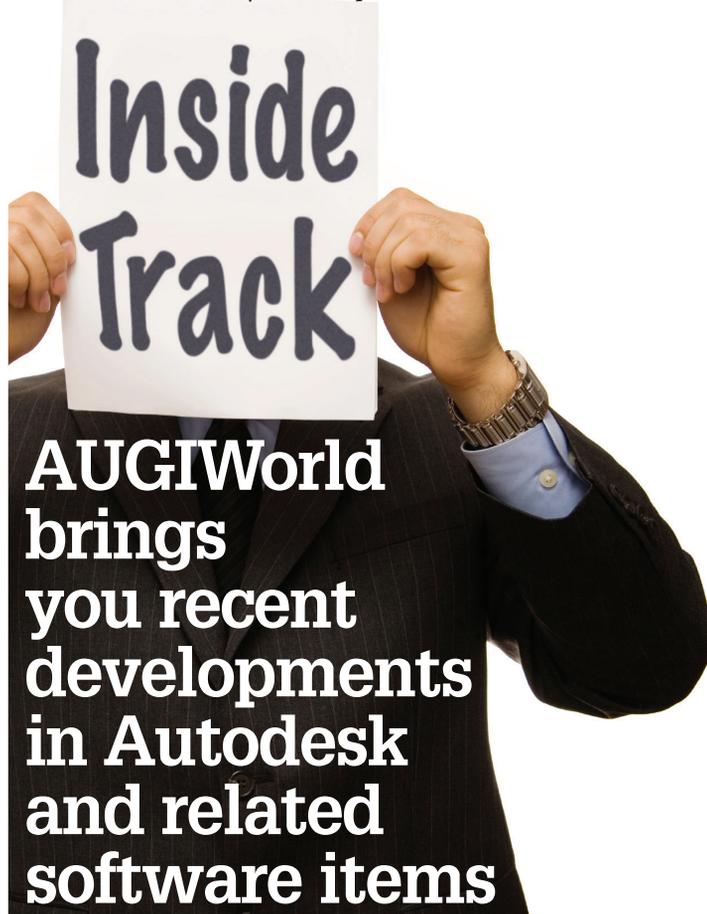


Ideate Sticky for Revit combines the ease and flexibility of Excel spreadsheet editing with the convenience of a sticky note. Use Ideate Sticky to elegantly connect non-BIM data from an Excel file into your Revit® project.

Revit schedules are the perfect tool to represent the data behind your Revit elements, but lack of a text editor makes organizing and formatting other essential non-BIM data frustrating and time consuming. Let Sticky manage the look and feel of your text and other tabular data.

Other schedules do not interfere with table creation or modification, and the table generated does not accidentally start scheduling things. Enjoy the benefits of formatting inside of Excel or Revit. What will you Sticky?

- Ideate Sticky for Revit connects and formats non-BIM data
- Stick a code compliance worksheet onto the cover page
- Update non-BIM consultant data from MS Excel into Revit
- Represent subtotaled data or matrix data
- Stick a non-Revit electrical panel onto a sheet
- Place the same Sticky on multiple sheets



<http://bit.ly/1E5BUL8>

Solibri IFC Optimizer



Solibri IFC Optimizer is built for optimizing ISO-standard IFC files. Optimization is lossless and the file size can be reduced by up to 90%. Optimized files are significantly faster to exchange and open. While plain compression (zip) reduces the typical file size to 15-30% of the original, the typical loading (IFC import) time does not change. With Solibri IFC Optimizer the optimized and compressed file can be only about 6% of the original file size and it opens in 17% of the original loading time. The actual ratios depend on how much redundancy the original file has.

Note: This application runs only on 64-bit Windows. Please select Solibri IFC Optimizer for 32-bit Windows.

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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

by Robert Green

Optimizing Workstations for MCAD Applications



With all the attention being paid to BIM these days Mechanical CAD (MCAD) users sometimes get overlooked - yet they need to plan for new workstation purchases too. So the question becomes: When buying a new MCAD workstation what is the best configuration to maximize performance and get the most for your money?

APPLICATIONS

The first thing to consider is what type of applications you'll be using along with your primary MCAD software. Will you be using visualization software like 3ds Max to create high quality rendered images? Will you be analyzing your designs for stress compliance, digital manufacturing, mold/fluid dynamics or other simulation? Will you be supporting marketing by creating compelling images? The answers to these questions will make a big difference in the hardware you'll need in your workstation as we'll see shortly.

PROCESSOR

Your workstation's engine is its processor and you only have once chance to get it specified properly. Since MCAD software is "lightly threaded" – meaning they tend to run mainly on a single processor core – spend your money on the fastest clock speed processor with the most ample cache you can afford. Using this logic, a quad-core processor like the Intel® Xeon® E5-1620v3 (at 3.5 GHz with 10 MB cache) or Intel® Xeon® E3-1246v3 (at 3.5 GHz with 8 MB cache) are a great choices for many MCAD users. Of course in cases where the MCAD software is run concurrently with analysis and rendering software it can make sense to move to more than 4 cores but you'll still want the highest speed and cache size you can afford.

Note: Intel Xeon 12xx/16xx series processors support more cache than the slightly less expensive i7 or i5 processors as well as supporting much more reliable error correcting code (ECC) memory. The additional reliability and speed are worth the extra cost.

RAM

In order for your processor to do its best it needs enough memory (RAM) to process your CAD application's functions as efficiently as possible. Here are a few quick rules of thumb to help you determine how much RAM is ideal:

- Start with 4GB + 1GB for each CAD/analysis/rendering application
- Add 20x your maximum assembly size for each application
- Round up to next standard size

So an Inventor user working with 100 MB assemblies and no rendering could get by with 4 GB + 1 GB + (20 x 0.100 GB) = 7 GB then round up to 8GB.

But an Inventor user working with 250 MB assemblies running an ANSYS add-on plus 3ds Max would need 4 GB + 1 GB + 1 GB + (3 x 20 x 0.250 GB) = 22 GB then round up to 32.

The first case (at 8 GB) leaves almost no room for the user to utilize more applications or larger models while the second case (at 32 GB) does. Since your workstation will likely be in use for at least 3 years you should probably consider 16 GB as a minimum configuration at this time.

And no matter how much RAM you purchase make sure to specify the fastest speed ECC memory your processor can support.

SOLID STATE DISKS (SSD'S)

Since MCAD software works with large models there is always a good bit of disk activity taking place. And it simply doesn't make sense to purchase the best processor and RAM you can afford only to have their performance hamstrung by a slow mechanical hard drive.

By equipping your workstation with a large enough SSD to contain your operating system, application software and the current models – and adding a conventional hard drive for extra storage - you'll reduce disk access and get every last bit of performance from your processor, cache and RAM configuration. HP's new PCIe based Z Turbo Drives achieve over 1 TB/sec of throughput as compared to 480 MB/sec for more common SATA 3 based drives. With 256 GB HP Z Turbo drives at just \$499 there's no reason not to upgrade to your MCAD workstation to achieve the best possible disk speed.



Figure 1 - HP's Z Turbo drive outperforms conventional SATA SSD's by a factor of 2x.

GRAPHICS

Of course all the inner workings of your workstation won't matter if you can't see the results on your monitor and that's where the graphics processor unit (GPU) comes in. With graphics options running the gamut from a few hundred to several thousand dollars, with or without application certification, picking the right GPU card can seem confusing.

A good way to pick the right GPU is to think about what you'll be doing as you design. Note your responses to the following questions:

1. Will you be designing smaller parts using only simple shaded views and very little 3D visualization?
2. Will you be designing larger parts/assemblies using shaded or semi-realistic visualization?
3. Will you use real time rotation, transparent assembly views or realistic visualization or image capture as you design?
4. Will you be creating photo realistic images using backgrounds, textures and realistic materials at high resolutions?

Of course the more you answer 'yes' to these questions the more graphics power you'll need and thus a more high end GPU. The good news is HP makes GPU selection simple by categorizing their certified graphics options (see Figure 2) in a way that aligns with questions 1 – 4. The options are (1) Professional 2D, (2) Entry 3D, (3) Mid-range 3D and (4) High-end 3D. Depending on the workstation's processor you can select from a variety of Autodesk certified graphics ranging from Intel® HD Pro P4600 on-board graphics to external GPU cards that are compatible with the available slots and power supply in the workstation chassis.

 A screenshot of the 'AutoCAD Hardware Advisor' web form. The form is titled 'Get hardware recommendations for AutoCAD and AutoCAD LT 2015 for Windows with our interactive site.' It contains three main sections:

- 1. What type of hardware do you want to find?** with radio buttons for 'System Hardware' and 'Graphics Hardware' (selected).
- 2. For which product(s) or suite** with dropdown menus for 'Product(s) (3 maximum)', 'Or a Design Suite', 'Suite Edition', and 'Product or Suite Release'.
- 3. For which operating system and manufacturer?** with dropdown menus for 'Operating System' and 'Graphics Card Manufacturer'.

 At the bottom, there are radio buttons for 'Which results would you like to see?' with options 'Recommended', 'Certified', and 'All'. A 'Find' button is located at the bottom right.

Figure 2- A list of certified hardware devices for Autodesk software can be found at: www.autodesk.com/hardware

ENJOY YEARS OF PERFORMANCE

Understanding your application software usage patterns allows you to specify processor, RAM, disk and graphics subsystems that give well harmonized performance without overspending. But as you specify your workstations remember to allow for some future growth of model sizes and possible additional application usage so your workstation will meet your needs in future years as well.

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ABOUT ROBERT GREEN

Robert Green provides CAD management consulting, programming, speaking, and training services for clients throughout the United States, Canada, and Europe. A mechanical engineer by training and alpha CAD user by choice, Robert is also well known for his insightful articles and book, *Expert CAD Management: The Complete Guide*. Reach Robert at rgreen@greenconsulting.com



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AutoCAD, the Versatile Veteran

 With the release of AutoCAD® 2016, I began thinking about what other software applications are still viable after 35+ years. Autodesk has done a magnificent job of moving AutoCAD forward, growing with trends, adapting to new technology, and building a product that people still want to use. Think about its beginning—it started in the mid-1980s on DOS, as one of the first non-mainframe based CAD programs, and the first version didn't even include dimensioning!

With the addition of Coordination Model attachment within AutoCAD 2016, you can now attach Navisworks® models as references. AutoCAD has become a platform that supports many different formats, regardless of the source. What other system can pull together Navisworks, Point Clouds, SolidWorks models, Inventor data, STEP, IGES, Microstation, and PDFs into a single document?

AutoCAD not only provides a collaboration environment, but also provides an avenue to document these models. This is especially useful for those systems that do not natively contain detailing and annotation features.

Look at Fusion 360 (or any of the newer cloud-based design applications). Let's be honest, the detailing and annotation features are lacking. This is not a slight; no CAD system in its infancy had great detailing tools. AutoCAD didn't, Inventor didn't, SolidWorks didn't, and the list goes on. So, instead of struggling with an inexperienced drafting system, why not detail your designs with a product that has a 35-year history? Moreover, if you have data from varying sources, use AutoCAD as the common platform to complete all the detailing requirements, building consistency across all the documentation

DETAILING STEP MODELS

To detail a Fusion 360 design you must first export it as a STEP file.

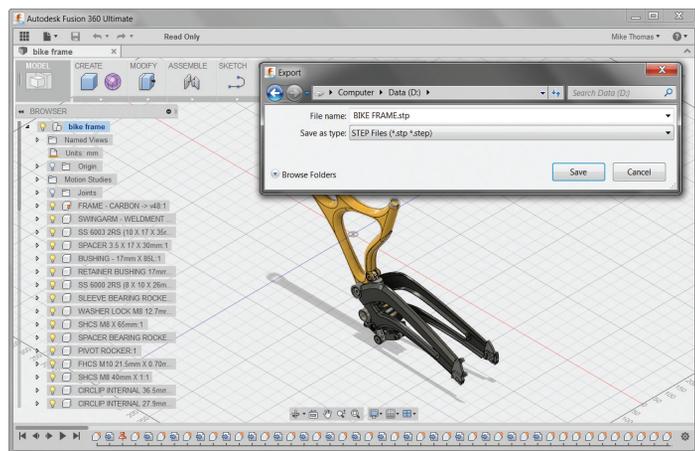


Figure 1: Exporting STEP file from Fusion 360

Within AutoCAD, create a new drawing (using your template) and import the STEP file.

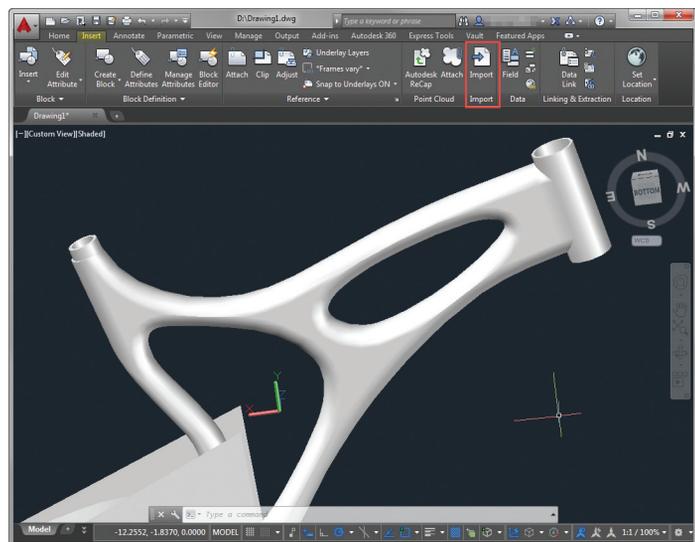


Figure 2: Imported STEP file in AutoCAD

During the import process, you must select the type of file to import. Looking at the list, AutoCAD supports a wide range of files. The model could be a ProEngineer file, a model from SolidWorks, or in many of the neutral file formats such as STEP or IGES. If the originating system is not on the import list, it is highly likely the system can export to a neutral format that AutoCAD supports.

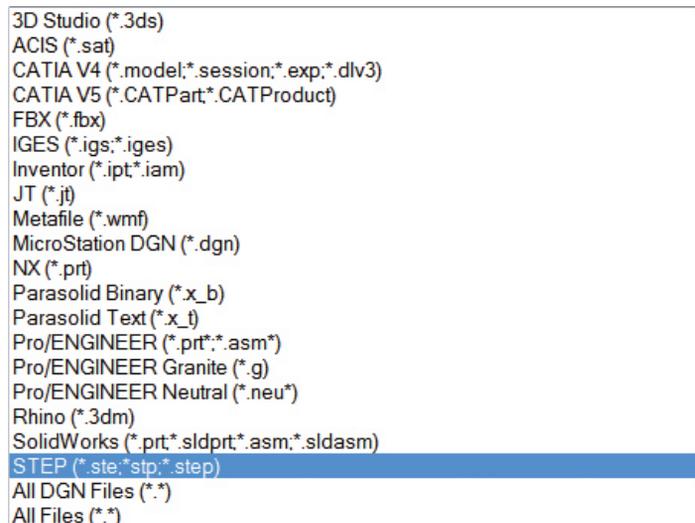


Figure 3: AutoCAD's importable model formats

Tip: as the Fusion 360 export is non-associative and the Fusion 360 model may change, I save the imported data and attach the drawing as an xref into a new drawing. This way, I can export the updated model from Fusion 360, overwriting the STEP file. When you update the xref, the drawing views and annotations remain intact.

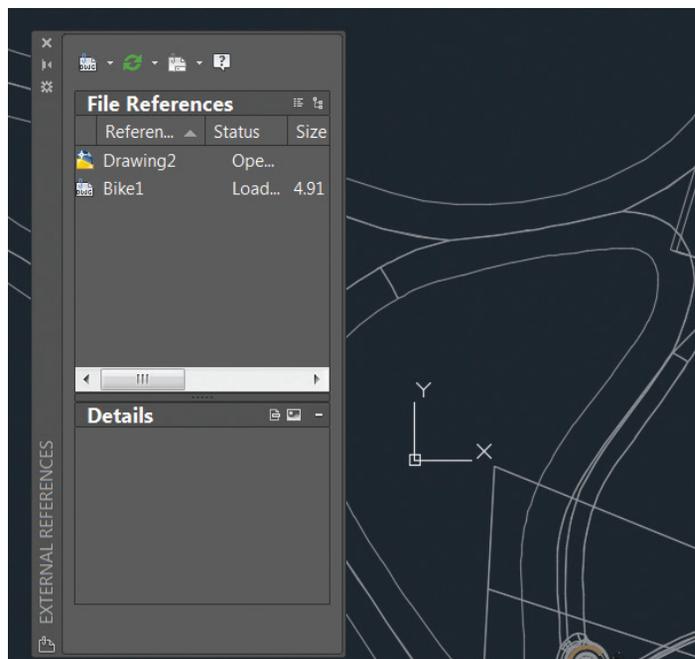


Figure 4: Creating an xref from the drawing-based model

AutoCAD 2016

As you have created the drawing using your template, the title block is already inserted and your styles are configured and ready to go. Use the Place View – From Model Space option, and select the model. After specifying the layout, locate the view by placing it into the desired location.

Note: before picking the location, you can use the contextual ribbon tab to adjust properties including the orientation, the inclusion of hidden lines, the view scale, and other appearance options.

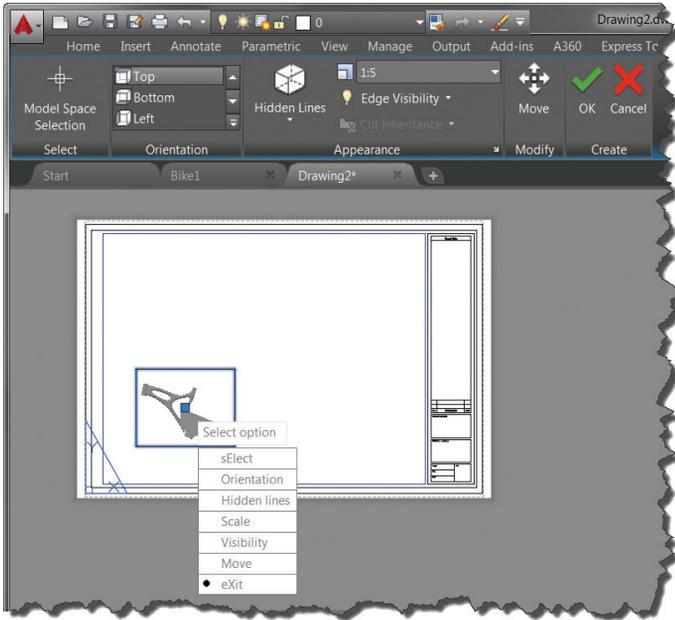


Figure 5: Initial view placement in paper space

With the placement of the base view, I now create the projected orthographic and isometric views.

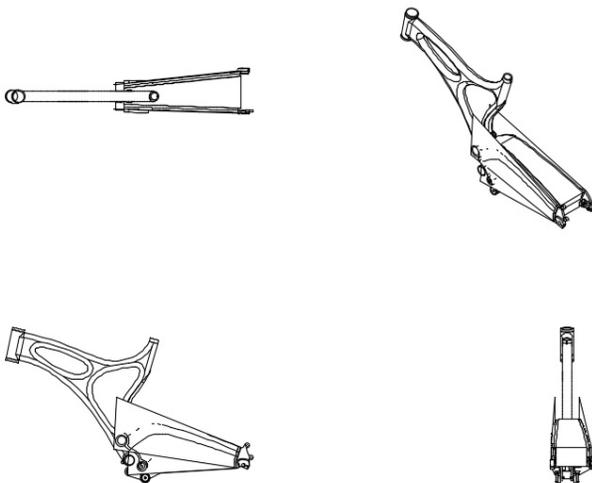


Figure 6: Drawing views

Once the views are generated, you can make adjustments by selecting the views and using their grips or the Contextual ribbon tab. In the example below the side view is adjusted to include tangent edges and the ISO view to be shaded. A detail view is added to detail the cut-out.

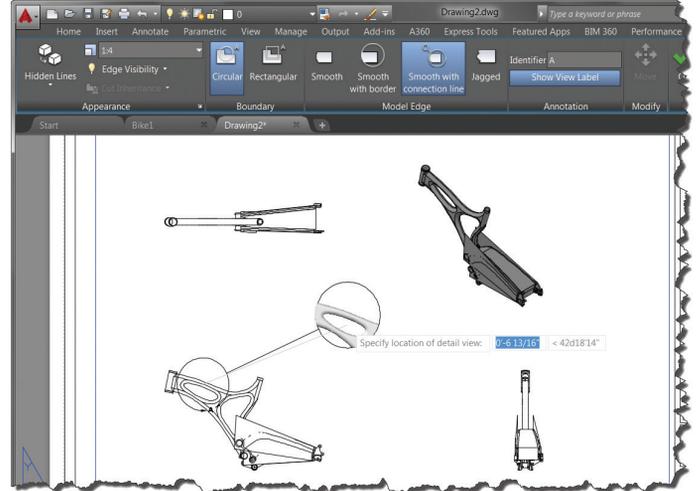


Figure 7: View detailing

With the views generated, use standard AutoCAD annotation tools to complete the detailing. This includes dimensions, leaders, text, and any AutoCAD object.

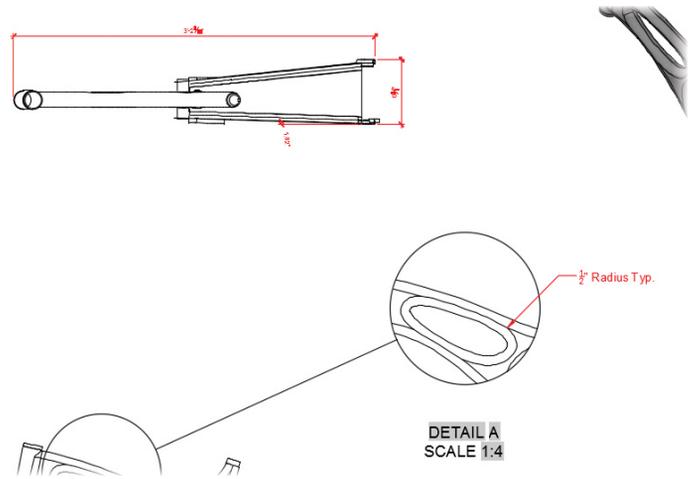


Figure 8: Dimensioning

Back in Fusion 360, a change to the model is made and subsequently re-exported in STEP format.

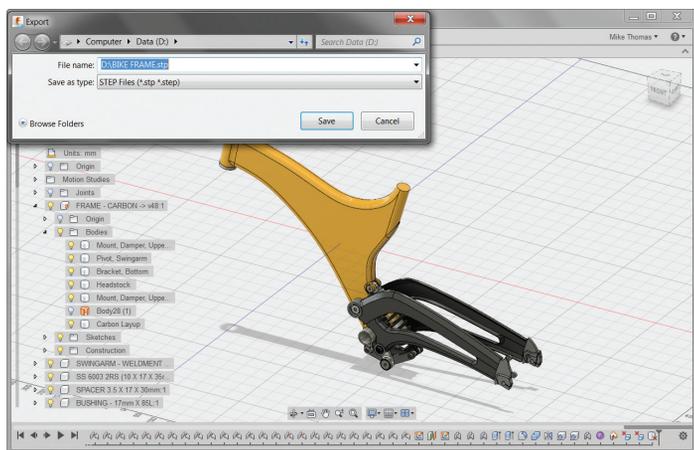


Figure 9: Modifying the Fusion 360 model

Within the AutoCAD file previously created, delete the original imported model and replace it by importing the new version, and save the file. Flip over to the detail drawing and update the xref. Because the cut-out was removed, the leader is no longer associative, and AutoCAD warns you and highlights the issue.

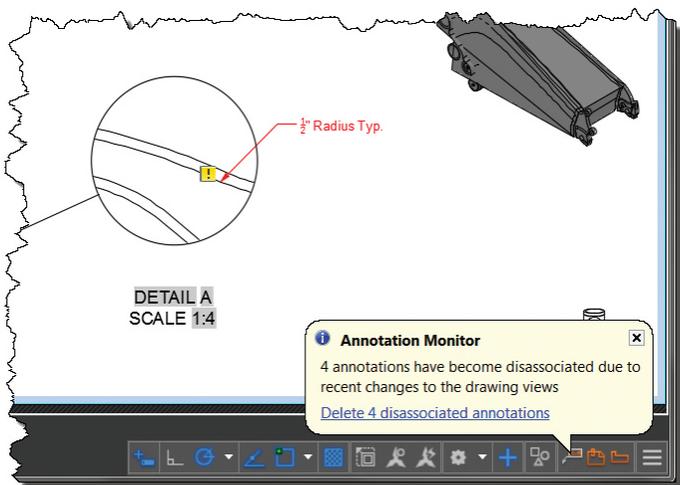


Figure 10: The detail drawing updates

NATIVE INVENTOR FILE SUPPORT

If I use this process with Inventor models, it works the same. Within AutoCAD, I select the place from Inventor, browse and select the Inventor model.

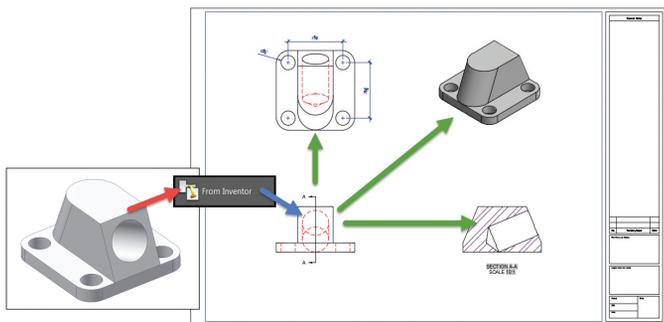


Figure 11: Inventor Model associativity

The bonus when using Inventor models is that the model data remains associative, meaning changes to the Inventor model will update the AutoCAD drawing. No exporting or importing.

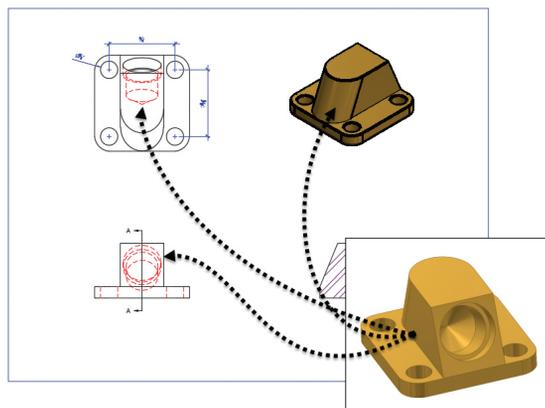


Figure 12: The Inventor model changes are automatically updated in AutoCAD

The above example was completed with vanilla AutoCAD, but any of the vertical versions will work as well. So if you are using AutoCAD P&ID, AutoCAD Electrical, AutoCAD Map, etc., you can use the core functionality to detail these models.

This shows that sometimes turning to an old friend can have big benefits. Don't be quick to dismiss AutoCAD and its place in today's design workflows.



Mike Thomas graduated with the honor of Most Distinguished Graduate in CAD/CAM engineering technology from the Saskatchewan Institute of Applied Science and Technology (SIASST). He is a specialist in the manufacturing industry with a strong knowledge of the Autodesk, Inc. mechanical products, and he has a solid understanding of document management, hardware, networking, and other Autodesk technologies. He is now the technical services manager for Prairie Machine & Parts Mfg. (PM&P), where he oversees the engineering department's technical operations and strategic technical growth. His primary duties include providing ongoing support of critical computer systems and programs, facilitating the interactions between the engineering department and other departments, providing the engineering department with effective systems and technology, and working with PM&P's vice president and engineering managers on the development and implementation of a cohesive strategic plan for the technical growth of the department. Mike is an active contributor to Design & Motion (www.designandmotion.net).

Considering the Move to Civil 3D



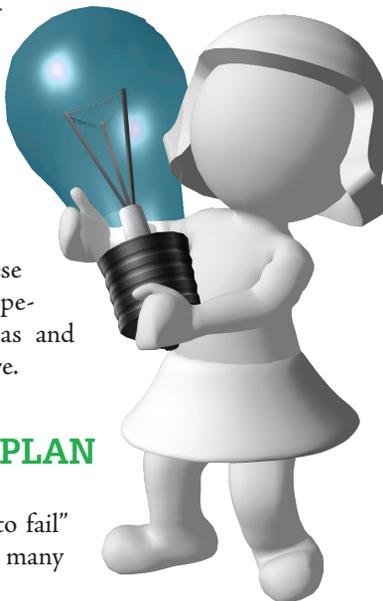
This will be the first of two articles covering things to review and plan for before making the leap from your current design process into the implementation of AutoCAD® Civil 3D® 2015. In this first article we will look at the investigation and planning stages.

THE CONCEPT

Whether you are looking to upgrade an existing installation or are planning to make the switch from one of the other Civil/Surveying CAD platforms will determine your direction.

Upgrading your existing installations may seem to be fairly straightforward, but there are still questions that may need to be answered prior to implementing the upgrade.

We will discuss both of these options in this article and hopefully will provide some ideas and perhaps a different perspective.



THE PLAN FOR A PLAN

“Failing to plan is planning to fail” has been proven true all too many

times by companies making changes to the core of their business practice. Any engineering firm can tell you that CAD is one of the core functions of their firm, even those that still see CAD as nothing more than a “digital drafting board.”

Simply making a decision to change design platforms without doing your homework can have disastrous results. A few things to think about (and hopefully plan for) are:

Training (for upgrades). Will you be providing training to your staff to ensure they can take advantage of the advanced features of the software without requiring your technicians to wade through the software and discover on their own the new features and processes that are available? While some, or possibly most, of your technicians already have a solid grasp of the software if you are upgrading from a previous release, there are still things to think about. Allowing your techs to wade through the fog may result in them finding a method of doing something that may not be the most effective, or possibly even prevent or restrict the design from being used in another process that can save time later in the design process.

Training (for new software). I have personally seen this scenario too many times: a company will invest thousands of dollars in new CAD software, install it on the user’s systems, and that is the end of the conversion. Then they wonder why production comes to a halt. Each CAD system is different and most of them have specific procedures the user needs to know in order to acquire the desired outcome. Even if you have people who have used the software before, that does not necessarily mean that they have used this particular release. Developing or finding a training program is paramount to having a successful launch when changing CAD platforms. Your local Autodesk Training Center (ATC) or vendor should be able to

guide you in finding what you need. Today, there are many instructors who will even develop a custom training curriculum tailored to your company's specifics to ensure the training your techs receive is focused on making your team as productive as possible. If your firm never does surveying, for example, there is little they need to know about using the surveying tools beyond a basic understanding.

Hardware. Are your existing systems capable of running the new version? This is yet another area that can come back and bite you if you haven't done your homework. With the advances in the software comes the need for advanced system requirements. You cannot buy a typical computer off the shelf and expect it to perform optimally when running your CAD software and any additional programs such as email or MS Office. Have your IT department go to the Autodesk website and download the Hardware Guide to make sure your video cards can run Civil 3D and that your system has enough RAM to allow the software to run efficiently. A bare minimum of 16GB RAM is standard, but with the price of the additional 16GB in each system, you will see that cost return a higher production level providing a quicker break-even on your ROI.

GETTING (MOST) EVERYONE ON BOARD

Now that you have a plan, you need to find an evangelist or two among those who make the decision. If that is you, then you need to start looking for some support from the "rank and file" along with the decision makers.

Failure to find these people may possibly doom your conversion from the start. Remember, most people do not like change!

This may be a mix of playing politics, using your networking prowess, or a combination of both. You may even need to call in a few favors to get your proposal in front of the "Board."

Remember, the more people who look favorably on your proposal, the better position you will be in when it comes time to talk dollars and sense. "If we are spending this much, doesn't it make sense to upgrade the hardware and implement a training program of some type?"

HUNTING THE SACRED COWS

One of the biggest hurdles you will undoubtedly face is overcoming the invisible herd of "Sacred Cows" that are scattered throughout

your company. They may be little blips, or some major obstacles, and not all of them will need to be addressed.

Finding and then categorizing them into three classifications will make your conversion to Civil 3D much easier in the long run.

So what is a "Sacred Cow" anyway? Let's take our favorite, long-time senior designer "Sam" as an example.

Now Sam has been with the company for a few years and is one of the most productive members on the team. Chances are pretty good that he has his own methods of doing things. He provides great looking plans and is fast at producing them, but when you have to hand those files off to a junior designer or CAD tech, it always seems to take much longer to get seemingly minor changes done. This would be a red flag to an experienced Sacred Cow Hunter. You may want to sit down and watch how Sam does things and probably pick up some tips that can (and probably should) be shared with other members on the team.

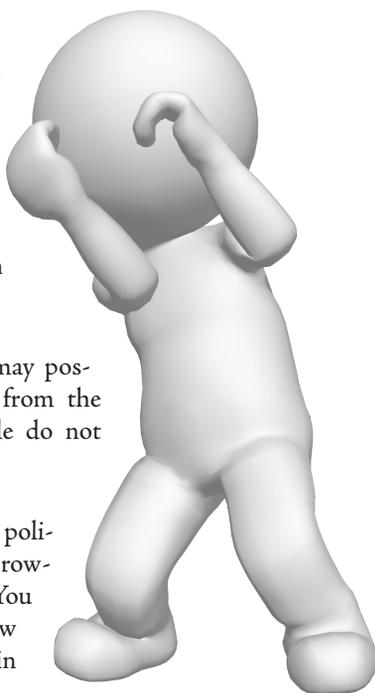
Now that you have seen Sam in action, you find he is doing things that may not be the most efficient method of producing plans, or the methods he is using are actually allowing more room for errors. Let's say that Sam prefers to create each drawing as a standalone file. You may know the type—never uses xrefs or data shortcuts, and each drawing seems to be many times larger than you would expect in terms of size and the amount of data that is being shown onscreen when plotted.

After watching Sam for a while, you notice that he will open one drawing and then use the Copy/Paste routine to copy data from one file into a second file instead of "xref'ing" the original file into his drawing. This could be because he doesn't want to deal with all the xref layers or he wants to place the data into a different position in his new drawing. This approach can be a recipe for disaster when working with Civil 3D because first, the program uses a coordinate system, and second, what happens when the original design is modified? Does Sam know about the changes and does he remember every drawing into which he had copied that data? Does he have the time to go through each of those drawings and update them with the new data?

This is one sacred cow extreme that you will need to find and exterminate early on if you want your conversion to be successful. I know it may sound farfetched, but I have actually seen companies that still use this approach, and they continue to wonder why it takes so long to implement revisions to a project planset.

PLANNING YOUR PROCESS

Now that you have received the go ahead to develop a plan for converting everyone, or even a small pilot team, over to Civil 3D, it is time to start planning the installation, roll-out, file management, styles and standards development, and getting your "power users" on board early.



AutoCAD Civil 3D 2015

Whenever I do a companywide conversion, I like to meet with the users in the office and spend a few minutes with each to try and determine their level of expertise and basic CAD knowledge and also to see who would be the most likely candidates for the Power User Team.

I prefer to create a team of strong users with good interpersonal skills to aid in directing the development of the company styles and standards that will be created during and prior to roll out.

Meet with your IT department to discuss which type of installation works best for your company size (and network infrastructure). If you have 50 CAD technicians and engineers using the network and your network is still on outdated equipment, chances are you will not want to use a networked licensing approach due to issues with licenses not being available or multiple downtime issues with the network.

Does your IT department have a plan to do a “silent” installation on the systems or will they be going to each and every system to install from a network image?

Are you going to create the installation image and then let IT do what they are best at? Or do you work for a firm that thinks, “It’s just software, so IT can handle everything.” This can lead to a massive headache down the road due to not being able to manage what people are using with respect to styles, standards, and even templates and custom LISP and VB routines.

When it comes to network storage and access of the files, templates, and standards that the entire company will be using, I like to create a three-stage approach on the company server. You will have one directory structure that contains everything users will need to perform their daily tasks including any custom styles, templates, block libraries, fonts, plotters, and plot styles.

I usually name the top-level directory CAD Standards and use this directory structure to build the default profile that will be included in the software roll-out. Then I copy that entire directory structure into another area of the server that is restricted to access only by the CAD Manager and IT. This will become the “Staging” area. This directory and all subdirectories will get copied to the CAD Standards directory tree overwriting everything every evening.

Finally, I create a third directory that I like to call my development area. This directory will contain anything that is in various stages of development and testing prior to being copied over to the Staging directory for propagation. Prior to moving any new item over to the staging area, I will develop the instructions for use of that item and have it scheduled to be emailed to the users the morning after the update has been copied.

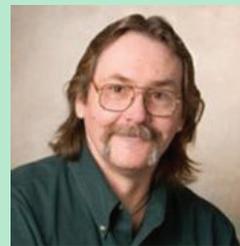
I like to create a network location that contains all adopted styles, standards, templates, routines—essentially anything that can and will be used by more than one person. That directory tree is made available to the entire staff. And then once

everything is in place, I create a clone of that directory and all subdirectories and copy that to another place on the server that is protected so that only a minimum number of people have read/write access to. This way, it provides you with a testing area for development of routines or standards before providing access to the general design group. Then set up a plan with the IT department to copy the files from your Staging directory structure to your Production Directory folder every night to clean up things that people may have modified during the day.

If you have a small office and have everyone running standalone installations, you can still redirect most of the settings in the program through the use of an Enterprise CUI and leave them areas that they can still customize. However, I have found that if you provide your users with an avenue to submit their personal programs or methodologies, and give them credit when you publish their idea or program, it will go a long way in improving the working atmosphere of the company (and hopefully keep everyone from tagging you with the label CAD Czar).

CONCLUSION

That about wraps up the preparation aspect of implementing Civil 3D 2015 for a standalone installation or a network licensed platform. Hopefully this has provided you with some things to review and discuss with your IT department before making the leap into Civil 3D 2015. Watch for the second part of this topic when we dive into the actual deployment strategies that are available and some of the issues I have encountered over the years.



Mark Hultgren is a Senior Civil Designer/CAD Manager for Ryken Engineering and Land Surveying, Autodesk Developer Network member for the past 14 years, and an Autodesk Certified Civil professional. He currently provides training, system configuration, and standards development for the three-office firm located in central Iowa. He has 33 years experience in Civil, Structural, and Survey drafting and design including 13 years as an instructor. He has attended Autodesk University 13 times and presented both live and virtual sessions. As an author, he has written several books on Label Styles, Civil 3D Expressions, and Style Standardization published through Amazon.com. The past 19 years have been focused on teaching standard development and implementation strategies for city/county agencies and engineering firms. Mark enjoys getting his students to think outside the box. He proudly bears the title of “Sacred Cow Hunter” from years of modifying workflows for efficiency.

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Implementation and Workspaces



A workspace in AutoCAD® Architecture is the basic user interface that includes those palettes, commands, and controls you need for your architectural process.

When you first start AutoCAD Architecture during implementation, the default Architecture workspace is displayed. The workspace can be reconfigured according to your preferences as you work. You can move or hide various components as needed, display additional ribbon controls, or add new tools and tool palettes. You can even save your customization as a new workspace that you can access for later drawing sessions. You can also switch from one workspace to another at any time.

THE WORKSPACE USER INTERFACE

The workspace is designed to make it easier and faster for you to find and use the tools and commands you need. The workspace user interface consists of several components.

- ♦ **The Ribbon** – Similar to Microsoft Office, AutoCAD Architecture 2015 uses the ribbon as the central access point for commands. The ribbon contains a number of tabs on which commands are grouped according to conceptual task types or selected objects. The ribbon replaces the menu bar and the toolbars as the primary command access point.

- ♦ **The Application Menu** – The application menu contains basic commands pertaining to the drawing as a whole, such as Open, Save, and Print. Like the menu browser it replaces, the application menu is accessed by clicking in the upper-left corner of the workspace.
- ♦ **Workspaces** – AutoCAD Architecture is equipped with one single default workspace (Architecture). The menus and commands associated with the previously provided workspaces (Design, Document, Detailing, and Visualization) can be accessed from the tabs of the ribbon.
- ♦ **Help Access** – With the removal of the menu bars in favor of the ribbon, the commands to access Help features have been moved into the InfoCenter at the top right of the application window. Here, you can find the online resources of InfoCenter and the Help menu, which allows you access Help, Tutorials, and other interactive resources.
- ♦ **Autodesk Seek** – You can use Autodesk Seek to find product design information. Many content providers—both corporate partners and individual contributors—publish to Autodesk Seek. Content includes 3D models, 2D drawings, specifications, brochures, and other descriptions of products or components.
- ♦ **Import design content into AutoCAD Architecture** – You can also share your own content with others using Autodesk Seek. Upload drawings or blocks to Autodesk Seek to give your partners and customers ready access to your content.

CUSTOMIZING A WORKSPACE

Workspaces control the display of sets of user interface elements and they are typically organized by function or workflow. You can create and manage workspaces from the user interface with the WSSAVE command or Customize User Interface (CUI) Editor. You can also define the properties of a workspace with the CUI Editor. These properties allow you to identify the workspace from other workspaces in the CUIx file and control the behavior of some of the user interface elements related to the application window.

A workspace must be set current to update the user interface based on the properties and settings of the workspace. Only workspaces in the main and enterprise CUIx file can be set current. If a workspace is in a partial CUIx file and you want to use it, you must transfer the workspace with the Transfer tab of the Customize User Interface (CUI) Editor to the main CUIx file before it can be set current. The most recent workspace is set current after closing and restarting the program. If you are setting up a Network Deployment, you can define which workspace to set as the current workspace the first time the program is started by setting a workspace as default. The CUIx file containing the workspace set as default must be defined as the main or enterprise file with the deployment. A workspace set as default is also set as the current workspace when the CUIx file containing the workspace is loaded with the CUILOAD command.

If you wish to set a workspace current, you can use the Quick Access toolbar, click the Workspace drop-down list, and select the

workspace you want to set current. You can also set a workspace current from the CUI Editor by clicking on the Manage tab of the ribbon, customization panel, and select User Interface. In the Customize tab, Customizations In <file name> pane, click the plus sign (+) next to the Workspaces node to expand it. Right-click the workspace you want to set current and select Set Current. Then select Apply.

Workspaces in a CUIx file can be marked as default. Setting a workspace as default determines that it should be restored when the CUIx file is loaded into the program the first time or after the CUIx file has been loaded with the CUILOAD command. To do this, click on the Manage tab of the ribbon, Customization panel, and then select User Interface. In the Customize tab, Customizations In <file name> pane, click the plus sign (+) next to the Workspaces node to expand it. Right-click the workspace you want to set as default and then select Set Default. Then select Apply.

You can save changes to an existing workspace from the Application window. On the Quick Access toolbar, click the Workspace drop-down list and select Save Current As. In the Save Workspace dialog box, Name box, enter a name to create a new workspace or select an existing workspace from the drop-down list to overwrite it. Click Save to create or modify the workspace.

If you wish to create and customize a new Workspace, begin with the Manage tab on the ribbon, Customization panel, User Interface. Now, in the Customize tab, in the Customizations In <file name> pane, right-click on the Workspaces node and select New Workspace (see Figure 1). A new, empty workspace (named Workspace1) is placed at the bottom of the Workspaces. Right-click on Workspace, select Rename, and enter a new workspace name. Now, in the Workspace Contents pane, click Customize Workspace. In the Customizations In <file name> pane, click the plus sign (+) next to the user interface elements to expand them. Click the check box next to each user interface element that you want to add to the workspace. The selected user interface elements are added to the workspace. In the Workspace Contents pane, select Done and then select Apply.

Once you have created your new workspace, you may find that you need to change the properties of that workspace. To do this, select the Manage tab on the ribbon, Customization panel, User Interface. In the Customize tab, Customizations In <file name> pane, click the workspace whose properties you want to change. In the Properties pane, do any of the following (see Figure 2):

- ♦ In the Name box, enter a name for the workspace
- ♦ In the Description box, enter a description
- ♦ In the Start On box, select an option (Model, Layout, Do Not Change)
- ♦ In the Menu Bar box, select an option (Off, On)
- ♦ In the Status Bar box, select an option (Application only, All Off, All On, Drawing Status Bar Only)
- ♦ In the Navigation Bar box, select an option (Off, On)

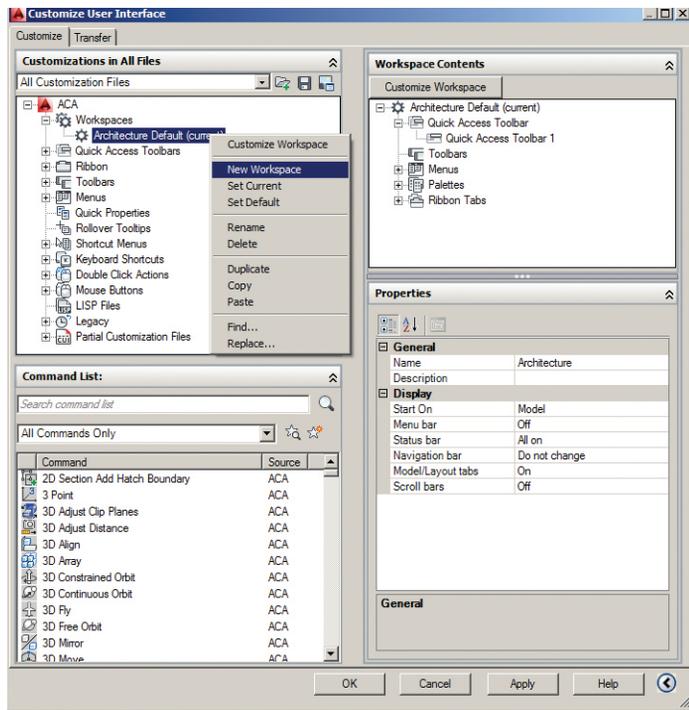


Figure 1: New workspace

- In the Model/Layout Tabs box, select an option (On, Off, Do Not Change)
- In the Scroll Bars box, select an option (On, Off, Do Not Change)

Once your changes are complete, select Apply.

WORKING WITH OBJECTS IN A WORKSPACE

The AutoCAD Architecture workspace is where you add and manipulate the architectural objects that make up your drawings. You can add objects to the drawing using tools. Tools generally have preset creation parameters called properties. When you click an object tool to add an object in the drawing, the Properties palette opens and you can change properties for the new object if desired. If not, you can go ahead and place the object in the drawing. Tools are arranged on tool palettes for easy access. To open the default Design tool palette, click Home tab on the ribbon, Build panel, Tools dropdown and then select Design Tools (see Figure 3).

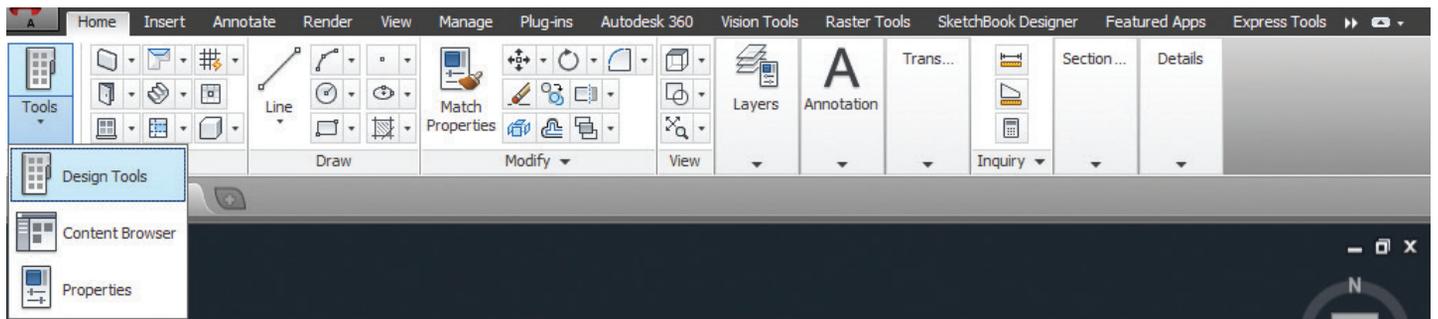


Figure 3: Design tools

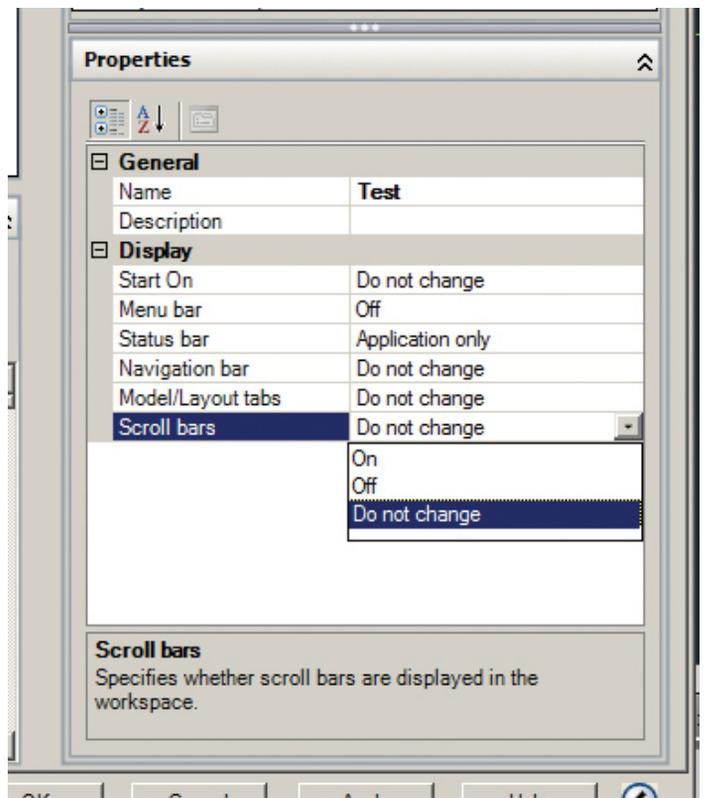


Figure 2: Workspace properties

You can modify an object in a workspace using any of the following methods.

- **Object-specific ribbon tab** – When you select an object, an object-specific tab is displayed on the ribbon. The object-specific tab contains commands that apply to the selected object.
- **Properties palette** – The Properties palette is one of the central locations for entering and changing information about an object. This palette has categories that group the properties by type.
- **Matching properties between objects** – You can use the Match Properties command to copy the style and display properties of one AEC object and apply them to one or more other objects of the same type.
- **Context menu** – Right-click the object to display its available commands.

- ♦ **Direct editing with grips** – Commands for modifying an object are accessible from the object's grips. Click an object in a two-dimensional (2D) or three-dimensional (3D) view to display its grips.

COPYING TOOL PALETTES AND TOOL PACKAGES TO A WORKSPACE

You can create a linked or unlinked copy of the tool palette. A linked copy remains connected to the original in the tool catalog, so that you can easily update the copy with any changes made to the original. An unlinked copy is treated as a new tool palette, with no relationship to the original. To do this, begin by clicking the Home tab on the ribbon, Build panel, Tools drop-down, and then select Content Browser. Open the tool catalog containing the tool palette to copy to the tool palette set. If the palette is located in a specific category of the catalog, open that category. Move the pointer over the i-drop icon next to the tool palette so that the pointer image changes to an eyedropper (see Figure 4).

To copy multiple tool palettes, press and hold Ctrl while clicking each palette and then position the eyedropper over any of the selected palettes. Drag the eyedropper according to the desired action. If you want to store a linked copy of the tool palette in the tool palette set, then click the eyedropper and drag it to a tool palette in the tool palette set. If you want to create an unlinked copy of the tool palette in the tool palette set, then press and hold Alt. Then click the eyedropper and drag it to a tool palette in the tool palette set.

You can also create linked or unlinked copies of the tools in the package. A linked copy remains connected to the original in the tool catalog, so that you can easily update the copy with any changes made to the original. An unlinked copy is treated as a new tool, with no relationship to the original. Just as you did with the tool palette above, begin by clicking the Home tab on the ribbon, Build panel, Tools drop-down, and then select Content Browser. Open the tool catalog containing the tool package to copy into the tool palette set. If the package is located in a specific category of the catalog, open that category. Move the pointer over the i-drop icon next to the tool package, so that the pointer image changes to an eyedropper (see Figure 5).

To copy multiple tool packages, press and hold Ctrl while clicking each package and then position the eyedropper over any of the selected packages. Drag the eyedropper according to the desired action. If you want to store linked copies of the package's tools in the tool palette set, then click the eyedropper and drag it to a tool palette in the tool palette set. If you want to create unlinked copies of the package's tools in the tool palette set, then press and hold Alt. Then click the eyedropper and drag it to a tool palette in the tool palette set.

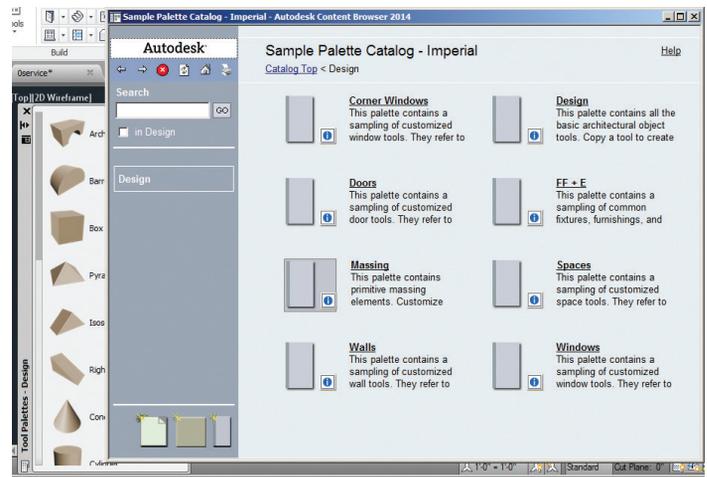


Figure 4: Tool palette

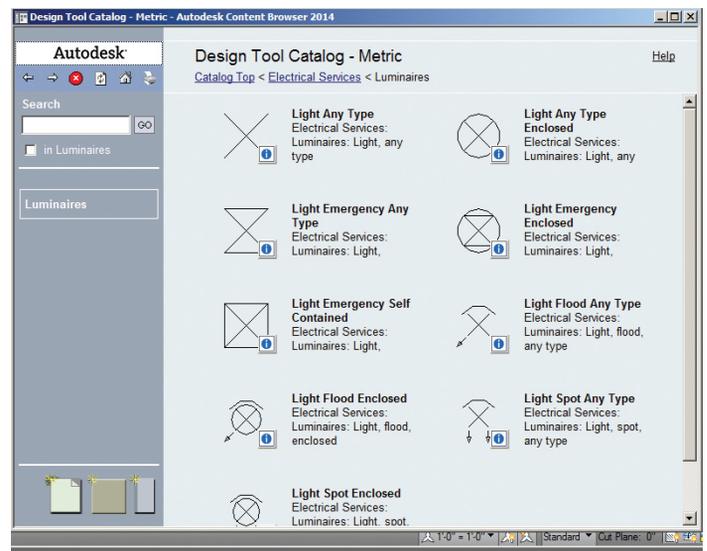


Figure 5: Tool package

CONCLUSION

Workspaces are sets of menus, toolbars, palettes, and ribbon control panels that are grouped and organized so that you can work in a custom, task-oriented drawing environment. Workspaces keep things organized and simple to find within AutoCAD Architecture. It is important to customize your workspace so you are as productive as you can be.



Melinda Heavrin is a CAD Coordinator & Facility Planner for Norton Healthcare in Louisville, Kentucky. She has been using AutoCAD Architecture since release 2000. Melinda can be reached for comments and questions at melinda.heavrin@nortonhealthcare.org

The Level After the Next Level

When it comes to change, the best defense is acceptance. Three years ago I wrote an article titled “Getting to the Next Level.” Reflecting on that now, quite a bit has changed since the article was published. For those who have not transitioned to a BIM-capable process, the same obstacles remain. For those who have managed to get to the point where they can say “we use Revit now,” it might actually be worse. They may be operating under the illusion they have kept up with the times. In fact, Autodesk® Revit® does not equal BIM and BIM alone is a far cry from where the industry is going. In the last several years, firms have faced increasing pressure to keep evolving and provide an ever-increasing variety of services. With the bar continually rising and the targets changing, how do you stay viable? How do you get to the level after the next level?

There is not a simple or one-size-fits-all answer, but firms will need to spend money, spend time, and build a culture of embracing change to get there.

WHAT'S HAPPENING?

Back in 2010 Patrick MacLeamy from HOK put forward that for every \$1 spent on a building information model, \$20 of benefit could be realized in the building assembly model, which in turn could lead to \$60 of benefit in the building operations model. It is not a big jump from there to linking the information in separate buildings together to form City Information Models (CIM). By combining the geospatial platform of something like Google Earth with data base-driven building models, cities can reap benefits of better emergency response times, lower crime rates through real-time police patrol adjustments, streamlined road repair leveraging resident reporting, and many others. The potential money gained by successively paying data forward should have everyone fully committed to a BIM process. The reality is, much like recycling and electric cars, because

it is a good idea and it can work doesn't mean everyone will just fall in line and make it work. The BIM process has a lot to overcome and one of the biggest obstacles may very well be the BIM design software on which the building industry has come to rely.

AUTODESK EVOLVES

Anyone who has used Revit for a while has come to understand the limitations inherent in software that was cutting edge in 1999. There are basic limitations to sharing design data over the entire rainbow of potential consumers in a building's life cycle. Perhaps in recognition of that, Autodesk has made some not-so-subtle changes in recent years. No more physical copies of Revit without a fee is nudging Revit users embrace a more virtual interaction with Autodesk. Desktop subscription of AutoCAD introduced a pay-as-you-go model that begins to steer users from a perpetual license to a term license structure. Most telling is the introduction of A360 Collaboration for Revit. It is a new way of providing Revit in an online manner with additional tools for in-context communication, extended team integration, and cloud centralization.

The casual observer can clearly see Autodesk transition from software provider to service provider. Cloud rendering and analysis will no longer be services that users will have to copy their data to the cloud to perform. It will already be there. These additional services do provide additional revenue streams for Autodesk as well as a pause for users who must decide how to bridge the gap from little data to big data.

THE CLOUD RETURNS

The idea of the cloud came with many an inflated expectation. Later, it seemed to just fade into the background, but don't count the cloud out. With new and aggressive expectations for buildings in

design, construction, and in use, the cloud's near limitless computing power provides a convenient way to appease the shortest schedules. The cloud also offers the ability to transfer the maintenance and expense of onsite servers and support offsite and out of mind for a monthly fee. Risk mitigation, upgrades, and technology shifts become the problem of the provider and not the firm. The cloud also acts as the entrepreneurial equalizer, allowing small firms to make a big splash with limited physical assets. This changes the landscape of too small to compete and too big to fail.

Ultimately the cloud allows for the direct linkage of data from multiple sources. This is where the idea of leveraging big data to support the design, construction, and use of buildings gains significant traction. With near unlimited data available, the skills of specialists will be in knowing what questions to ask, not in their ability to research. Companies such as the Google X offshoot Flux have already found ways to compile and parse multiple building codes for the city of Austin into a 3D geospatial-aware interface that instantly and graphically shows developers the constraints of building on differing sites. This not only shortens the site selection process, but greatly improves the chances of finding the best site by turning massive amounts of data into usable information.

It makes sense for the cloud to be the common ground for teams. The big players in BIM are built on proprietary programming, leaving few widely used BIM tools built on an open standard. IFC has fallen far short of being the common language of BIM for over a decade. Cloud technologies leverage the Web and Internet protocol. A more well-proven and supported environment than the Internet would be difficult to find.

WHAT'S COMING?

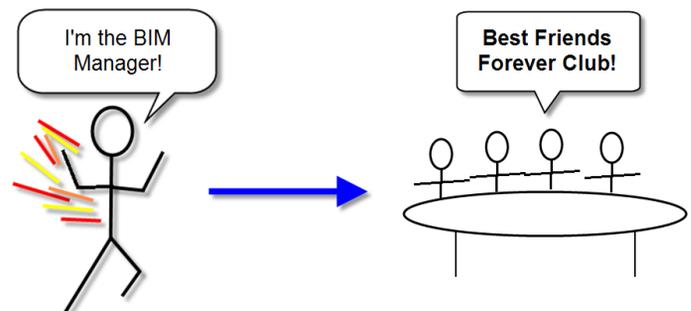
At KeenCon last year, Jen Carlile of Flux gave a compelling presentation on the large order of magnitude it will take to house the planet's growing population over the next 35 years. The addition of 3.3 billion people requires a more streamlined process that can adapt quickly to changing sites and conditions. Flux's solution is the idea of a building seed that is able to query the site and instantly orient and configure a building, potentially accounting for traffic, drainage, solar, and code issues. In the demonstration the building went from zero to SD in seconds and then allowed for interactive modification. The same building seed planted at a different site would produce a different building based off the new geospatial and code conditions present there.

Autodesk's Technology Futurist Jordan Brandt spoke last October about how cloud computing has enabled future-looking firms to let computers essentially take a billion shots in the dark as a design technique. Running genetic algorithms, Moon Express and Autodesk produced an organic looking bracket that attaches a thruster to the fuselage of a lunar lander. It's organic looking because it was essentially grown and vetted against thousands of other virtual attempts. In a very evolutionary process the most capable bracket was produced.

If these changes are difficult to accept, there is more bad news. The changes don't end there. Bio-nano printing, 4D printing, construction robots, and a genetically engineered leaf have entered the news in the last year. Buzzwords and phrases such as parametricism, nextification, disruptive innovation, and revolution by disruption are working their way into the common vernacular. Not that long ago the positions of BIM Manager and Technology Futurist didn't exist. You can bet there are going to be many more new job titles required in the quickly evolving world of designing, building, and operating buildings.

THE ROLE OF THE BIM MANAGER

The pie that was once cut in three slices for the architect, engineer, and general contractor is already being cut into thinner and thinner slices to accommodate specialists, analysis, and advocates. They will run smoke mitigation, LEED accreditation, terrorist scenarios, energy, evacuation, and solar analysis, and more. The general practitioner will be replaced by a gaggle of specialists. So the days of the all-knowing BIM Manager running from fire to fire saving the day will have to transition to a BIM Manager who truly manages a team of BIM specialists all focused on complex tasks of their own.



WHAT DOES IT MEAN?

I often ask myself "Why are we doing this?" Today, my answer is because there has never been a more exciting time to be in the business. It may seem as though a thousand things are going a million directions and it's pointless to engage, but in chaos there is always opportunity. For those who are willing to take a leap of faith, the rewards can be great.



Todd Shackelford is the BIM Manager for Leo A Daly, a University of Nebraska instructor and a founding member of the Omaha BIM Collaborative and the Revit Workshops. He authors two Blogs; CAD Shack and The Lazy Drafter. A Revit 2013 Certified Expert. Todd looks for his missing socks when not otherwise committed. Tweet Todd @ShackelfordTodd or email Todd at tmsackelford@leoadaly.com

Real Life Perspective: Transitioning from AutoCAD to Revit, Part 2

This article is a continuation of Part 1 from the January 2015 issue.

 Autodesk® Revit® Structure implementation can be an intimidating task for new users and their employers. Finding time to properly train employees, maintain project budgets, and manage upgrades to software and hardware present significant challenges to companies of all sizes. This article discusses the best Revit implementation strategies to ensure your firm successfully transitions from AutoCAD® to Revit Structure.

WHERE TO BEGIN

Successful Revit Structure implementation actually starts in very familiar territory, AutoCAD. That's right—the most effective place to start Revit implementation is in AutoCAD. The first Revit implementation step should be defining and documenting current AutoCAD standards. The importance of this first step cannot be overstated. Without properly defined standards for items such as linetypes, text and dimension styles, annotation symbols, standard blocks, and standard details, the foundations of your first Revit drawings will be on unsettled ground. If clearly defined company standards do not exist, now is a great time to make them. Revit implementation not only provides a step towards Building Informa-

tion Modeling (BIM) and other new technologies, but also provides an opportunity to evaluate and improve upon your current design and drafting processes.

Many firms have unique graphical styles for various annotations including detail callouts, level indicators, and framing or wall tags. Out-of-the-box Revit may not have your firm's specific symbol style for all annotations. This may create user complaints and a slightly different look to Revit drawings. Do not let the "look" of Revit drawings become a stumbling block. Recreating exact replicas of AutoCAD annotations within Revit can be challenging and time consuming. Creating specific graphics to duplicate AutoCAD should not be the focus of beginners. I strongly recommend starting with any and all out-of-the-box annotations. There will always be time to modify annotation symbols after mastering other aspects of Revit.

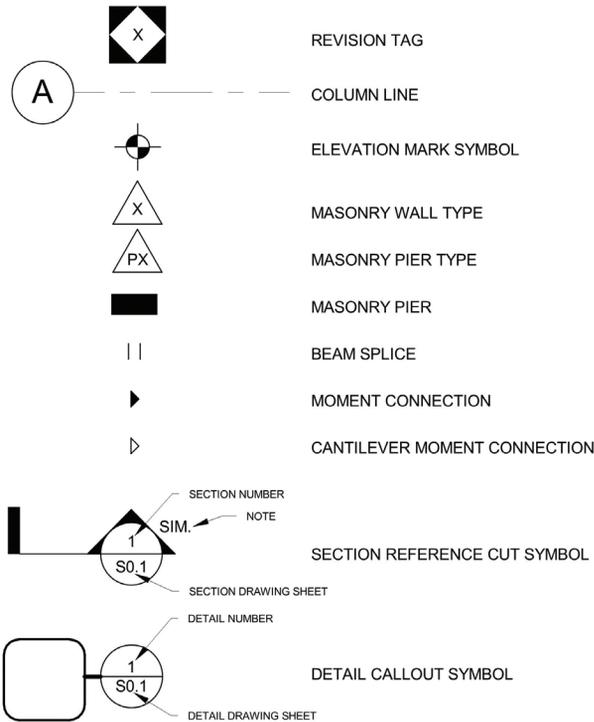


Figure 1: Sample annotations

Defining standards from AutoCAD is so vital because of the Revit project template file. A Revit project template file contains standard notes, details and annotations, view templates, and various other settings that are integral to creating a high-quality product. This file is used as the start of each new Revit project. Much of the Revit implementation process will focus on creating and maintaining the project template file. Recommendations for creating a useful project template file can be found through Autodesk and numerous online or print resources.

IMPLEMENTATION ATTITUDE

At the beginning of my company's Revit implementation process, the office certainly had its fair share of Revit naysayers and antagonists. No one was sure how the Revit implementation process was going to work or how long it would take. This created a lot of stress and doubt that we could continue to be successful while learning completely new software. Revit turned into a curse word within the office. Revit implementation can be challenging, but it does not have to be a miserable experience. Without a doubt, one of the most important implementation strategies is to maintain a positive and confident attitude.

The first step I took when beginning the implementation process was to instill a positive attitude. I did not have all the answers, but I was confident that I could find them. Continually reiterating the message that we will work together to find solutions to our problems and be successful had an immediate impact on the entire team. Just by creating a positive attitude, Revit was no longer a curse word. It was a joyous achievement to bring about this change. The Revit implementation leader must be the most positive voice within the company.

Besides being positive, an open mind is also a requirement. Working within a BIM environment is a completely different experience than working in AutoCAD. In some ways, learning to use Revit and 3D parametric modeling would be easier without any previous knowledge of AutoCAD. You must be prepared to open your mind and accept a new reality for construction document creation and coordination.

BIM MANAGER AND BIM COMMITTEE

The person tasked with leading Revit implementation, often given the title of BIM Manager, assumes a very serious and important role to the company and all employees. The selection of this person must be given careful consideration. The BIM Manager will be responsible for creating Revit standards and training the firm's employees to become proficient Revit users. This person must be motivated for positive change. Having previous Revit experience is not a necessity, but a desire to learn and explore is.

To be successful, the BIM Manager must be empowered by management to make decisions affecting the entire company. Leadership without the authority to make decisions is detrimental to the entire process. It is also extremely important for the BIM Manager to have time dedicated to complete the necessary job responsibilities. A BIM Manager's responsibilities may include:

- + Creating deployment strategies and directing BIM implementation
- + Developing, implementing, and enforcing BIM standards
- + Installing Revit and other related BIM software
- + Providing BIM software training to staff
- + Acting as a liaison to software vendors
- + Marketing BIM services

Revit Structure

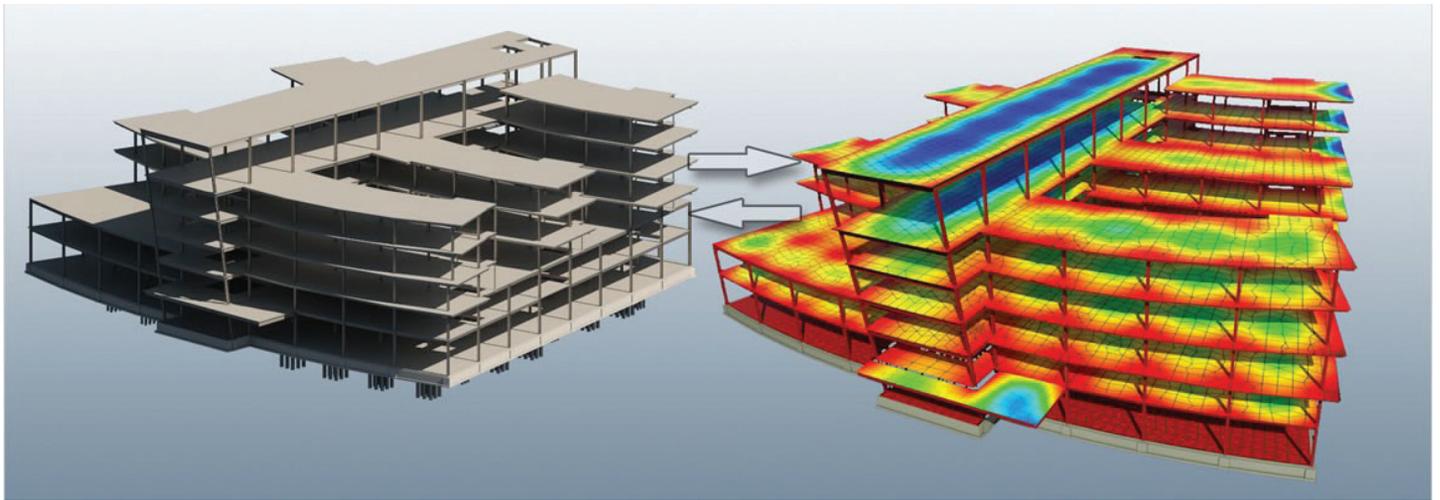


Figure 2: Analytical design

This is a short summary of a BIM Manager's duties and essential job functions retrieved from www.bimmanager.com/bim-manager-job-description.

These responsibilities can be intimidating for a single individual, especially if he/she has other design or drafting duties. If this is the case, the BIM Manager should create a BIM committee, which can assist in completing the BIM Manager's responsibilities. The committee should consist of employees who are self motivated and eager to explore Revit. However, it is also a good idea to include a Revit doubter. This person will provide necessary perspective and counter arguments worth discussing. Ideally, the BIM committee will be responsible for the company's first Revit projects.

The BIM committee will discuss numerous topics and determine the best procedures for many Revit tasks. All decisions should be documented so they can be properly communicated to other employees. However, there will almost certainly be a point where the BIM committee runs across a problem they cannot answer. The BIM committee should not hesitate to consult a Revit implementation expert. An expert can come from many places such as a local or national software training company, Revit User Group, or Autodesk University. This tip is fairly obvious, but having the input from someone who has been there before is essential to a smooth Revit implementation. The experts I have worked with have significantly influenced our Revit implementation process.

BECOMING YOUR OWN EXPERT

Revit Structure software offers numerous capabilities that improve the way structural engineers and drafters complete their work and collaborate with other engineering disciplines. Creating a 3D building model improves design coordination and allows better visualization of design intent. Interferences with architectural and MEP elements are easily detected. Parametric components, known as families, allow for the easy creation of column, foundation, or reinforcing schedules as well as quantity takeoffs. Analytical models created with Revit Structure contain information such as loads, load combinations, member sizes, and release conditions. Analysis pro-

grams are capable of returning design information to Revit and can dynamically update the physical model and documentation. Additional point cloud tools, such as Autodesk Recap, connect laser scans directly into the BIM process (www.autodesk.com).

Attempting to incorporate each of these capabilities into your first Revit project is a challenging proposition. Successful Revit implementation is an iterative process completed in deliberate steps, not a giant leap. Deciding which features should be implemented first depends on many factors. How much time is available to train staff before the project deadline? What are the client's expectations of BIM? Is a clash detection analysis required? Is an analytical design model being created for the project?

Determining what is implemented and when is key to successful Revit implementation. Unfortunately, there is no simple answer to apply to all situations. Each firm has unique goals and different interpretations of how to utilize Revit. Engaging an implementation expert at this stage will provide guidance with a firm's specific needs and goals in mind.

Although incorporating all that Revit has to offer can be challenging, there is no need to rush the implementation process. Before a project begins, determine what Revit features will be incorporated. For the first few Revit projects, Revit may only be utilized to create a 3D model to coordinate interferences with the other engineering disciplines. Once this first iteration has been mastered, add another feature for the next project. Continue to add features as they become convenient with training schedules and project requirements. Starting with small goals and working towards larger ones will prevent frustration from trying to do too much at once.

For my firm, our first Revit project was an AutoCAD / Revit hybrid. We modeled the main building components in Revit, but the structural details were imported from AutoCAD. At the time, we were not fully trained on creating Revit details and had not converted our AutoCAD library. The start of our next Revit project gave us enough time to include Revit details and create smart schedules for columns and foundations. We continued to add to our new skills for each following project. Even after the successful

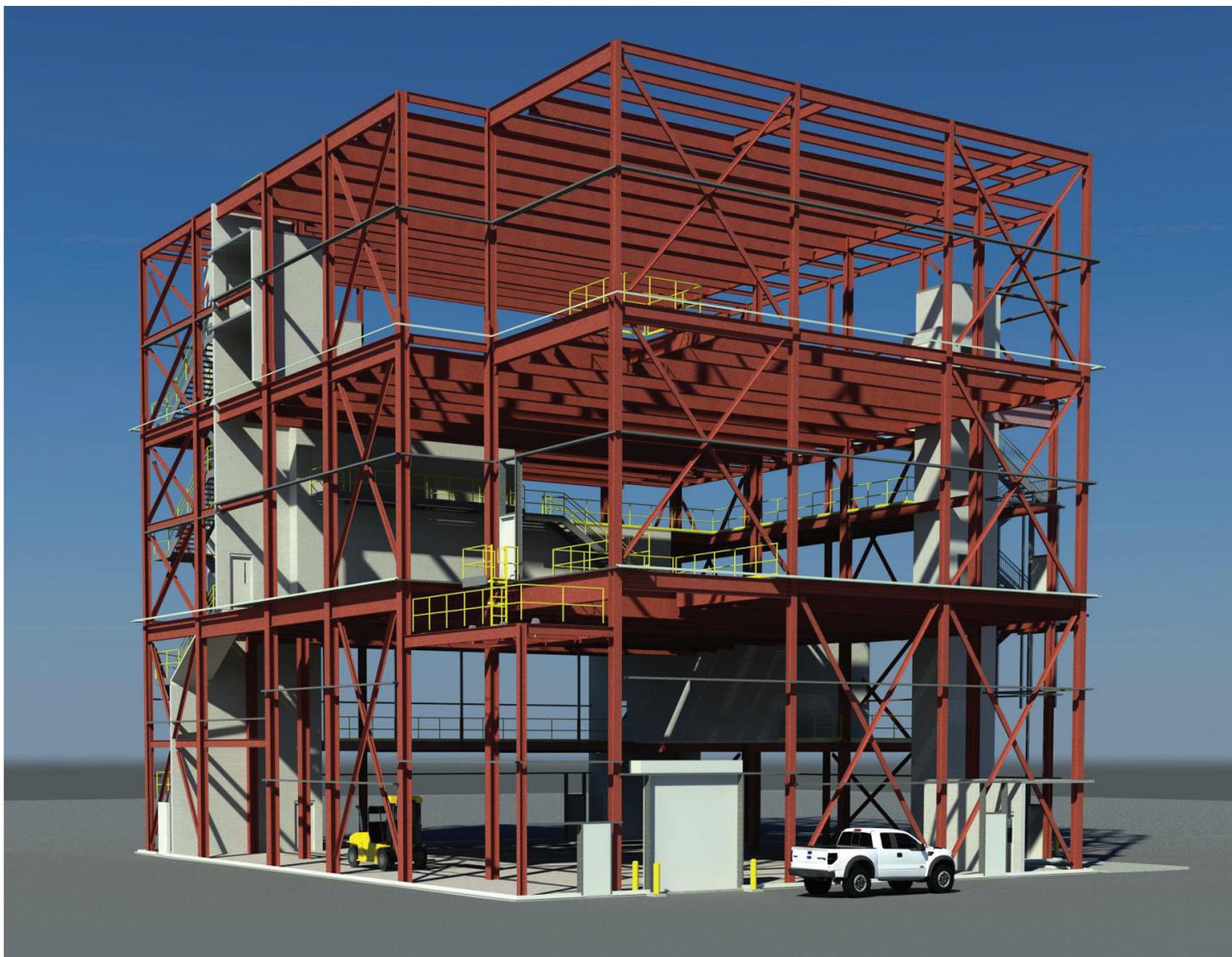


Figure 3: 3D visualization

completion of numerous Revit projects, I still find myself updating various specifics of the project template and evaluating our drafting procedures to improve upon the previous project. This iterative process is the best approach for successful Revit implementation.

Another useful tip is to document the process of modeling specific structural elements. We utilize many modified out-of-the-box families to properly convey design intent on the structural drawings. These modeling procedures act as a living document which can be modified for more efficient modeling methods as our Revit experience grows.

The only reasonable approach to becoming a Revit expert is to use it—all day every day. Switching back and forth between AutoCAD and Revit is not efficient. Once the decision has been made to use Revit, commit to using it full time and on as many projects as possible.

Ultimately, the focus of Revit Structure implementation should be to create a better product for our clients through improved visu-

alization and increased coordination. Getting there requires every employee to be excited to learn new technologies and leaders who can motivate their teams to reach lofty goals. I hope that these strategies will aid you and your company to realize the impressive benefits of Revit Structure.

Renderings created by Zach Engle of CenterPoint Engineering.



Michael Hopple is a structural designer and BIM manager at CenterPoint Engineering, Inc. in Mechanicsburg, Pennsylvania. CenterPoint Engineering is a multi-discipline consulting engineering firm where Michael directs the implementation of Revit for the MEP and Structural departments. He can be reached for comments and questions at mhopple@centerpointeng.net.

Implementing the Multileader to Stand Out in the Crowd



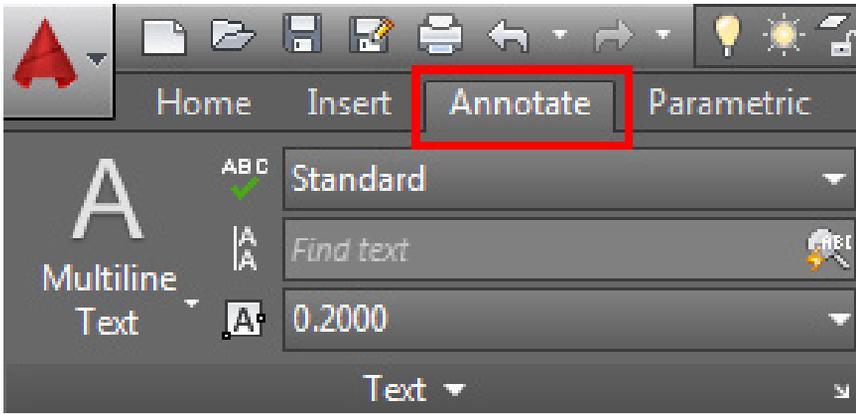


Figure 1: Annotate tab

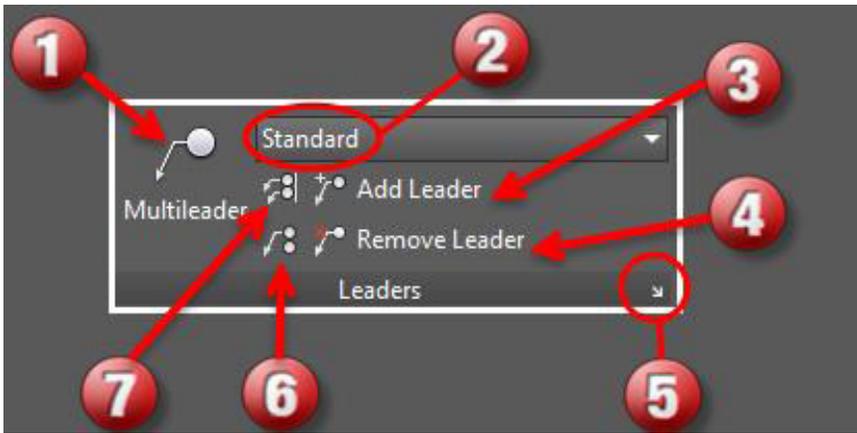


Figure 2: Multileader ribbon panel

THE MULTILEADER



long time ago,
in a galaxy far far away...

Well, not that long ago, but prior to AutoCAD 2008 the CAD designer/operator had to point to an object using numerous leaders to reference single or multiple items. Yes, there were tricks to making the leader point to several areas by using a grip copy or even just tracing over the original leader.

A multileader is more than just a leader having the ability to have numerous leaders attached to a single piece of text. A multileader object typically consists of an arrowhead, a horizontal landing, a leader line or curve, and either a multiline text object or a block. Multileaders can be created arrowhead first, leader landing first, or content first. If a multileader style has been used, the multileader can be created from that specified style. Let's review the multileader and some of the variables and concepts that make this tool a very important part of standards implementation in AutoCAD.

Multileaders can be found on the Annotate tab (Figure 1) of the ribbon under the Leader panel. Figure 2 shows all of the individual components of the Leader panel on the ribbon. Items 1-6 shown below are defined as listed (command shortcuts are shown in parentheses).

1. Issues the Multileader command (MLD). Command shortcut: launches current mleader style.
2. Pull down for your current multileader style (MLS).
3. Add another leader to a current multileader object (MLE).
4. Remove a leader from a current multileader object (MLE).
5. Multileader Style menu dialog box (MLS). Same as number 2 above.
6. Multileader collect (MLC).
7. Multileader align (MLA).

IT'S ALL ABOUT STYLE

If you work in Civil 3D like I do you already know the importance of styles. The same is true for the Multileader. Selecting the leader panel arrow as shown in Step 5 (Figure 2) will bring up the Multileader Style Manager as shown in Figure 3.

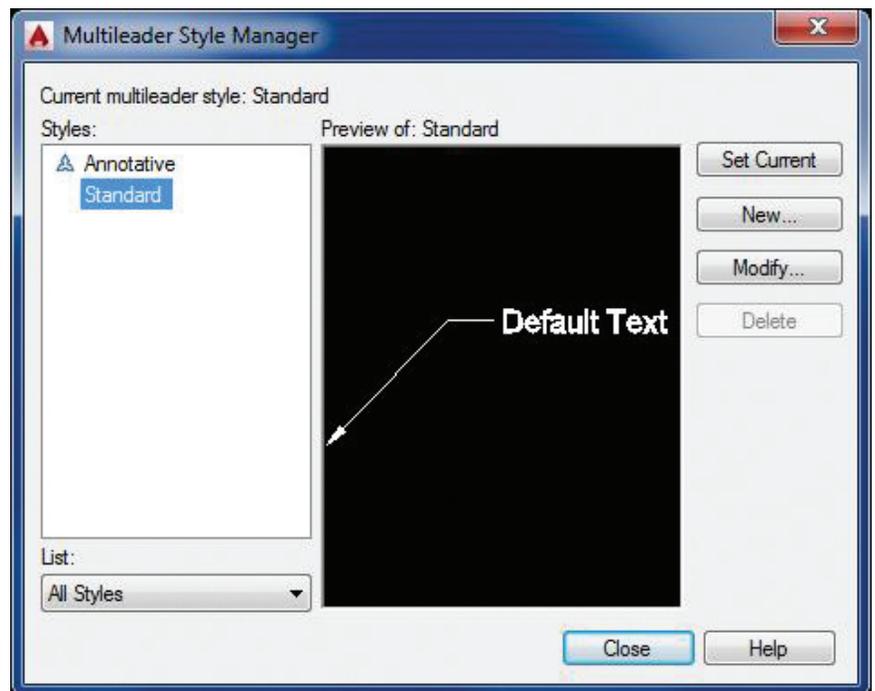


Figure 3: Multileader Style Manager



Figure 4: Multileader Style Manager

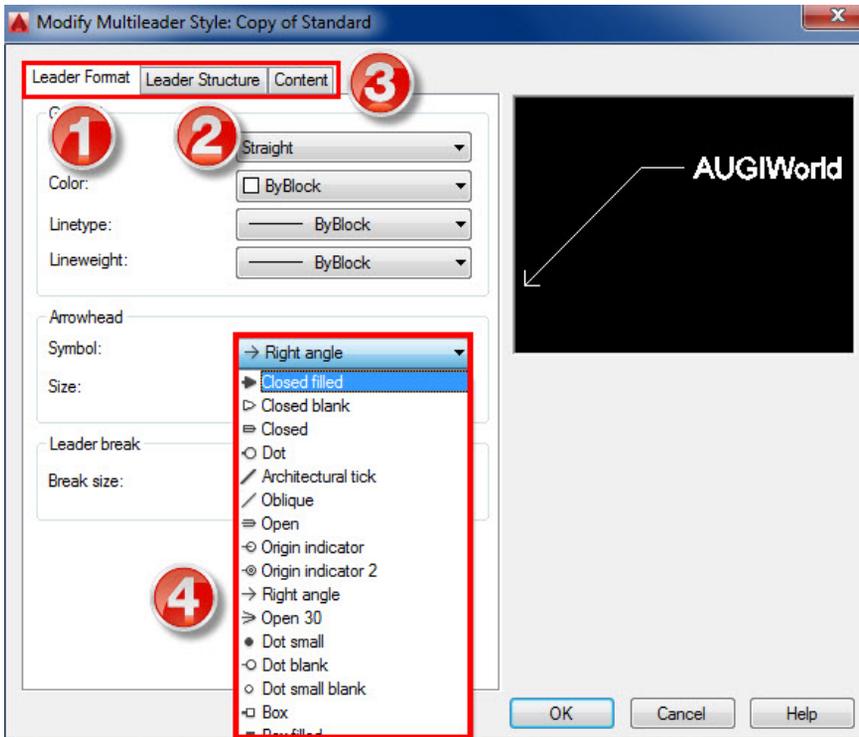


Figure 5: Define your new leader

The Multileader Style Manager is where we can create, modify, and delete multileader styles in our drawing and add to our current drawing and/or template. Hit **New** and type in **My New Leader** as shown in Figure 4. The default style is **Standard**. As with linetype and dimension styles, it is good practice to create new styles with unique names so you do not have a conflict with other users opening up your drawings.

After selecting **Continue**, the **Modify Multileader Style** menu will appear with many options for your new style. The **Style Manager** has three different tabs: **Leader Format**, **Leader Structure**, and **Content** (see Figure 5). Within this box you can define a default arrowhead format as well as text, to name a few. Let's continue to modify our new style by reviewing the steps shown below.

Leader format determines the type of leader you are going to create (i.e., type, color, linetype, line-weight). We are only going to change the arrowhead symbol and keep the leader **Straight** (you can also choose **Spline** or **None**).

1. **Leader Structure** is where you can set constraints, landing distance, and scale of the multileader.
2. The **Content** tab controls the content of the leader where you can specify **mtext**, **blocks**, or **none**. This tab is where we will set the default text to **AUGIWorld** as shown above. You can also change the setting to a block and have the leader connecting to an object or user defined block.
3. Under the **Leader Format** tab select **Right Angle** for your arrowhead as shown in step 4. Then move to the **Content** and type **AUGIWorld** as your default text. Hit **OK** then close the **Style Manager**.
4. Hint: When issuing the command don't forget to look at the command line. Autodesk has made some significant improvements to the AutoCAD command line in the last few releases; there are many options there that you may not be aware of.

You are now ready to try out your new leader by selecting the **Multileader** icon or typing **MLE** at the command prompt. Your current style will be listed directly right of the image as shown in Figure 6.

Continue on and create a template drawing with all of your **Multileader** styles and have those available to import into a current or new drawing. Figure 7 shows an example of how you can create several different multileader styles (annotative and standard) and place within one drawing as a guide. In the example the **RS=Romans** and the **ARB=ArialB** is the font style. The number (i.e., 12 = 12pt) represents the text size. Also, notice the **annotative** symbol to represent the **annotative** properties of the leader.

ARB=ArialB is the font style. The number (i.e., 12 = 12pt) represents the text size. Also, notice the **annotative** symbol to represent the **annotative** properties of the leader.

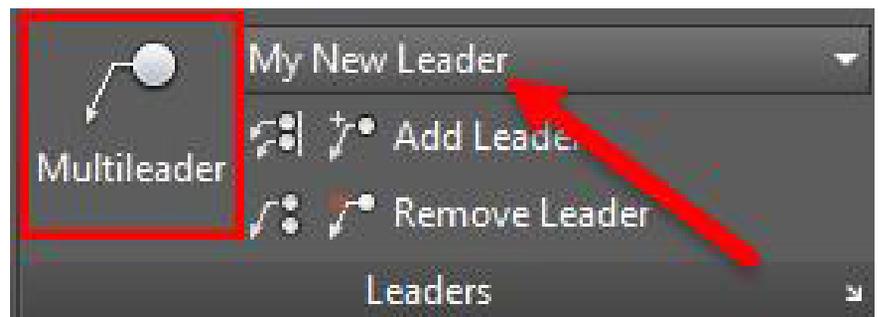


Figure 6: Define your new leader

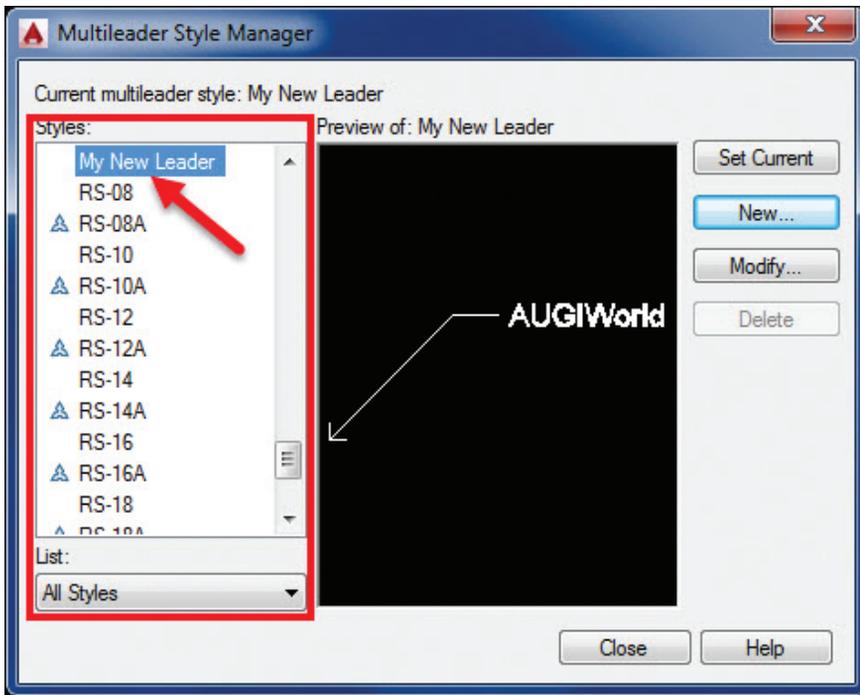


Figure 7: Define your new leader

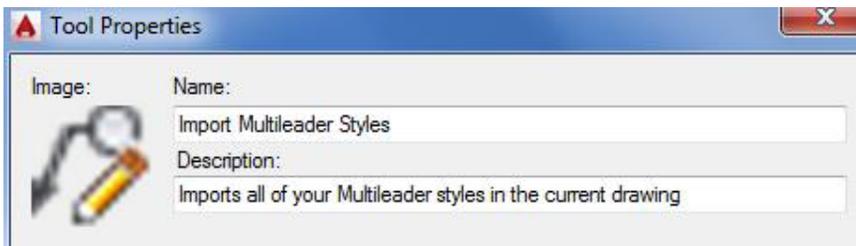


Figure 8: Multileader button tool

IMPORT THE MULTILEADER

Now that we have our template created let's take that one step further and add it to a button or a tool palette. Figure 8 shows an example image followed by the code needed to insert your multileaders into an existing drawing via tool palettes. You can do the same with the CUI by adding a new command. Several classes at Autodesk University online show you how to add a new command to the ribbon (look for AutoCAD Customization). We are going to focus on adding the command to a palette as shown in Figure 8; the code for the macro is shown below it.

The macro to insert our multileader styles will look like this:

```
^C^C_-insert;"C:/AUGI/My Leaders.dwg";^C^C_mleaderstyle;
```

First we will cancel any existing command by entering ^C two times. Next run the insert command (with a hyphen to suppress the dialog box) then the file path. Notice how I have forward slashes. In a macro a forward slash is used for the path; the typi-

cal backward slash will pause for user input and the command will be cancelled. Then finally we run the Mleader style command to show the user that the styles have been loaded into the drawing.

GET A GRIP

With right-click customization turned on, you can touch your multileader and use the multifunctional grips to quickly edit. You can use grips to manipulate a multileader's individual component, just as if it were several objects instead of a single object. Hold down the Ctrl key and click a multileader to select different pieces. You will notice the landing grip (blue arrow) to stretch the distance of the landing line. Making the grips hot, you can add leaders, remove leaders, and even add a vertex as shown. This will not affect your current multileader style.



Figure 9: Grip editing

MULTILEADERS IN BLOCKS

Start to create another new leader by using our current leader as our start from point. Under the Content tab change the multileader type to Block and select the Block as Detail Callout (see Figure 10). AutoCAD supplies us with several blocks to start and those are shown within the source list shown below.

Use the attachment drop-down list to specify how to attach the block to the leader. Pick the insertion Point Option to attach the block to the leader according to the base point. The Center Extents

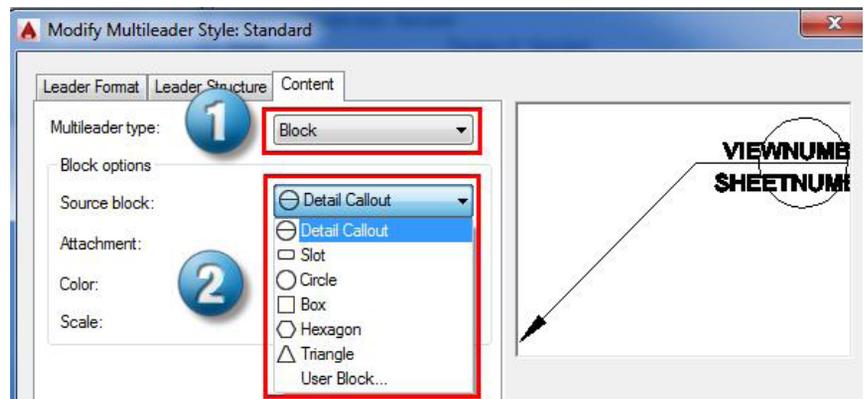


Figure 10: Use a block in Multileaders

AutoCAD 2015

option is used to attach the block to the leader by using the center of the block. Add the leader to your current drawing and see how you now have a block (with attributes) that reacts just as a multileader. You now have a block that contains all of the functions of a multileader—you can add leaders, move and the block object remains attached according to the setting you specified within the Content tab of the Multileader style.

COLLECT AND ALIGN

The collect and align multileader editing tools provide us a way to clean up and organize our drawings. MULTILEADERCOLLECT will collect the multileaders into one group as shown below. The image below (from Autodesk Help) shows a before and after scenario of collecting multileaders.

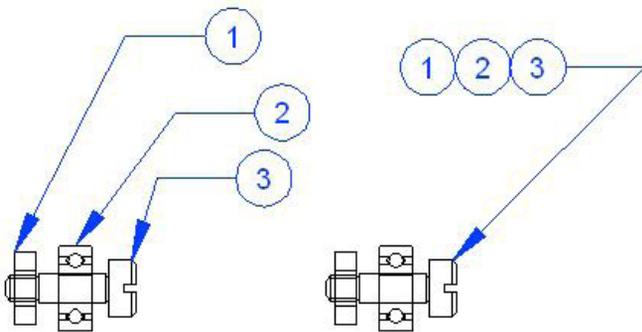


Figure 11: Align multileaders

The Align command helps us line up leaders in groups rather than moving and editing individually. If you want to change the spacing of the multileader objects, enter S and specify one of the following spacing methods:

Distribute – Spaces content evenly between two selected points.

Use Current – Uses the current spacing between multileaders.

Make Parallel – Places content so that each of the last line segments in the selected multileaders are parallel.

TOOL PALETTES AND MULTILEADERS

Tool palettes can provide one of the quickest ways to increase productivity without programming. A tool palette is a free-floating tab that you can bring up on screen and keep active while you work in your drawing so you have quick access to common symbols, commands, and most any other tool you need to complete the design. You can add any command from AutoCAD to a palette, creating quick access to all of your favorites and shortcuts. AutoCAD supplies us with multileader samples within the tool palette as shown in Figure 12. Create your multileader template drawing, then place on a palette. To do this just right-click and copy one of these leaders and paste to the existing palette or a new palette, then just replace the code with what has been provided. You now have your Multileader standards just a click away!

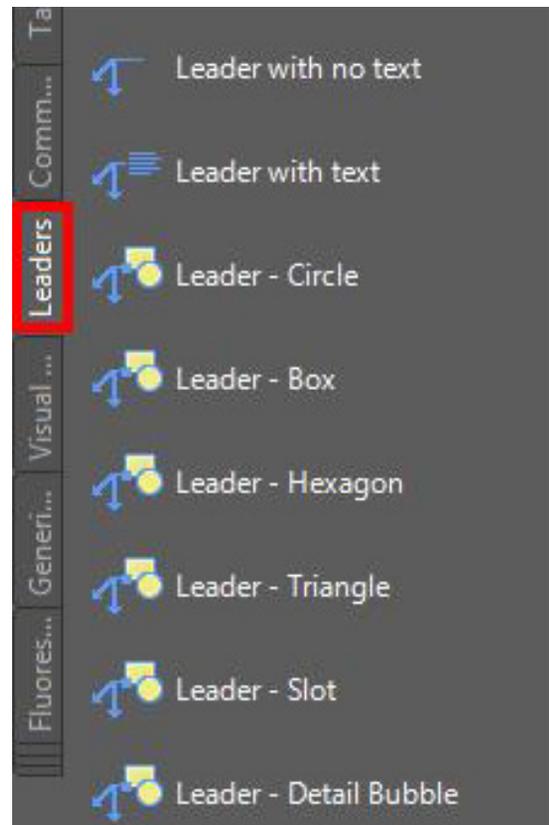
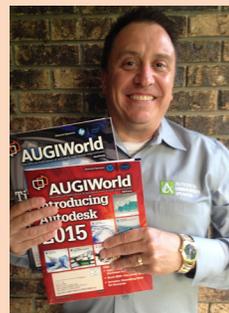


Figure 12: Tool palette example

CONCLUSION

Multileaders tools have been available in AutoCAD for more than six years. Take time out of your day to explore the possibilities of this tool which, in my opinion, is one of the most efficient and productive methods for labeling and identifying objects in AutoCAD. In this article we have covered a basic overview of the multileader object. Go out there and be a leader by taking control of how you edit and label your drawings. You will learn how to leverage the power and flexibility that the multileader has to offer. You will become more efficient and productive in this fast-paced world of CAD and design.



Sam Lucido is a CAD Services Manager with Haley and Aldrich, Inc. He has more than 20 years of experience involving design, user support, and customization. Sam is professionally certified in AutoCAD and finished his third year speaking at Autodesk University in 2014. He uses his vast knowledge about AutoCAD to help provide support to engineering and design teams with monthly tip sheets and online training. You can find his blog at CADproTips.com, twitter @CADproTips and he can also be reached at slucido@haleyaldrich.com.



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