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The Official Publication of Autodesk User Group International

July 2015

Great Tips for Managing

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- Processes
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[1]Units shipped based on IDC Quarterly Worldwide Workstation Tracker Q3 CY2014.

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Cover image:
Tampa Museum of Art 2014

Visit David's blog at http://caddhelp.blogspot.com.

Letter from the President

Your Board of Directors has been meeting more often than usual over the last month. The reason for this is that the board feels that AUGI needs a stronger definition of the following items:

- What do we do?
- How do we do it?
- Whom do we do it for?
- What value are we bringing?

With this in mind, we are asking for your input. What is it that you like about AUGI? What do you wish AUGI provided you? What do you feel is a waste of time regarding AUGI's benefits?

A very interesting question above is "whom do we do it for?" It seems obvious that the answer is AUGI's members, yet that is somewhat shortsighted. Just like any organization, AUGI needs new people. In fact, the design industry in general needs new folks. Just how AUGI can help attract new folks has been quite the topic over the last several months.

For example, would more career development-related resources be a useful thing for the membership? What are your ideas related to that? How about school outreach? What form could that take and would it be something in which AUGI should invest?

It is good for an organization to ask itself these questions every few years. It is even more important when an organization exists for the sole purpose of providing benefits to its members. The time certainly seems right for AUGI to ask these sorts of questions.

But the board cannot truly answer these questions in the absence of feedback from the membership. The board will be conducting surveys related to this over the next several months and we ask that each of you take a few minutes to provide feedback.

The board wants to be sure that AUGI's resources are put to the best possible use. The board knows which AUGI benefits are the most popular and beneficial to both the members and partners. What the board would like further data on is what other benefits or enhancements will be best for you and AUGI.

We look forward to hearing from you. If you have some feedback that you want to provide right now, please feel free to send an email to board@augi.com so the board can review it immediately.

As always, thank you for your attention and support.

R. Robert Bell
AUGI President

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by: Mark Kiker

Five Esses of Management Success

We all want to succeed at our tasks, positions, and careers. There are several areas that CAD/BIM Managers need to address to assist with their success. By starting or reenergizing these areas of review, you can push your progress forward.

STANDARDS

It always starts here. You have to get Standards rock solid. They must be followed to provide control over output. Standards must be respected as a tool to get better production, not an end in themselves. Your firm does not get paid for creating perfect CAD files of BIM models. They get paid to design. You want a bottom line—here it is: The Standard helps increase your speed, quality, and productivity.

In all my years of working in CAD and BIM, nothing has improved my environment better than a strong Standard/Guideline. Training has its value. Support has its benefits. Resellers and Autodesk can provide help. But nothing is more valuable to a Tech Manager than a Standard that has been created, tested in the trenches, and refined over time.

The reasons for this are simple:

- It allows your users/teams/firms to work together
- It allows your firm to unify the product
- It allows your staff to know what is expected of them and what to expect from others
- It allows your management to think about other things
- It allows you to measure success

The Standard should be as brief as possible and still be effective. Keep it as short and as simple as you can, but not so short and sweet that it is not effective. Cover what needs to be covered to the depth that is needed and then stop. Don't embellish. Keep the focus on the facts. Get the information produced and documented in understandable language that makes sense to your readers. Use plenty of screen captures if you can. Nothing beats a good screen shot of a dialog box with settings checked.

The Standard should not get overly focused, nor spend too much time documenting things that are not causing problems for people. Don't spend too much time majoring in the minors. If you do, you will create a monstrosity of a Standard that no one uses. The amount of time you spend on any given topic is related to the amount of time that you spend correcting problems for that area. If an area is not a problem, move through it quickly. If it is a constant source of troubles, then spend more time defining what is needed for that issue.

Don't expect anyone to read the Standard. Okay, you have just finished defining, collecting, collating, writing, and publishing your Standard. Now act like no one will ever read it. The reason I say that is because "if" people read it, it will be because you make them. Most of them will not care to read it. They will ask you what it says and they will expect you to know it like the back of your hand. They will seek the easiest way to get the information. If you are that way—they will use you.

SAVVY

This is your tech savvy. Like your Standard, it has to be current, relevant, and extensive. You need to know the tools you manage. If you are new to the role of CAD or BIM Manager, then your skills will still be sharp. As you move farther and farther from production, you start losing the edge that you may have brought by being the best tech jockey on the floor.

Keep current by staying connected to production. It might be that your job function includes production time, making this less of a concern. But if you are distant, then stay connected to the best production staff at your firm. Talk shop as much as you can. Pick their brains for the latest ideas. Run your management ideas past them. Stay connected.

STYLE

This is your management and leadership style. You need to understand how you approach each new idea, discussion, decision, and personal interaction. It is a combination of your demeanor, methods, drive, perspective, and desire. You will have to modify your approach from time to time depending on the situation and person/team. I call it Customized Leadership. It is a realization that one size does not fit all.

Early career managers often approach every situation using the same method. They expect others to bend to their will, or change their minds when information is provided. They may have one style—be it begging, whining, or demanding. When they encounter someone that does not respond to the standard approach, they have no other options. I encourage you to read as much as you can on management and leadership. You will use every concept and idea from all that you read at some point. Learn to be nimble and adjust.

SOLUTIONS

You have to provide solutions to succeed. Fixing problems is paramount. Keeping things moving is critical. But Tech Management is not just about maintenance. If all you do is keep the lights on, then you will fall behind. Obviously success is needed, but keep in mind that success breeds more success. Start with small achievements and build on them. People will start trusting you with bigger items. Providing solutions means that you focus on keeping people working. You get them back on task or develop a workaround while they wait for the ultimate fix.

STAFF

You may be the only person watching over the entire design technology environment. "Staff" may be just you. Count yourself lucky if you have staff helping you.

If you have staff, keep them on their toes and helping where needed. Interact with them in such a way that you build trust and confidence. You need to have them be an extension of you. Share your vision and goals; share with them your outlook and perspective; share your approach and plans. Keep them informed and a part of the conversation of CAD/BIM. Have them join in the planning and budget talks. Let them interact with vendors. You need to manage people as well as technology. You spent a great deal of time learning how to use the tech tools. Now learn about managing people.

If you do not have staff, ask for some. Do not be afraid to let management know that you can get more done with help. If budget precludes you from adding employees, then enlist the internal user community. Pull together a team of users and treat them just like staff. No, you cannot order them to do things, but you can ask them to help out. I have found that the best users want to be involved in management efforts. They have great ideas and want to share them. Keep them involved and you just might double your output and effectiveness.

By remembering all of these areas that share the same originating letter as success, you can smooth the road in front of you and build on your talents. Make a habit of leaning 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.

by: Curt Moreno

The "-ate" Tips for All New CAD Managers

The road may have been long and the work was definitely hard, but now it is your time. You have been promoted to the position of CAD manager for your production group or company.

Welcome to the big time, my friend. Your professional life is about to change!

MANAGED VERSUS MANAGING

We all know what it is like to be "managed," to be part of the giant mechanism in an engineering, architecture, or other design firm that is cranking out production designs. It is where we pay our dues and learn the ropes. It is where we start. It is also where we first learn what it is to have a "manager."

Being "managed" simply means that you were being guided by someone with a somewhat higher level perspective on project-related tasks. They knew when deadlines were scheduled, when people would be out of the office, and "how things are done" in the office. The CAD manager was the person you turned to when you needed help or when you needed something to do.

You were "doing CAD" and they were "managing" your work. And the relationship worked out pretty well.

STEPPING UP TO THE ROLE OF CAD MANAGER

Things in your CAD production work life worked out so well that you have now been promoted to being the CAD manager. It is time to leave your old position behind and move into a role of leadership. This can be an easy transition for some and a bit more difficult for others—especially for those who may not consider themselves "management material" or "a people person." But there are two important facts to keep in mind. First, your supervisors have seen in you the makings of a person who is capable of being a fine CAD manager. Second, anyone can become a good manager. Management is just one more skill that you will have to work to develop in the same manner that you developed your CAD and production skills that led to this new position.

So have faith that you are more than ready for this new challenge. Having said that, a few tips for the newly minted CAD manager can only serve to get you started on the right foot. So check out the following list of "-ate" tips that will help you start off strong in your new job.

From "coordinate" to "educate" to "participate," there are tips here for everyone. So take these seven tips to heart and prepare for success!

Coordinate. Naturally, being a CAD manager eventually leads to … well … managing. That means that it is time to put on your organizational hat and put things in order—both literally and metaphorically.

Begin with the physical space. That means cleaning up the CAD room, tossing out the old unneeded plots, and ordering supplies. It always helps to have what you need where you can find it. Next on your list should be your staff. Be sure they are all up to date on employee reviews and have access to training resources. Both of these items are quick to visit and can have immediate return on your investment.

Another vital area of coordination is your production schedule. Without an organized handle on this vital listing of projects and deadlines, along with assigned staff, it will be impossible to project workloads. However, with it you will be able to coordinate your workload and staffing availability to ensure that deadlines are met. It will also make it possible to approve time-off requests without danger of being caught short-handed.

You might find that a good, old-fashioned Gantt chart is the easiest way to keep all your production timelines in check. It easily illustrates current workload and the duration of project phases. On top of that everyone will see just how on top of things you are when you bring your nifty chart to those weekly staff meetings!

Communicate. Being a CAD manager carries a good bit of overhead with it. There are all sorts of new tasks and responsibilities that simply were not part of your world when you were a member of the production staff. From managing the workload of projects to mediating minor disputes between staff members—your new responsibilities will be wide and varied.

Obviously it will take a diverse set of skills to make all of this work. Organizational and technical skills are among the many that you will need, but there is one skill that will help across all of these new tasks: communication. Working to become a better communicator can only serve to be a huge asset in all facets of your new position.

Whether you are working with production staff to hit a fast approaching deadline or working with project managers to hammer out difficult design issues, better communication skills are a must. Work to be open about your concerns and work to be open to the concerns of others. Just as important, do not hesitate to let your staff members know where they can work to improve their skill sets and congratulate them when they rise to the occasion.

Raising your communication game can be a challenge for some technically-minded people. It may even prove to be uncomfortable at times, but don't look at that as a barrier. Look at it as another opportunity to lead your production staff by example and to show your supervisors that you are the right person for this new job!

Estimate. Estimating might be the single hardest of all the dark arts. "How long will this take?" is more than a simple question. It determines so many things. How many people will we need? How much we should charge. Do we need to bring in contractors? How much other work should we schedule to keep people working? How soon can we promise the next project?

The answers to all of those questions begin with the estimate. So it is an important skill.

As a CAD manager the importance of estimating is increased by several factors. Now you are not only creating estimates for yourself, but your entire team. Still, estimating does not have to be a terrible experience if you go about it correctly.

Take any common task your company turns out, perhaps a plan sheet, and examine it. Make note of the type of sheet it is, the complexity of the design, the amount of text, and the general amount of "white space" on the sheet. Then, guess.

That's right, guess. Then write the guess—er, the estimate—down and give the project to a production-level staff member and ask them to repeat the process. Then write their estimate down.

Now have them complete the work for that sheet, keeping an eye to how long it takes. Once the task is complete make note of the actual time and record it. And repeat. A lot. A whole lot, in fact.

Over the course of time you and your staff will find that your ability to correctly estimate time will improve dramatically. More importantly, your collective skills will improve together. This offers an added bonus of a complete understanding by the entire production staff of how long any given task will take. That is great for them in terms of productivity and great for you in terms of your bosses seeing how accurate you can be!

Educate. Managing is about more than just being the "boss" and handing out the assignments. Management is about guidance in all forms. A good manager guides production. A good manager shapes output. And a good manager educates those who are earlier in their careers.

When a person starts their new career as a CAD professional they really don't know much. They have the skill they learned in whatever place they learned to use the CAD product. But whether that was college, a vocational school, or YouTube, they don't have the experience to support and grow that skill. As a manager, it is your job to share your experience and guide them to grow their own experience and skill set.

While technical people are often "uncomfortable" dealing with other people, this is a task that you must make first-nature. You must be able to help those around you in making judgments on work-related matters. You must share your experience to help your team reach the deadline or raise morale when it is low. And, of course, you must be able to sit down and tutor those who are not as skilled as you with more advanced topics.

This sort of stewardship is a growing experience for everyone involved. Not only are there the obvious benefits to your teammates who will gain from your knowledge, but you will also grow as a teacher and communicator. And it is very likely that your own stock will rise in the eyes of your supervisors as they watch you guide and educate the entire product staff and raise the bar for the whole team.

Elaborate. We live in an era of brevity. Everyone is in a rush and time has been money since the watch was invented. This means that every minute has to count. It counts for getting things done. It counts for reducing costs. And it counts in just being able to cram more into the workday. So it only makes sense that you should make things as brief and concise as possible, right?

Wrong.

Everything you just read regarding the fact that time is limited and saving time saves costs is 100 percent true. It is so true, in fact, that it is a cardinal sin to have to revisit work that was done incorrectly or instructions that went misunderstood. These situations not only cause confusion and mistakes, they also lower morale and lower your standing as an effective manager.

So, how does a new CAD manager avoid this pitfall while maximizing the value of time? You elaborate.

This might seem somewhat cryptic, but it does not have to be. And it boils down to just one skill: you must elaborate. Elaborate when giving assignments. Elaborate when explaining a solution. And elaborate when teaching a new skill. Elaboration is the hidden tool of efficiency.

Collaborate. Your first assumption as a CAD manager is that it is up to you to be in charge. You are the CAD manager, right? That might frighten many new CAD managers. After all, it is lonely at the top. But it shouldn't be.

If you resist the urge to stand atop the career ladder and issue commands, you will find that life is better for everyone involved. Best of all, it doesn't have to be difficult. All you have to do is be open to other people's ideas and comments and to include their input in decisions.

This does not mean that all decisions are democratic. Not at all. It means that as a manager you take the time to discuss and collaborate with your production staff on matters that do not require a unilateral decision. Take a moment and ask for input on arranging the plot room. Ask for suggestions on the new workstations upgrades, or ask for thoughts on the topic for the next lunch and learn.

Though the final decision on most of these topics remains with the CAD manager, you will find that people enjoy participating. Even if the final result doesn't go their way, your CAD staff will almost certainly have more buy-in if they know their voices have been heard.

Participate. Traditionally, being the "manager" meant that you were set apart; you had been elevated above others. This sort of thinking led far too many managers into a world where a barrier grew between themselves and their production staff. And that sort of situation will always serve to hinder work.

Instead of thinking of yourself as being "set apart" from the team, put extra effort into being part of the team!

Take the time to have conversations with people that are not just production-related. Ask them about their weekends or go to lunch with them in a group. Share a funny story with the group or just ask about the last big sports event. All of this sort of communication lets everyone know that you haven't lost touch with the people you used to work with. And when it's time to work, don't hesitate to roll your sleeves up and help out. Always be willing to take on any task to help ensure that your production staff can get the job done and make the deadline every time.

This might all seem basic, but remember that you have to overcome the great obstacle of now managing those who used to be peers. Participation and showing people that you "haven't changed" can blow that obstacle right out of the water!

MANAGING TO DO IT ALL

You are the new CAD manager. You've got a whole new set of demands that you will have to measure up to and a whole group of people that will be looking to you for leadership. That can be an intimidating position and some people don't make it, or just make their way along in a mediocre fashion.

But if you employ all, or even just a few of the seven tips listed above, you will begin to climb over those obstacles. Between coordinating, communicating, and estimating you will have a head start on getting your space and work in order. Educating and elaborating will help your production staff raise the bar and achieve more every year. Collaborating and participating will ensure that your production staff feels that their voices are heard and that you are still part of the team.

Welcome to this new world of management and all that it has to offer. If you find success with these tips or possibly even have your own eighth "-ate" tip, send me an email and tell me all about it. You can never really have too many -ates, now can you?

Based in Houston, Texas, Curt Moreno is a CAD Coordinator for a civil engineering firm and the owner and editor of the Kung Fu Drafter blog. He began using AutoCAD with Release 10 and has spent the past 20+ years working with various Autodesk products including AutoCAD, Civil 3D, and other design applications. Curt is also a freelance content creator, featured Autodesk University speaker, training content developer, and a member of the board of directors for AUGI. In his spare time Curt writes, games, and spends time with his dog.

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https://www.onshape.com/

Onshape is the first and only full-cloud 3D CAD system that lets everyone on a design team simultaneously work together using a web browser, phone, or tablet.

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http://www.123dapp.com/tinkerplay

Autodesk Tinkerplay is a free app that lets you design and customize your own creatures and characters on your mobile device and make them real using a 3D printer.

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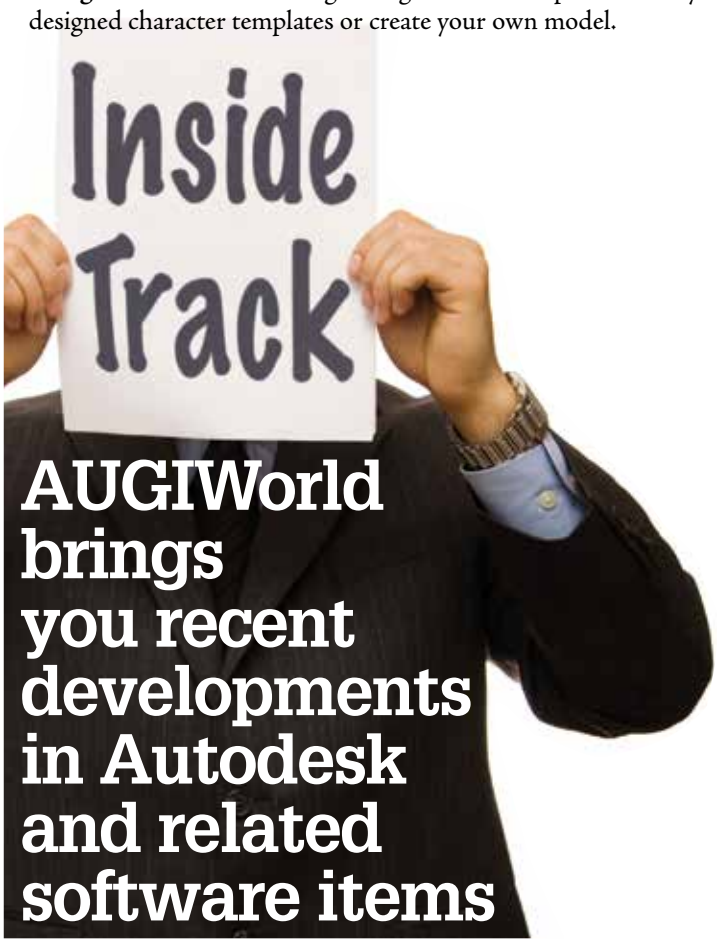
- **Customize** – Select from various textures and colors to truly personalize your design.
- **Set the scene** – Add an extra touch by placing your creation in different scenes—who knows where the journey will take you?
- **3D print your creations** – Tinkerplay makes 3D printing a snap. It organizes parts by color and neatly arranges them so you get a perfect print every time.



AUGIWorld brings you recent developments in Autodesk and related software items

http://www.autodesk.com/store/dynamo-studio

Dynamo has been out for a while now, but recently it has become a part of Autodesk software suites!

This has spawned another item called Dynamo Studio, a standalone programming environment that lets designers create visual logic to explore parametric conceptual designs and automate tasks. Users can solve challenges faster by designing workflows that drive the geometry and behavior of design models. Dynamo Studio lets you extend your designs into interoperable workflows for documentation, fabrication, coordination, simulation, and analysis.

Explore parametric design concepts in a lightweight environment to iterate faster and earlier than ever

- Rapidly test and iterate your designs so you can study more options in less time
- Solve complex geometric problems with visual logic even if you don't know how to program
- Automate repetitive tasks for more precision and speed

Visualize geometry in a standalone environment

- Access a world-class geometry library to create solids and surfaces compatible with most downstream needs
- Work live in shared collaborative environment without the need for export
- Communicate to other applications from within Dynamo Studio for further insight, including Revit, Robot, Rhinoceros, NavisWorks, SAP2000, Excel, Google Spreadsheets, Tableau, and more

Extend computational design into other professional applications smoothly and more effectively

- Design parametric geometry that translates into Revit families
- Communicate your work easily and efficiently with project teams with shareable content
- Harness the power of BIM so you can realize design changes without remodeling and build systems, not just models

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: Jay Zallan

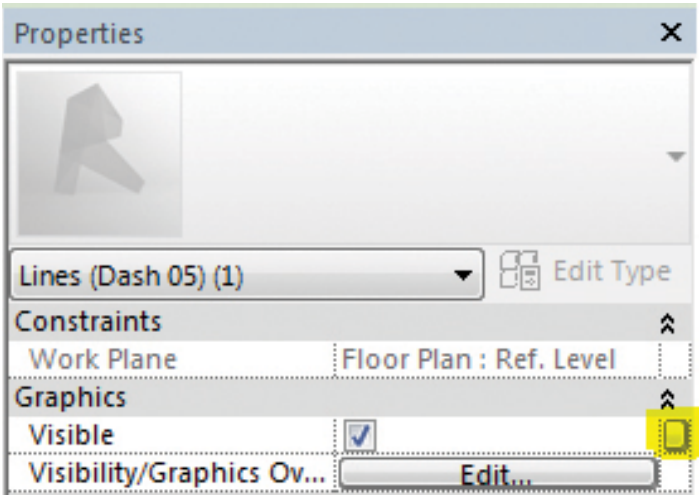
Revit on the Line: Line-Based Families

Create line-based content for general and specific Project Design. In this article we will go over Line-Based 101 | The Detail Component.

We will be using a "seed" file for efficiency, so I suggest that newcomers read the processes first, then create the families with the step-by-step in-hand ;) …but first:

FIRST LINE OF ATTACK | PLANNING

These concepts and (maybe all family) methods can be transposed to many, many other families; at times exactly, at times similarly, at times just in spirit. Planning is fundamental to creating with predictability, flexibility, and… success.



Assess

Consider what you want, when you want it. Assess the parametric needs, graphic needs, informational needs, etc. Think (about what is needed now as well as what might be needed later; one can always make the family progressively more complex), Re-Consider (how complex it needs to be), Re-Think (the final output needs—don't put in any more than you need, but no less either). Also mix-in conversations with others—this always helps prove or disprove perceived concepts and usually saves overall project time. And then…

Plan

Plan how to create what you want, when you want it, etc. Capture and diagram everything from the assessment phase and strategize the desired results. *(A Family-Planning example is included at the end of this document!)*

Create

Create the best you can; and what that means is better than you ever have previously. The planning should allow this! If training is needed; do it. Remember the Internet—someone has most likely done "it" before, or at least tried something similar and by reading other's successes and failures you can propel yourself further than you might have expected previously.

Validate

This is to find out if in fact the content project is moving forward successfully. Validate the first piece, the first set of pieces, and the entire library. Do an honest review, use a peer group as well…find if it truly works perfectly and, if not, then repeat the process for those items, rebuild until "perfect," and then move forward.

LINE(R) NOTES

- Flex (Test) at every step. The better one gets the more this needs to be done consciously ;-)
- Successful Flex=Save
- Unsuccessful Flex + Fix + Flex again (Repeat until Successful Flex)

- ALWAYS make at least 1 type—no matter what!
- If you don't create at least 1 Type DO NOT PASS GO, DO NOT COLLECT $200 ;-)
- It's recommended to set up family templates with objects that will be repeated throughout (such as Line Styles, etc.) This may generate many .rft's for each kind of family template, but it does follow a standard BIM workflow I like to forward:
  - **Make it Once, Use it Many Times**

Modifying a Family Template

- Create a family from an existing .rft
- Save the family
- Make modifications
- Save
- Change .rfa to .rft (accept the Windows warning). Some items will not go away after this so do be mindful of what is included in the .rft modifications

LINING UP | OUR PLANS

01 | Detail Item | Line Based Component

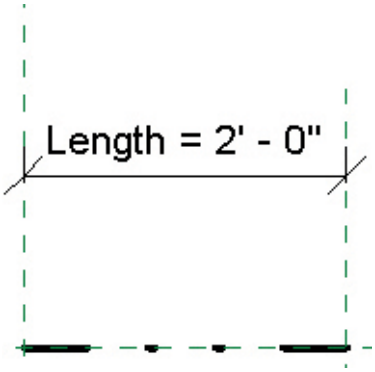
Sheet Waterproofing

Preliminary Lines | Detail Item | Seed Family

STEP 00 | Make Geometric "Seed" Family

PROCESS | Big R (Application Button) > New > Family > Detail Item.rft >

- **Create Length Parameter:** Create a vertical Reference Plane (RP) to the right of the insertion Ref Plane, Dimension (from Ref Plane to Ref Plane > Parameterize the Dimension > Name=Length > OK. Once back in the family environment flex the dimension (now a parameter) to verify that it works; if so move on, if not undo and start step 00 over)
  - **Save As: Seed Lines**
- **Create One Type per Line Style** *(Line styles are not covered in this article, as there is at least a basic understanding necessary to create families, so remember that these would need to be created ;-)*
  - **Family Types > New Type > Dash 05 > Apply > New Type > Dash Dot Dot 05 > OK …(Repeat for each line style)…**
- **Draw a Dash 05 line** and lock it to the horizontal Ref Plane. Be sure to snap to vertical Ref Planes so Length works > Flex, if good Save (If not retry) > Select the line and push the Associate parameter button to the right of "Visible" > Make a New Parameter called Dash 05 (this will be a visibility parameter that we'll hook up to the Type) > OK
- **Draw a Dash Dot Dot 05 line** and lock it to the horizontal Ref Plane, be sure to snap to vertical Ref Planes so Length works > Flex, if good Save (If not retry) > Select the line and push the Associate parameter button to the right of "Visible" > Make a New Parameter called Dash Dot Dot 05 > OK
  - **Setup the Types** Make sure the proper line is associated to the similarly named "Type"
  - **Flex Length**
  - **Save** (When working properly)
  - **Load Into Project**



Seed Family with "Dash Dot Dot 05" and "Dash 05" lines as shown individually

Main Line | 01 | Detail Item | Line Based Component

Our planning process ;-) dictated that we create the detail component with the following requisites:

Family Name | Sheet Waterproofing

Type Name 01 | Tyvek

Type Name 02 | Typar

Parameterization: Length (I) Built-in | Family Types (T) | Offset from placement points (I)

STEP 01 | Make the Family

PROCESS | Big R (Application Button) > New > Family > Detail Item Line Based.rft

At this point one would nest AKA: load in the Seed Family

STEP 02 | Make Two Types

PROCESS | Family Types Button > New… Family Types > Name "Tyvek" > New… Family Types > Name "Typar" > OK > Save.

Revit Architecture

STEP 03 | Create Offset Parameter

PROCESS | Reference Plane (RP) -Input above families' Ref Plane (about 3" to 6" away, exact distance not important (yet)) > Create a Dimension (from Ref Plane to Ref Plane (NOT REF LINE) > Parameterize the Dimension > Name=Offset > OK | Once back in the family environment change the dimension (now a parameter) to 1". If it works move on; if not, undo everything and start step 3 over)

STEP 04 | The Geometry Part 01

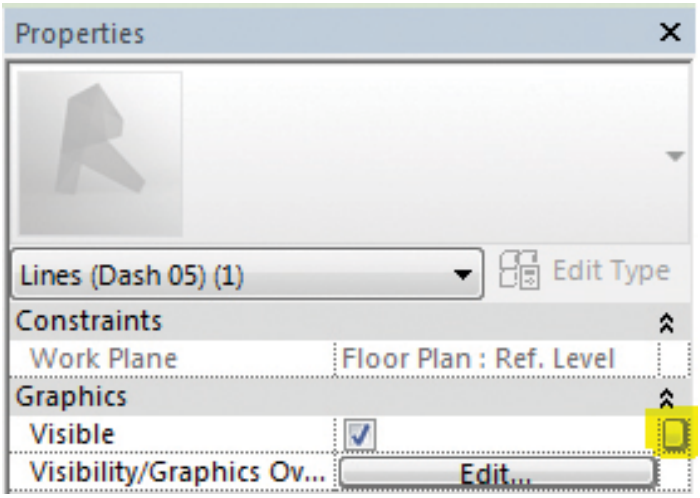
PROCESS | Place a Dash 05 and align/lock to the vertical Ref Plane and the "Offset" Ref Plane > Lock > Flex > If ok, Save.

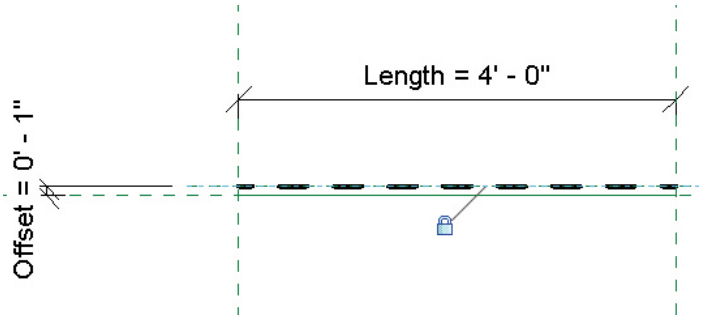
STEP 05 | The Geometry Part 02

Place a Dash Dot Dot 05 and align/lock to the vertical Ref Plane and the "Offset" Ref Plane > Lock > Flex > If ok, Save.

STEP 06 | Visibility Control part 01 | Setting Up for Types

PROCESS | Select the line Dash 05 > (see images below) push the Associate Parameter button for "Visible" > Create a parameter (Type) named Dash 05 > OK > temporarily hide element > Select the line Dash Dot Dot 05 > push the Associate Parameter button for "Visible" > Create a parameter (Type) named Dash Dot Dot 05 > OK > Reset temporary hides > Save.





STEP 07 | Visibility Control Part 02 | Setting Up the Types

PROCESS | Family Types > Set the Type "Tyvek" to have "Dash 05" on and "Dash Dot Dot 05" off > Set the Type "Typar" to have the converse "Dash 05" off and "Dash Dot Dot 05" on > Flex > Save

STEP 08 | Final Flexing | The Real Test for Success | THE PROJECT TEST

PROCESS | Create a new Project from an OOTB (out of the box) template > Load in the family > Place a few of each and switch types, change sizes, etc. to see if it all works > If working, then it's ok to load into a real project…if not ☹ Something needs fixing ;-)

When it's all working: Voilà | End of Detail Component | Line Based 101. Now you can Tag and Keynote those items that look like and act as lines, yet are not "only" lines… they're data-filled now!

Architecture | Technology | Creativity

These are Jay B. Zallan's professional passions: an intense and well experienced Virtual Design and Construction, BIM Leader. Designer, Artist and an AEC technologist

As an AECO BIM & VDC leader, Jay brings unique & qualified insights into the business & creative processes of Architecture, focusing on large projects and large teams through communication, collaboration and shared goals. Jay brings proven strategies, leveraging technology, both human and mechanical, building teamwork toward efficient project delivery

Mr. Zallan has more than 20 years of Architectural experience and enjoys a varied & diverse portfolio of Architecture and Art

Jay is an Autodesk Expert Elite member, President @ Los Angeles Revit Users Group, AUGIworld magazine Revit Architecture Editor and Graphic Standards' BIM Advisory Board

A speaker at Autodesk University, Revit Technology Conference(s) and lecturer on Creativity & Architecture at the University of Southern California, Cal Poly, LACMA, as well as various AIA & CSI events

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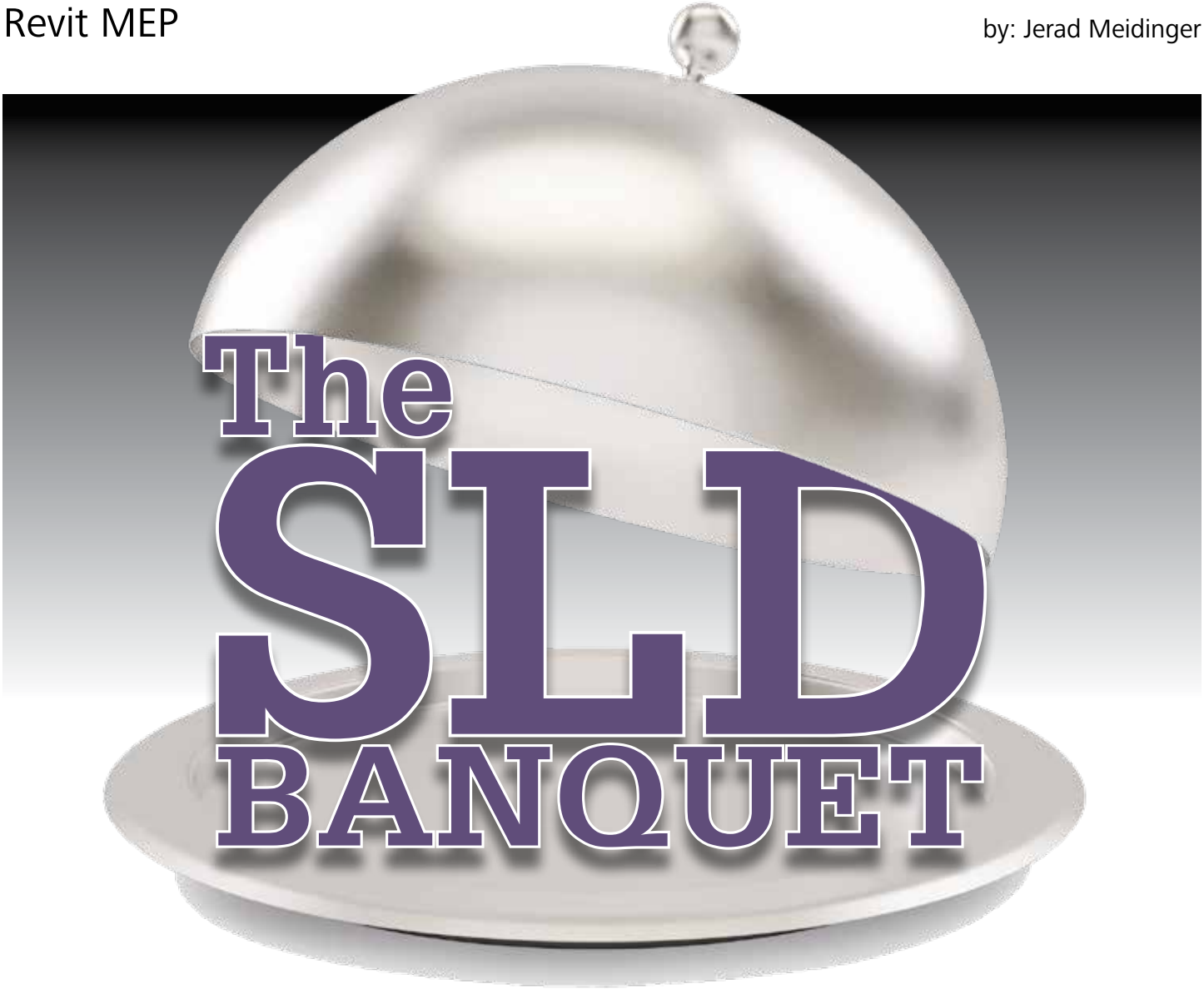


The SLD BANQUET

Electrical single-line diagrams (SLDs) have been a hole in Autodesk® Revit® software. Fortunately, there are ways to implement SLDs into Revit, but it requires a little legwork and some workarounds. The goal of this article is to show these workarounds and guide you in a direction to implement Revit-generated SLDs into future projects. The article utilizes a family that can be downloaded from the internet at http://www.jeradical.com/SLD Panel Tag jm.rfa

BENEFITS OF REVIT SINGLE LINE DIAGRAMS

Unfortunately, even on Revit projects, SLDs typically must still be done in AutoCAD®. The information is in the model, sitting on the "BIM platter," but there are no utensils (Revit families) to access it. Because of this required AutoCAD crutch, extra time is required to tidy up a project (i.e., AutoCAD titleblocks must match Revit titleblocks, panel naming and sizing must be consistent, feeder sizes must be coordinated between the two separate design files, etc.). During crunch times, some of these double-checks may be overlooked, and it can lead to a disgruntled boss, engineer, architect, contractor, or owner.

If an SLD is implemented in Revit, using the information nested within the families, fixes can be implemented once and automatically updated elsewhere. Overall, this reduces the time required to make design changes, allowing for more efficient work.

GETTING STARTED

There are several steps to implementing SLDs into Revit, and they can be summarized as:

1. Evaluate a sample SLD
2. Create an elevation view
3. Build required families
4. Tag all equipment
5. Block out background
6. Annotate where necessary

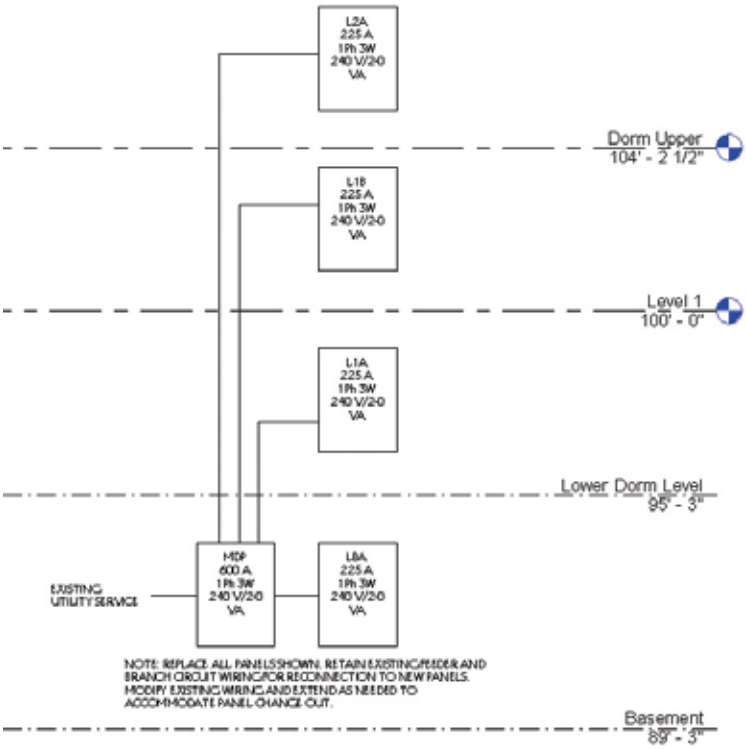


Figure 1: Example of Revit SLD

STEP 1: GATHER A SAMPLE SLD

The first thing to figure out is the current company standard is for SLDs, which is done most easily by looking at an existing SLD (typically produced in AutoCAD). Some firms may be very particular on how the appearance comes across while others may allow for more liberties. Make sure that the SLD is printed full-size for exact dimensioning purposes. This sample should be similar to the example provided in Figure 1.

STEP 2: CREATE AN ELEVATION VIEW

Begin creating the SLD by creating an elevation view of the building. It is not required to be facing any particular direction, but the best user experience will be the view that maximizes the number of panel faces perpendicular to the elevation.

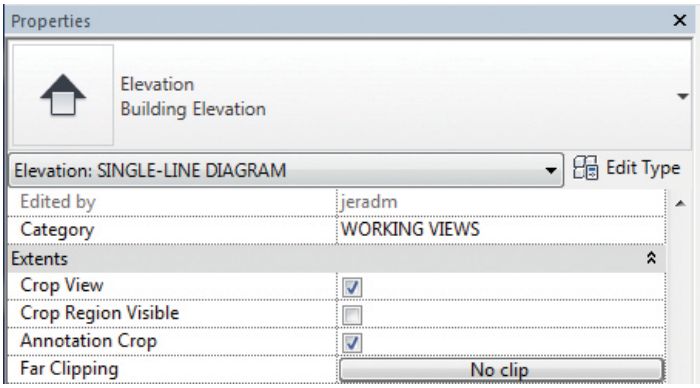


Figure 2: Cropping helps reduce the SLD size

Name this new elevation view SINGLE-LINE DIAGRAM, and choose a scale that will make text heights consistent throughout the project. For this example, 3/8" = 1'0" was chosen.

In the Visibility/Graphic dialog box for the new elevation, modify it to hide all linked files (assuming that levels have already been copy/monitored into the project). Also within the dialog box, modify Annotation Categories to show only Electrical Equipment Tags, Levels, and Text Notes. Ensure that under Model Categories, Lines and Electrical Equipment are shown.

In the elevation view's Properties pane, turn on Crop View and Annotation Crop.

Crop the view to a size that includes all equipment that will be included in the SLD. If the equipment is excluded from the cropped view, its annotation will be excluded as well, so be sure to include it.

For a cleaner looking SLD, level names should be all on one side of the diagram. This can be toggled similar to how grid bubbles are toggled, via the checkbox on each end of the level.

STEP 3: BUILD FAMILIES

Once an SLD is available as an example and an elevation view has been created, it is time to start building an annotation family. The first useful family is one used to represent electrical panels. Create a new family using Revit's Electrical Equipment Tag.rft template file.

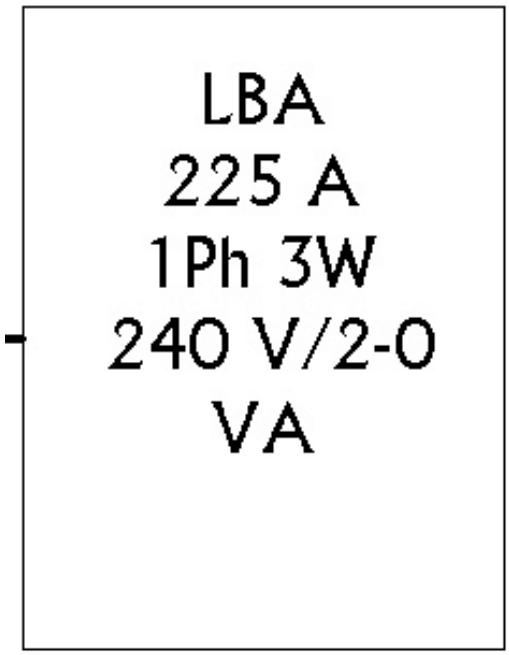


Figure 3: Finished panel tag family should look like this

Label Parameters

	Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
1	Panel Name	1		LBX		☑
2	Type Name	1		225A		☑
3	Voltage	1		XXX	V	☑
4	Number of Phases	1		3	Ph	☐
5	Number of Wires	1		4	W	☑
6	Electrical Data	1		Electrical Data		☐

Figure 4: Potential label parameters

Measure the physical dimensions of the example SLD and have the numbers handy. Create a box made from lines (Create Tab-> Detail Panel -> Line). Match the dimensions of the example SLD. For a better user experience when tagging individual panels, make sure that the intersection of the reference planes is nearly centered within the box. If they are not shown, they can be turned on via the Visibility/Graphic dialog box.

Next, insert a label (Create Tab-> Text Panel -> Label). Specify its placement within the box and include parameters consistent with the company current standard (or at least very close to it). This may require a bit of trial-and-error to work properly, but it will eventually work out. Be sure to include breaks, prefixes, and suffixes where required. It can also be helpful to use meaningful Sample Values for a good check while building the family. Example parameters can be seen in Figure 4, but each firm will be slightly different.

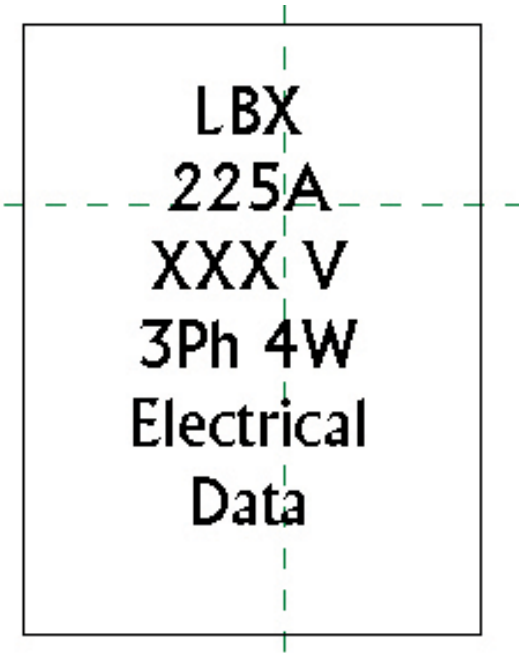


Figure 5: Example of family with sample values being used

Once this family is created, save it and then load it into the project. Congratulations on creating your first utensil and being one step closer to enjoying the information steaming on that BIM platter. Get ready to enjoy!

STEP 4: TAG ALL EQUIPMENT

Now that the family has been created, it is time to dig the utensil into the BIM platter by placing the family into the SLD. Open the SLD elevation view and Tag by Category for the panels shown in the view. The tag initially placed may be different from the one created, but just switch it after it has been placed. It is also possible to use the Tag All feature for this step. This may cause some overlapping of the annotations, but just nudge/move them around to have spacing consistent with the company standard.

Note: Unfortunately the physical representation of the panels will still show up in the view, which is a major *faux pas* in SLDs. Furthermore, if the physical representations become hidden in the view, the annotation will also become hidden in the view. Fortunately, there is a workaround for this issue, as detailed in Step 5: Block Out Background.

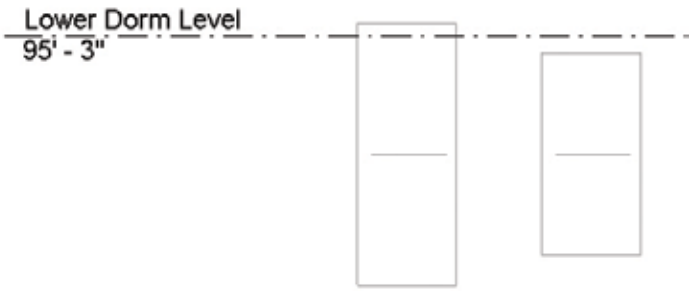


Figure 6: Example of panels showing up when undesired

STEP 5: BLOCK OUT BACKGROUND

Now that the BIM platter has been tasted, a little cleanup is required. After all, what feast is complete without a napkin placed on the table?

This next step requires the use of the white, non-inverted background. If the inverted background (black) is in use, this workaround will not work properly.

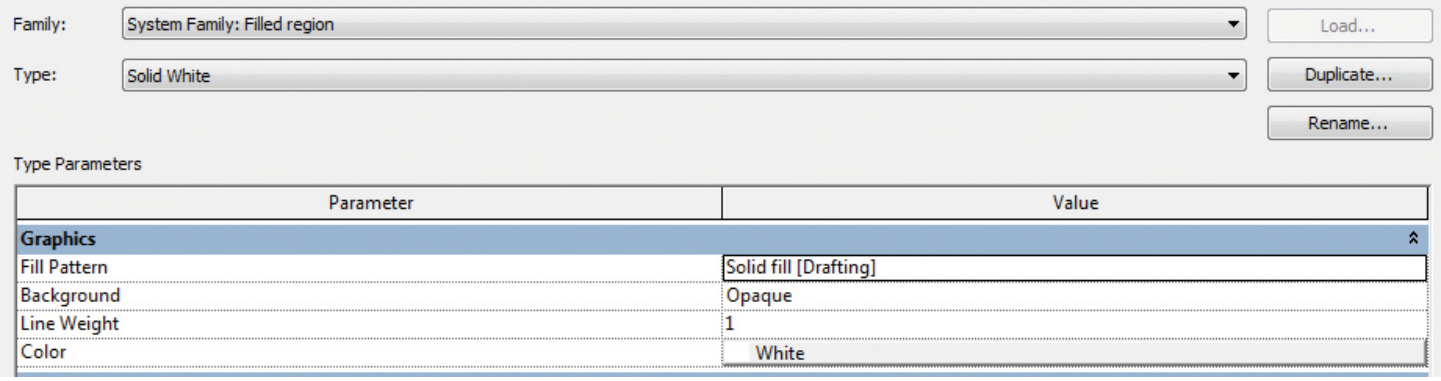


Figure 7: Solid white filled region

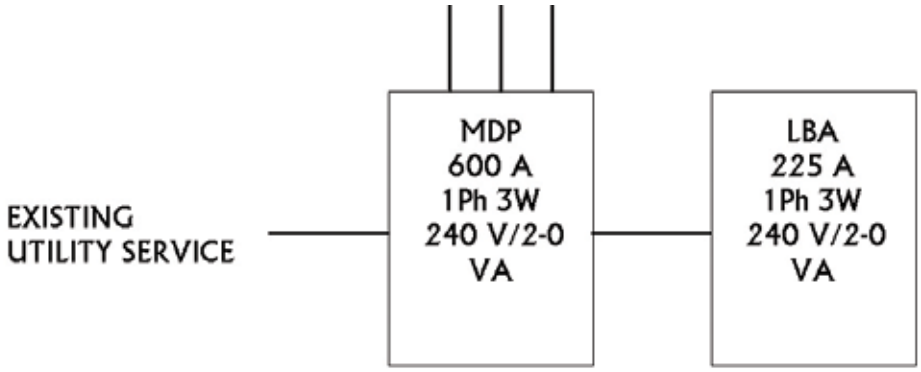


Figure 8: Lineweight projection example

At locations where a panel is showing up, begin creating a filled region (Annotate Tab-> Detail Panel -> Region Dropdown -> Filled Region). Make sure this region fully covers the panel. It can also cover multiple panels, if desired.

Unfortunately, the filled region should default to a type that is not useful for this, so it must be changed. Hit the Edit Type button in the Properties panel. If "Solid White" is an option, choose it. Otherwise, it must be created. Set the following type parameters:

- Fill Pattern: Solid Fill
- Background: Opaque
- Color: White

It is not merely a coincidence that napkins are typically white and rectangular and are used to clean up unwanted extra food. These white, rectangular regions also cover up unwanted Revit elements. Once the SLD is covered with these filled regions, it is time to move on and add some finishing touches.

STEP 6: ANNOTATE WHERE NECESSARY

Now that panels are tagged and showing up in the SLD, connect the annotation symbols together via Detail Lines (Annotate Tab -> Detail Panel -> Detail Line). These single lines diagrammatically represent the conduit connection between two panels. Once again, be sure to conform to the existing standard SLD example.

Being consistent with the SLD example may require creating another Line Style. The example in Figure 8 uses a Lineweight of 3 and its color is Black. If necessary, Line Styles can be added to the project (Manage Tab -> Settings Panel -> Additional Settings Dropdown -> Line Styles).

In any given Revit project, the uppermost power distribution equipment is not modeled, so add text annotation to the SLD to represent objects that may not be modeled within the project.

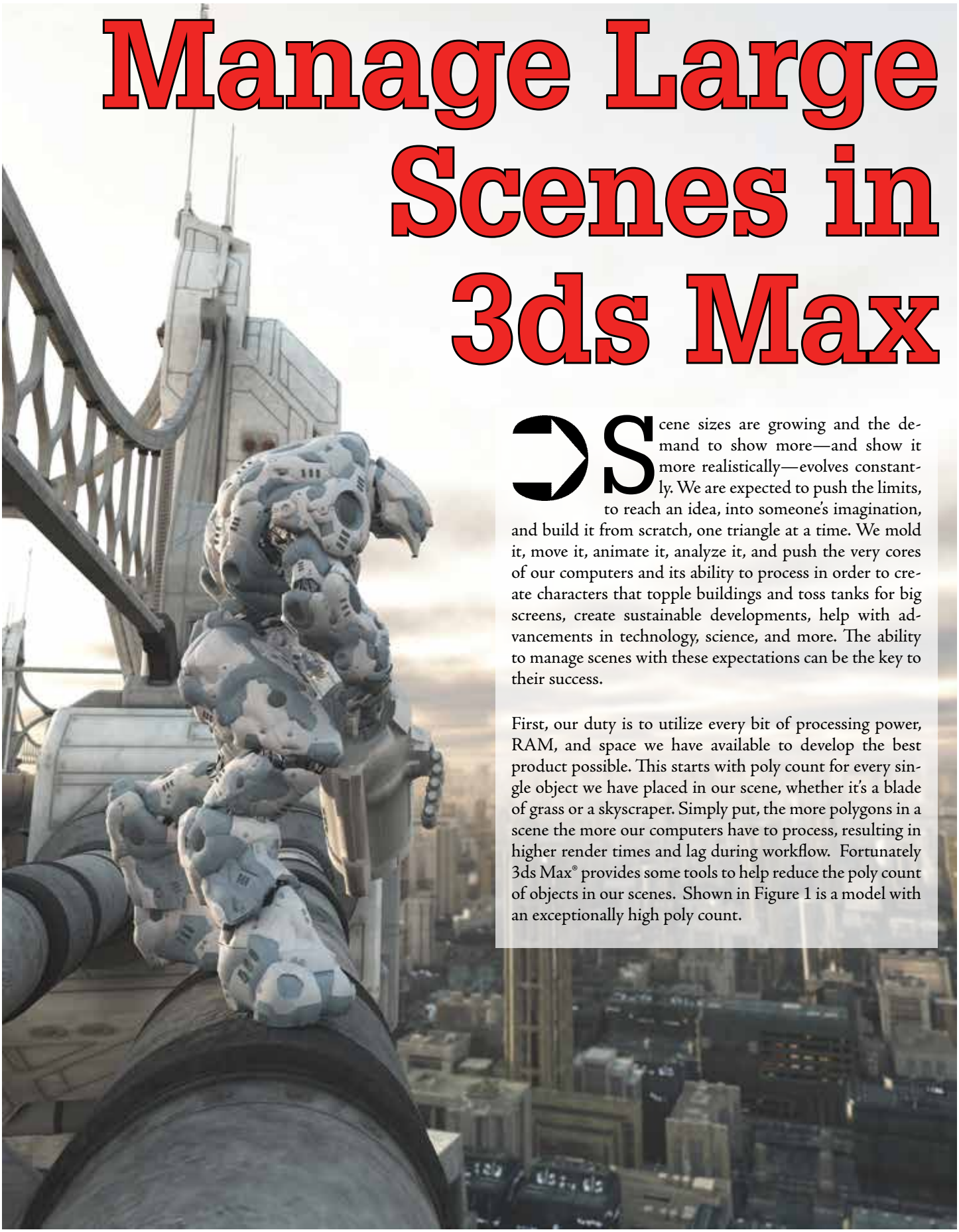
FURTHER EXPLORATION

Electrical single-line diagrams can encompass much more than just panels and conduits based on the complexity of the project. Elevators, motor disconnects, transformers, and other pieces of electrical equipment often need representation as well. Each of these is sitting on the BIM platter, ready to consume via its own unique utensil. The information contained within this article provides a good starting point for firms to begin creating families that can pull the required information together. In turn, this can help with creating a path toward implementing SLDs via Revit, using the information modeled.

Jerad Meidinger is an electrical engineer for Associated Construction Engineering, located near Bozeman, Montana. In his free time, he can be found developing smartphone apps on the Google Play store under the publisher name Jeradooka. Jerad can be reached via email at jeradm@acemt.com.

by: Brian Chapman

Manage Large Scenes in 3ds Max



Scene sizes are growing and the demand to show more—and show it more realistically—evolves constantly. We are expected to push the limits, to reach an idea, into someone's imagination, and build it from scratch, one triangle at a time. We mold it, move it, animate it, analyze it, and push the very cores of our computers and its ability to process in order to create characters that topple buildings and toss tanks for big screens, create sustainable developments, help with advancements in technology, science, and more. The ability to manage scenes with these expectations can be the key to their success.

First, our duty is to utilize every bit of processing power, RAM, and space we have available to develop the best product possible. This starts with poly count for every single object we have placed in our scene, whether it's a blade of grass or a skyscraper. Simply put, the more polygons in a scene the more our computers have to process, resulting in higher render times and lag during workflow. Fortunately 3ds Max® provides some tools to help reduce the poly count of objects in our scenes. Shown in Figure 1 is a model with an exceptionally high poly count.

Figure 1: Housing development in 3ds Max

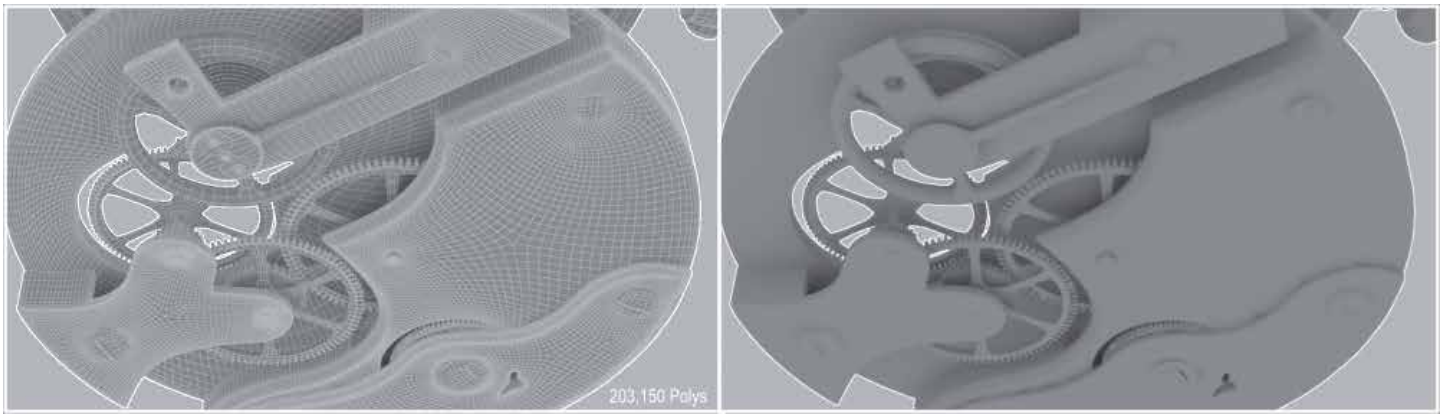


Figure 2: Gear system for watch—203,150 Polys; 134,967 Verts

Figure 3 below shows the same model after running 3ds Max's Optimize Modifier.

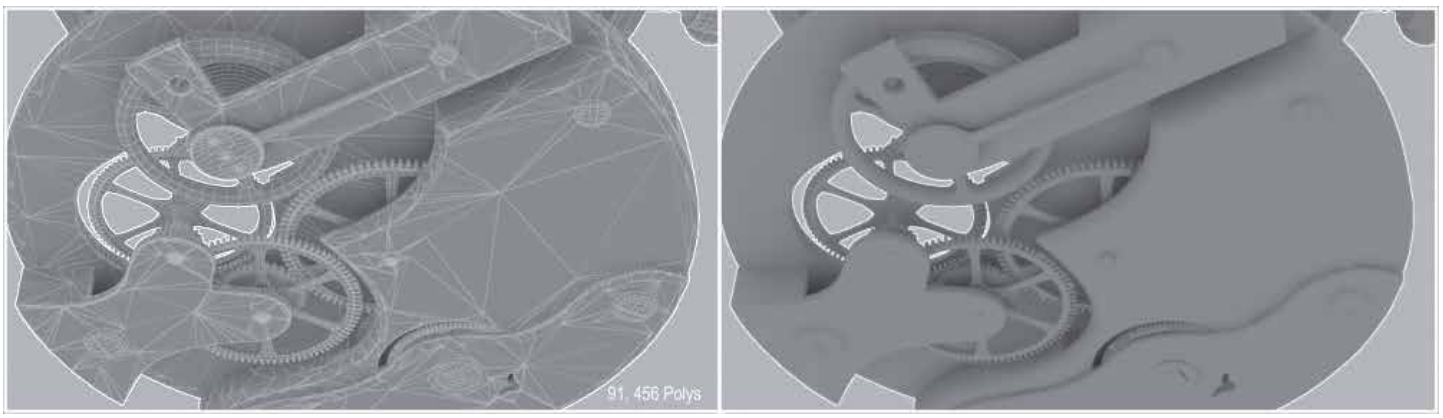


Figure 3: Gear system for watch—91,456 Polys; 79,120 Verts

As you can see there's little difference between the edge-free renders.

Using the modifier is simple: select the modifier and change the Face and Edge Thresh values.

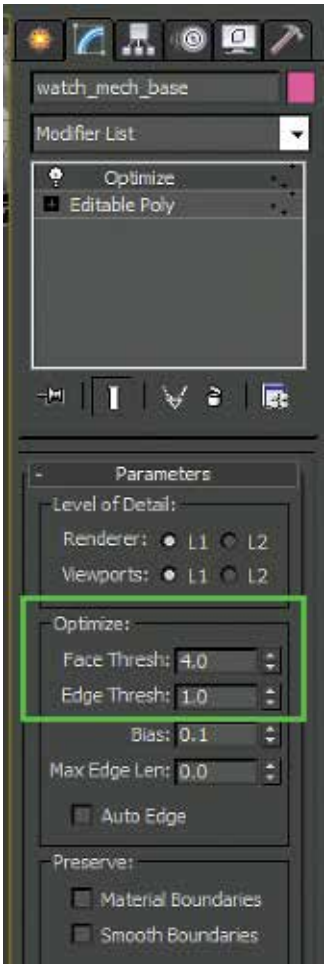


Figure 4: 3ds Max Optimize Modifier

If you've already developed your scene and simply want to scan it for areas you can optimize, this is simple as well. Choose the Select by Name tool (number 1 in Figure 5) and add Faces to the columns available to sort by (number 2 in Figure 5).

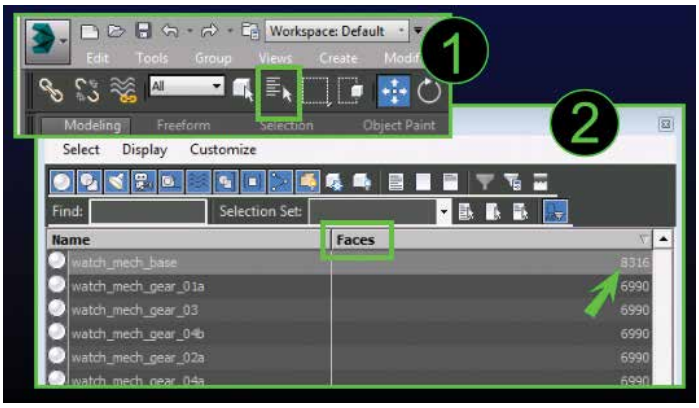


Figure 5: 3ds Max Select by Scene tool

Second, keep in mind the distance from which your object appears. The farther the distance from your camera, the more likely it is that you can exclude particular details such as fillets, bevels, chamfers, or even entire faces since many of them may not be visible to the eye in the final product.

Third, in order to effectively manage a complex scene it's necessary to use proxy objects. Proxy objects are low-poly representations of high-poly models in a scene, based on a single source file. These can be trees, blades of grass, cars, people, or whatever you decide. They allow us to place hundreds of these objects using various tools such as linear or random arrays in a matter of a few minutes, while populating our scenes with only low-poly representations of what they actually are. This frees up memory, allowing us to work more quickly within our scene. When it comes time to produce the final result, the render will process the high-poly version to produce the best possible render.

Tip: when creating a model that will act as a proxy object, it's best to produce it in its own scene; using your larger (parent) scene can cause problems.

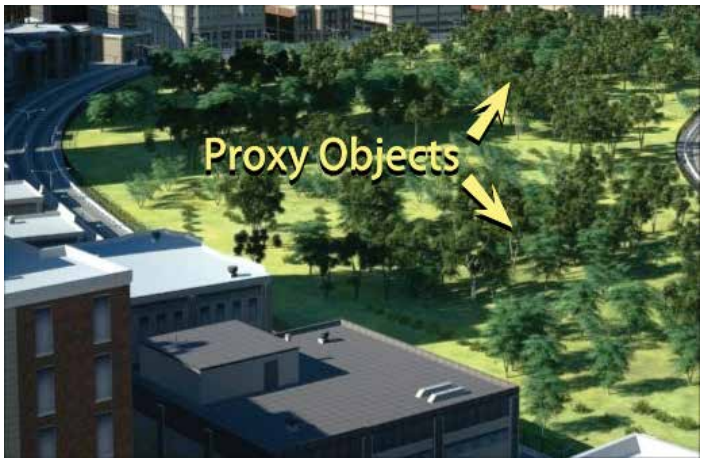


Figure 6: City scene with proxy trees

Fourth, use xrefs. Xrefs allow us to build incredibly complex scenes by dividing them into multiple files. In high-production environments this is also helpful by allowing members of multiple teams to work on a specific scene. For example, when working on a large community development, one member can work on the streetscape while another works on the homes or traffic features.

Finally, planning for predetermined camera angles allows us to minimize poly count by focusing our attention on details seen in specific frames, allowing us to ignore or even delete objects that we wouldn't see. Spend time setting up scenes early in the production process to avoid a lot of unnecessary work.

Brian Chapman is creator of www.pro-cad.net and a Senior Designer for Slater Hanifan Group. Slater Hanifan Group is a civil engineering and planning firm dedicated to superior client service with locations in Las Vegas, Nevada, and Lake Havasu and Phoenix, Arizona. Brian can be reached at procadman@pro-cad.net.

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by Robert Green

Intel® HD Graphics P4600 Xeon Processors

Let's be honest, not everybody who uses a CAD workstation is doing huge project BIM coordination, clash detection, advanced 3D visualization, or rendering. In fact, it turns out that a number of CAD users still use AutoCAD™ (or AutoCAD™ LT) for 2D tasks a lot while doing little or no 3D work. So if this category of users – let's call them professional 2D users - aren't using the most complex 3D software systems what is an appropriate hardware and graphic platform for their workstations? That's the question we'll examine in this month's Tech Insights.

XEON E3 WITH HD GRAPHICS P4600 OPTION

Whenever a workstation is specified the question "Which graphics card should be included?" inevitably comes up. With recent upgrades to Intel's HD Graphics - to level P4600 on its Xeon® E3 series processors - professional 2D users can get very good 2D performance in inexpensive professional workstations - without need for an extra discreet graphics card.

HD Graphics P4600 graphics processors are available on several Intel® Xeon® 4 core, 8 MB cache processors (the E3-1225v3, E3-1226v3, E3-1245v3 and E3-1246v3) ranging from 3.6 to 3.9 GHz, respectively. These processors can support up to 32 GB of ECC (error correcting code) memory and high clock rates thus providing a great low cost foundation for a professional 2D CAD setup as implemented in HP Z230 or HP Z230SFF professional workstations. So with HD Graphics P4600 graphics you're not only getting graphics capability you're getting a great processor as well.

SOLID SPECS

HD Graphics P4600 equipped Xeon processors boast some impressive specifications that make them ideal for typical 2D CAD usage. A few of the more relevant features include the following:

High clock rates. For lightly threaded CAD applications the high 3.6 to 3.9 GHz clock rate of the processor is drives performance more than any other variable.

Up to 1.6 GB of graphics memory. The memory is shared from the installed system RAM and is typically preconfigured by the manufacturer – as is the case with HP Z230 workstations.

Up to 3 displays supported. Since most CAD users now use multiple monitors this is essential – The HP Z230 supports three Display Port monitor connections on its rear panel.

High screen resolutions. Up to 3840x2160 (4K) at 60Hz refresh rate over Display Port digital connections is supported meaning even the latest monitors can be used at full resolution.

ISV (independent software vendor) certified. Independent software certifications for 15 popular applications from Autodesk™, Adobe, SOLIDWORKS, Bentley and Siemens means smooth running, fully supported graphics drivers are available for the life of your HP Workstation investment.

So while HD Graphics may not support 4GB of video memory or 4 monitors like some of the professional discrete graphics cards can, it is clear that there is plenty of memory, resolution and driver stability for general purpose dual monitor CAD usage – even on newer 4K 60Hz monitors.

SAVINGS COULD MEAN UPGRADES

Of course by not purchasing a discreet graphics card – by specifying an HD Graphics P4600 equipped processor instead - there will be some resulting cost savings. How could that cost savings be utilized to achieve a more balanced workstation experience for the user? Let's explore.

A quick look at the HP Z230 graphics configuration options on HP's web site shows that allocating the savings from a default 1GB graphics card is enough to upgrade the standard mechanical boot drive to a conventional 128 GB solid state (SSD) high performance boot disk as one possible example. So for professional 2D users - who don't require 3D performance graphics – the cost of a discrete GPU could be allocated to other components that may have more impact to 2D users – such as much faster disk I/O in the case of the SSD - for that user's immediate software usage needs.

If specifying your workstations with HD Graphics can keep the total cost of a workstation constant while allowing upgrades to other key systems – to achieve better balanced performance for the user – it is an option that should at least be considered. (Particularly since you can upgrade graphics later which we'll talk about now.)

OPTIONS REMAIN OPEN

So what if, at some point in the future, user's needs change and a more powerful graphics processor is required – what will your options be on a HD Graphics equipped machine? Assuming an expansion card slot is available in the workstation you can simply purchase and install a new GPU device later and use it instead. This approach gives you the peace of mind that going with HD Graphics P4600 processors now will not limit the workstation's performance in the future.

And with the power of graphics processors always going up while costs remain constant or even drop, you could purchase a better GPU solution in the future when you actually need it.

THE VALUE CAN'T BE DENIED

Perhaps the best way to think about whether HD Graphics P4600 equipped processors make sense for professional 2D CAD users is to ask yourself the following questions:

- Can my users work efficiently without a 3D graphics capable card?
- Could I achieve a better performance balance for my 2D user's needs upgrading systems other than graphics cards?
- Can my users work efficiently with dual monitors supporting up to 4K resolution graphics output?
- Would I like to leave my options open for graphics upgrades later?

If you answered these questions yes then you really should consider specifying HD Graphics P4600 equipped Xeon processors for professional 2D CAD workstations. With great choices like the HP Z230 or HP Z230SFF available at great prices there's simply no reason to saddle a professional user with anything less.

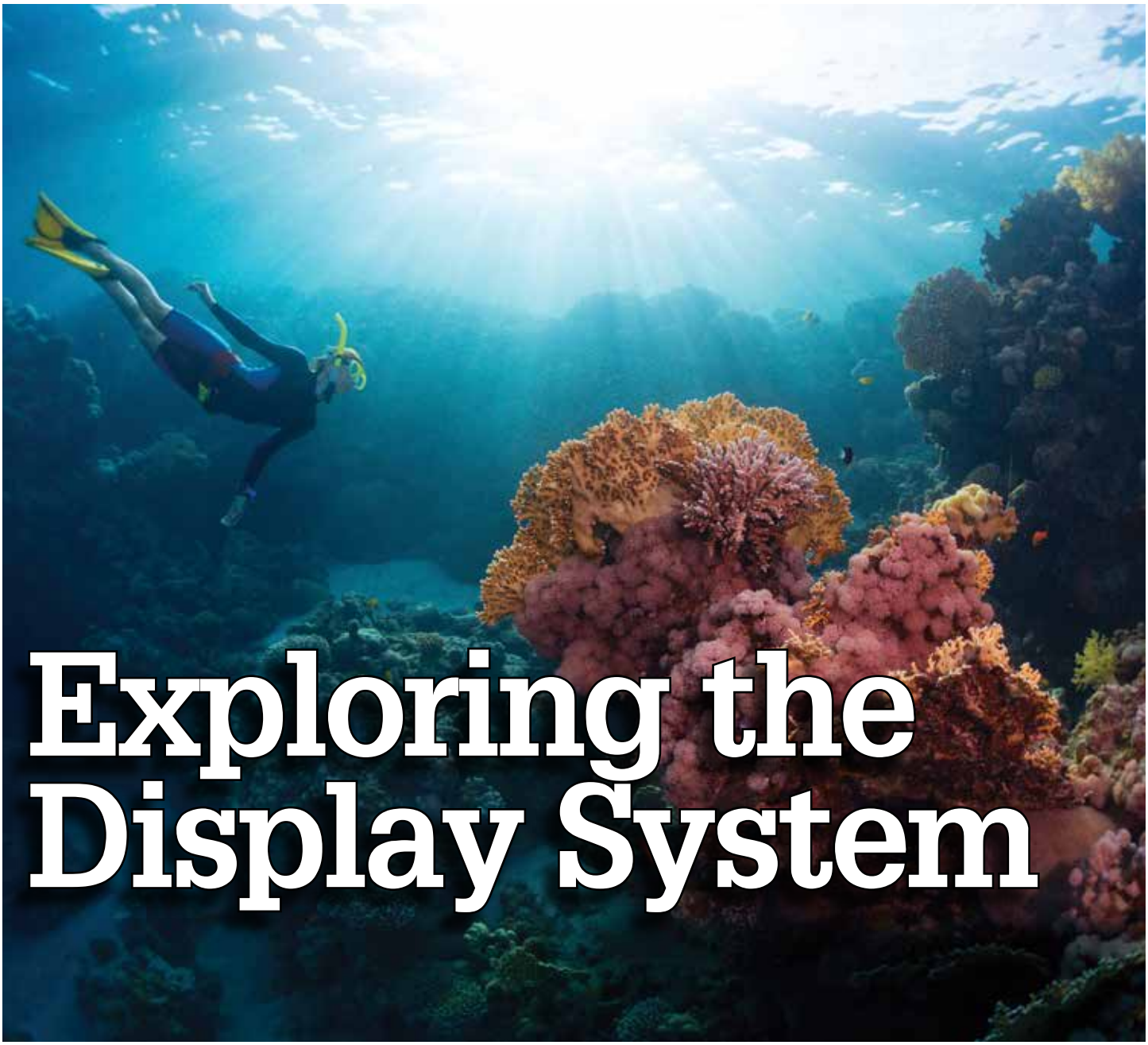
ABOUT HP

HP helps you stay ahead of the curve with professional desktop and mobile workstations designed for large and complex datasets, dispersed teams, and tight deadlines. HP Z Workstations, built for Pros with Intel® Inside®, deliver the innovation, high performance, expandability, and extreme reliability you need to deliver your 3D CAD projects in less time. To learn how to configure a HP Z Workstation, visit the HP and Autodesk page at www.hp.com/go/autodesk. Start saving now!

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

by: Melinda Heavrin



Exploring the Display System

The display system in AutoCAD® Architecture is specifically designed so that you only have to draw an architectural object once. The appearance of that object will then change automatically to meet the display requirements of different types of drawings, view directions, or levels of detail. The view-dependent display of objects in AutoCAD Architecture is made possible by a hierarchical system of display settings that specify display properties (visibility, layer, color, linetype, etc) for individual display components of all the different types of architectural objects under all the different viewing scenarios.

If you are a CAD manager, you will want to fully understand the Display System structure and the Display Manager so you can modify and organize default settings as necessary to implement your own display standards. But any user can quickly change the appearance of an object in a particular view by modifying values on the Display tab of the Properties palette.

To change the display using this tab, click Select Components, select an object display component, and then select or enter a new value for the display property you want to change (such as color or lineweight). The results are immediately visible in the drawing area for the current display representation and can be applied to other display representations that use the same component.

A material definition is a group of settings for the display properties of a real-world material such as glass, brick, or wood. The settings define how the components assigned to the material appear in every view. The materials feature works with the display system to simplify the process of customizing the display of drawings. Rather than specifying individual properties, you can control

the display of objects according to the materials assigned to the physical components of the objects. In addition, if the materials change during the project, you can reassign components to the new material. Sample styles in AutoCAD Architecture catalogs contain predefined materials assigned to their components. You can use these materials in your drawings, customize them, or create your own materials.

The display system has three major elements:

- Display representation – controls how an individual object is displayed
- Display set – a group of display representations of objects
- Display configuration – a collection of display sets assigned to particular view directions

These three elements are hierarchical: each display configuration contains a number of display sets and each display set contains a number of display representations. To use a display configuration, you assign it to a viewport. The objects in the viewport then use the display properties specified in the display configuration.

You use different display configurations for different tasks such as sketching and plotting. You also use different display configurations for different types of drawings, such as floor plans, 3D models, and elevations. AutoCAD Architecture includes templates with predefined display configurations applied to viewports. These configurations are created for typical architectural tasks and drawing types. You can use the configurations and viewports supplied by the templates or you can modify the display system settings to suit your office standards. If you want to create your own display configurations, you can start a drawing from scratch or from a template that does not contain predefined display configurations.

DISPLAY MANAGER

The Display Manager is a centralized location for the display system information for your drawing in AutoCAD Architecture. The Display Manager is used to create and modify display configurations, display sets, and display representations. The Display Manager window can be resized as needed to view display information. To open the Display manager, click on the Manage tab of the ribbon, Style & Display panel, then select Display Manager.

On the left pane of the Display Manager is a hierarchical tree view that organizes the display information for your drawings. You can add, rename, purge, send, and copy display system components in this area. As you select items in the left pane, you will notice that the right pane is updated (see Figure 1).

The right pane of the Display Manager contains information about your selection in the left pane. In this area, you can view display sets and mapped view directions that are associated with each display configuration. You can also view the display representations of objects and preview how an object is displayed.

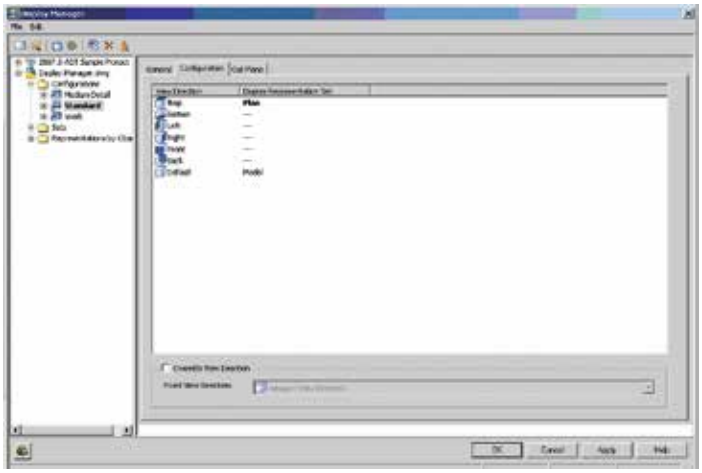


Figure 1

DISPLAY SETS

Let's take a more in-depth look at display sets. Display sets are collections of object display representations. A display set determines which objects are visible and how these objects are displayed in different views. A display set contains display representations that are appropriate for specific tasks and/or drawing types. For example, the Reflected display set contains display representations for objects that are usually included in a reflected ceiling plan (see Figure 2).

It is possible for a display set to contain more than one display representation for an object. For example, a display set designated for plotting a floor plan might include the Plan and Threshold Plan display representations for doors. In this example, Plan display representation contains components for the door panel, frame, stop and swing; whereas the Threshold Plan display representation contains components for the inner and outer thresholds of the door.

If a display set does not contain display representations for a particular object, the object is not displayed when that display set is used. For example, a reflected ceiling plan's display set does not need representations for railings, which usually are not shown in these drawings.

A display set is not dependent on view direction, although it usually is designed with a specific view in mind. Similarly, a Plan display set might contain Plan display representations for a number of objects intended for two-dimensional (2D) top views. A three-dimensional (3D) model display set might contain the Model display representation for a number of objects. The display representations included in a display set depend on what representations are available for each object and whether objects need to be drawn differently from different view directions.

Drawings based on templates provided with AutoCAD Architecture contain display sets for many purposes. All drawings, including those that are not created from templates, contain the follow-

AutoCAD Architecture 2016

ing default display sets: Elevation, Model, Model High Detail, Model Low Detail, Plan, Plan High Detail, Plan Low Detail, and Reflected. These display sets contain display representations for each object based on the most common design situations.

To create a display set, begin by clicking on the Format menu, select Display Manager, and expand Sets. If you want to create a display set with default properties, right-click Sets and click New (see Figure 3). If you want to create a display set from an already existing display set, right-click the display set you want to copy and click New. Enter the name for the new display set and hit Enter. Specify the display representations to use in this display set and click OK.

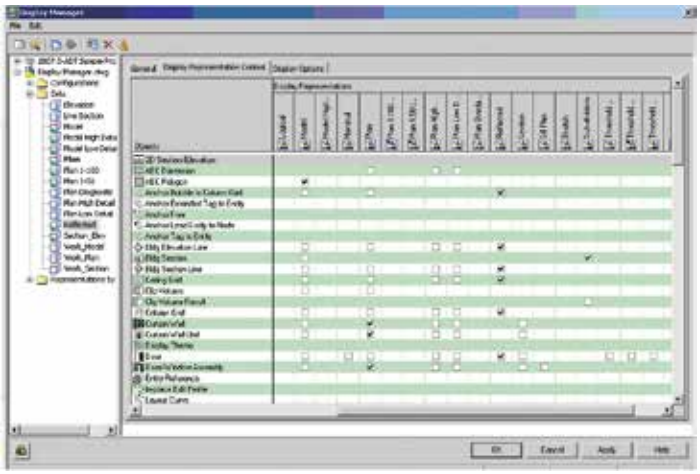


Figure 2

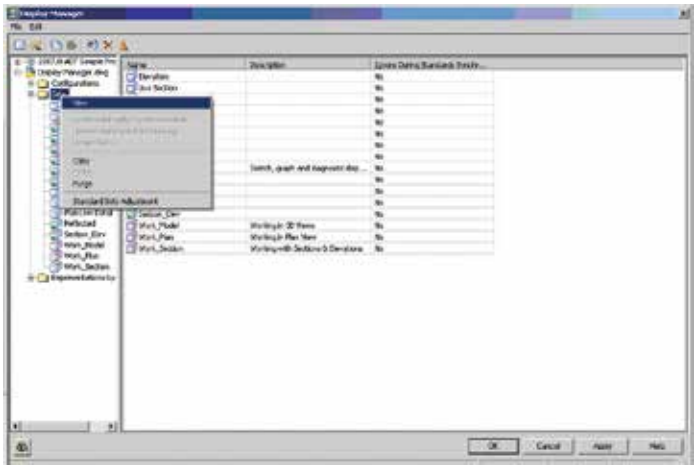


Figure 3

DISPLAY REPRESENTATIONS

Display representations define how the components which make up an object are drawn. In traditional CAD and manual drafting, a single object such as a door is typically drawn multiple times in different drawings. In these drawings, each instance of a door is a separate collection of linework. In AutoCAD Architecture, you can create an object that changes the way it draws itself depending on the display representation used to represent that object. Many AEC objects are made up of individual components. Each component of an object has both physical and graphical properties that help to determine the display representation of that object. The physical properties of an object control height, width, location, and shape of the object in the drawing. The graphical properties control visibility, color, layer, and linetype.

The physical properties of an object are typically decided when you create it. For example, you specify the size of a door and its location in a wall. The graphical properties of an object are controlled in its display representation. Multiple display representations can be defined for the same object.

All AEC objects have predefined display representations. Most objects have Plan, Model, and Reflected display representations because these are the most common design situations. Other objects have only a General representation because the display of these objects does not change in different views.

A single object can be drawn in several ways, depending on the needs of each drawing type. For example, the Plan display representation draws the door panel, stop, frame, and swing components (see Figure 4). The Nominal display representation draws the door panel, frame, and swing components. Even though both representations draw the door panel, each draws it differently. The Plan representation draws a door panel as a rectangle, while the Nominal representation draws it as a single line.

The display representations available for an object and the names of those representations are based on the ways you might need to view the object. Display representations can include different components of an object or additional display options.

To create a display representation for an object, begin by clicking on the Format menu, select Display Manager, and expand Representations by Object. Select the object for which to create the new display representation. In the right pane of the Display Manager, right-click the display representation to duplicate and click Duplicate (see Figure 5). Enter a new name for this display representation and hit Enter. The new display representation will have the display properties of the representation you just duplicated. Please note that the display representation created in the right pane will not be listed in the Representations by Object directory in the left pane until you close and reopen the Display Manager. Double-click the new display representation to edit its properties and then assign the display representation to the display sets in which they will be used. When finished, click OK. You can also click Apply instead of OK to save the changes and continue working in the Display Manager.

To edit a display representation, begin by clicking on the Format menu, select Display Manager, and expand Representations by Object. Next, expand the object that contains the display representation you want to edit and select the display representation to edit (see Figure 6). The display properties you can edit will depend on the object and the display representation you select. Select

the Layer/Color/Linetype tab in order to change the AutoCAD properties, including the visibility of the object components and whether their display is controlled by the material assignment. If applicable, select tabs such as Hatching or Other to change object-specific display properties. When you finish editing display properties, click OK.

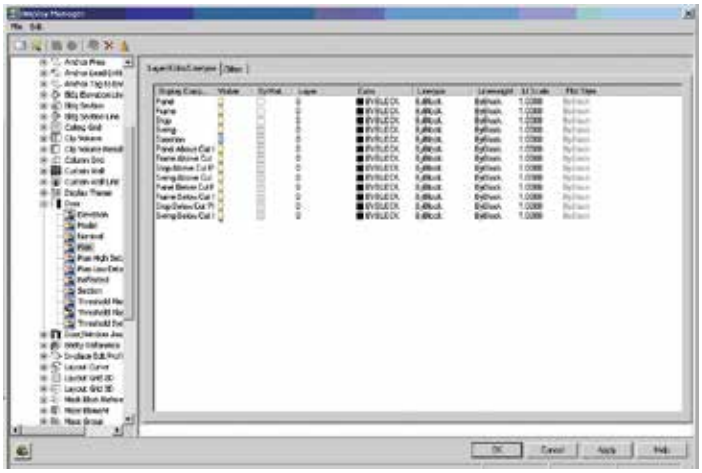


Figure 4

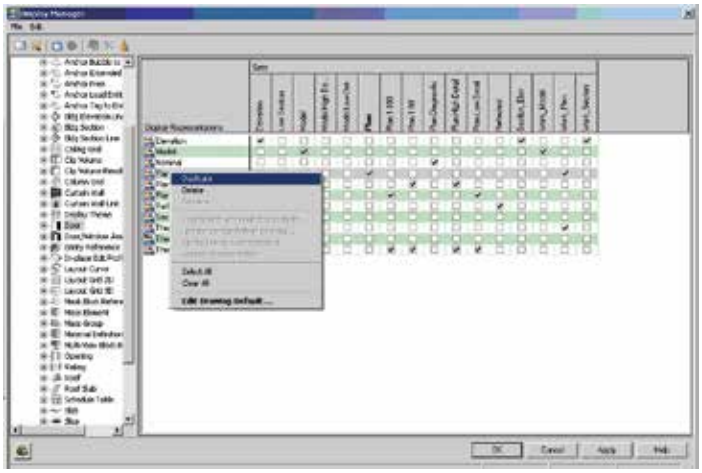


Figure 5

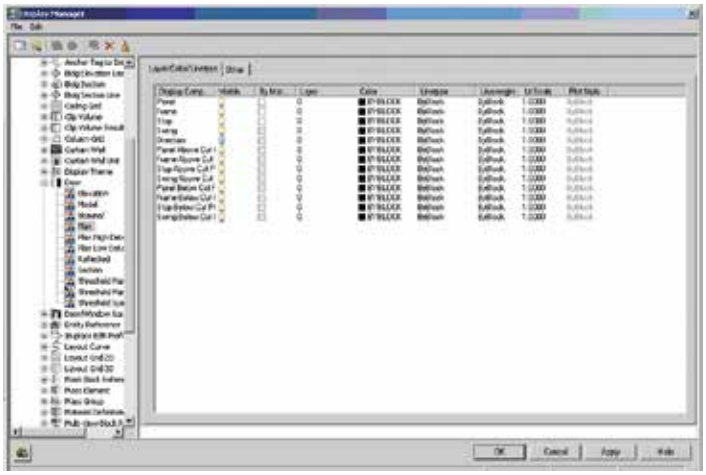


Figure 6

DISPLAY CONFIGURATIONS

A display configuration is basically a collection of display sets assigned to view directions. A display configuration is created for a specific design task or drawing type. To use a display configuration, you need to assign it to a viewport. Drawings based on templates provided with AutoCAD Architecture contain layout tabs with viewports to which appropriate display configurations are assigned. You can use the configuration assigned to a viewport, assign a different one, or customize the configuration.

You can identify the display set assigned to each view direction using the Display Manager. In the Display Manager, the active viewport in the drawing is assigned the Medium Detail display configuration. In the left pane, the display sets used are listed below the configuration name. An icon next to each display set indicates the view direction to which the display set is applied. The Configuration tab in the right pane shows the view direction to which each display set is mapped.

The display configuration, the current viewport, and the object interact in the following manner to determine what is shown in a viewport:

- The active viewport has a current view direction and a current display configuration.
- The display configuration has one or more display sets and uses the display set that is assigned to the current view direction.
- The display set has associated display representations and it selects the representation associated with the object that needs to be shown.
- The object is shown in the active viewport using the appropriate display representation and display properties.

The display configurations in a drawing depend on the template used to create the drawing. A drawing that is not created from a template contains the Standard display configuration, which includes the Plan and Model display sets.

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

by: Adam Muñoz

Managing Revit Shop Drawings in Color

As I've been transitioning from a Structural Drafter to a Concrete Detailer, I've learned some new ways to utilize Autodesk® Revit® in color. Typically, structural construction documents are black and white, but on shop drawings we're allowed to add color. This opens up a rainbow of opportunities, especially when complemented with a 3D view.

BUT ONLY ARCHITECTS USE COLOR!

Not anymore... For years drafters, designers, and detailers have been embracing the use of color on shop drawings to help the field differentiate items for various reasons. If you search the Internet for "shop drawings," you'll notice a bunch of black-and-white drawings. You may find some MEP shop drawings in color, or maybe some old AutoCAD® shop drawings that used colored dimensions or text, but not much color on the elements themselves. Let's change that search result and integrate some of your beautifully drafted shop drawings for the world to admire.

I will share some options on how you too can quickly add color to complement a shop drawing. Throughout this article I will be giving examples of concrete shop drawings, but I'm sure you can apply some of the color methodology to your own trade.

PAINT A PICTURE

When building a concrete model, pay close attention to all the various details provided by the architect, structural engineer, civil engineer, landscape architect, and so on. As the project progresses you will start to appreciate all the intricate details you've managed to gather for reference from your research.

As always, it can be helpful to supplement the typical plan-view, front-view, side-view and/or section with a 3D view of the portion of the project in question. If we add color, now we can paint a better picture to help tell the story and direct the reader's eyes. The quicker the person reviewing your drawing is able to understand what they are looking at and the information at hand, the sooner you can move forward with addressing the question or problem.

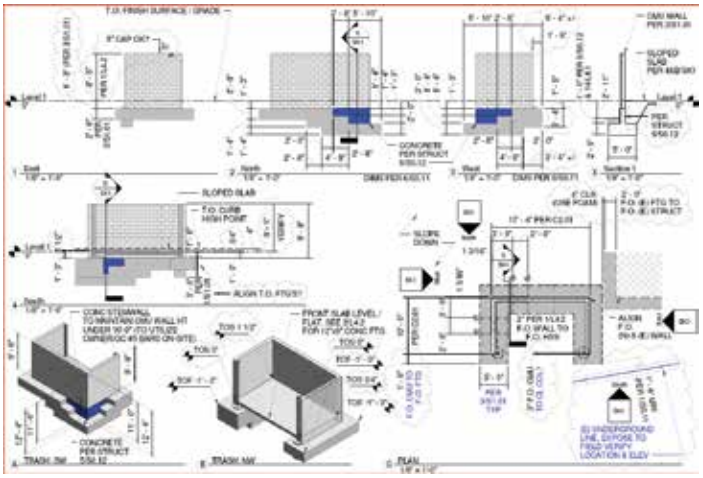


Figure 1: Trash enclosure with stepped footing. The blue area in question is either concrete or CMU.

DISTINGUISH YOURSELF

Starting off a project, if you've been provided one or more other models to link in, it may be best to assign color schemes to those other trades. Whether the project is large or small, as other trade models become populated, color-by-discipline can help when navigating busy environments. This helps to distinguish between your elements (working with concrete drawings I may choose mostly grey) versus the architectural model (I might choose cyan) versus the structural model (probably magenta), as well as any other models that you may be required to coordinate. Not doing this might get a little confusing and/or overwhelming, but it mostly helps simplify what you're looking at when investigating a busy model.

DIFFERENTIATE YOURSELF

Typically concrete and existing conditions are represented as grey. Out-of-the-box Revit templates also have both set to grey. This just means we, as drafters and detailers, will have to get creative when sharing information if we want to utilize color. If I'm also going to use phasing I may have to get creative with my use of colors—but try not to make the colors too overwhelming.

I've noticed colored 3D images from other software and I'm sure there is meaning behind that color… but can they change those colors based on their mood? It almost looks too colorful and too similar from one project or company to the other. Are they stuck with those colors? Are those drafters not allowed artistic freedom when presenting 3D works of art?

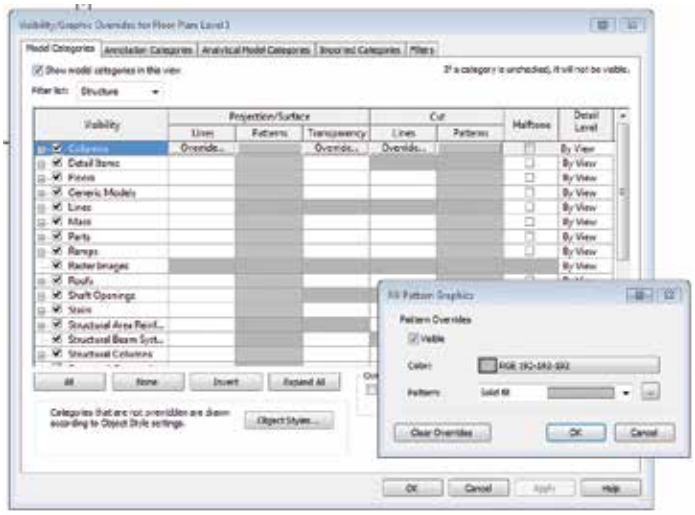


Figure 2: Visibility Graphic setting visibility of the entire model category pattern to solid grey.

THOU SHALL EXPORT TO COLOR GREY

I already see your wheels turning on what colors to use next, but remember this: some BIM projects will also require that you export your elements to a pre-determined color, so be sure to read up on your BIM project guidelines!

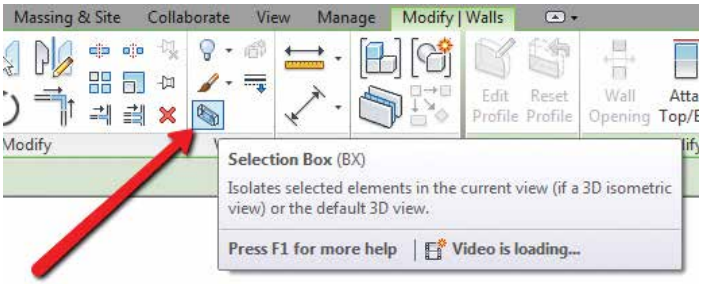
One way to accomplish this requirement is to simply create some isolated 3D views that contain the word "export" within the view title. After isolating relevant elements, I can assure everything is set to the pre-determined color by setting my visibility graphics to equal the required grey often based on RGB colors. This makes adjustments to the file after export minimal. (Also, I understand there are other ways to do this—export mapping, filters, materials, shared parameter, family editing, etc. I will only be touching on some of the ways I change colors.)

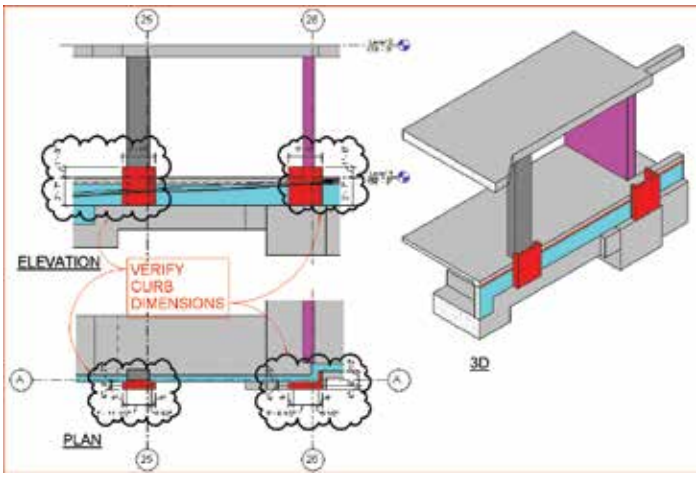
COLOR WITH MEANING

With shop drawings, give all the dimensions and elevations needed. Provide references to the plans or detail sheets from which that information was retrieved. This helps anyone reviewing and verifying the shop drawings with approved documents. Now I know they're seeing what I'm seeing. It also may be important to draw attention to items in question on plans and details, as well as on a 3D view.

Revit Structure 2016

In the image of the curbs below, to get the point across I used the color red to highlight a specific scope of work to be detailed. Depending on the time needed and the amount of RFIs that would be required to complete a shop drawing, I may want to submit my work as complete as I can.





Figures 3 and 4: The 3D view was created with the new Revit 2016 feature called "selection box." It will take whatever elements you have selected and quickly create a 3D view. This can quickly accompany plans, elevations, sections, and details of the curb. Create a view template with filters, forcing colors to apply the same color scheme.

This would include a bold cloud drawn around the missing information such as dimensions and elevations to be provided and/or verified. Using large colored text helps the question stand out, as color tends to draw the eye.

DON'T FORGET TO ADD A COLOR LEGEND

Depending on what you're documenting, you might not need a legend. But if you're coloring multiple items in the same family, you might want to add a legend to the shop drawing, spelling out what the colors define. Is the color on your slab defining slab thickness or slab/pour thickness? Are you making all footings reflect colors by Top of Footing or Bottom of Footing? Do you need one drawing to reflect color by wall types to distinguish between the kind of concrete wall being created (existing, CMU, precast, CIP, shotcrete, shoring, retaining, etc.) or do you only need to differentiate the wall thickness? Let's dig deeper!

Figure 5: Colored slab by pour with joints where required.

COLOR BY SLAB THICKNESS OR POUR SEQUENCE

The plan view color by pour sequence can give you a glimpse of the timeline and help understand the cubic yards of concrete needed. Depending on the construction schedule, sequencing may be figured out—but it may move around. Field adjustments may get made and last-minute decisions will be addressed due to unforeseen field conditions. But having a colored drawing that lets you know roughly how much square footage and/or cubic yards are getting poured on a certain date may help give some folks a detailed estimate of upcoming information required. On big buildings with fast construction schedules it can also help orient yourself so you know what area you're looking at—especially if no grids are available.

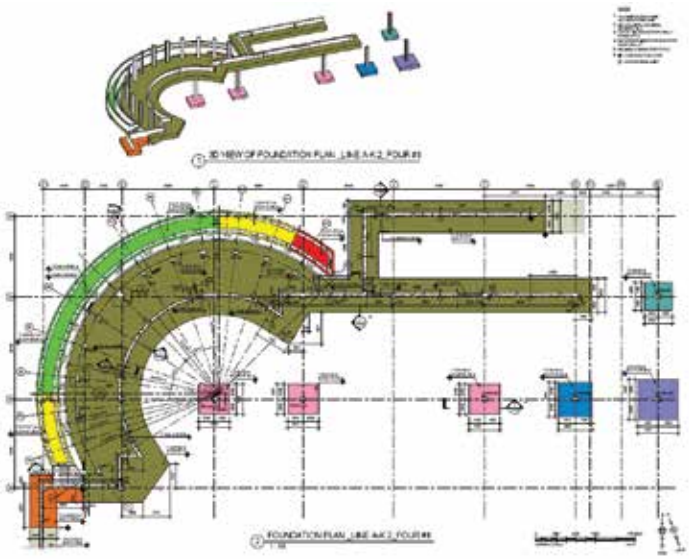


Figure 6: Color by Top of Footing Elevation. Image provided by Pinnacle Infotech www.pinnaclecad.com.

COLOR BY TOP OF FOOTING ELEVATION

I've been asked to create a plan by assigning color by Top of Footing. Looking ahead it may also help to generate something similar such as the color assigned by Bottom of Footing Elevation. Drawings like these, dimensioned out with the bottom of grade beam footing steps all figured in beforehand, help when excavating foundations, laying out points, and building formwork. My shop drawings might not have all the answers, but it gives the team a good starting point for a conversation with other team members and helps highlight items in question. Communication is a must to connect with your experienced team in the field. This assures that you're getting them the information they need in a timely manner.

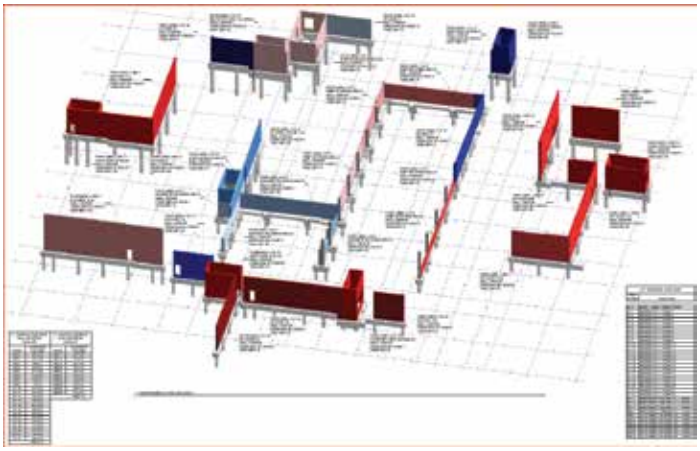


Figure 7: Wall lift drawing colored by the sequence of two different crews. Provided by Dan McCloskey of www.mbbimsolutions.com.

COLOR BY WALL THICKNESS/TYPE OR SEQUENCE

Another good example of utilizing color in a shop drawing is to assign a different color to walls for each wall thickness. Of course, if you only have one wall thickness and you want to use color, in that case grey may suffice. But once you have two or more thicknesses (or types such as CMU or shot-crete versus CIP), color can help the quickly locate wall types and thicknesses in plan. I've used filters to highlight all the CMU wall types in a project to quickly add thickened footings where need be. It is also possible on the same day, same project to make a filter for coloring all the wall thicknesses. You do not have to use one technique to color. In the same project, simply use View Templates and Visibility Graphics with Filters to help drive those colors.

LET'S CREATE A FILTER!

I consider myself an entry-level filter user, but I'm getting better and learning more with each project. Some Revit-utilizing experts will add formulas to their view filters that run calculations and turn columns or beams a variety of colors. I'm no engineer, simply a drafter evolving with the times. So, though my examples may seem elementary, the point I'm trying to emphasize is the importance of communication.

I had to have someone show me the filter ropes. Yes, I could have searched the Internet for videos, maybe watched an expert at Autodesk University give some filtering examples. But until someone sat down with me and explained to me all these things I'm about to share next, I was scared of filters.

At first filters sounded so advanced (flashback to stretching multiple items in AutoCAD with a crossing window… yikes!) and I was fine coloring items by choosing "override graphics in view" "by element"… boy, was I coloring items the elementary way! For drawings such as "Color by Pour," there is no need to create filters. Sometimes the fastest way IS the best way. (Although in this case maybe phasing would be best utilized to assign color. Hmm…)

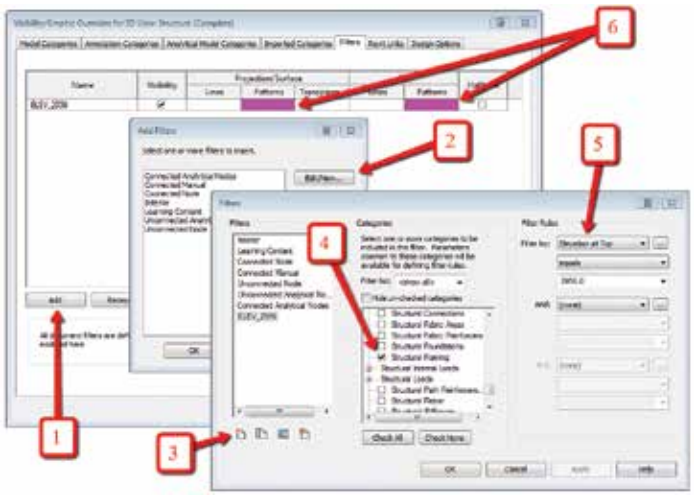


Figure 8: Steps to create a filter

Step 1: Get to your Visibility/Graphic dialog box (VV, VG, View Template).

Step 2: Choose Edit/New.

Step 3: Create New Filter.

Step 4: Select the item you're filtering (Wall, Structural Foundation, Structural Column, Structural Framing, etc.).

Step 5: Adjust Filter Rules (elevation, mark, comment, type name, etc.) I've been mostly using "equals," but the other options have purpose. This way you can see the "elevations" or "type" to help verify as you go down the list assigning colors.

Step 6: Assign a "Solid Fill" pattern with the color of your choice.

BAM! That wasn't so hard, was it? Now let's learn how Dynamo can drive our colors! Revit UP!

Adam Muñoz, born and raised in Roseville, California. is a Concrete Detailer at Urata & Sons Concrete, Inc. To learn more about him and his team, please visit www.linkedin.com/in/lispishly and www.urataconcrete.com. You can also reach out to him at adamd@uratacon-crete.com.

by: John Evans

Inventor Shafts and Splines

Autodesk Inventor® has had nice shaft design tools for some time. While the complex manner in which Inventor delivers the shafts might seem overdone, it offers some unique capabilities with a fabulous user interface.

I was working with other CAD software to develop some preliminary compressor designs, and wanted to automate the splined shaft designs. I was quite disappointed to learn that not only would I need to manually add common shaft features, but also what features were included would need to be manually adjusted if changes were required later. I don't know about the business you are in, but in mine, changes are always required.

That led me back to Inventor, just to feel how nice a shaft design user interface (UI) could be, and this article.

Figure 1: Splined shaft and hub example.

INVENTOR SHAFT DESIGN

Any long-time *AUGIWorld* reader will know that I love the design accelerators in Inventor. I think Autodesk did a fine job of putting the features and UI together in a well-rounded package. The only problem I have is that it can be a bit tedious editing accelerated features because they should be edited through their editing dialog. This is a small price to pay for the ability to return to the design and modify the shaft design in an easy, consistent, and stable manner; a blessing of untold proportion.

Shaft design is grouped within the Design Accelerator tab in the Assembly environment. You might ask "why the Assembly environment, when I am trying to develop a part?" The reason is that power transmission components such as shafts and bores, gears, splined shafts and hubs, bearings, etc. are all part of assemblies, and designing these is a function of an assembly. In addition, Inventor enables users to automate the sizing of additional components, such as bearings and splines, based on the size of mating component features in the assembly.

Design

From the Design Accelerator tab, picking the 'Shafts' tool will open the Shaft Component Generator dialog box.

A generic shaft design fills the features area as a starting placeholder, a model of that follows the cursor, and the process of placement and design is begun.

Tools

The toolset includes:

1. Design, Calculations, and Graphs tabs
2. Import/Export Configurations, Component File Naming, Enable Calculations, Reset Calculations, and HTML Report buttons
3. Placement Buttons and Assembly Mate option
4. Sections/Bores pulldown, section and bore type (such as cylinder, taper, etc.), and assembly component geometry selector
5. Feature type and options
6. Lower expansion (messages and warnings), right expansion (feature size list), as well as the chevron that expands the saved configurations area, similar to the Bolted Connection dialog

The placement is directed by feature references such as circular faces, axes, planes, etc. until the user is satisfied with the location.

TIP: Expand the feature group in the Assembly Browser that you want to use to reference and place your shaft by. You can easily select these rapidly when you start your shaft design right from the browser without having to struggle in the Graphics Window.

Each feature on the shaft can be modified by selecting it from within the dialog and/or the Graphics Window. Once selected, the feature is highlighted in the Graphics Window and glyphs appear that allow dragging and resizing. Furthermore, the size and location can be modified by picking the ellipsis button at the right of each Section in the "Sections" area of the dialog box.

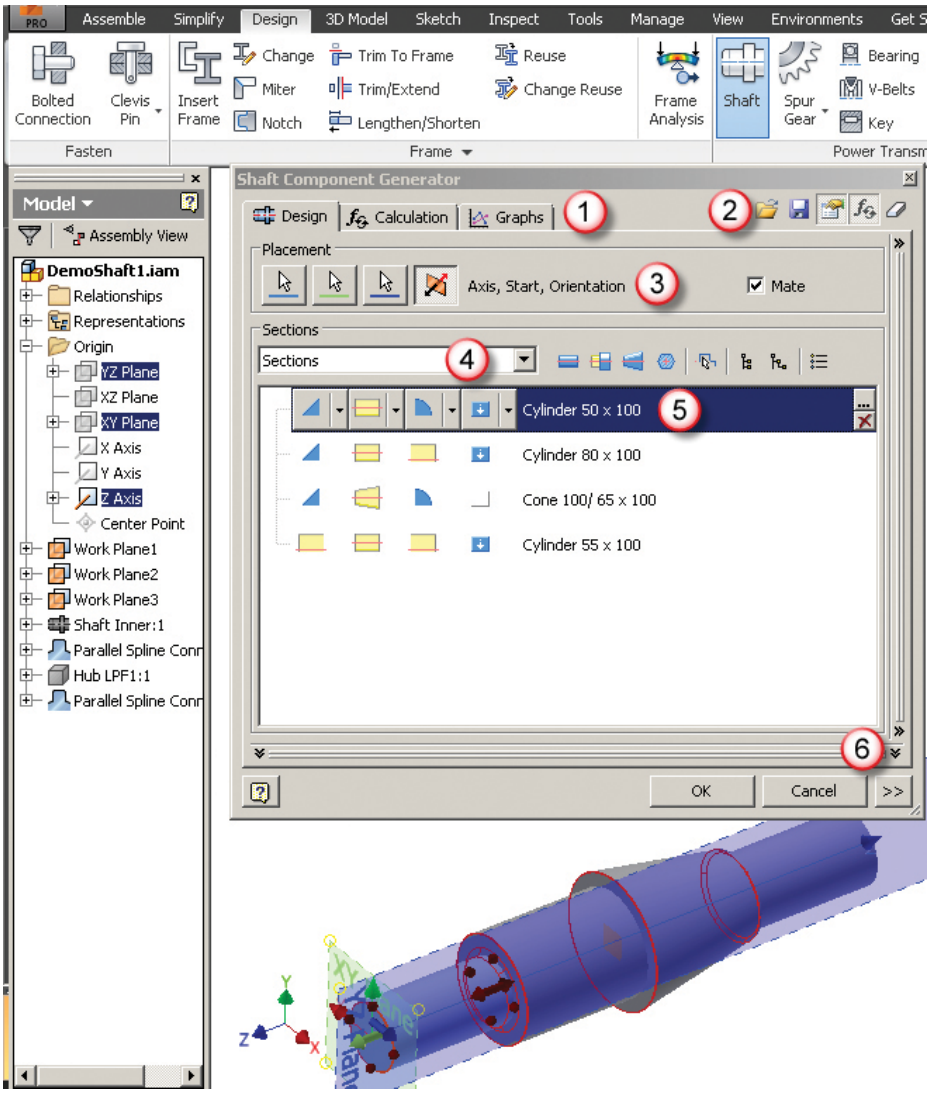


Figure 2: The Shaft Component Generator dialog box opened. Notice the references highlighted in the Assembly Browser, and the adjustment glyphs on the selected feature in the Graphics Window.

Inventor 2015

Section Features

Shaft functionality is divided into Sections. Each Section consists of concentric masses arranged along the shaft axis, namely:

- Cylinder
- Cone
- Polygon

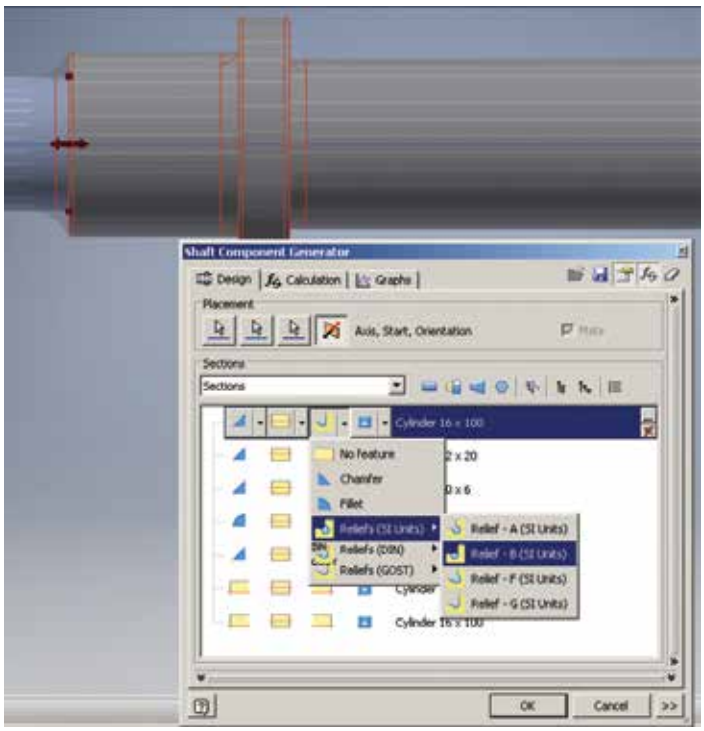


Figure 3: Shaft Sections—note the end treatments flyout showing treatments and reliefs available.

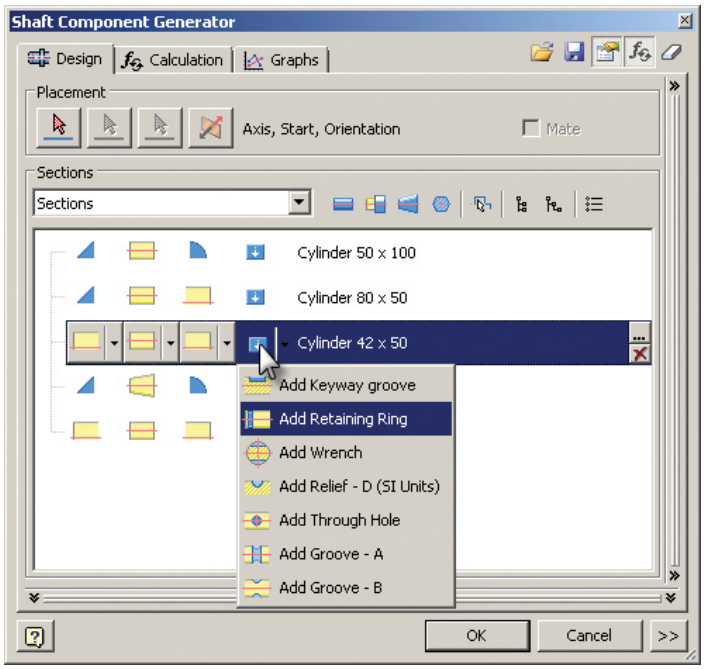


Figure 4: Add Features button.

The length, width, and number of faces for each can be changed easily, and each Section can be split at will.

Start and end treatments for each Section include:

- No Feature – left unchanged
- Chamfers
- Fillets and Corner Rounds
- Reliefs – SI, DIN, and GOST types

Users can arrange these however they desire.

In addition, features may be added within the limits of each section, as many as needed, including:

- Keyway Grooves
- Retaining Ring recesses
- Wrench flats
- Reliefs (SI)
- Through hole
- Grooves – Concentric (A) and Tangent (B)

Each of these can be edited, like the Sections themselves, in the dialog boxes initiated with the ellipsis button attached to each, or graphically by dragging the glyphs attached to the 3D model in the Graphics Window.

Figure 5: Retaining Ring Library—note the company- and standard-based selections.

Bores

In addition to features segmenting the shaft, Bore sections can be added along the shaft and are defined with measurements from either end. These are added by the Sections pulldown, replacing the editing area of the Sections (see Figure 4) with the Bores that are present.

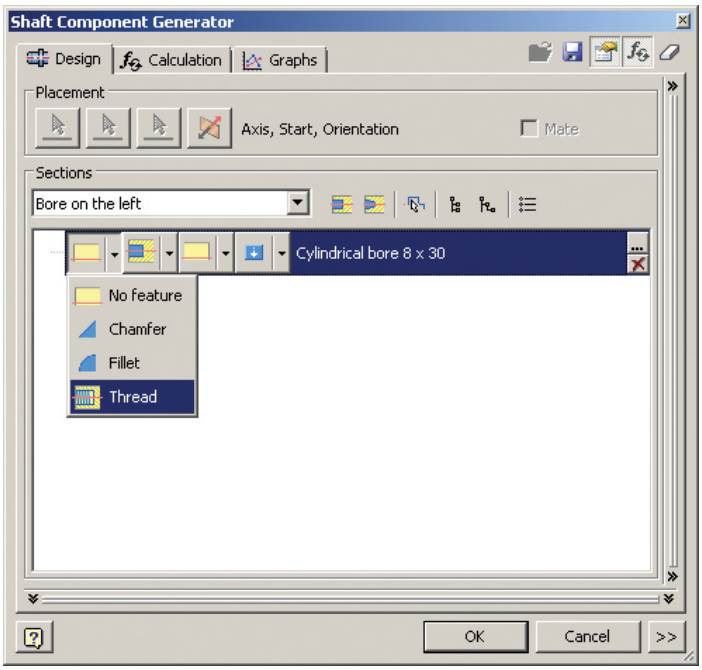


Figure 6: Bores present are found in the Sections pull-down.

Engineering

Once the shaft Sections have been established, designers can proceed to the Calculations tab and apply loads and supports to the shaft as needed for basic static engineering calculations. Again here, glyphs and markers are present in both the dialog box and the Graphics Window, allowing easy additions and editing of loads and supports.

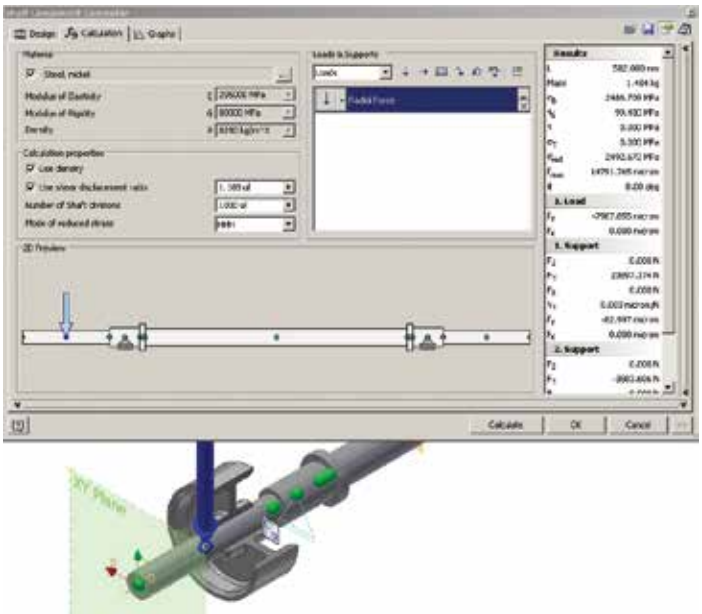


Figure 7: The Calculations tab—note the support and load glyphs in the Graphics Window and the dialog box.

The Loads available are:

- Radial and Axial Force
- Continuous Load along the section
- Bending Moment
- Torque
- Common Load – combined loads in one definition

Supports include both fixed and free types, which if enabled, will allow calculations to consider the support subtended by bearing type.

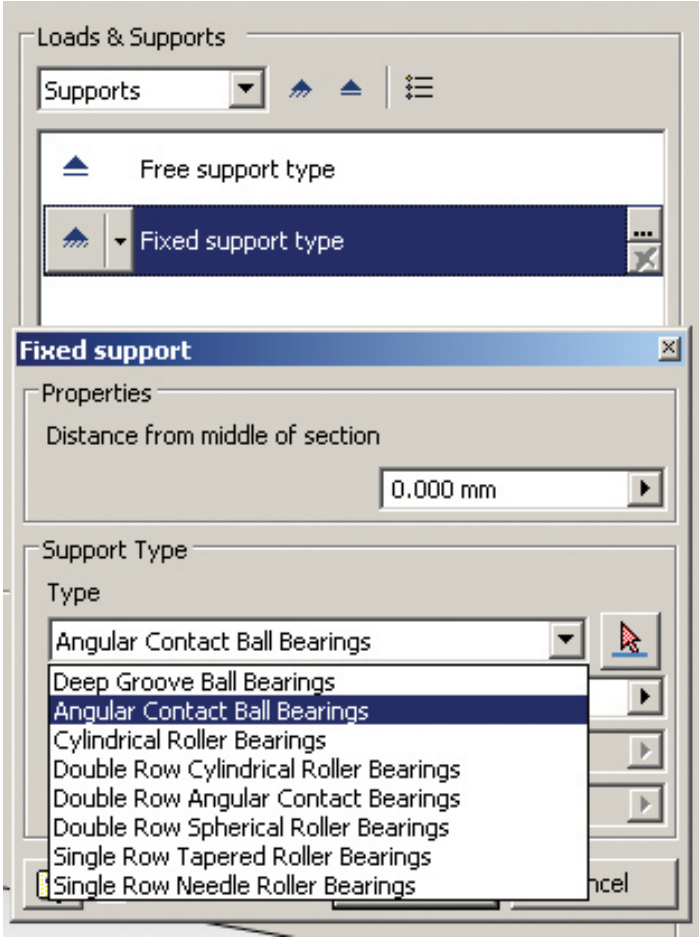


Figure 8: Support types.

At any point, the Calculation button may be picked and the updated results thereof are posted in the Results panel at the right side of the panel (see Figure 7).

The results shown include:

- Length
- Mass
- Maximum Bending Stress
- Maximum Shear Stress
- Maximum Torsional Stress
- Maximum Reduced Stress

- Maximum Deflection
- Angle of Twist

Below these, the specific makeup of each load and support are displayed—all of which can be offloaded to an HTML report with the push of a button (see Figure 2, item 2).

In the Graphs tab, graphic representations of individual calculations may be reviewed as well as the combined stress on the shaft.

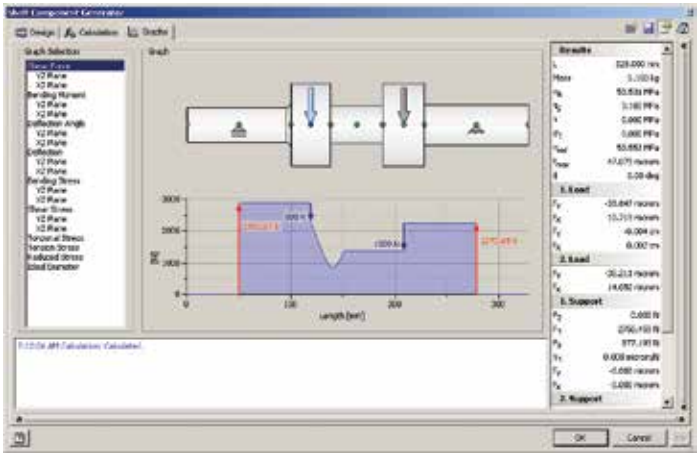


Figure 9: The calculation results Graphs tab.

INVENTOR SPLINE FEATURES

I do a fair amount of shaft and hub design; manually extruding these features repeatedly is not part of my plan.

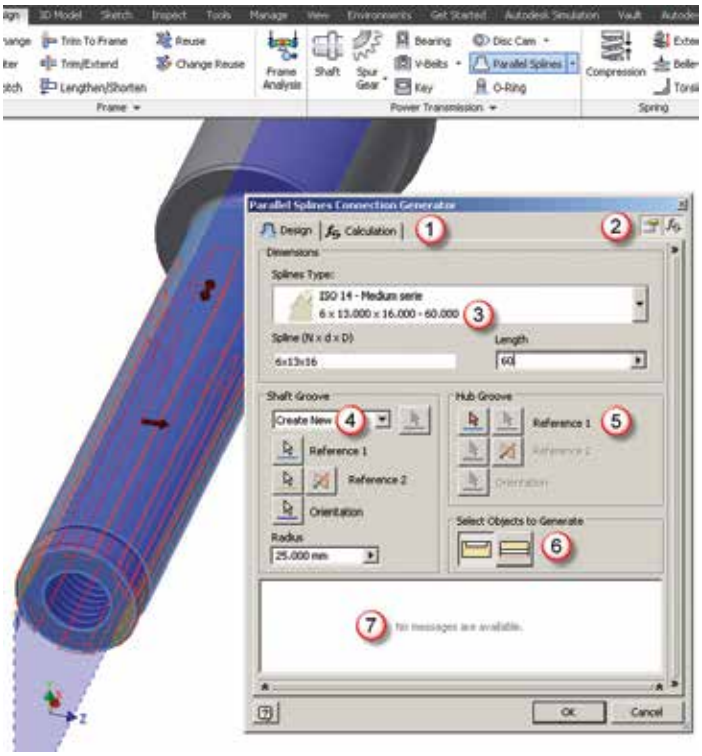


Figure 10: Parallel Splines Connection Generator.

Splines are created through the Splines tool found on the ribbon's Design tab. Actually, you should see "Parallel Splines," and if you pull the tool down, you will also find "Involute Splines." For the scope of this discussion, we will cover Parallel Splines.

Starting the tool opens the Parallel Spline Connection Generator, a dialog box with the following features (see Figure 10):

1. Design and Calculation tabs
2. File Naming and Enable/Disable calculations
3. Spline Type pull-down, along with respective size and length controls
4. Shaft Groove controls
5. Hub Groove controls
6. Shaft/Hub feature selection
7. Message box

The tool is called a Connection Generator because it can discern features that exist and create matching splines for the mating component, as well as creating both shaft and hub splines simultaneously.

When creating new splines, Inventor expects users to identify which standard they want to reference. Inventor offers S.A.E, DIN, ISO, and GOST, with variations for light, medium, and heavy duty in some cases; there are 13 total categories. In each, there are numerous sizes from which to choose

In order to continue, the user will need to select the outer diameter face, and a starting plane (or face) as references for Inventor to use.

Tip: Review the standards well, and create a cheat sheet that describes the features you are concerned with. If the shaft or bore diameters are not available in the standard, Inventor will alert the user, but will not change the size of the feature. It's best to know the size and set the diameter before starting the tool.

Glyphs appear on the shaft (or hub) that permit the user to resize the feature directly in the Graphics Window, as well as by direct input within the dialog box.

Tip: New users are often frustrated that the generator will not continue after the respective settings are added. Make sure you check the Shaft/Hub feature creation option (see item 6 on Figure 10). This is set to both shaft and hub by default. If you are only creating a shaft spline, Inventor will still be waiting for the hub. Check the hub option off and Inventor will create the feature.

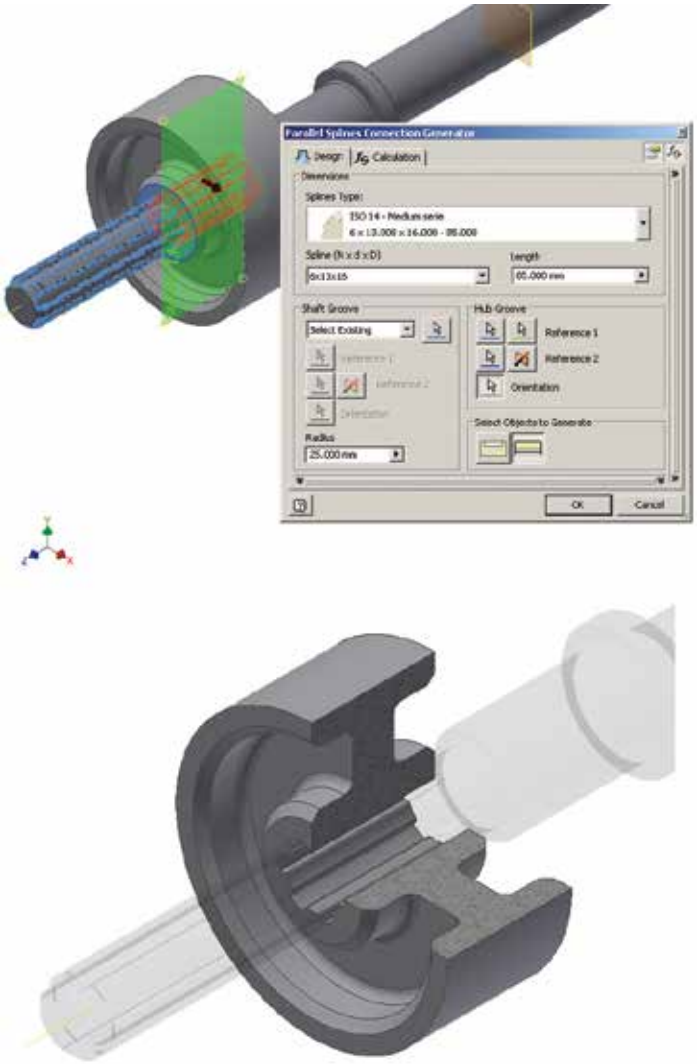


Figure 11: Creating Hub Splines—note the shaft creation option is off and Inventor is using the splines from the existing shaft to size the hub splines.

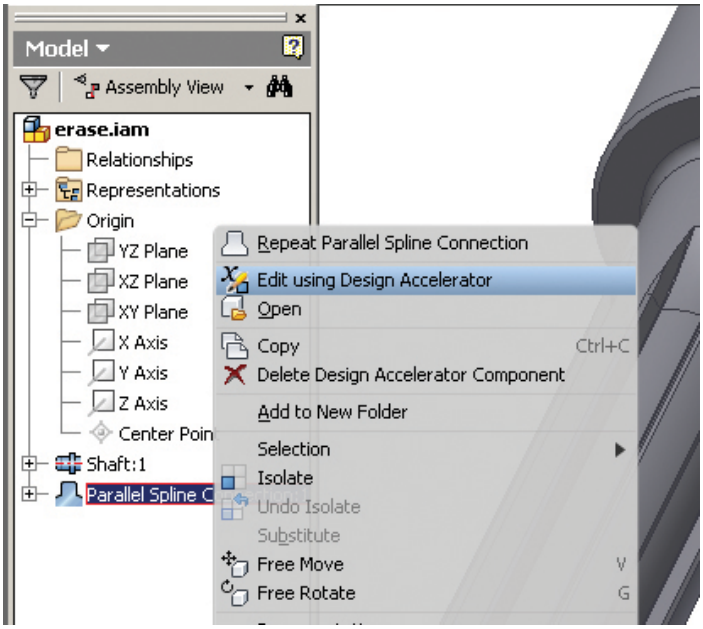


Figure 12: Editing Design Accelerator features.

Editing

Once the settings have been applied and OK is picked, the features are created as subassembly components and added in the Assembly Browser, just like the Shaft components mentioned earlier. In the event that users need to edit these, simply pick the component and select "Edit Using Design Accelerator," or conversely "Delete Using Design Accelerator."

Users can edit these generated components directly without this option. For example, if you needed to add some faces and geometry to a Design Accelerator shaft, users can add those features and it will not affect the Design Accelerated features. However, I encourage users to use the "Edit" and "Delete using Design Accelerator" option whenever the Accelerator-specific features, such as a different standard, need to be adjusted or simply removed. Inventor will clean up its tracks, deleting components and features or adjusting part extrusions and parameters automatically.

CONCLUSION

In some cases, the Design Accelerator features being loaded through assemblies can begin to crowd your browser a bit and create additional complexity. It is a small price to pay for automation like this. Could it be better automated, like better positional automation within mating components, like maintaining bearing and mating journal alignment? Possibly. Can the complexity of the file and assembly structure be simplified? Perhaps. However, considering how well the existing feature set works, it's a small price to pay, and not something I am overly concerned about.

Having the standards in one place, selectable and automated, is a dream. And being able to edit these later in the design without concern that the components will have to be recreated is a real comfort. It is one of my favorite things that Inventor offers. Let's face it, calculating involute spline profiles once is bad enough. Repeating the process in the assembly is not an option.

John Evans is an Autodesk Certified Inventor Professional living in the Florida Panhandle, where he provides technical troubleshooting at Gustin, Cothern, and Tucker, Inc. His career through the Aerospace Design, manufacturing, and maintenance spans 24 years and includes a tour in the USAF. John now works as a design consultant and author from his company John Evans Design and manages the blog "Design and Motion," where he combines his passions: Autodesk Inventor, simulation, and motion control. He is a regular attendee of Autodesk University and has recently joined Tekni Consulting as a contributing author for the Creative Inventor training series. He can be reached at john@johnevansdesign.net.

by: Bryson Anderson

MANAGING Autodesk Licensing

Managing your Autodesk software licenses can feel like a daunting task. The goal is to ensure all your users have access to the software they need be productive, while staying license compliant. The good news is, this goal is attainable!

Developing an understanding of the types of licenses, how they work, and how they are implemented will give you the confidence to effectively attain the goal, without the headache. You may find benefits you didn't even know existed that you already have at your fingertips.

AUTODESK LICENSING OPTIONS

There are currently two models of Autodesk licenses available, perpetual and term based. You are likely familiar with perpetual licenses—it is the way Autodesk has licensed software for decades. When you purchase a seat of software, it is yours permanently. If you keep the license on maintenance subscription, the license is upgraded to the latest version each new release. If the license drops off subscription, the current version you are upgraded to is yours permanently.

The second type is a term-based licensing model called Desktop Subscription. This is a newer licensing model Autodesk introduced recently. With this "pay-as-you-go" style, software is purchased on a monthly, quarterly, yearly, or multi-year term. At the end of this term, you can choose to renew for another term or cancel the subscription. Unlike perpetual licenses you do not permanently own the software license. This model allows you to gain access to software at a much lower cost up front. This makes it possible to ramp up on licenses for a project, summer interns, etc. at a low cost, and then easily drop those licenses. This cost could then be billed to a project rather than treated as a capital expense for your company.

The key difference between the two models is permanent licenses versus term-based licenses. Another key difference is that Desktop Subscription is licensed to a named user. This means the software is licensed to a particular individual at your company rather than activated on a workstation that could be used at different times by different individuals.

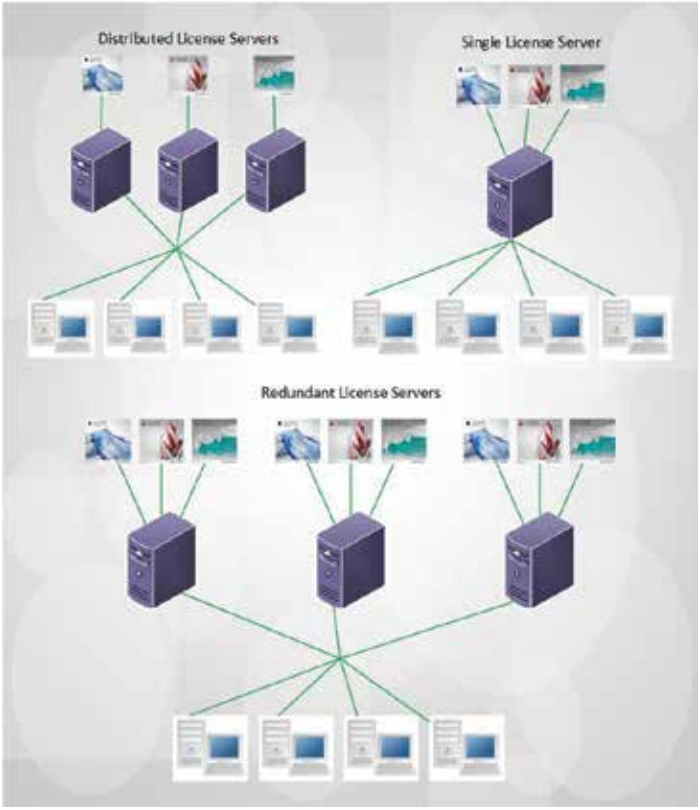
To illustrate this, consider this scenario. You have two part-time individuals—one works in the morning and the other in the afternoon. Because they are in the office at different times, they share the same workstation. This is a valid scenario with a perpetual license. However, with Desktop Subscription, because the software is licensed to a named user and it is only possible for one license to be activated on a workstation, this would not be a valid scenario. Each user would require his own Desktop Subscription license and workstation.

Within the perpetual model, there are two types of licenses, standalone and network. Standalone licensing is activated once via the Internet on a workstation and that license resides permanently on that workstation. Network licensing is a floating license type—the licenses are hosted on a local licensing server allowing the software to be installed on any number of workstations. The number of seats licensed by the server will open at any given time. When a user closes the application, the license is returned to the server and available for any other user to then open the software.

License Servers

This can be accomplished with a single license server or with many license servers spread across your multiple locations.

A single license server, the simplest type of license server, hosts all your licenses and is the single point of license availability. This is



great for a single location where redundancy of license servers is not critical. If this server goes down, all licenses are unavailable.

If you have multiple locations there are two other license models available, distributed and redundant. The distributed model is the most often used. With this model you have multiple independent license servers at each of your locations and your licenses are split across them. Users can be configured to pull a license from these servers in a specific order, usually starting with their local license server then reaching out to others if no licenses are available. In this model, a license server can be rebuilt without affecting the other license servers and each server can act independently of the others. If a server goes down, those licenses are unavailable, but the other locations may still be available.

The third and, from my experience, most seldom used type is the redundant model. In this model you have three license servers, each configured with all your licenses. If one server goes down, the other two can still host licenses and all license are still available. However, if more than one license server goes down, then all licenses are unavailable. This also requires that all servers be on the same subnet and have the ability to reliably communicate. Any change to the licenses on one server requires those same changes made to the other two.

SUBSCRIPTION BENEFITS

Whether you have Desktop Subscription or Maintenance Subscription on a perpetual license there are many benefits available. There are a few in particular that are important to understand when discussing managing licenses. These include access to the latest versions of your software, desktop, and laptop activations, previous version and home license usage.

Latest Version

With Subscription, whenever a new version of your software is released you are automatically granted access to that version. The contract manager for your licenses will receive an email when the product is released with the new serial number and product key.

Desktop and Laptop

With each seat of standalone software, you are allowed to install the software on a desktop and a laptop for a single user. These two machines cannot be used at the same time. For network licensing, if a user wants to take a laptop into the field where he or she will not have access to the license server, the user can borrow that license from the license server. This temporarily assigns a license to that laptop until a specified date and is no longer available on the license server until that date, or the license is manually returned.

Home Use Licenses

Home use licenses allow users to install and activate their software on a workstation at their home as well as the office. With standalone and Desktop Subscription licenses you simply install and activate with your existing serial number. For network licenses, you can request a home use serial number through the Autodesk Account website.

Previous Version Usage

For both Maintenance and Desktop Subscription, users have the ability to run previous versions of their software. This Subscription benefit allows users to have installed and use the current version and three versions prior. A user could have all four allowed versions of the software installed on a workstation concurrently. There are scenarios when you may need to run software older than three versions previous. If you owned that legacy product version and you are currently on Subscription, your reseller can help you with an exception to run that legacy software.

For standalone licenses, if you already have a serial for the previous version you can install and activate with that serial. If you do not have a serial for that previous version you can request a serial number through the Autodesk Account website. For network licenses, this functionality is built directly into your license file.

Keep in mind that with network licensing, for each version of the product a user opens concurrently, a license is consumed. For example, if a user opens AutoCAD® 2015 and AutoCAD 2016, this would consume two AutoCAD licenses. For Desktop Subscription, to use a previous version you simply download, install, and activate with your current license information.

AUTODESK ACCOUNT

The Autodesk Account website, which replaced the Autodesk Subscription Center, is your hub for managing your contracts, software assets and users, downloading software, making serial number requests, and so on. There are a few key functions of this site you should be familiar with.

To see contract information and serial numbers, add users, and to perform administrative tasks you must be either the Contract Manager or Software Coordinator for your subscription contract. The Contract Manager is the main point of contact with Autodesk and is typically the person who initially ordered the software. If you need to change your Contract Manager, your reseller can make that change. The Contract Manager can also appoint Software Coordinators to help manage the contract. Both of these admin users can also create regular users on the contract and assign them permissions to download software, use cloud benefits, or access Desktop Subscription software.

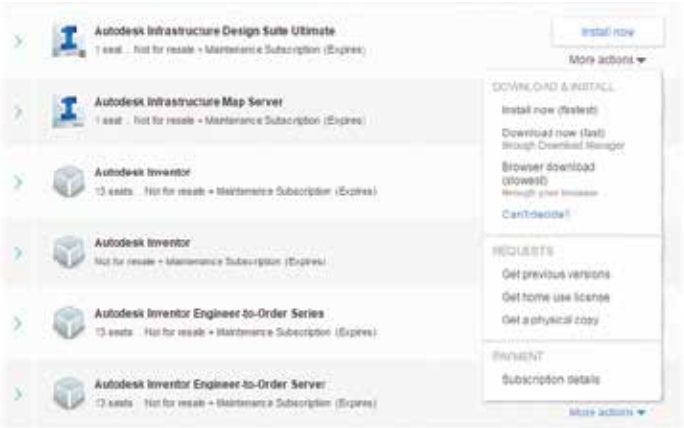
Downloading Software

When it comes to downloading software there are three options available. *Install Now, Download Now, and Browser Download*. The Install Now function is the fastest, but is also the most temperamental method. This method downloads, decompresses, and installs simultaneously. However, deployments cannot be created from this method, and if the network connection is lost it is not able to recover the install and the install will fail. This method works well on fast, stable Internet connections, but can be problematic on slow or unreliable connections.

The Download Now method is the method I most often use and it typically works very well. This method uses a download manager to download and decompress the installation files, after which you can install or create a deployment. Unlike Install Now, if network connection is lost, the download can resume where it left off.

The third type, Browser Download, uses your Internet browser's built-in download function to download the software in a highly compressed self-extracting executable(s). Once finished downloading these are then extracted to a specified directory from which you can install or create a deployment. With a single application such as AutoCAD, typically only a single compressed file is downloaded. However, a suite will contain multiple compressed files. You must download all files before extracting. The file names will indicate the total number of files in the set, and which part of the set that file is. For example **Autodesk_Infrastructure_Design_Suite_Ultimate_2016_001_006.sfx.exe** would indicate this is the first file in a set of six.

If all else fails, the Autodesk Virtual Agent can be used to download. This is the "bullet-proof" method. It is a browser download type, but allows you to manually pick and download each file in the compressed file set. This can be handy if your browser download only downloaded parts 1-4 of 6; you can manually download parts 5 and 6. The Virtual Agent can be accessed from many Autodesk sites—the one I typically use is http://register.autodesk.com. At the bottom of the page you will see a blue button that says Virtual Agent. This will open the virtual agent in a new window; from here click Download Links and follow the prompts to the software and version you need.



Once you have downloaded the software you will need the serial number and product keys to install. These can be found on the products and services tab of the Autodesk Account web page. Under each of your products you will see serial number and product keys for current version and three previous versions. You must be a Software Coordinator or Contract Manager to see the serial numbers.

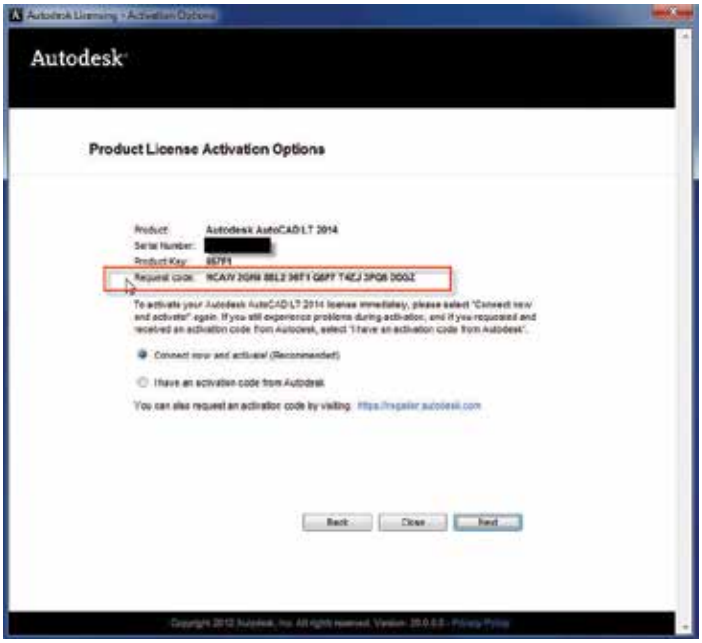
ACTIVATION AND REGISTRATION

Each of your Autodesk products will have a serial number and product key. The serial number is unique to you and to that product. With each new version of the software you will receive a new serial number. This serial number can be for a single seat or for multiple seats. For example, you could have 10 seats of AutoCAD that all share the same serial number. The Product Key is specific to the application version, but is the same for all Autodesk users. For example the Product Key for AutoCAD 2015 is 001G1. These product keys change each year, this change is predictable. The fourth character, a letter, changes to the next letter in the alphabet each year. For example, AutoCAD 2016 is 001H1.

Activating Standalone Licenses

When installing your software you enter the serial number and product key. On first launch the software will attempt to activate via the Internet. If activation is not successful, check to ensure you entered the correct product key and serial number for the application and version you installed. Also check to see that the activation is not being blocked by a web filter or firewall.

If you are indeed using the correct product key and serial number and you are still unable to activate, you can manually activate with a request code. When you launch the software and the activation screen comes up you will see a request code listed. You can submit



this info to Autodesk via a link on the activation window, or by calling your reseller or Autodesk directly. Autodesk will then generate an Activation Code based on your request code, which you will enter in the activation window to manually activate your software.

If you need to remove a standalone license from a computer and move it to a different computer, this can be done using the License Transfer Utility (LTU). This utility allows you to export your license to Autodesk using your Autodesk ID and password and then import the license on the new computer.

Registering Network Licenses

Network licenses are hosted on a licensing server in your office with a Network License Manager (NLM) called LMTOOLS. This is a very light application that can be run on an existing server, or if need be a workstation that is always on. You can find detailed instructions for installing and configuring this application on the Autodesk Knowledge Network.

The license server must be configured with a license file that contains your licensing information. You can generate these .lic files through the Autodesk Registration site, http://register.autodesk.com or they can be created for you by Autodesk or your reseller. Knowing how to create your own can save you time and help you better understand your licenses. To generate the file, login to the registration site with your Autodesk ID. You will enter the serial number, as well as the host name and mac address of your license server. Once you have submitted this information a license file is generated and can be downloaded; a copy is also emailed to you. You will need to do this for each network serial number.

License File Management

Once you have all your license files created you will need to combine them into one file to be applied to the license server. You will want to generate all your license files on the same day because if they are created on different days you will run into issues when combining the files. To combine the files you simply open them with notepad and copy the contents of each file into a single file. You will notice the first three lines of each file contain server information—this only needs to be in the file once at the very top, and those three server lines should not be placed into the file multiple times.

I find it very helpful to add comments to the license file to make sorting through the file later a little easier. In the license file the # symbol at the first of a line tells the license server to ignore any text on that line. I typically comment above each license what the license is, the number of seats, and the serial number. I do this simply to make the file easier to read. This is especially helpful if you have many products and serial numbers.

Each year when the new versions of the software are released you will need to update your license file with the newest license information. When you generate these new license files keep in mind it contains licensing for the current version and three versions back. You do not need to keep your old previous years' licensing information in the file. I find it helpful to start a new license file each year with all the new licensing information. Once you have your license combined you can check it by going to http://licenseparser.com. This site will parse your file and tell you what that file contains. I always check my license files with this utility, double checking products and license counts for accuracy. You will also want to update LMTOOLS to the latest version each year when upgrading your license file.

An often overlooked part of network license administration is an Options File. This file allows you to set restrictions on license usage. One function of the license file I find very helpful is the license timeout feature. This can be set to release a license back to the server if the user has been inactive for a certain specified period of time. You can find detailed information on Options File on the Autodesk Knowledge Network.

Bryson Anderson has worked in the IT industry since 2008. During this time he has been involved in many aspects of IT including Systems Administration, Networking, Telecom, Hardware, and IT consulting. He has helped large and small companies in a variety of industries including healthcare, software development, engineering, and architecture to plan, implement, upgrade, and maintain their IT infrastructure. At ProSoft, Bryson administers all aspects of the internal IT infrastructure. With his knowledge and experience in IT, he assists customers with the licensing and installation of Autodesk products. He also consults with companies worldwide on the planning, implementation, and training of Autodesk data management software.

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