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August 2016

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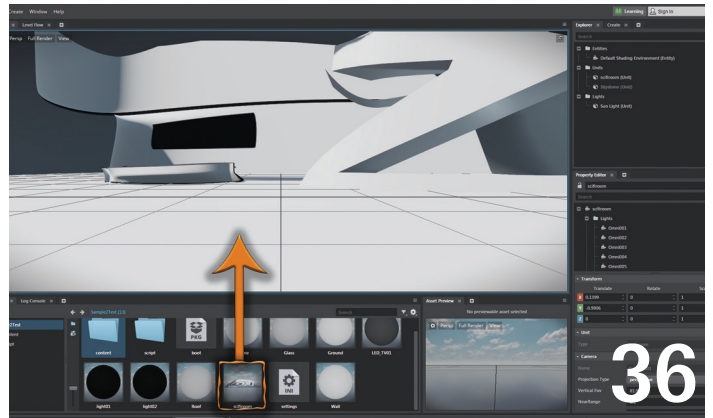
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Letter from the President



AUGI

ONE OF MY FAVORITE TOPICS

This month, *AUGIWorld's* theme is that of collaboration. This is one of my favorite topics. Collaboration is one of those buzzwords that we hear all too frequently. It also holds a broad range of meanings. Perhaps we need a collaboration meeting on the meaning of collaboration? <grin>

However, I'm going to talk about it from the perspective of working with other firms in a BIM project. Here are two common collaborative issues specifically with Revit® projects.

Issue One: Someone in the project decides to use worksets instead of Revit's phases to control the visibility of elements at particular stages of the project. For example, the architect decides to place tenant improvement or interiors elements in a workset rather than use a new Revit phase for those elements that will be built after core and shell construction.

Let's face it—within the architect's model, there is little difference between using Revit's phases or worksets to control the visibility. Is this true in a collaborative environment? Alas, it is not quite so easy to control the visibility of the linked architectural elements from within the engineers' models. Why is that? At the very minimum, it means that the engineers' models will need to control the visibility of each linked model's worksets on each and every view that the engineers' models use. Sure, effort can be made to create override view templates to help produce the correct views.

OR: when everyone uses Revit's phases, the engineers only need to map the phase in the engineers' models to the appropriate phases from the linked models. All that's left after that is to assign the correct phase to each view. It's easy, it's fast, and it's far less confusing. Anyone that says worksets are easier than Revit phases hasn't had to deal with workset "phases" from a linked model.

Issue Two: The MEP engineers request that ceilings be set to non-room bounding. "But wait!" cries the architect, "that makes it more difficult for me to work with my room elements!" True. I cannot deny that. But what are the ramifications for the MEP engineers? Why are they asking this in the first place?

The MEP models need to have space elements in the models to help assist with design. However, if the ceilings are marked as room bounding, the space element in that room will stop at the ceiling. There is no way to force the space to continue up to the floor slab above. Read that again: *there is no way to force the space to be correct.*

The proper approach, from a collaboration perspective, is to not make the ceilings room bounding. This is the only way the engineers can get the elements they need in their models.

Your final takeaways should be that sometimes collaboration means doing something you've never done before, but for reasons that really matter to the rest of the design team. Also, don't be shy about asking someone to do something to make the overall project better.

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AUGI President

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What Is the Best Computer for Revit?



➡ **W**hat a moving target that question is! LOL
What is today? Did Intel release a new chip?

With this in mind, let's look at the computer needs for three types of computer users: The Management, The Superstar, and The User. Adding to those few typologies let's overlay the following general, but driving tactic: Get the most your budget allows!

For Autodesk® Revit®, the search should include, if not begin, by doing the research into Autodesk's "Systems requirements for Autodesk® Revit® products." Consider that those specs are far below any actual acceptable workstation spec for The User, let alone The Superstar.

Both CPU hardware as well as GPUs have useful tools on Autodesk's site to start your research. The GPU requirements as well as their drivers are a most important item to become aligned with the Autodesk recommended spec, which can be found on their "Certified Hardware" page by tapping into the Graphics Hardware portion. There's a link to this tool on the SysReq page

listed above also. Use the tool for ideas and then get shopping and benchmarking (or researching benchmarks). I suggest you steer clear of the ADSK "certified" cards if you can help it and only go with the "Recommended" choices. While I am at it, stick to the NVIDIA Quadro's M or the more budget-conscious, though lesser, K series.

- [System requirements for Autodesk Revit 2017 products](#)
- [System requirements for Autodesk Revit 2016 products](#)
- [System requirements for Autodesk Revit 2015 products](#)
- [System requirements for Autodesk Revit 2014 products](#)
- [System requirements for Autodesk Revit 2013 products](#)
- [System requirements for Autodesk Revit 2012 products](#)
- [System requirements for Autodesk Revit 2011 products](#)
- [System requirements for Autodesk Revit 2010 products](#)
- [System requirements for Autodesk Revit 2009 products](#)
- [System requirements for Autodesk Revit 2008 products](#)

Figure 1

The ADSK SysReqs can be found for 2008 through 2017 (at the time of this article). Macintosh is spoken to there as well, though the Windows-based specs are quite strikingly more thorough, if not ultra conservative (IMHO a bit too weak, but we'll get there). And since I will mostly be sidestepping the whole "Mac thing" herein, let's look at the terse requirements for Mac usage:

“Running Revit® products on a Mac

Refer to the attached document about using Autodesk® Revit® software with Boot Camp®, part of Mac OS® X that enables you to install and run Microsoft Windows (and Windows-based applications) on a Mac® computer or with Parallels Desktop, a system utility available from Parallels, Inc. that allows you to run applications in each operating system without restarting your computer.”

OK, back to Windows PCs and my general suggestions.

PROCESSOR

Xeon multicore processors. Get as many and as robust cores as your \$ allows. Did someone say 44 cores and 512GB RAM? Yes, I just did. You can and someone should check processor ratings and speeds at CPUbenchmark.net.

RAM

64GB is my bare minimum recommendation; 32GB if your firm is absolutely broke and doesn't really care as much about lost \$\$\$ and productivity.

GPU

NVIDIA Quadro M or K series (and the bigger numbers of these series, too ;)

STORAGE

SSD. This is mandatory imo.

OK, now onto recommending specifics and my preferences for the three typologies: The Management, The Superstar, and The User.

THE MANAGEMENT

This typology encompasses project managers, BIM or VDC managers, and if you ask me today, most all executives. This group will not do heavy production, but will still need to push models around a screen from a multitude of places and for a multitude of

Microsoft Surface Book - 1TB / Intel Core i7



Figure 2

August 2016

purposes. For this group the best thing I found in the mainstream is the Surface Book.

The Surface Book with 1TB SSD, Intel Core i7, 16GB RAM to be exact. Ikr, a bit light on the RAM for my taste, but outside of that it is close to perfect in its purposefulness, form-factor, and flexibility and there is no competition that I have found (yet).

THE SUPERSTAR

These are the heavy-lifters. The advanced modelers, big project designers and producers, renderers, and the like. Sometimes The User will need these types of machines, too—it depends on the size, complexity, and scope of the project(s). For these pivotal folks we want to bounce our ideas off of workstations that one can rate on sites such as PCmag.com. HP and Dell and, to a lesser degree, BOXX seem to remain the most common players in the arena of tuned workstations with decent support, but if you are adventurous there are other custom manufacturers such as DigitalStorm and many others that can perhaps build even better machines at competitive price points.



Figure 3

The Superstars warrant, for instance, an HP Z840 or a Dell 7000 or a BOXX Apexx2 or a nifty GoBOXX 17 for Superstars on the go. Price point is key to balance, but in my experience one can stay around the \$5,000ish range and get a great machine that will last a few years of new Revit releases, as well as capture their ROI within the first year.

Superstars are worth every penny for a \$4,000 to \$10,000+ workstation, if they are truly one of the superstars noted above or similar and they are worth not having to wait for a machine to chug through the moderately large datasets they need to deal with day to day.

THE USER

As we have seen, sometimes The User needs a Superstar machine. If not though, I would look into the mid-range workstations from the manufacturers I have already mentioned.

If you do some due-diligence and cross referencing you can find a suitable setup for around \$2,500 to \$3,000ish, as in the Dell 5000 series, the BOXX Apexx2, or the HP Z640s. I'd still get The User a

Revit 2017 – Architecture

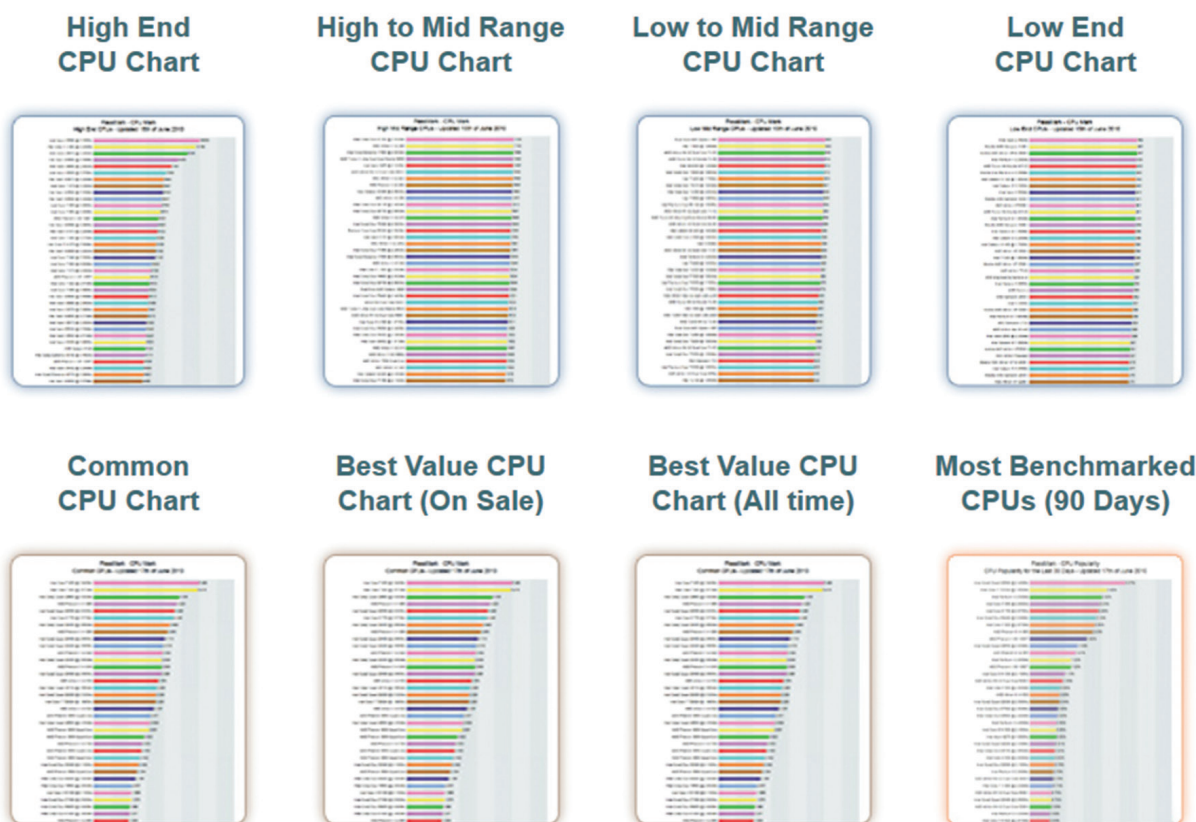
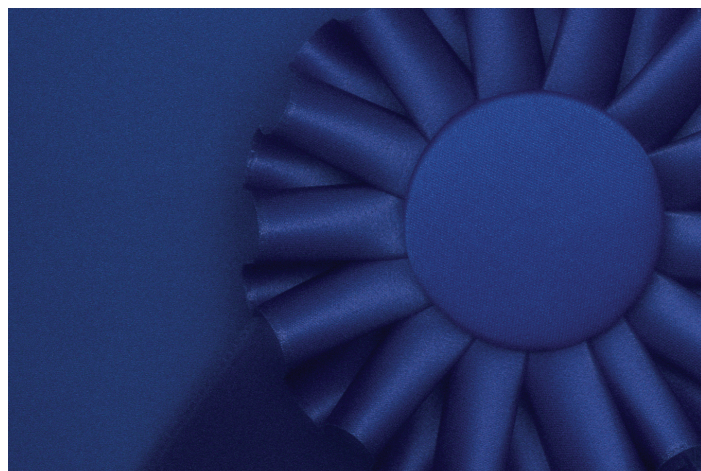


Figure 4: Image from CPU Benchmark

Superstar machine, but that's me—I'm not in control of the budget or productivity concerns in your office ;)

That said, I have done tests with Dell, HP, and BOXX. I also did the math, and higher-end machines (as I mentioned under The Superstar) are easily shown to be the most cost-effective set of machines available, even if they cross the \$7,000 plateau.

So again, whatever level of workstation The User and The Superstar gets, ensure the best Xeon with the most multicore processors, ADSK recommended NVIDIA M or K GPUs, and get the most RAM above 64GB you can, with SSDs for the best Revitouring experience.



Art - Architecture - Technology - Ideas
These are Jay B. Zallan's professional passions. He is a Designer, an Artist and an AEC technologist.

Harley Ellis Devereaux's Los Angeles VDC's Director of BIM Jay Zallan brings unique & qualified insights into the business & creative processes of Architecture with proven strategies for production & growth.

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

He is currently the President of the Los Angeles Revit Users Group, AUGI-world magazine Revit Architecture Editor, BIM Advisory Board member for Graphic Standards and he is a frequent lecturer on Creativity, BIM and Virtual Design & Construction.

He can also be found presenting at Autodesk University, Revit Technology Conferences and as a guest lecturer at the University of Southern California, LACMA, as well as many AIA, CSI and other industry events.

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by Robert Green

New Intel® Xeon® Processors Accelerate HP Z440 and Z640 Workstations

If there's one thing that never changes in the computer industry it is that technology improves and workstations get faster as a result. The new Intel® Xeon® E5-1600 v4 series processors from Intel, utilizing Turbo Boost Max Technology (TBMT) 3.0, illustrate this rule by speeding up Autodesk software performance on HP Z440 and Z640 Workstations.

Designed as tower workstations with ample power and expansion room to support a wide variety of drives and graphics processors, the HP Z440 and Z640 Workstations can utilize the newly available Xeon processors to power thru aggressive usage scenarios encountered by Autodesk power users.



Figure 1 – The HP Z640 Workstation.

HIGHER XEON® CLOCK SPEED AND MORE CORES

Many Autodesk users utilize single software products like AutoCAD, Inventor and Revit which run almost all of their computations in a single processor thread which executes on a single core. These “lightly threaded” applications perform best when the core they run on has the fastest clock speed available. Since these types of tools don't take advantage of multiple cores many Autodesk software users have been able to utilize quad (4) core processors. Most Intel processors utilize Turbo Boost technology which allows one or more active cores in lightly threaded workloads like CAD applications to run at higher frequencies.

However, as power users have begun running rendering and analysis applications concurrently with their CAD/modelling it is increasingly common to see more than a single core with high computing loads. In these cases, the traditional Turbo Boost technology falls short because only a single core can be accelerated to the maximum frequency. The new Intel® Xeon® E5 processors address this problem via use of Intel® Turbo Boost Max Technology (TBMT) 3.0 which can accelerate two dedicated cores to maximum frequency to meet aggressive demands from multiple applications.

UNDERSTANDING TURBO BOOST MAX TECHNOLOGY 3.0

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	GPI (GT/s)	Hyper-Threading	Featuring Intel® vPro™ Technology	Intel® Turbo Boost Technology ¹	TDP (W)
Intel® Xeon® E5-1680 v4 processor	8	3.4	20	2400	—	YES	YES	2, 4, 6	140
Intel Xeon E5-1660 v4 processor	8	3.2	20	2400	—	YES	YES	2, 4, 6	140
Intel Xeon E5-1650 v4 processor	6	3.6	15	2400	—	YES	YES	2, 2, 4	140
Intel Xeon E5-1630 v4 processor	4	3.7	10	2400	—	YES	YES	1, 1, 3	140
Intel Xeon E5-1620 v4 processor	4	3.5	10	2400	—	YES	YES	1, 3	140

Figure 2 – New Intel® Xeon® E5-1600 v4 processor options from HP's web site.^{1,2,3}

Looking at the E5-1650 example from the processor chart we see that 6 cores running at a base clock rate of 3.6GHz comprise the processor. It is the 2, 2 and 4 entries in the Turbo Boost Technology column that require some definition as follows:

2: All six cores in the processor can be boosted 2 100MHz steps for a maximum of 3.8GHz using Turbo Boost.

2: Any single core can be boosted 2 100MHz steps while the other cores stay at base speed yielding a maximum of 3.8GHz using Turbo Boost.

4: Two dedicated cores on the processor can be boosted 4 100MHz steps using TBMT 3.0 while the other cores stay at base speed yielding two cores at 4.0GHz.

So in this case the 3.6GHz processor with TBMT provides the best of both worlds: 4.0GHz performance on two cores for CAD applications and up to 3.8GHz performance on the remaining cores to support other computing processes.

Note: For specific usage cases where it is desired to run a particular software application on the two dedicated high speed cores a processor affinity utility can be downloaded and run.

MEMORY ARCHITECTURE AND SPEED

Of course any processor must access data from the memory (RAM) in the system to operate so it follows that the maximum speed of the memory is an important consideration. As seen from the chart Xeon® E5-1600 v4 series processors support 2400MHz DDR4 memory modules – a 50% improvement in memory speed from the 1600MHz DDR3 memory Intel processors supported just a year ago and 13% faster than 2133MHz DDR4 memory supported on other Xeon® E3/E5 processors currently.

Another major consideration in memory specification is the support for error correcting code (ECC) memory which is only supported on Xeon processors⁴. For aggressive simulation, rendering or analysis applications (like finite element calculations) that run in conjunction with CAD tools ECC memory prevents single bit memory errors that can cause expensive data corruption or system crashes. In these usage cases Xeon® processors with ECC memory should be specified.

To achieve the best possible processor performance installing the same types of memory modules in all memory slots to fully utilize all available memory channels and switch the system BIOS setting to high performance mode. For example, to load a workstation with 32GB of memory choose 4, 8GB ECC modules rather than 2, 16GB modules and be sure to install the fastest speed memory supported by the processor (in this case 2400MHz DDR4).

THE LONGER VIEW

Unlike the disc or graphics processor components of a workstation, the motherboard, processor and memory are the most expensive to replace so upgrading later is highly impractical. This means that you

need to specify a workstation's core components to support not just the software in use today but usage scenarios for the coming years as well. Especially in AEC and Manufacturing environments where many software applications tend to update frequently, model sizes grow larger, and additional software applications for analysis and rendering will become more common.

If your company needs to equip its Autodesk power users with new workstations to meet aggressive computing requirements the newly available Intel® Xeon® E5 1600 v4 processors with Turbo Boost Max Technology 3.0 you'll find in the HP Z440 and Z640 Workstations are strongly recommended.

ABOUT HP

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ABOUT ROBERT GREEN

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



1. The specifications shown represent the following: (all core maximum turbo steps, one core maximum turbo steps, two core maximum turbo steps with Intel Turbo Boost Max Technology 3.0). Turbo boost stepping occurs in 100MHz increments.

2. Table represents HP specific processor selections that are not representative of the full Intel® Xeon® E5 v4 line.

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

4. Intel® Xeon® E3/E5 processors can support ECC memory; Intel® Core™ i5/i7 processors only support non-ECC memory.

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HATCHKIT FOR REVIT 2017



<http://bit.ly/29DM4Xs>

Let's start off with the most requested item for Autodesk® Revit® we have seen lately. With more and more users getting into construction documents with Revit, hatch patterns are a big deal! HatchKit is a graphical hatch pattern editor for editing existing patterns or creating new patterns, either directly or upon receipt of a pattern template sent directly from Revit. The HatchKit Demonstration Version allows trialing HatchKit while unregistered.

Use the HatchKit Add-In for Revit to manage a project's currently loaded patterns:

- rescale and rotate fill patterns within Revit without reloading
- view large, zoomable pattern samples with a double-click
- edit a pattern's name, type, and orientation directly within the displayed table
- delete individual patterns from the project (excepting SOLID)
- purge all unused patterns from the project

The HatchKit Add-In for Revit is bundled with this HatchKit Demonstration Version. The HatchKit Add-In provides hatch

pattern management to Revit and directly interfaces to any installed version of HatchKit to access its full functionality.



CTC BIM MANAGER SUITE 2017



<http://bit.ly/29BLJm1>

This is one of the first add-in tool bundles that works for Autodesk® Revit® 2014, 2015, 2016, and 2017. The BIM Manager Suite is part of the CTC Express Tools family of products, and contains the following tools:

Family Tools: A collection of utilities for family creation, including: deleting backup families, working with type catalogs and shared parameter files, and listing the version of Autodesk Revit in which families were last saved.

Project Cleaner: Delete views, sheets, schedules, legends, and links; useful for sending projects to consultants.

Revision Cloud Remover: Makes it fast and easy to remove non-issued revision clouds from your project.

Dimension Checker: This tool finds dimensions whose text does not show dimensionally accurate values.

Family Processor: This tool can batch add, change, or delete materials, parameters, and shared parameters. This includes replacing existing parameters with shared parameters and updating parameter values and formulas.

Import and Link Manager: This tool assists with locating and managing CAD objects within a Revit model.

Schedule Parameter Resolver: Changes schedule parameter definitions to match those used in families, without losing schedule formatting.

Shared Parameter Manager: Manages the content of shared parameter files and assists with batch loading pre-saved sets of shared parameters into projects.

Type Swapper: This tool makes it easy to change the type or style used for text, dimensions, and line elements.

Watermark: This tool adds secure, password-protected digital signatures to your families and projects.

RHINOTONAVISWORKS



RhinoToNavisworks

<http://bit.ly/29RBff7>

RhinoToNavisworks is a plug-in for Autodesk® Navisworks® that enables viewing Rhino models (*.3dm) in Navisworks 2015-2017.

The plug-in contains the following features:

- Integration with open file dialog of Navisworks.
- Conversion of geometry and material colors of Rhino model.

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How Important Is Collaboration?



When employees are asked what their biggest complaint with their company is, a large percentage of the time they say it is a lack of communication. In the world of BIM, we have a similar issue, but we tend to call it a lack of collaboration.

THE DEFINITIONS

To better understand this concept, one must know the definitions. Communication is the imparting or exchanging of information or news. Collaboration is the action of working with someone to produce or create something. Based on these definitions I would say we can't have one without the other.

In preparing this article I did two things. First I asked my coworkers, people who do the same thing I do on a daily basis, to share their definition of collaboration. Below are bits and pieces of what was sent back to me.

"A concerted effort by a group that either results in a sharing of the work load more evenly or culminates in an output that is better in some measureable combination of cost, schedule or quality."

"Additionally having an open-minded disposition and a willingness to compromise are key factors."

Second, I went to social media to get additional thoughts from outside of our industry. Some of those responses:

"Working with an individual or team that is outside of your expertise to complete a project."

"Working together utilizing an individual's skills and expertise to achieve or accomplish a common goal."

"Bringing all your ideas together so that you come up with a well thought out and a well-rounded plan."

"A joint venture."

These are all very good definitions and they make it clear that whether you are working in the design industry or are a stay-at-home mom, you have the same basic opinion of collaboration.

WHY DON'T WE COLLABORATE?

We understand that communication and collaboration are critical to delivering a good project, so why don't we do these things?

Is it because each discipline finds that their work is more important than the others? Is it because many disciplines work

as sub-consultants on the project and don't feel the same sense of ownership? Or is it easier to just focus on your discipline and not worry about any other interactions from the other disciplines? Let's look at each of these reasons. For the purpose of this article I am going to talk about the main disciplines of architectural, structural, and MEP.

Often, it seems that each discipline finds that its work is more important than the others. I have heard it and witnessed it from all disciplines. Architectural disciplines control the overall design and function so their work is the most important. The structural disciplines are the ones who support, literally, the vision of the architects so that makes their work the most important, and MEP makes the design and function habitable, and because of that they are the most important. In reality, if any one of these disciplines fail you cannot complete a project, so each group is just as important as the others.

Ownership of the project is a big part of collaboration. Depending on the type of project and how the contracts are written, the other trades often work for the architect. When this is the case it can be easy to lose the sense of ownership of the project as you may not have direct interaction with the owner of the project. If you are working as a sub and your issues and concerns are glossed over, it becomes difficult to want to collaborate and communicate with the other teams. If your sub-consultants aren't supporting the project, then the project suffers.

My wife and I recently bought a new home and when we did our final walkthrough we witnessed the concept of a trade looking out for themselves and only focusing on their own work. There was a rather large hole in our master closet in the drywall and the trim carpenter placed his trim right over it—it was obvious that the hole was there before the trim went in. This is how the trades often work. One trade was done first so you will have to work around them, no matter what effect it has on the project. Again, if we work together from the start, these type of issues can be avoided in most cases.

HOW TO START OFF ON THE RIGHT FOOT

"We just don't have time to have a BIM kick-off meeting!" or "We didn't figure into our price a BIM kick-off meeting!" I can't tell you how many times I have heard that phrase come from a project lead's mouth. Talk about setting up your project to fail from the very beginning!

If we aren't setting goals and expectations up front, before the project starts, we may as well not collaborate at all on the project. I have witnessed these meetings done poorly, where it is run like a dictatorship and you aren't allowed to have an opinion or question the process. I have also seen these meetings run really

well, but follow-through wasn't done well, which cancelled out the good meeting.

What makes a good kick-off meeting? Short and to the point is probably the biggest key. There isn't any reason to drag it out and make it a long meeting. It is a good time for each team to get to know the lead from each discipline, which is why having the right people at these meetings is critical. The meeting should also cover what software each group is using, what their deliverables are, and what their level of detail will be at various stages of the project deadlines. This is also a good time to set a weekly upload schedule and location for these uploads so that everyone can be working in the most current model. Now if you do set a weekly upload schedule, that doesn't mean you can't reach out earlier in the week to discuss issues and request or send models in between the weekly uploads.

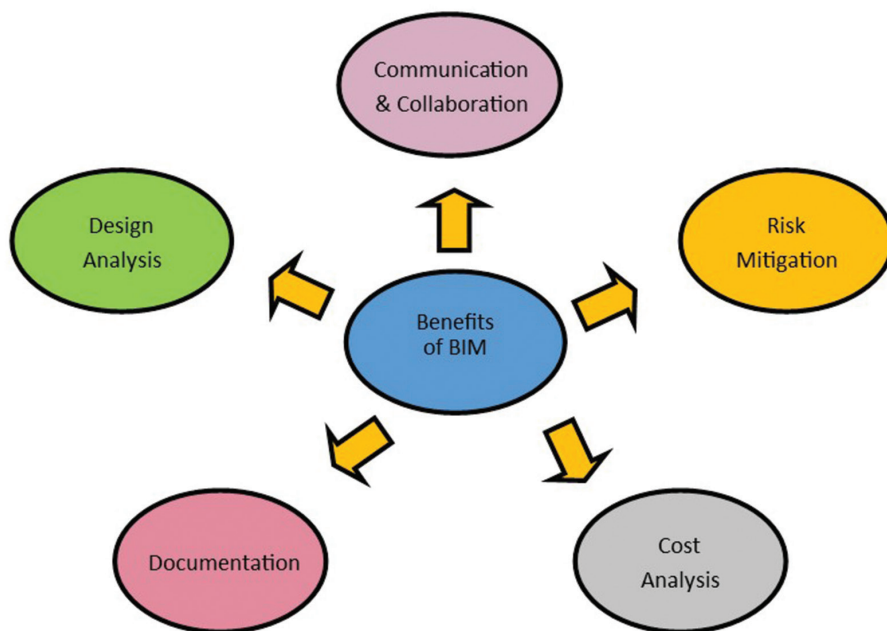


Figure 1: Benefits of BIM

HOW TO CONTINUE WALKING IN THE RIGHT DIRECTION

In a perfect world, everything would fit together like a great puzzle, but we know we don't operate in that world. We are going to have walls that interfere with structure, windows that go in front of columns, HVAC penetrations that interfere with joists and lights, plumbing that clashes with other items in walls and ceilings, and so on. The idea of working a BIM process is to catch these things up front and not in the field when time is of the essence.

Clash detection is a critical step of a BIM process and a key part of collaboration. If we all work in our own bubble and place our items where we want them with no consideration of the other disciplines, we severely handicap the project. If we are following a clash detection schedule, then we should be able to resolve issues in a timely manner. But to make these meetings

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the most effective, you need to have a good schedule and timeline of what disciplines will be where at which point in the game. Otherwise you can clash, but if there isn't anything in that space it isn't beneficial.

Ongoing discussion is also part of the clash process. We don't have to wait until there is a scheduled clash detection meeting. If we see a major interference we should reach out to the affected discipline and have a discussion about how it can be resolved, and then issue new models with these resolutions incorporated.

In my opinion, clash detection is one of the most, if not the most, critical processes of a project. If we aren't going to resolve issues in the design we may as well go back to 2D design and let it be resolved in the field. Not only will you find issues in your own design, but you see how your changes impact the other disciplines.

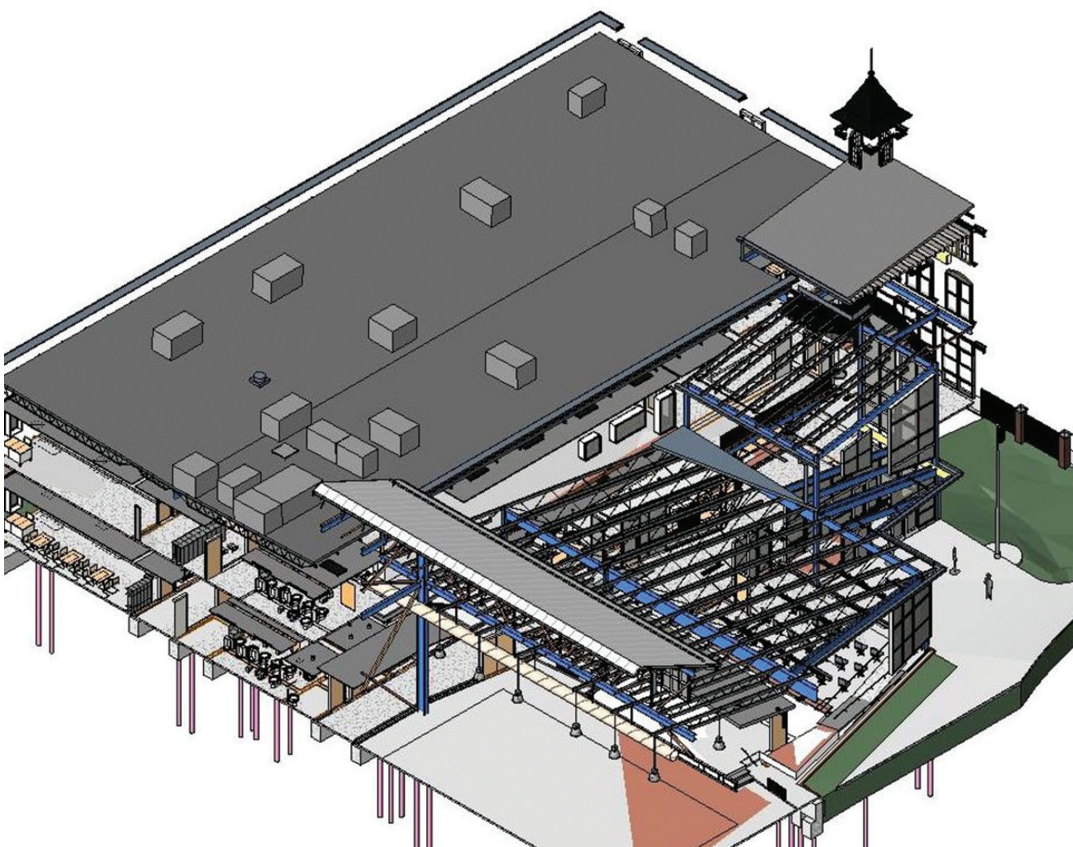


Figure 2: Coordination model

IS COLLABORATION ONLY PEOPLE BASED?

I hope the resounding answer to this question is NO! Although it needs to start on the human level, it needs to translate to the software level as well. We should all know that BIM is not software, but the process, and this process is designing a building collaboratively using one coherent system of computer models.

Working in the world of BIM we know that all disciplines can come to the table with a different software package to deliver these models, and until recently they only worked together in a mildly low form of functionality. Many times the geometry was there,

but the parametric data was lost. There have been great strides for interoperability and it has been a main topic of releases each year.

I have sat in meetings where one discipline pushes for everyone to work in the same software, and although it can be ideal, it isn't very often the best solution. When we run a project and we are collaborating, we want each discipline to produce the best deliverable they can, and often that means using a different software.

This is a discussion that needs to happen up front before the bulk of the project is being modeled and long before model exchanging starts. As a BIM manager there isn't much worse than to think you are going to receive one type of file and get something completely different, or even worse, something only in 2D. If we discuss expectations up front, we should be able to come to an agreement of what will be exchanged and what works for all parties involved.

SO COLLABORATION ISN'T JUST HUMAN, BUT ALSO INVOLVES SOFTWARE... ANYTHING ELSE?

I am glad you asked! If we are going to work in a 3D design world in our BIM process, why isn't more of our existing information in some form of 3D? We need to collaborate with our existing conditions when we are doing renovations and additions.

I recently saw a reply from someone who was asked if they utilize any LiDar scanning in their existing takeoff process. His response astounded me and shows me the lack of understanding of how far the

technology has come. His process was to take his software of choice with him and shoot a laser dimension on each wall and adjust the model as needed and then he would take 3D pictures of everything in case he needed to reference where something was.

In the same amount of time he spent doing that process he could have scanned the project and had much more data available to him than he ever could have gotten on his own. His one comment was that if it's scanned it still doesn't tell you where the pipe is in the wall, which is true, but last time I checked neither do our eyes. His second comment was he can go back to his pictures and see that something was missed and find where it was. This is great, but wouldn't it be better if you could then measure to this item with great ease and get an exact location?

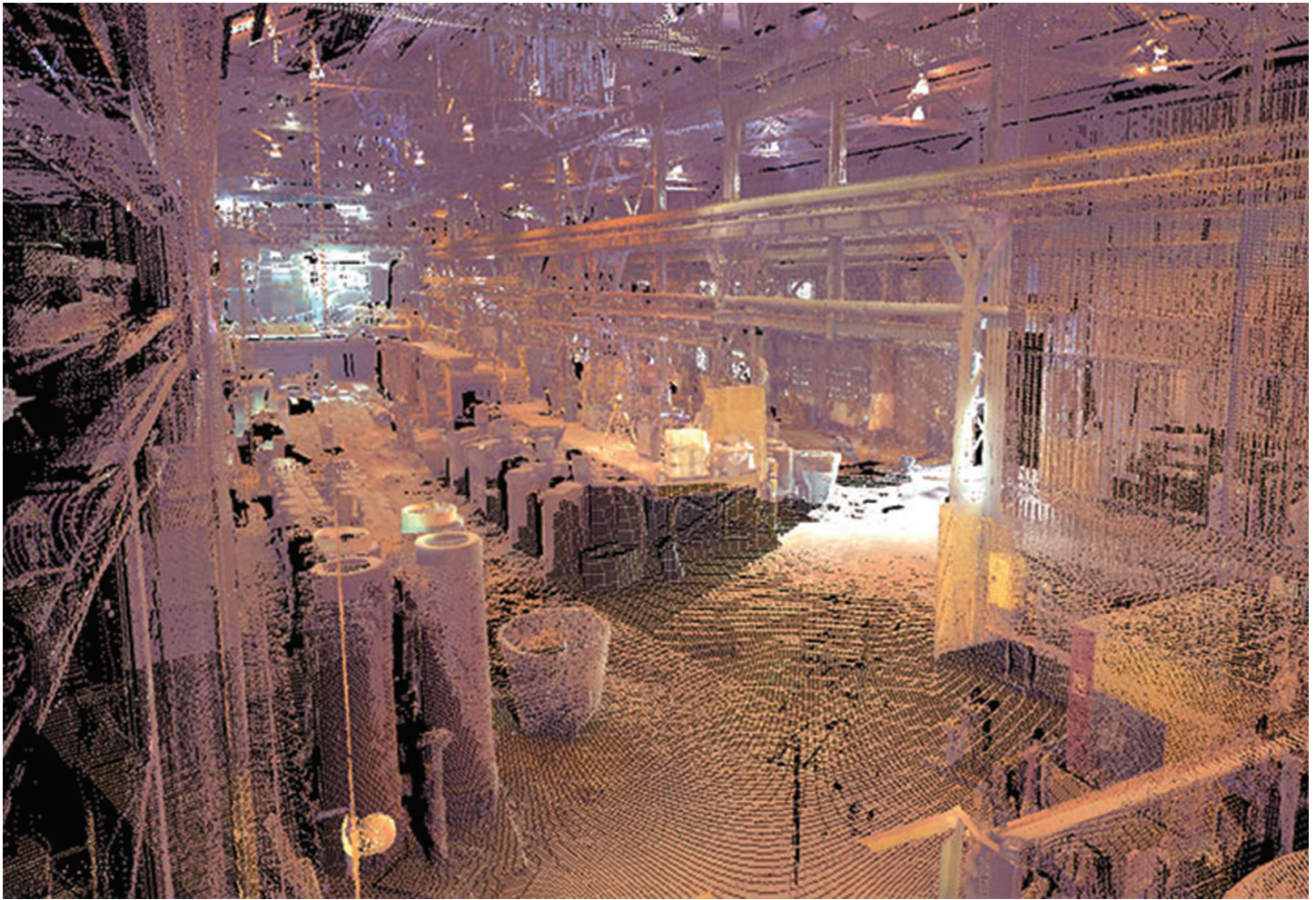


Figure 3: 3D Refractory scan. Image Credit: LSC Design, Inc.

Too many times an existing as-built model isn't correct and many disciplines work off of the wrong information, especially when you have one discipline recording information for all disciplines. Also, multiple disciplines will often go out to field measure and all have slightly different information and nothing will ever line up. If a LiDar scan is done, everyone can work off of the exact same information and everyone can be coordinated.

IN CONCLUSION

As we can see, both communication and collaboration are critical in the BIM process. You really can't have the effective use of one without the other, and without using communication and collaboration you really aren't deploying a BIM process.

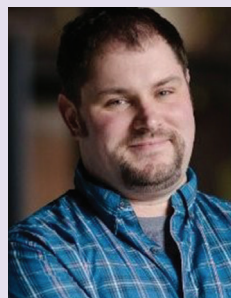
What if everyone doesn't want to play nicely in the sandbox? Who suffers? First, everyone who wants to utilize this process is at a loss. If everyone doesn't get on board the process can never be fully completed and integrated.

Second, the project itself suffers. There will be delays in the field, there will be a high number of RFIs, and the project schedule and costs will continue to push.

Third, the client/owner is going to suffer the greatest loss and

lose trust in the design team for future work. They expect us to be coming together for the good of the project and their vision. When we can't collaborate and deliver a design that is well thought out and clashed, they are going to start to wonder why they are paying what they are paying.

So let's be the ones who put the collaboration into the BIM process! It will be better for the project and all players involved and it will result in a better product for the client.



Joshua Geimecke is a Construction Support Specialist with the Fluor Corporation. He is currently working nuclear construction doing constructability review of civil commodities for the Integrated Construction Planning Team for new reactor builds. He has been involved in the CADD industry, working in many different disciplines and sectors for more than 16 years with the last eight years focused on structural BIM.

Giving AutoCAD the Boot



AutoCAD® was once described to me as Autodesk's baby that won't leave mom's house. My response was, "This kid's old enough. No more coddling. It's time for some tough love and the boot." I know a lot of you are thinking, "How is this even a feasible idea?" Have no fears, I'm here to let you in on some reasons as to why it's time to give AutoCAD the boot and how to make it happen.

Understand that some AutoCAD availability will need to remain in order to provide control when required. Converting to Autodesk® Revit® is the end game for this article. The reasons to move away from AutoCAD are relevant even if the software choice is not Revit.

First, consider the time and energy saved by not educating on AutoCAD. These days many new, young engineers or designers no longer have AutoCAD experience coming out school. The software most commonly taught in Architectural Engineering schools is Revit. Depending on the major, some may not have experience in either software. When these new employees join a company they have so much to learn. Should they really be expected to pick up two new programs to learn in addition to company standards? And that's just the "drafting" side of things they will be expected to learn. This process can be expedited by teaching only one and giving them the tools to excel in that software.

The use of both AutoCAD and Revit applies to existing employees as well. Maintaining the skills and knowledge to excel in both takes time and energy.

Second, maintaining standards and training for both products doubles more than just the BIM Manager's workload. If the time for training could be cut in half and employees could focus on refining just one skill set, everyone would have the opportunity to go deeper in Revit instead of shallow in AutoCAD and Revit.

Third, there is a lot of work involved to keep AutoCAD up and running. The time required to update LISP's, details (in two places), schedules (in two places), symbols, and CUI files could better be used furthering Revit development, family creation, smart schedule development, and ultimately help the standards process and save time.

Fourth, there may very well be a financial impact to licensing. Instead of purchasing Design Suites where the Premium runs around \$2,730 and the Ultimate runs around \$4,830 per license there is a potential to only support Revit licensing that runs around \$2,000. Multiply these savings across the number of licenses being supported and the savings will add up fast.

With compelling reasons to drop AutoCAD, why don't we? I have often heard, "We have to use AutoCAD because that's what our clients are using." This is not true. The received AutoCAD files can be linked into Revit for use and AutoCAD files can in

turn be exported from within Revit. Most of the time the actual deliverables are in PDF format, which either can perform.

We also have older engineers who are not as savvy with Revit as they are AutoCAD. This is where individual companies need to evaluate what steps work best to proceed. Do the engineers need to learn the basics in Revit in order to be efficient? Should engineers focus their time, experience, and efforts elsewhere instead of AutoCAD or Revit?

There are reasons to switch, so let's move on to how to do it.

First, say sayonara and uninstall all AutoCAD...I'm kidding! Start by creating an outline of the concerns and finding ways to address them. I am going to outline my process below that likely covers the common concerns you might have.

1. Save the AutoCAD files locally. Open them up and burst any items inside until they are just lines. (This will help with controlling layers from within Revit.)
2. Open a Revit project (some are created from templates) and perform any necessary initial company standard set up.
3. Open an elevation view; create necessary levels at best known elevation.
4. In the open elevation view, create reference planes for a general ceiling location and name reference plane appropriately (see Figure 1). (For different ceiling heights, different planes can be created, but remember the expected scope of work—they are necessary for the deliverables? The fewer planes, the less confusing it is when it's time to model. I only use one for all ceilings per level.)

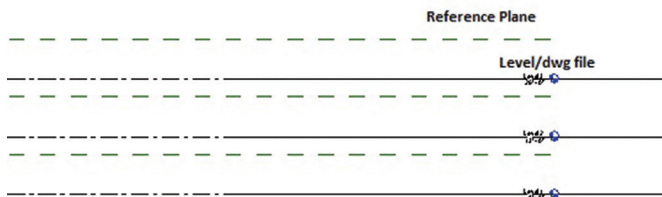


Figure 1

5. Next, create a level 1 floor plan and link in the AutoCAD file for level 1.
6. Repeat for all levels.
7. Create a reflected ceiling plan for all levels and link in the AutoCAD file. (An important part of this process is to link and not insert. This will save time with background updates.)
8. Open a floor plan with a linked file and open the Visibility Graphics.
9. On the Imports tab, expand the linked AutoCAD file so that all layers are visible. (Layers become subcategories under the drawing when linked.)
10. Select all of the subcategories and the AutoCAD file and Overwrite Lines to show company standard color and weight. (If different for existing and new, assign appropriately by changing from overall selection to by groups.) The linked file should now look correct for line weight and color.

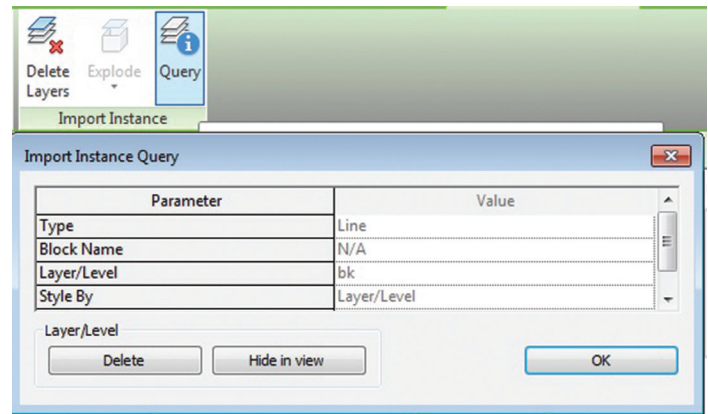


Figure 2

11. Inside the floor plan select the linked file; on the ribbon, click Query (see Figure 2).
12. Select a line from the AutoCAD file that needs to be turned off. A dialog will open and display the layer name. If it needs turned off, click Hide in view. If the layer needs to remain on, click OK and the command will do nothing to the layer. (Bursting the file previously makes this operation run smoother.)
13. The dialog will close, but the Query command is still active so the lines can continue to be clicked until all layers are off that are needed.
14. If a Hide in view needs to be reversed, Escape the command and click Undo. It will only undo the last Hide in view.
15. Layers can also be turned off inside Visibility Graphics, Imported Categories, and subcategories (layers) under the AutoCAD file (see Figure 3).
16. Once set, create a view template from the view of the Imported Categories (see Figure 4).

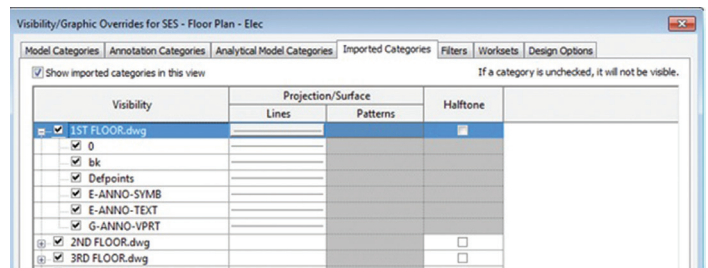


Figure 3

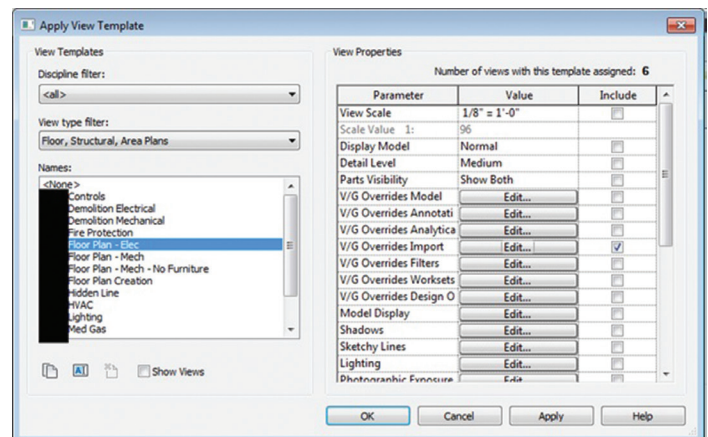


Figure 4

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17. Assign this view template to all views associated with this AutoCAD file.
18. Repeat for each level and reflected ceiling plans.
19. From this point, model elements the same way as a regular Revit job.
20. Face hosted families associated with walls were recreated as standalone type families for our process, but reference planes can be placed along walls if this is not an option.
21. To place face hosted families in the RCP, select Place on Work Plane, select the reference plane by the name given. This should only prompt once and default to the correct plan following the initial selection.
22. When setting up a title block, place the AutoCAD content in the paper space, not model space, and then insert. (Only option in Revit title block editor.)
23. Use labels and text as desired for title block information.

To update an AutoCAD link:

1. Save the AutoCAD files locally. Open them up and burst any items inside until they are just lines.
2. Open a new local of the Revit project or, if inside the project, navigate to Insert tab, Manage links, select link, and click Reload.
3. Any added/new layers will show up as original color from AutoCAD so changes will be visible. Choose to either override those colors/weights or turn them off. (See the steps from the previous section.)
4. By using assigned view templates, background changes will be made to all associated floor plans at once instead of individually applying to each view.

If AutoCAD plans are needed to send out of the office, simply choose to export the sheets or overall views to AutoCAD from within Revit (see Figure 5).

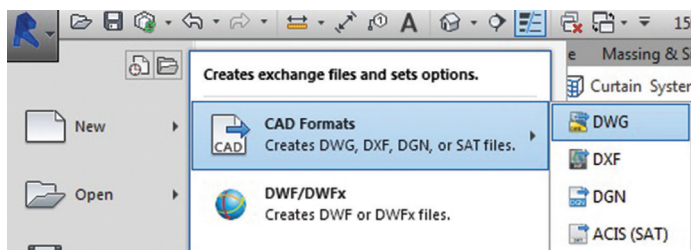


Figure 5

Some of the benefits I have found from this process are as follows.

- Model coordination can still happen if reference planes for ceiling heights and levels are set at appropriate elevations.
- Smart schedules can still be used to populate information from the smart families.
- The company is no longer supporting AutoCAD and training time is redirected towards excelling in Revit.
- We have fulfilled our need for additional licensing by adding Revit-only licenses, saving money.

I have created a “starter project” that alleviates some of the tedious setup tasks, such as linking files. The “starter project” takes the

AutoCAD



place of a template and reduces time for project setup. In this “starter project,” the links just need a quick Reload From.

When presented with existing and demo work, there are options depending on the complexity of the project. I recommend controlling lineweights, linetypes, and colors through Revit by editing how layers are shown through the Imported Categories tab of the Visibility Graphics dialog. When AutoCAD files are linked correctly, layers can be turned on/off from this location. This requires AutoCAD work on the front end, but once it's done it shouldn't need to be changed.

When connecting to existing work, some elements may need to be redrawn in Revit. Choose only the elements that are required. Redrawing everything is not going to be beneficial or crucial in most cases. Redrawn items can be deleted out of the linked AutoCAD file so they are not shown twice.

In all cases, making the switch to Revit from AutoCAD just makes sense.

This was not an easy change for some. There was a lot of concern and hesitation from some, but it was alleviated after the process was created, presented, and demonstrated. The implementation of anything new has its obstacles, but thus far this process has not had any that were unforeseen and none that have not been overcome.

I hope I have opened the box a little wider and proven that it's not impossible to simplify the processes of working in Revit for AutoCAD-driven projects. Here's to giving AutoCAD the boot!



Andrea Alderton is the BIM Administrator at Specialized Engineering Solutions in Omaha, Nebraska. An Autodesk Revit Architecture 2013 Certified Professional, she has been in the MEP industry for nearly nine years working on projects from small, two-room renovations to multimillion dollar university buildings and hospitals. Andrea has a passion for learning, teaching, thinking outside of the box, and asking “why?” Connect to Andrea on LinkedIn.

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Priorities



It's all about priorities, right? In the July 2016 issue we discussed the creation of Task Lists. We left off at the point of having a task list created, grouped, and categorized. This may have uncovered items that can be grouped together. Larger recurring items, when looked at holistically, may uncover underlying themes that run through them all.

All items on your task list do not carry the same level of importance. That is obvious. If you look at the list we created from last month, it should be easy to pick off a few low-priority items and move them down the list. It might be easy to find a few high-impact items that will move your firm toward better use of technology and production. But when you add the influence of critical timing (has to happen now), everything might get jumbled up.

LIST CREATED – NOW SPLIT IT

The task list groupings, when collected together, can become a project. Project planning moves beyond just task list approaches to getting large efforts done. Planning will uncover a flow of work over many tasks and call for staging them to be done first, second, third, and so on. You may have to use shared resources or materials. It may require assigning work to yourself or others in a progressive manner. When time, resources, and manpower have to be coordinated, that to me is a project.

Small or large, projects need more thought than just jumping in and pounding through. If you fail to see a grouping of tasks as a project, then you might move through them one by one and not generate the best workflow for you or others. You cannot install a new tool until you define the problem it will solve. You cannot install what you have not bought. You cannot buy what you have not budgeted. You cannot get approval until you define costs. You get the picture. Step by step. Planned out. Coordinating workload.

I would suggest taking the projects off your task list and start a project list. Projects are probably more important than tasks, but time constraints may make them hard to get to. Projects are also

longer range and tasks are quicker to complete. Projects on the list need to be done. They have been designated as important, but take a different approach that just working on tasks.

DRIVING REAL-TIME DECISION MAKING

The real-time decisions that need to be made are focused on getting the most impactful results from what you are doing now and what you do next. Your efforts to prioritize your workload live in the real world consist of deciding what you should be doing now and then what to do next. Peter Drucker points out in his book *The Effective Executive* that "Knowledge work is not defined by quantity. Neither is knowledge work defined by its costs. Knowledge work is defined by results."

Are you focused on results? Are you doing the most important thing right now? If you constantly ask yourself that question, you will stay on track and make the most of every day. If you are reading this article at work, that question might encourage you to drop this magazine and get something done ☺. When you start a task, ask that question: "Is this the most important thing I should be working on?" When you reach a milestone in your project or task, ask again. When you finish something, ask again about what is next in line. Always be asking yourself, "What should I be doing now/next?"

ADDING A THIRD LIST

So now you have two lists, tasks and projects. Projects are larger and longer term. Tasks are shorter and smaller, but that does not mean that tasks are less meaningful, important, or impactful. Most projects start on the task list and get moved over.

There is another list that I suggest you develop. It is the Initiatives List. This list is a result of your strategic thinking and planning. Items on this list are focused, systemic changes to infrastructure, introducing new software, shifts in workflow/culture, or moving in a new direction. New things start on this list. Reforming processes are on this list. Getting rid of unproductive tools is on

this list. Initiatives usually involve large change efforts. Out with the old, in with the new. Initiatives involve project planning, but do not start as tasks. They migrate down to the project list as you move them toward completion.

YOUR FIRST PRIORITY

You might do well to have a decision framework for defining priorities. You can make your own, but you should have this type of list either written down or at least the first few items burned into your brain. This is the order of precedence that defines what you work on first, second, third, and so on. Some of this may seem painfully obvious, and it is. Other items are sorted by the priorities of your firm and can be more specific when you create your list.

The framework should start with critical system failures. Fixing things that are broken is your main focus and number one priority. Tech Managers are first responders when things fail. You dive in when there are system failures or project delays that threaten to impact a deadline. You watch for large system failures that might take down several projects if not corrected. You seek to help when staff troubles arise so they do not impact a project.

- Diagnose Problems – Define what caused the problem so you can fix it and avoid it later.
- Fix Problems – Get things back in working order.
- Prevent Problems – Do preventive maintenance to avoid system failures.

Fixing things is job one, but after that, then what? When there is some down time (and there will be at some point) what do you work on? Projects? Initiatives? Other tasks?

WHAT NEXT?

The results of a Franklin Covey survey show that 41.5 percent of people's time is spent on unimportant activities such as trivial work, gossip, procrastinating, unneeded reports, other people's minor issues, and irrelevant meetings. When you have free time, do you get trapped in some of the above?

Don't just look to your task list for the next thing to do. I tend to use the task list for filling in short breaks that I get. When large chunks of time are available, I look to the project or initiative lists. It might be best to plan your free time so that you know what to do when you actually have that free time. You may be able to put something on the calendar and move other things aside to focus some time on your projects. Keep in mind that you need to spend time on the things that really matter. The pressing issues will gobble up your time and you need to protect it.

Things that really matter should be on your project and initiative lists and some might be on your task list. Items such as creating documentation, training docs, or making a call about an invoice might all be on the task list. Don't forget to do some things just because you want to or feel that would bring your best strengths to the forefront.

The framework you develop can be run through each time you have a chance to decide what to do next. Here are some ideas. Move them around or add your own, but come up with something or you will be running from pillar to post all day long (it happens to all of us). Depending on your firm's current focus, your list may lean toward bringing in new tech, saving money, expanding to new offices, etc.

Relationships – working on the relationships you have with others at work and developing new ones. Reaching outside of your tech world and rubbing elbows with other departments when you do not have a shared project. The better your relationships are, the more you will be able to work with teams.

Cleaning House – going through your server, systems, documentation, standards, or whatever and getting rid of old junk. Organizing your applications directory when you store software for installs. Throwing away your AutoCAD 14 books (NO!)

Seeking Efficiency – finding better ways to do what you are already doing. You may be fine, but can you be better. Squeeze more out of what you already have.

Bringing in New Tools – if you do not push people forward, who will? You need to always be looking for the next thing, the next upgrade, or the next utility.

Planning – filling out and reviewing your initiatives list. Talking to others about what might be added to it. Defining what is within reach based on cost or time or manpower.

Mentoring/Coaching – helping others climb up the ladder or advance tech skills or career. Teaching someone something.

Continuous Learning – sharpening your skills. Taking a class, reading a book, going to Autodesk University.

You should have three priorities in your head so that when you get free time you can quickly turn your focus to them. The priorities can and should change, but by having a quick list you can capture free time and make it productive for yourself and your firm.



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.

Collaboration with Autodesk Design Review

Autodesk Design Review is a free viewing application that enables all members of the project team to easily view, measure, markup, and print designs shared electronically. Built around the DWF file format, Design Review enables users to view and print complex 2D and 3D drawings, maps, and models published from Autodesk design applications or from the DWF Writer. DWF (Design Web Format) is an open, published, and secure file that enables you to combine and publish 2D and 3D design data and share it with others. Much like Adobe PDF files, DWF files are no more alterable than printed paper copies. However, unlike PDF files, DWF files retain detailed design information and scale, which makes them more suitable for architects, engineers, and designers.

When DWF drawings are marked up in Autodesk Design Review, you can then view these markups in AutoCAD® Architecture and make changes to your drawings. How does this work? When you want to submit designs for review, you can publish a

DWF file from AutoCAD Architecture and then send it to the reviewer of your designs. The reviewer can open the DWF file in Autodesk Design Review, mark up the file electronically, and then send it back to you. When you open the marked-up DWF file in AutoCAD Architecture, you can view the redline markups in the AutoCAD Architecture drawing area, turn them off, make your changes, and republish the DWF file to send out for another review. Doing all this electronically with AutoCAD Architecture and Autodesk Design Review will greatly decrease time normally spent in collaboration with others.

PUBLISH DRAWINGS FOR REVIEW

Once your design is complete in AutoCAD Architecture, it is time to publish the drawings for review. In order for electronic markups created in Autodesk Design Review to align with the original drawing geometry, it is important not to change elements in your drawing file that can affect this alignment after you have published the DWF file for review. These elements include the following:

- Layers and layer states

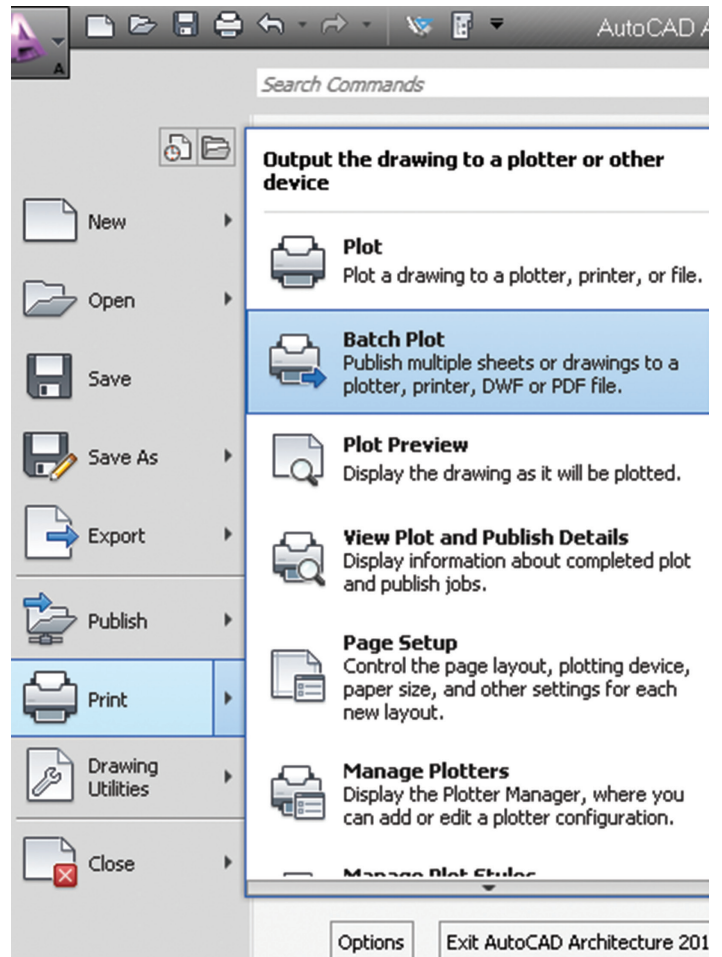


Figure 1: Batch plot

- Layers to which objects are tied
- View rotation
- Number and placement of viewports in layouts
- Position and scale of objects within viewports

To publish a drawing set in AutoCAD Architecture to a DWF file, select the main menu drop-down, print menu, and then select Batch Plot (see Figure 1). This brings up the Publish dialog box. If the Automatically Load All Open Drawings option is selected in the Publish dialog box, all the layouts in the current drawing are listed in the sheet list. You can modify the list of sheets in the Publish dialog box as needed. When your list of drawing sheets is assembled

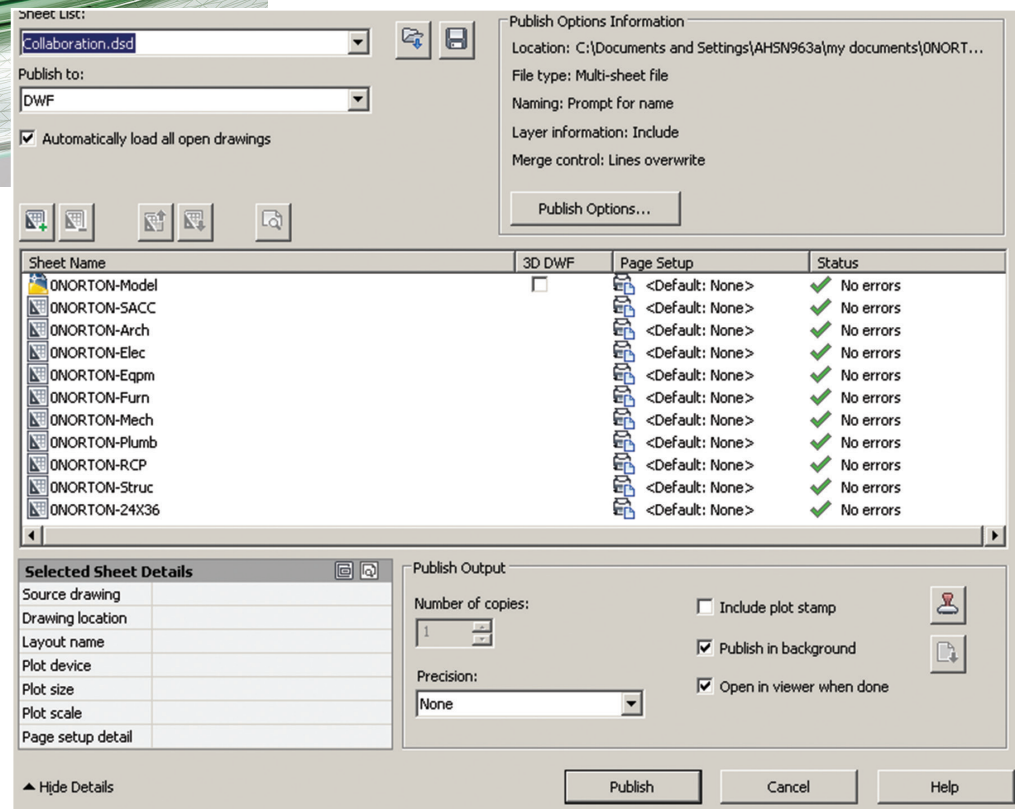


Figure 2: Publish dialog box

AutoCAD Architecture 2017

and configured the way you want for your drawing set, click the Save Sheet List button (see Figure 2). In the Save List As dialog box, enter a name for the list in the File Name box and then click Save. The drawing set list is saved as a drawing set descriptions (DSD) file. Now, in the Publish dialog box, under Publish To, select DWF File. Then click Publish. Next, in the Specify DWF File dialog box, enter a file name. The Files of Type is DWF based on the selected DWF format. Click Select to provide the name and destination for the DWF file. Click Save to start the electronic drawing set creation.

INSERT MARKUPS

A markup can be either a single comment or a redline geometry correction that is inserted into a DWF file. Once the AutoCAD Architecture drawing has been published for review, you can use Autodesk Design Review to add markups electronically, just as you would mark up a paper version of the drawing. You can also assign a status to the markup and add comments. After you have made the markups you wish to make, resave the DWF file. Now the markups can be viewed and corrections made. Markups can be made using the Markup & Measure tab on the ribbon (see Figure 3).

SECURE MARKUPS

Design Review enables you to lock and unlock markups, which helps to prevent accidental changes and deletions. Locking a markup prevents several actions such as cutting, deleting, moving, and modifying text. However, not all changes are disabled when a markup is locked. Locked markups do not prevent changing formatting and properties. After creating new markups, they remain unlocked and you can manually lock and unlock markups as needed. When a marked-up DWF file is opened, all existing markups are locked.

You can determine whether a markup is unlocked or locked by looking at the grips. On the canvas, the grips of a selected markup are either yellow, indicating unlocked; or gray, indicating locked. You can also look at the Markups palette. To the left of each markup, a lock icon indicates whether a markup is unlocked or locked.

If you wish to change the security of a markup, begin by clicking Select on the Canvas toolbar. On the canvas or in the Markups palette, select the desired markup object. To lock the markup, click the unlocked icon in the Markups palette to the left of the markup name or, on the canvas, right-click the markup and select Lock. The selected markup is now locked. To unlock a markup, click the locked icon in the Markups palette to the left of the markup name or, on the canvas, right-click the markup and select Lock. The selected markup is now locked. It is important to note that you can also double-click a locked markup on the canvas to unlock it.

VIEW MARKUPS

Now that you have received markups, it is time to review them so corrections can be made. To view the markups in your designs, load the markup set into the Markup Set Manager. A markup set is a group of markups contained within a single DWF file. To open the Markup Set Manager, select the View tab on the ribbon in AutoCAD Architecture, then click the Markup Set Manager button on the Palettes panel. This brings up the Markup Set Manager palette (see Figure 4).

Now, in the Markup Set Manager, click the Markup Set list control and select Open. When you load a markup set into the Markup Set Manager, the tree view will display each marked up drawing sheet and its associated markups. It is important to note that if you try to load a markup set by opening a DWF file that does not contain markups, you will not be able to open the DWF file in AutoCAD Architecture. You can, however, open the DWF file in the DWF file viewer.

While in the Markup Set Manager, you can view details of an individual markup. To do this, click on an individual markup node. The Markup Details area in the lower portion of the Markup Set Manager will display details for the selected markup. These details can include creator of the markup, date and time it was created, and any comments associated with the markup. It is important to note that markups are color-coded and have icons that are specific to their status (see Figure 5).

When you double-click a model space markup in the Markup Set Manager, the original drawing file opens in model space. The

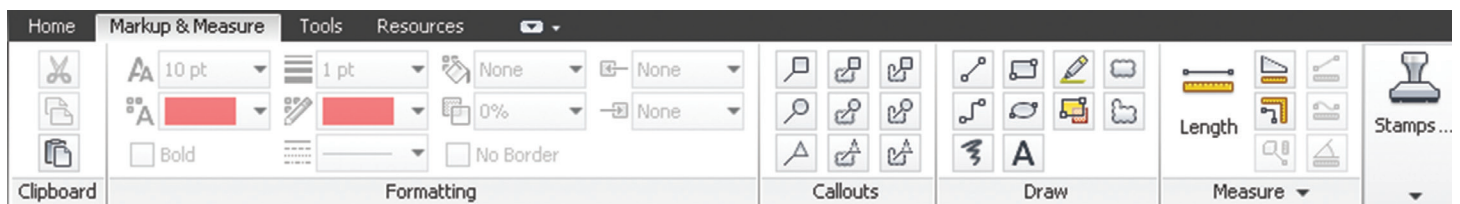


Figure 3: Markup & Measure tab

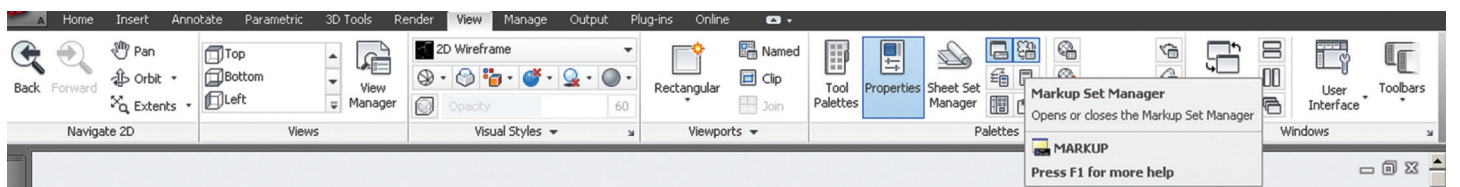


Figure 4: Markup Set Manager

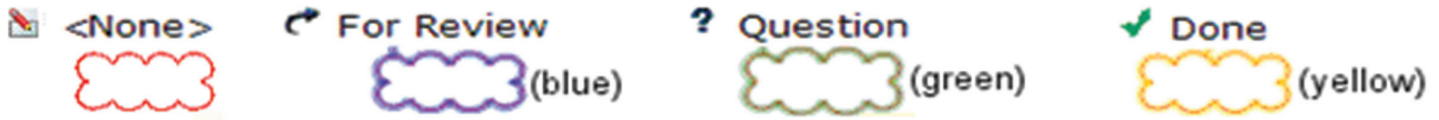


Figure 5: Color-coded markups

drawing automatically reverts to the view rotation that was current when the drawing was published. Please note that if you then change the view rotation, the markups will not be shown in the drawing until you double-click a model space markup and revert to the published view. Also, note that visual style and Shademode must be set to 2D Wireframe.

The Markup Set Manager allows you to specify what is displayed in the drawing area. You can show or hide the originating drawing file, the reviewed DWF file geometry, and the redline geometry. This allows you to view the redline geometry, turn it off to make the changes in your drawing file, and then view the redline geometry again in AutoCAD Architecture to check your corrections. If you wish to hide DWG geometry for drawing sheets with associated markups, click the View DWG Geometry button. You can click the same button again to show the DWG geometry. If you wish to show DWF file geometry in the drawing area, click the View DWF Geometry button to show the DWF geometry. You can click the same button again to hide the DWF geometry. If you wish to show or hide redline geometry (markups) in the drawing area, click a markup node to view the redline geometry in the drawing area. Then click the View Redline Geometry button to hide the redline geometry. You can click the same button again to show the redline geometry.

RESPOND TO MARKUPS

Now that you have reviewed markups, you can change their status and add comments that are saved with the markup. In the Markup Set Manager, select an individual markup in the tree view and the Markup Details area displays information about the markup. In this area, you can change the status of the markup or you can right-click on a markup and select an option on the Markup Status shortcut menu. You will notice that the default status for new markups is <None>. A markup's status can be changed to Question, For Review, or Done.

In the Markup Set Manager, you can add comments or notes for the selected markup in the Notes area under Markup Details. Changes in markup status as well as added comments are automatically saved in the DWF file and are included when you republish it. Markup changes can also be saved by right-clicking the markup set node and clicking Save Markup History Changes on the shortcut menu.

REPUBLISH A MARKUP SET

After you have viewed a markup set and made necessary changes to your drawings, you can then republish the markup set for another review, if needed. It is important to note that when you republish the markup set, the markups and any changes that have been made to them are saved in the DWF file. When anyone reviews the



republished DWF file in Autodesk Design Review, the changes that have been made to the drawings are visible as well as any changes that have been made to the status and the details of the markups. If you republish a DWF file that has had sheets deleted from it or rearranged within it in Autodesk Design Review, the new order of sheets will be reflected in the republished DWF file. However, any sheets that were added to the DWF file in Autodesk Design Review will not be included in the republished DWF file.

To republish a markup set, click the Republish Markup DWF button at the top of the Markup Set Manager. Next, select one of the following:

- Republish All Sheets – Clicking this option republishes all sheets within the marked up DWF.
- Republish Markup Sheets – Clicking this option republishes only those sheets in the marked up DWF file that have associated markups.

Then, in the Specify DWF File dialog box, select a DWF file or enter a name for the file and click Select. By default, the previously created marked up file name is displayed and is overwritten with a file of the same name that contains the drawing and markup changes.

PRINT A DRAWING WITH MARKUPS

If you desire, you can print a drawing with markups. Begin in Windows Explorer and double-click a DWF file that contains markups. The DWF file will open in Autodesk Design Review. You can then print the marked-up DWF file.



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Collaboration Tips



This month is all about collaboration, and CAD professionals, designers, architects, and engineers deal with this regularly. What is collaboration? Although there are many definitions, they pretty much fall into one of two categories, and this first hit I chose online summarizes them concisely:

1. The action of working with someone to produce or create something.
2. The traitorous cooperation with an enemy.

Even though we sometimes do not see eye to eye with our clients, consultants, or coworkers, I think the best choice of the two above would be #1. So “collaborating” is working with others with an end goal of producing or creating something.

In any industry, whether it be manufacturing, automotive or the Architecture, Engineering and Construction (AEC) industry, drawings are created in order to show how an end product is to be built. These drawings are then shared and coordinated with multiple parties during the design process in order to get their input and assistance—this is collaboration.

The process of collaboration will require the use of various products to be successful and the product that many use to produce their drawings is AutoCAD®. This is important to mention, because this is an AutoCAD column.

As we all know, there is much more to collaboration than just creating drawings. Drawings that are created need to be shared with the various parties involved in the design and approval process. Although this type of work happens in many industries, for ease of description and examples, this article will be based

around collaborating on a building project and we'll discuss a few other items used in conjunction with AutoCAD.

In a building project, the team that will be collaborating is typically composed of an architect (usually the lead), civil, mechanical, electrical, plumbing, and fire protection engineers, interior designers, contractors, suppliers, vendors, and of course the building owner—the one everyone is ultimately working for.

To make sure the project is a success, as part of the collaboration process there will be lots of back and forth conversations and sharing of physical and electronic data. The electronic data, which is commonly composed of emails, cut sheets, project schedules, specifications, and most importantly, the actual drawing files, can be shared via various methods. These methods and how files are (or should be) shared are discussed in this article.

In 30 years of working in the building design industry I have seen a tremendous amount of evolution in how drawings are created (mylar and slicks with pin bars and sticky backs is where I started) as well as how they are shared. The days of hand-carried drawings on floppy disks or CD-ROMs is all but gone; even FTP sites are a rare find these days. Of the current technologies available the most common way to share the electronic data is via email and online (in the cloud) sharing sites such as Dropbox, Sharefile, Justcloud, Hightail, and of course Autodesk's own cloud services, A360. Each method and service has its own advantages and features, with some being more geared toward just the sharing portion of collaborating.

From an AEC industry perspective, where the bulk of our designs are done using Autodesk products such as Revit® or AutoCAD, it would seem that A360 would be the way to go. But as I currently work with a small firm and clients that handle projects involving quick turnarounds and typically less than a hundred drawings, I see most collaboration being done through email and Dropbox.

No matter the system or technology used, there are some key concepts and procedures that should be followed in order to make the overall collaboration process successful. Two of these concepts are communication and coordination.

COMMUNICATION

By far, some of the biggest mistakes made on projects happen due to the lack of good communication. Someone didn't ask, someone didn't tell, or someone assumed it was understood or common knowledge. When collaborating, communication is what keeps the project moving forward. Checklists and questionnaires are great ways to start initial communications. What are the expectations of the team by the owner, the architect, and the other team members? What's the

schedule? What are the deliverables? What has changed? Everyone needs to be aware of what is happening on the project and what the client's expectations are. When communicating with the team, it is better to have over-communication than a lack of.

COORDINATION

Once the majority of the data is pulled together, which often seems to be a couple days before the project is due, it needs to be shared and coordinated with the rest of the team. Wall or space configuration changes, new equipment, revised lighting layouts, or myriad other items need to be communicated to the entire team in order to make sure nothing is missed. Sometimes the team lead, whether it be the architect, project manager, or general contractor on design-build projects, knows exactly who to include when sharing changes. And sometimes, not so much. If you are the lead and you're not sure who or what the changes will affect, let everyone know. This falls back to communication.

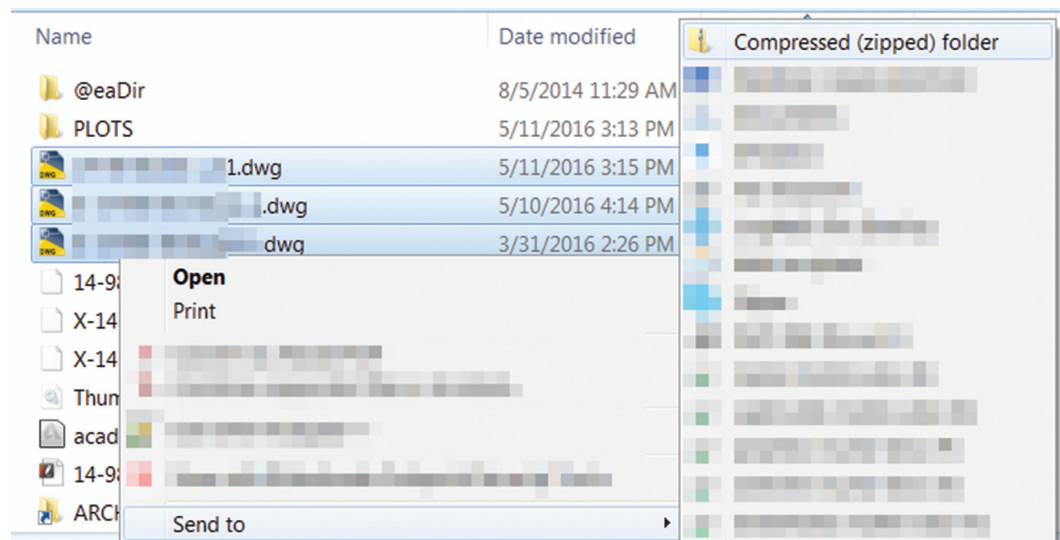
EMAIL

Email is still by far the most common method of communication in the business world, and even with its limitations, is one of your most powerful tools to keep the team updated.

Email is not the best method of sharing large files, but is still commonly used as the sole method for sending and requesting file updates. Although it is becoming less of an issue these days, many email providers as well as some corporate servers have attachment size limitations. This is frustrating and can lead to a reduction in files sent to limit this headache, which leads to a reduction in information provided or a tidal wave of individual emails in order to get all the files distributed.

If you're still sending files through email, you can reduce the attachment sizes by compressing them into a zip file. In Windows it is as easy as selecting your files, right clicking, and choose "Send to Compressed (zipped) Folder."

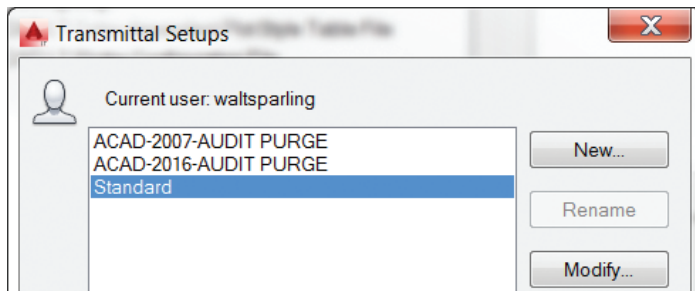
Then attach the compressed ZIP file to your email.



AutoCAD 2017

If you are sending DWG files, be sure to Audit and Purge the files before sending. If you are having issues getting your file sizes down, see the February 2014 and July 2015 articles on “Drawing Cleanup” and “Drawing Purge” in *AUGIWorld* for some additional help. When cleaning up your drawings, do not skip the xrefs, and be sure to include them in your ZIP.

AutoCAD has a tool to do a bunch of this for you and then some. By using the eTransmit command, which you can type or access through your File pull-down menu, you can have your files purged, audited, and compressed into a ZIP for sending. If you have a client who is using an older version of AutoCAD, you can even have the files converted automatically to a usable version through custom transmittal setups.



Note: If you are not using eTransmit, to save yourself some extra work you may just want to create a draft email with the links to Autodesk's viewing/conversion tools: <http://www.autodesk.com/products/dwg/viewers>. I recommend “DWG TrueView” regularly.

CLOUD SERVER

If you are sharing your project files via one of the cloud services, there are a few things you can do to make it easier for your team. One is how you set up your folder structure and project name.

Things to do:

- Create a structure that allows an organized hierarchy of trades, revisions, etc.
- Create a project name that works for everyone. For example, naming your shared folder “Project Files” or “Drawings for Consultants” can be very confusing when that share shows up in a list 20 other folders in a service such as Dropbox or Sharefile.
- Use a descriptive project name such as what is on the plan's titleblock.
- Don't use an internal project number, which has no meaning to anyone else on the team—they have their own project numbers.



Below are some examples of shares that have shown up in my Dropbox or Sharefile list. If you are typically doing the sharing, put yourself on the other end and maybe you can see why some folder names can be confusing.

Name ▲



16-58



ACME Office Bldg 134th St.



Consultant Drawings



Pompano Business Park



Tenant Build-out

SOME COURTESIES

Let everyone know what has changed. When making changes, develop some method of tracking and then sending that information along with the drawing updates. Those of us who have been burned because we were told that “We just moved a door” (and trusted it) have come up with ways to find what the changes really entail. Consider sending a PDF with the areas clouded and commented on or add this to the drawings on a separate layer. This is a lot more efficient than what basically equates to an Easter egg hunt on the DWG receiver’s end.

Timely updates make the collaboration process go smoother. It is not necessary to send a new background, section, or elevation each time you make a change, but likewise, do not wait until the afternoon before a job goes out and send all the changes that were made that week to include in your team’s final drawings.

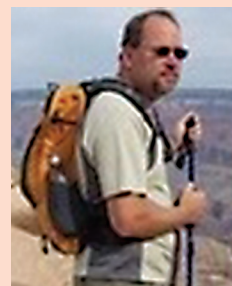
Provide more than a background file and a titleblock. Note that much of a project’s work, whether it be mechanical, lighting, electrical power, plumbing, fire protection, structural, landscape, or interior work, is much like yours. It gets installed in a 3D world; i.e., it is affected by sections, and elevations, both interior and exterior, roof plans and details—not just in floor plans and reflected ceiling plans. It is not necessary to have a BIM model to collaborate successfully on a project, but a good “set” of drawings can make it work. So when sending out updates, be sure to at least send PDFs of your latest drawings along with your background updates. If you are not sure what to send, just ask. It may be surprising, but when I have asked for sections and elevations for coordination, I have actually had some people ask why we needed them.

During the course of a project it is very common to have an architect/owner require multiple review sets for owner review and or approval, but it seems more and more that the consultants are not given a copy unless they specifically ask. These review sets should be for everyone’s benefit.



Collaboration is a team effort, and sometimes it is the little things we do that can make a huge difference. When it comes to collaborating with the team, the team leader sets the tone. Let it be a good one.

If you want more details or have a comment, feel free to send me an email at walt@functionsense.com.



Walt Sparling has worked in the building design industry for 25+ years, starting as a hand drafter. He moved on to CADD in the mid 1980s and then into CADD and networking training and consulting. Walt has served as project manager and designer in the mechanical and architectural realms and currently works with an electrical engineering firm in Tampa, Florida. In his spare time, Walt maintains a couple of blogs and a personal website: FunctionSense.com and waltsparling.com

Better Site Coordination and Topography: An AutoCAD Civil 3D and Revit Workflow



Does this conversation sound familiar?

Civil Engineer: Why doesn't Revit have a project base point?

Architect: Revit has a project base point.

Civil Engineer: Then why doesn't it reference the "Real-World" base point from our survey?

Architect: Well, why does your DWG come in way out of left field when I insert your file into my project?

Civil Engineer: Because you're using the wrong 0,0 point.

Architect: Why can't you just relocate the corner of my building to the 0,0 point?

Civil Engineer: Why can't you move your project base point to reflect where the building actually sits in the real world?

Coordinating the Autodesk® Revit® building model with the AutoCAD® Civil 3D® site plan has been a thorn in the side of many project teams. Everyone wants to get along and create a well-coordinated site plan. However, the strengths and limitations of both Revit and Civil 3D cause miscommunication and misinterpretation that can result in the above conversation.

SOME LIMITATIONS OF AUTODESK REVIT

Autodesk Revit is... well... Revit. It is crucial to understand that while Revit can link and import DWG files into the project environment, and can extrapolate topography based on connecting a series of points derived from a CAD file, Revit is not able to incorporate certain types of data that Civil 3D takes for granted.

These data types include applying rules in how the data is connected, no control lines, feature elements, breaklines, etc. When Revit interpolates the elevation points acquired from a DWG, it undergoes a triangulation process with the two nearest adjacent points and extrapolates the topography.

Assigning "real-world" coordinates to a Revit project requires some input and an understanding of how Revit "sees" its location. In other words, to use a common phrase among Revit users: You have to know "What Revit wants" before it can do what *you* want. Let's start with some basic Revit Terminology.

ORIGIN OR STARTUP LOCATION

The Startup Location is the original position of the Project Base Point of a new project. This is analogous to the 0,0 point in AutoCAD®. However, because civil engineers use State Plane Coordinates (or something similar) to establish the project location, linking a Civil 3D plan in Revit by the 0,0 point is less than helpful. Spot Coordinates and Spot Elevations set to Relative reference this location.

REVIT PROJECT BASE POINT

The Project Base Point (PBP) defines the origin of the project coordinate system, which may (or may not be) the same as the Startup Location.

The PBP is often used to define the location of the building on the site. Spot Coordinates and Spot Elevations that reference the project coordinate systems are displayed relative to this point.

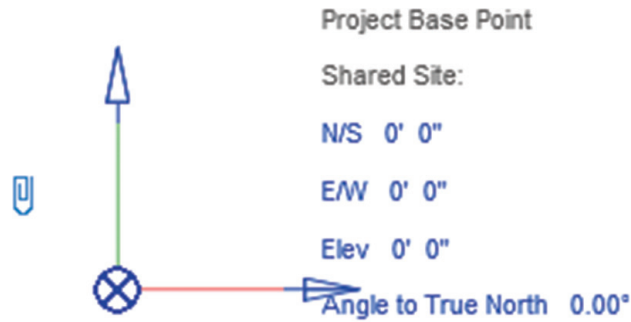


Figure 1

The PBP also establishes the “Project North” for laying out the building plans on sheets (see Figure 1).

REVIT SURVEY POINT

The Survey Point represents a known point in the real world. Although the Survey Point can represent something like a geodetic survey marker, it can also represent any known physical location on or adjacent to the physical site.

The Survey Point (when used correctly) orients the building geometry in another coordinate system, such as Civil 3D and established “True North” of a Revit project (see Figure 2).

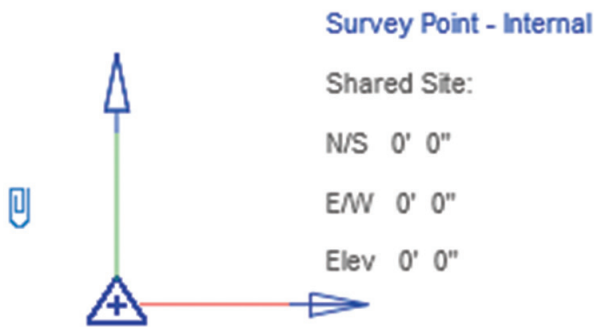


Figure 2

WHAT REVIT AND CIVIL 3D NEED FROM EACH OTHER

To best coordinate the Architectural Building Model with the Civil Site Plan, Revit and Civil 3D need to share some information with each other. This information exchange requires some back-and-forth in data sharing that should start with the architect.

Ideally, the architect should create a Site Model separate from the Building Model, especially if the intent is to build accurate topography for rendering purposes.

If, however, the architect is not going to create a realistic topography of the site, then the following steps may be carried out in the Building Model.

ESTABLISHING SHARED COORDINATES IN SITE MODEL (JUST ONE METHOD)

The Architect

1. Create a floor plan view (I am going to assume the architect knows how to do this part) and hide all categories not essential to representing the building footprint.
2. Export the new Floor Plan (let's call it Plan-Export) to a DWG format (again, I am going to assume the architect knows how to do this) and share this file with the civil engineer.
 - a. NOTE: The architect can also export the entire Building Model as a 3D DWG or an ADSK, allowing the civil engineer to locate a 3D building on the site.

The Civil Engineer

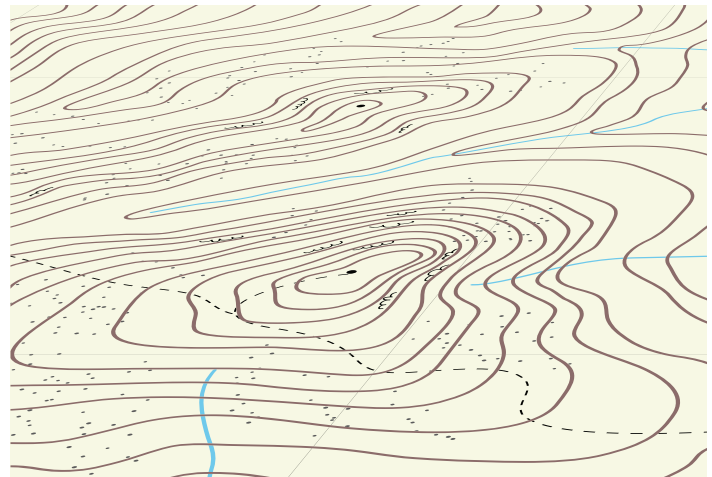
1. Insert this file (DWG or ADSK) as an External Reference and locate the building on the site (moving, rotating, etc.).
2. Once the building has been located on the site plan, the civil engineer (in all his magnanimous generosity) will create a Reference Point (RP) on the Site Plan for the architect.
3. This RP will show the Northing, Easting, and Elevation of some point on the site that will become the Site Reference Point between the Site Plan and Building Model (see Figure 3).



Figure 3

The Architect

1. Link the Civil Site Plan into the Building Model (or Site Model if you are going that route), making sure you are using the Positioning: Origin to Origin option.
2. Locate the Reference Point on the Civil Site Plan and take note of the values. (Record on a sheet of paper if your memory is anything like mine.)



AutoCAD Civil 3D 2017

3. Access the “Visibility/Graphics Overrides” for the Site Plan within the Revit Project (see Figure 4).
 - a. Open the “Site” category.
 - i. Turn on the “Survey Point” subcategory.

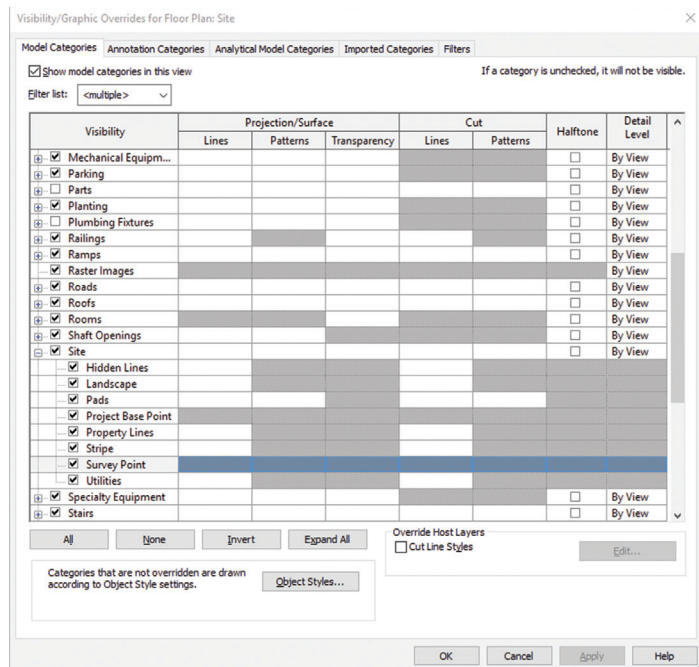


Figure 4

4. In the Site Plan view, select the Survey Point.
 - a. Click on the paperclip icon to “unclip” the Survey Point (see Figure 5).

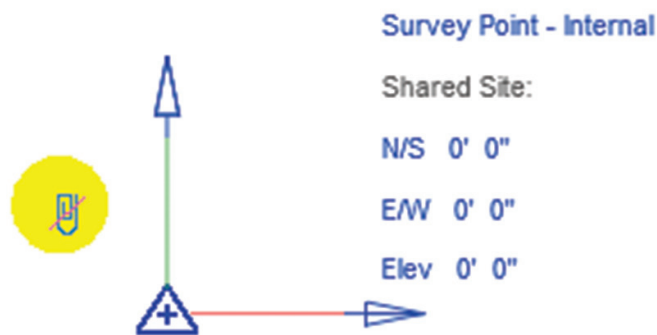


Figure 5

5. Copy or type them into the appropriate fields of the Survey Point.
 - a. NOTE: Do not copy/paste the values from the reference point directly into the Properties palette.
6. Clip the Survey Point (making sure the red slash is no longer visible).
7. Move the Survey Point to align with the Reference Point on the linked Civil Site Plan.

SHARED COORDINATE SYSTEM

If the architect is using a Site Model to coordinate one or more Building Models on the site, then the architect will not be able to utilize the “Publish Coordinate System” to the Building Model(s).

The Architect

1. Link Building Model(s) into the Site Model.
 - a. Ensure the Positioning: Origin to Origin option is selected.
2. Locate the Building Model(s) on the site to their final resting place(s).
 - a. Ensure the correct elevation of each building from an elevation or section view.
3. Ensure that all other users have Synchronized to the Central file and, preferably, have exited the project until the following steps have concluded.
4. Publish Coordinates to Building Model(s).
 - a. Manage Tab > Coordinates Panel > Publish Coordinates Tool.
 - b. Select the Building Model(s).
 - i. Use the “Internal” Coordinates for each Model.
 - ii. Create a Duplicate Coordinate system for each Model that is repeated in the Site Model.
5. Save the Site Model.
 - a. A dialog box will appear with the message that the “Location Position Changed” for each model to which the new coordinates were published.
 - b. Select “Save” for each occurrence of this message.
6. Close the Site Model.
7. Open the Building Model(s).
 - a. Repeat the following steps for each Building Model.
8. Link the Site Model
 - a. Insert Tab > Link Revit > Select Site Model.
 - b. Positioning: Auto – By Shared Coordinates.
9. Verify that the Site Model is in the correct position.
10. Pin the Site Model in place (if desired).

ROCK THE TOPO!

Coming full circle to the limitations of Revit Topography, there are some things civil engineers can do to maximize the usability of their 3D surfaces in Revit.

Typical workflows for creating surfaces are perfect for the run-of-the-mill topographies in Revit. However, there are times (like when the architect wants to dazzle the client with a higher quality rendering) the standard workflows lack the necessary level of detail.

So, what can you (as an amazingly awesome civil engineer) do to provide that greater degree of detail as well as expand your list of added services? The following steps will help you facilitate that extra dazzle the architect is seeking (see Figure 6).

The Civil Engineer

1. Extract the 3D faces from Surface (combining the EG/FG surface if necessary).
 - a. Put triangles on a different layer in Surface Styles so triangles will populate a specific layer during extraction.
2. Create COGO points along all TIN (Triangulated Irregular Network) edges due to significant grade changes—i.e., curbs, retaining walls, etc. with the applicable method(s) below.
 - a. Survey Figures, Feature Lines, and Grading Object Daylight Line, Alignments/Profiles.

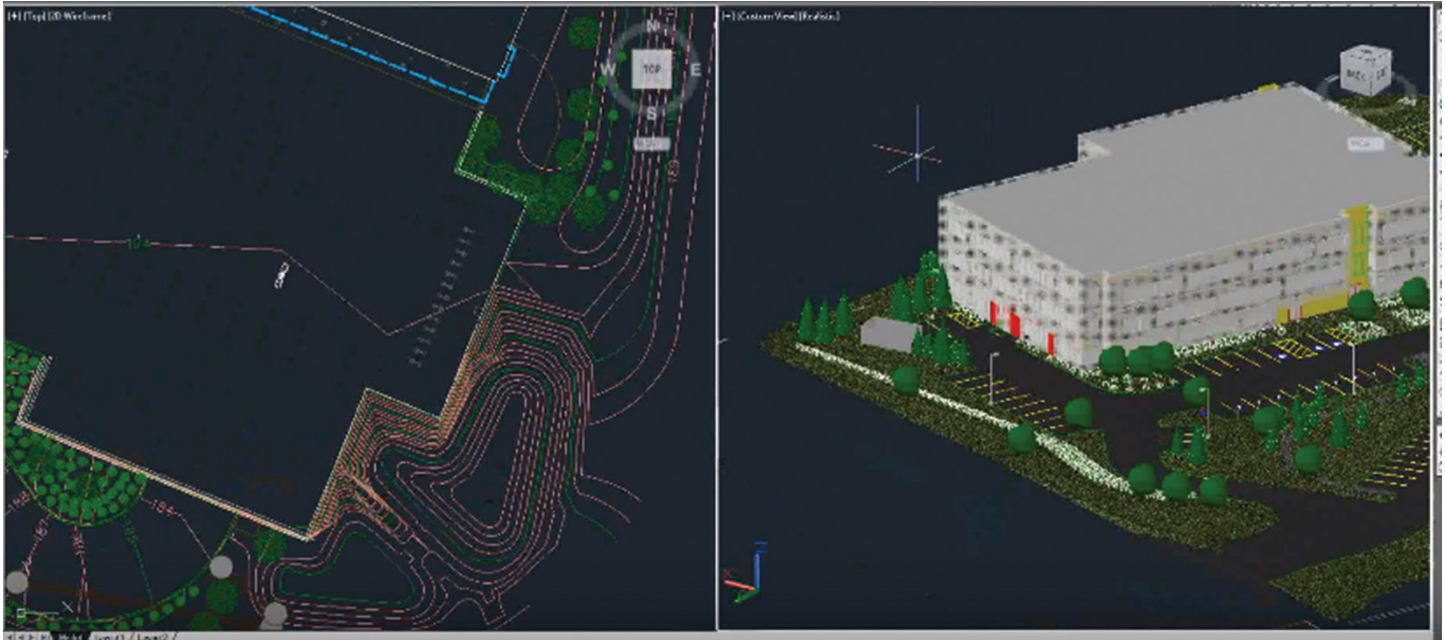


Figure 6

- i. Point Creation Tools > Command Settings
 1. Prompt for Point Names: None
 2. Prompt for Point Names: None
 3. Prompt for Descriptions: Automatic
 4. Next Point Number: 10000 or similar
- ii. Create Points > Miscellaneous: Measure Objects (Figures, Feature/Daylight lines).
- iii. Create Points > Alignment: Measure Alignment (Alignment/Profiles).
- iv. Create enough points so that triangulation in Revit (based solely on points) will be in the correct direction. Some experimentation is required. However, spacing the points to match the height or width of a transition will usually yield the desired result.
- b. Corridor
 - i. Increase frequency along TIN edges of significant grade change.
 - ii. Select Corridor > Contextual Ribbon > Launch Pad Panel drop-down > Points from Corridor.
 - iii. Select Point Codes corresponding to applicable TIN edges. Typical examples for curb include Top_Curb, Flowline_Gutter.
3. Add new "Revit" points to new "Revit" surface.
 - a. Extract 3D faces from this surface.
4. Provide call-out of precise 3D location on site using a GOGO Point with Northing, Easting, and Elevation labeled.
 - b. Explode COGO Point to turn it into a block.
5. WBLOCK 3D faces and label new file for use in Revit.
 - a. Ensure nothing other than the 3D faces have been selected.
6. If using Autodesk Shared Reference Tool (not discussed in this article), run that command now.
 - a. When prompted for the first point, pick 3D location mentioned in Step 4.

- b. Pick second point (or turn on Ortho) in direction precisely north of 3D base point. Distance is not important.
- c. Confirm other default settings: origin, etc.
- d. Save as XML file and provide this to Revit user along with accompanying DWG file.

CONCLUSION

There is still no "Easy Button" (as much as I've been begging Autodesk to create one) to coordinate between Autodesk Revit and Autodesk Civil 3D. After all, Civil 3D is AutoCAD based. And Revit is... well... Revit! Revit and AutoCAD still have a language barrier inherent to their base programming, so until a Universal Translator comes along (come on, you Trekkies out there) we're going to have to just learn how to communicate better with each other.

After all, the project is bringing us together. But the software doesn't have to keep us apart.



Adam Nicholes is a BIM modeling expert based out of Utah. Adam has been a part of the design community for roughly 11 years in all aspects of design, construction, and software implementation. He has implemented and trained companies across the country on Revit and other design tools and their best practice workflows. Adam can be reached for comments or questions at awaitocadcivil3dcm@augi.com.

Tutorial: Collaboration with 3ds Max and Stingray



One of the best solutions for collaboration provided to us recently is Autodesk's Stingray. Stingray is a real-time engine based on Swedish Bitsquid technologies for game development. Autodesk did what it does best and integrated and improved the software to provide us with the opportunity to take advantage of its power and simplicity. Through Stingray Autodesk gives us the ability to collaborate with real-time visualization where the viewer—our customers—can navigate scenes with game-like keyboard controls for an interactive experience and review. This article will present a tutorial using 3ds Max and Stingray to create such a scene.

INSTALLATION

First, in order to use Stingray with 3ds Max®, users must have 3ds Max 2016 with Extension Pack 1. To connect with Stingray and use the Stingray menu inside 3ds Max, users must install the plug-in. Once Stingray is installed, the installation file for the plug-in can be found under C:\Program Files\Autodesk\Stingray\extras folder and is called StingrayDCCLink2016.msi. This installs the menu displayed in Figure 1, which contains the connect and import functions needed to transfer 3ds Max scenes into Stingray.

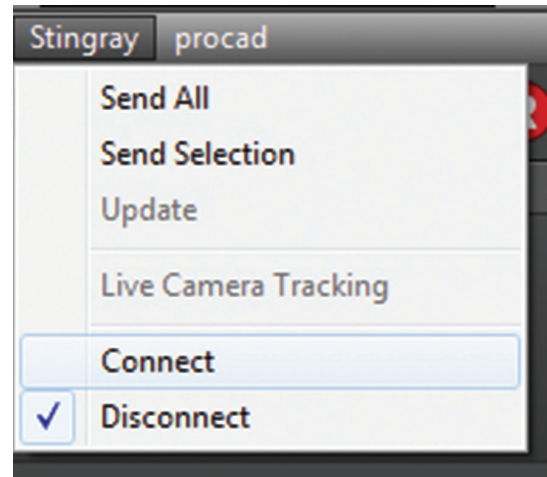


Figure 1: Stingray menu in 3ds Max

STARTING A PROJECT

To work with Stingray, ensure that both Stingray and 3ds Max are opened simultaneously. If they are, begin your project in Stingray simply by selecting the "empty" template inside the Project Manager as shown in Figure 2.

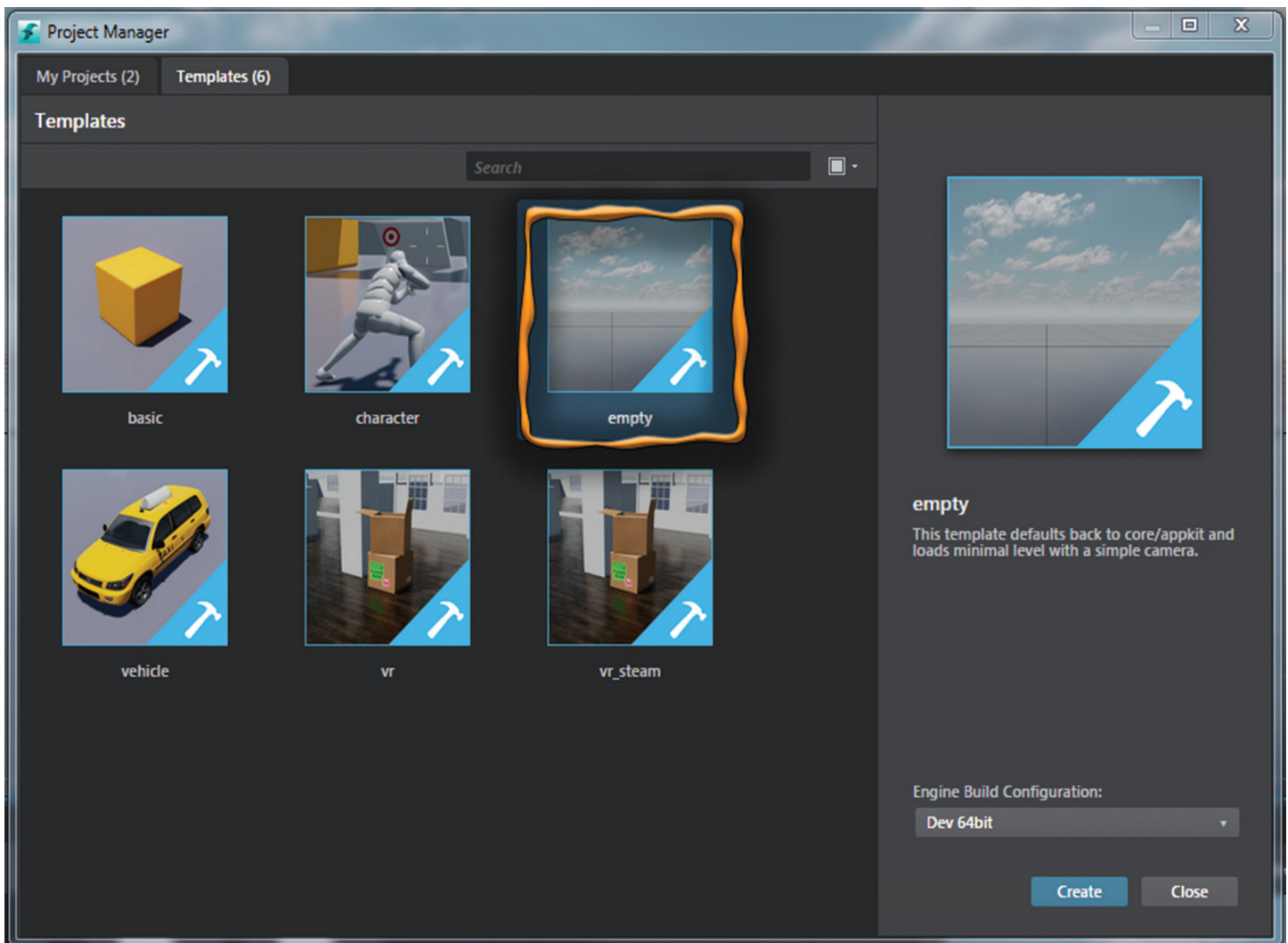


Figure 2: Select Empty Template in Stingray Project Manager

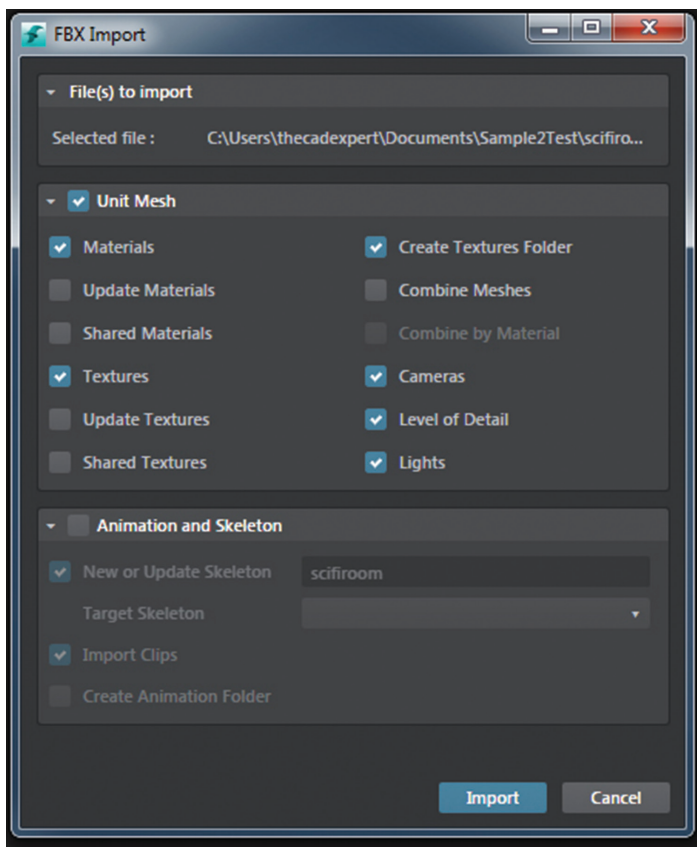


Figure 3: 3ds Max export options for Stingray

The Stingray interface is relatively organized and the documentation provided with Stingray, coupled with information available online, will help you as you learn to navigate through the system. To demonstrate the simplicity of using Stingray with 3ds Max and to keep the article a reasonable length, I recommend that users refer to those documents as I continue to the next step.

IMPORTING A SCENE

To import a scene, first select the “Connect” option in the 3ds Max Stingray menu shown in Figure 1, then select “SendAll.” The plug-in should navigate you to the correct folder to export your 3ds Max file. The file exports the scene to an FBX file format and will display the options shown in Figure 3.

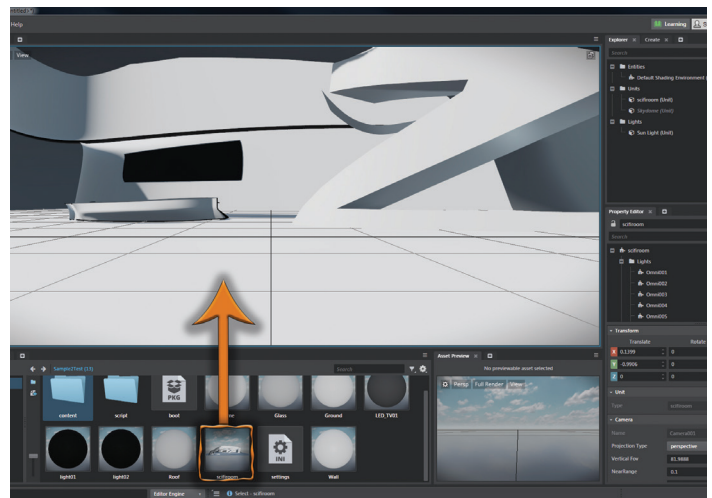


Figure 4: Importing 3ds Max asset into Stingray Level Viewport

Now you can switch to Stingray. You will notice inside the Asset Browser the file that was just created. Simply click on the asset and drag it into your Level Viewport as displayed in Figure 4.

CONCLUSION

At this point in the tutorial you can select the green (play) arrow to test the level (or press F8). This will open a separate window where you can use your mouse to control the eye position and the keyboard controls “WSAD” to walk. These are the same controls used by many computer games available on the market today.



Brian Chapman is an Autodesk Authorized Developer, creator of Pro-Cad.Net, and Senior Designer for Slater Hanifan Group, a civil engineering and planning firm dedicated to superior client service. Brian can be reached at procadman@pro-cad.net.

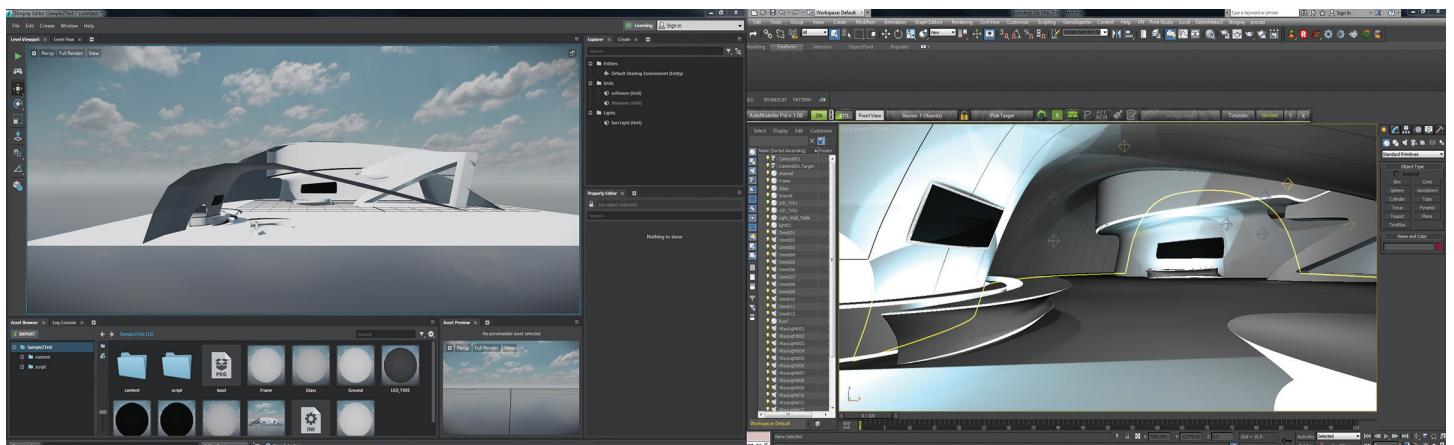


Figure 5: Stingray and 3ds Max example



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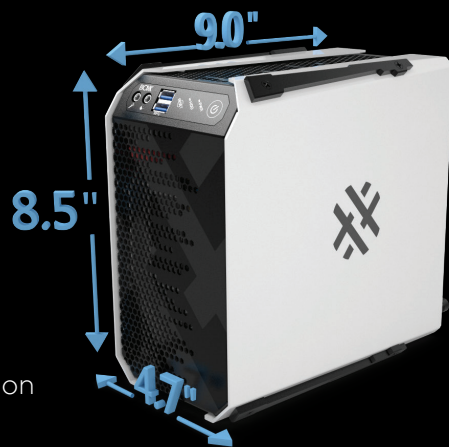
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