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AUGIWorld

The Official Publication of Autodesk User Group International

December 2015

Transition Time: Drawing versus Modeling, and More

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- Keeping it Civil in 3ds Max

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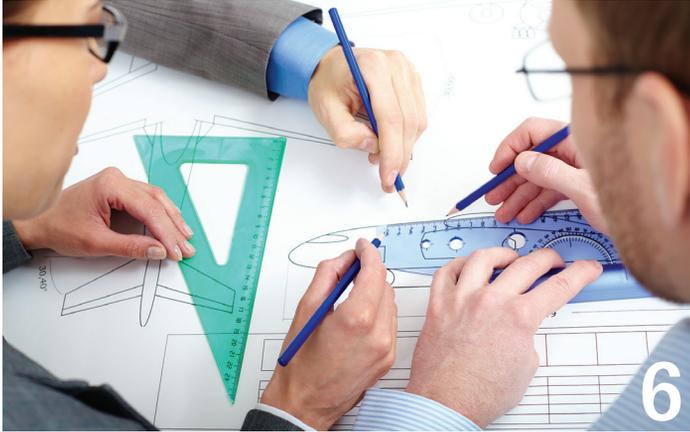


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contents



6 AutoCAD Is Drawing Composition Becoming a Lost Art?

12 Revit Structure Industry Insights

16 Revit Architecture Internally Re-Centralizing (Sent and Received) Central Models

18 InfraWorks 360 InfraWorks 360, What Can You Do for Me?



20 3ds Max Keeping it Civil in 3ds Max

24 AutoCAD The Importance of AutoCAD in the BIM World

28 AutoCAD Architecture Exploring Schedule Tables in ACA

32 Revit Platform Shared Coordinates and Civil State Plane Coordinates



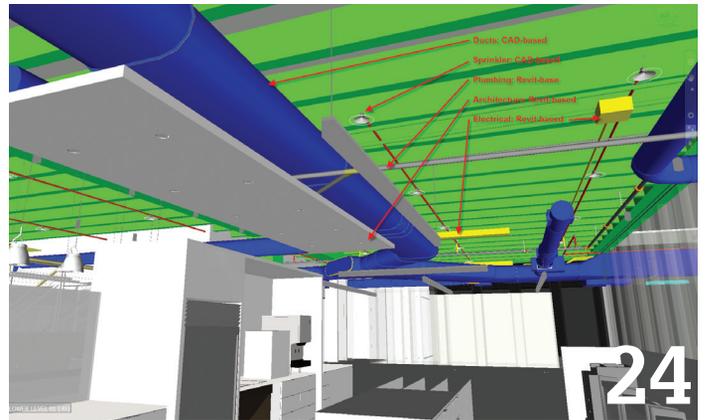
columns

4 Letter from the President

8 Tech Insights

10 CAD Manager

37 Inside Track



38 Thank You to Our Volunteers



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Letter from the President



COLLABORATION

I was sitting in a meeting about collaboration recently. An interesting premise was brought up early in the meeting. The presenter put two words up on the screen with their definitions. The presenter mentioned that these two words are often used interchangeably when they really are not interchangeable.

Coordination: The process of causing things to be the same or to go together well.

Collaboration: To work with another person or group in order to achieve or do something.

I feel that the presenter “cherry picked” the definition for coordination, because there is another definition: “the process of organizing people or groups so that they work together properly and well...” which is similar to the definition for collaboration. But there is an interesting point here about the definitions chosen.

Coordination can be about physical *things*, whereas collaboration is only about *people*. This can be taken a bit further. You could have a project with separate models for each discipline that are coordinated in the absence of a collaborative environment. Think of it as lobbing models across the silos until they are coordinated.

I wouldn't want to work on such a project. I'm guessing you wouldn't either.

How do you feel about collaboration, especially as it relates to a BIM project? Do you feel that people tend to think the model can take the place of communication person-to-person?

I feel that collaboration means what the definition above describes. It is about working with another person or group.

How does this relate to a BIM project? Just because you have a project with a model does not mean that you can forgo communication. Yes, I'm sure you have heard this before. Yet I have seen, amongst some project teams, a disheartening trend to discount communication (it's just another BIM project).

We learn from every project we do, do we not? Why wouldn't you take the lessons learned on the prior project and *communicate* any improvements on the process or procedures? The written word is still one of the best ways to keep a record of the decisions made. This means that a BIM Execution Plan or BIM FAQ will help your projects.

But collaboration is more than just sending out the written word. Communication needs to include talking to one another, sometimes even face-to-face. Don't be reticent about picking up the phone to ask the author of another model for the project to correct an issue in their model. I certainly want someone with an issue with one of our models to contact us about it!

I will leave you with this blended definition: Work (communicate) with the other person to achieve (collaborate) a well-designed building (coordination).

Until next time,

R. Robert Bell
AUGI President

AUGIWorld

www.augiworld.com

Editors

Editor-in-Chief

David Harrington - david.harrington@augi.com

Copy Editor

Marilyn Law - marilyn.law@augi.com

Layout Editor

Tim Varnau - tim.varnau@augi.com

Content Managers

3ds Max - Brian Chapman
AutoCAD - Walt Sparling
AutoCAD Architecture - Melinda Heavrin
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Advertising / Reprint Sales

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Is Drawing Composition Becoming a Lost Art?



Now that we are deeply secured in the digital age, we hear the term “lost art” being tossed around a lot these days. We hear about the lost art of hand writing a letter, or the lost art of book publishing, or the lost art of printing daily newspapers. What these lost formats had in common is they used the art of composition to convey information—traditionally, by *hand*. Even though an old-fashioned, handwritten letter to a pen pal looks vastly different from that of a newspaper, both of them had distinct compositions that aided the reader in understanding the narrative being conveyed.

Creating a CAD drawing is also, it seems, becoming a lost art. Note I used the word “drawing” and not “model.” The practice of breaking down a 3D object or structure into several components and visually conveying it as a 2D hard copy drawing is going by the wayside. In short, the art and skill of drafting is dying. The ability to know not only what has to be put on a drawing, but how to present it is being lost.

Composition items such as proper presentation scales, appropriate object line weights, the right linetypes, consistent and well-placed annotations and dimensions, etc. are virtually ignored these days. Failure to use proper visual communication techniques can cause confusion that costs time and money, and may damage good reputations.

I want to make it clear this article is not intended to be a slam toward designers who create 3D models, nor is it to be interpreted

as “old school” drafters refusing to transition from 2D to 3D. I am talking specifically about the lost art of drawing composition, or drafting skills, if you will.

When CAD software was introduced to the AEC market in the early 1980s, there was a legitimate concern that the art of drafting would be lost. Those initial worries were put to rest when the generation of hand drafters who transitioned to the digital medium managed to keep one foot in the physical world. This is to say, the art of creating a drawing with good composition was still the primary goal, and CAD software was just another drafting tool. In their minds, all they did was replace their T-squares and zip-tones (look it up, kids) with the “Ortho” setting and hatch patterns, respectively.

So what’s going on? The evidence would suggest that no one is interested in making drafting a career choice anymore. In particular, the people pursuing post-secondary education are enrolling in Technologist or Technician programs, which tend to focus on practical design and theory. Even though it is clear they are getting exposure to the various CAD design software as part of their curriculum, it is making the previous generation of drafters wonder if today’s students are getting any instruction on proper drawing/drafting composition.

There seems to be an assumption among companies that if they hire a technician, they will get the luxury of a single person performing two tasks (design and drafting), which will maximize productivity. In the short term, this may be true, but when it becomes evident the drawings are not clear or of the quality their clients are used to seeing, time and money could be lost to change-orders and addendums.

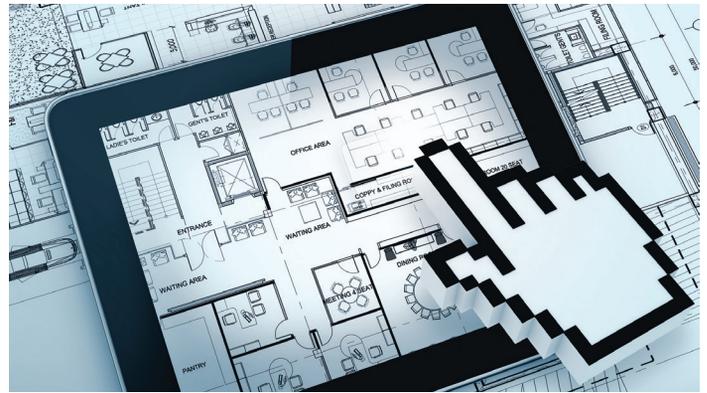
Not only is the newer generation entering the industry often unaware of proper drawing composition, many also lack basic CAD practices. They may have sufficient design skills to develop complex models, but without a foundation in “proper CAD practices” to ensure a drawing is organized and composed properly, a basic skill like xrefing that model across several drawing sheets may be lost on them.

The result is that these people are not necessarily being hired under false pretenses, but rather hired under assumed qualifications. In the past, when someone came into the office to interview for a drafting position, they came with a roll of drawings to prove why they would be qualified for the job. But now, it would appear that when an interviewer asks: “Do you know how to use ‘XYZ’ CAD software?” the interviewee will typically answer: “Yes,” giving the impression they know how to compose a drawing. This doesn’t mean the interviewees are being deceptive; they are being truthful when they say they know how to “use” the software, and the interviewers are assuming that proper drafting skills are inherent.

Once young Techs are settled in with their new employer, their designs and calculations are reviewed and approved by senior professionals, but is anyone reviewing or critiquing the actual hard copy drawings they create? These drawings may go out the door with improper drawing composition, causing confusion to those who need to read them (typically the clients, contractors, estimators, review boards, and even lawyers). The people overseeing the Techs are likely assuming the drawings are okay since they were impressed with the design models.

So, how can this be resolved? One idea is that design and consulting firms could look into a better QA/QC program where the senior professional reviews the drawings more closely. But again, if the assumption is being made that a good model results in a good drawing, then QA/QC becomes ineffective.

Companies can also look at developing a policy where the “old school” CAD drafters mentor the newer Techs’ drawings during their first few months of employment to show them the “company way” of doing things. This approach may include having the Tech review and follow a written guideline with everything spelled out as well as letting the mentor access and redline the CAD drawing with comments. Once Techs have earned the trust of their mentors, they can “graduate” to creating drawings independently and will then only be scrutinized by the already established QA/QC policy of the company. The problem with this approach is that there are fewer and fewer of the old-school drafting generation left because they have either moved on to other things or have retired altogether.



A third option, and this may be a little tricky, is for the companies to establish a relationship with the institutions that are instructing the younger Techs. They can potentially reach out to them and suggest modifying the curriculums to include drafting fundamentals, and if need be, offer assistance in developing a curriculum. Even though these institutions may already have an established drafting program with an advanced curriculum, a fundamentals program designed specifically for the technician and technologist students would make a world of difference.

Many technical institutions and companies may already have work placement or internship agreements in place to aid the fledgling new Techs, but reviewing and shaking up the current practices may be needed. And considering that the intent of these institutions is to educate the younger generation so they are employable, it would be in the institutions’ best interest to work with companies in the AEC field.

One final thought... although this article is focused primarily on those who are overseeing the development of the Techs coming into the industry, I would be remiss if I did not mention that the Techs themselves have a role to play as well. My advice to them: take responsibility for developing your drafting and composition skills. Not only are you developing a career, you’re creating a reputation for yourself—a reputation that depends on improving your knowledge and skills. Get to know your new coworkers. Find out who among them have the best reputations, because they are typically the “go to” people who can guide and mentor you. These people will not only show you WHAT to do, but more importantly, what NOT to do.



Murray Clack is the CAD Systems Coordinator for CBCL Limited, a consulting engineering firm operating in Halifax, Nova Scotia, Canada. He has been using Autodesk-related products for 26 years. Murray has had articles published in Autodesk’s ‘a’ magazine, submitted tips and routines to Cadalyst magazine’s “Hot Tip Harry,” and recently provided consultation to Autograph Technical Services for the metric version of the CADCard.

by Robert Green

HP Brings Blended Reality Computing to AU 2015



If you're heading to Autodesk University (AU) this year HP has an interesting mix of classes and products to show that all come together in a concept they call Blended Reality. In a nutshell, the idea is that 3D CAD and BIM software, workstations, 3D scanning, 3D printing, and

3D virtual reality displays can all come together to create an environment where design is no longer an abstract exercise in 2D on a monitor, but rather an immersive 3D experience.

To introduce the Blended Reality concept HP will have a large presence at AU spanning far more than a simple trade show booth with display hardware. Let's have a look at what you'll be able to check out.

CLASS SESSIONS

Part of introducing the Blended Reality concept will be three class sessions that focus on the tools available from HP and an example project that illustrates the real world possibilities of the concept.

The first session, Blended Reality: Atoms to Bits, and Back Again, is a forward looking glimpse of HP hardware and software technologies that span from desktop to mobile devices to 3D print/scan tools.

The second session, Creating History with BIM: Crowdsourced Reconstruction of Sir John Soane's Bank of England, focuses on a currently active project that utilizes BIM models contributed from a wide variety of users that will ultimately create a virtual reconstruction of the famous building. You'll learn from industry experts Shaun Frazier, Paul Aubin, and Lindsey DuBosar how technology from Autodesk and HP, in the hands of the crowd, is used to bring this building back to life.

The third session, Visualization and Information Mobility: Mega-trends for BIM and Productivity, focuses on the

significance of visualization and mobility components such as interactive displays, tablets, smart phones and virtual reality immersive devices as well as hard copy to make vital project information portable, collaborative and easy to use. You'll learn from industry experts Steve Jones and Maurice Clark as they present case studies and statistics based on their actual field experiences balancing these diverse technology components.

AT THE BOOTH

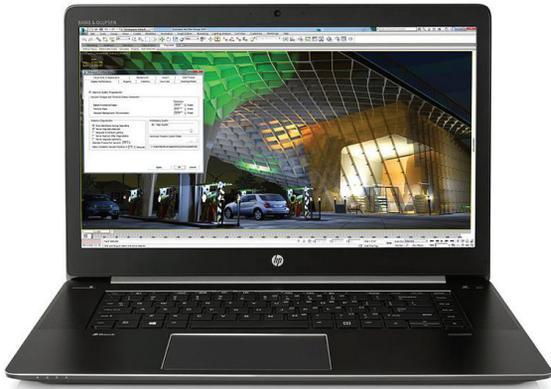
It is one thing to talk about new methods of design in a classroom situation, but how about getting a hands-on chance to test drive some of the technology, workstations and output devices that can power it? That's what HP's booth presence will be about at AU this year. Here are a few of the technologies that will be featured and some information on what technologies will be demonstrated:

HP Multi Jet Fusion™ 3D Printing

HP professionals will present an overview of the new technology that combined with HP's open platform approach for materials and software, is set to advance the state-of-the-art in 3D printing and ultimately transform how things are designed and manufactured.

HP PageWide and DesignJet Multifunction Printers

Of course it wouldn't be an HP booth without HP printing devices. A variety of devices will be on display including the HP PageWide XL 5000 (a 40" wide format, monochrome/color device delivering 30% reduction in costs and high speed output in a single reliable device), the HP DesignJet T830 (a 36" wide format multifunction print/scan/copy device with Wi-Fi sharing), and the HP DesignJet T2530 (a 36" wide format multifunction print/scan/copy device delivering professional-quality color output for CAD/GIS applications.)



HP ZBook Studio G3

A sleek stylish 15.6" diagonal quad-core workstation Ultrabook™¹ offering great looks, light weight and workstation level CAD performance. The ZBook Studio G3 will be demonstrating various AEC and manufacturing datasets using AutoCAD 2016, Autodesk Inventor 2016 and Autodesk Revit 2016. Key features to note are Intel® Xeon® processors options, dual 1 TB HP Z Turbo Drive G2 for up to 2 TB of total storage, dual Thunderbolt™ 3, up to 32 GB ECC memory, an NVIDIA® Quadro® M1000M professional graphics GPU.

HP Z240 Small Form Factor Workstation

A speedy little workstation with features that make it an ideal 3D CAD and BIM platform without breaking the bank. The Z240 will be demonstrating the Project Soane (see above) Revit project files so you can get a feel for the performance for yourself. Key features to note in the Z240 are Intel® Quad-Core Xeon® processors, 64GB of high speed DDR4 ECC memory, professional graphics and the new NVMe based Z Turbo Drive (yielding up to 4X speeds over conventional SSDs).

HP Z840 Workstation

Heavy duty computational iron for CAD analysts and rendering professionals is the only way to describe the Z840. The Z840 will be demonstrating NVIDIA® Iray+® for Autodesk 3ds Max with various AEC and manufacturing data sets – including preliminary renderings of [Project Soane](#). Key features to note are the HP Z27x DreamColor display, dual NVIDIA® Quadro® M6000 pro graphics cards, up to 2TB DDR4 ECC memory and NVMe based Z Turbo Drives.

Sprout by HP

The Sprout is an innovative multi-display and touch surface computer that uses multiple cameras and a pen/touch interface to allow the user to truly immerse themselves in their designs. Sprout will be demonstrating SketchBook Pro. There's almost no way to describe your immersive experience with Sprout – you simply have to get your hands on it for yourself.

HP Zvr Virtual Reality Display

Like the Sprout, the HP Zvr display simply immerses you in a 3D visualization environment that must be experienced. By donning a pair of special glasses the 24" diagonal stereoscopic 3D display tracks the motion of your head so you can simply "look at" an object in a virtual 3D field. Using the 3D stylus you can pull apart assemblies to look inside objects. The Zvr display will be demonstrating multiple 3D assemblies, parts explosions and cross-sectioning. Don't worry about how you look in the glasses – try the Zvr for yourself!

WRAPPING UP

Whether your company is thinking of moving to a more virtual, 3D design environment or not at least take the opportunity to have a look at the new technologies and workstations HP is showing at AU this year. Why not attend a breakout session and then get hands on with the devices that are making Blended Reality design/computing possible for yourself and think about how you could apply the technology in your environment?

ABOUT HP

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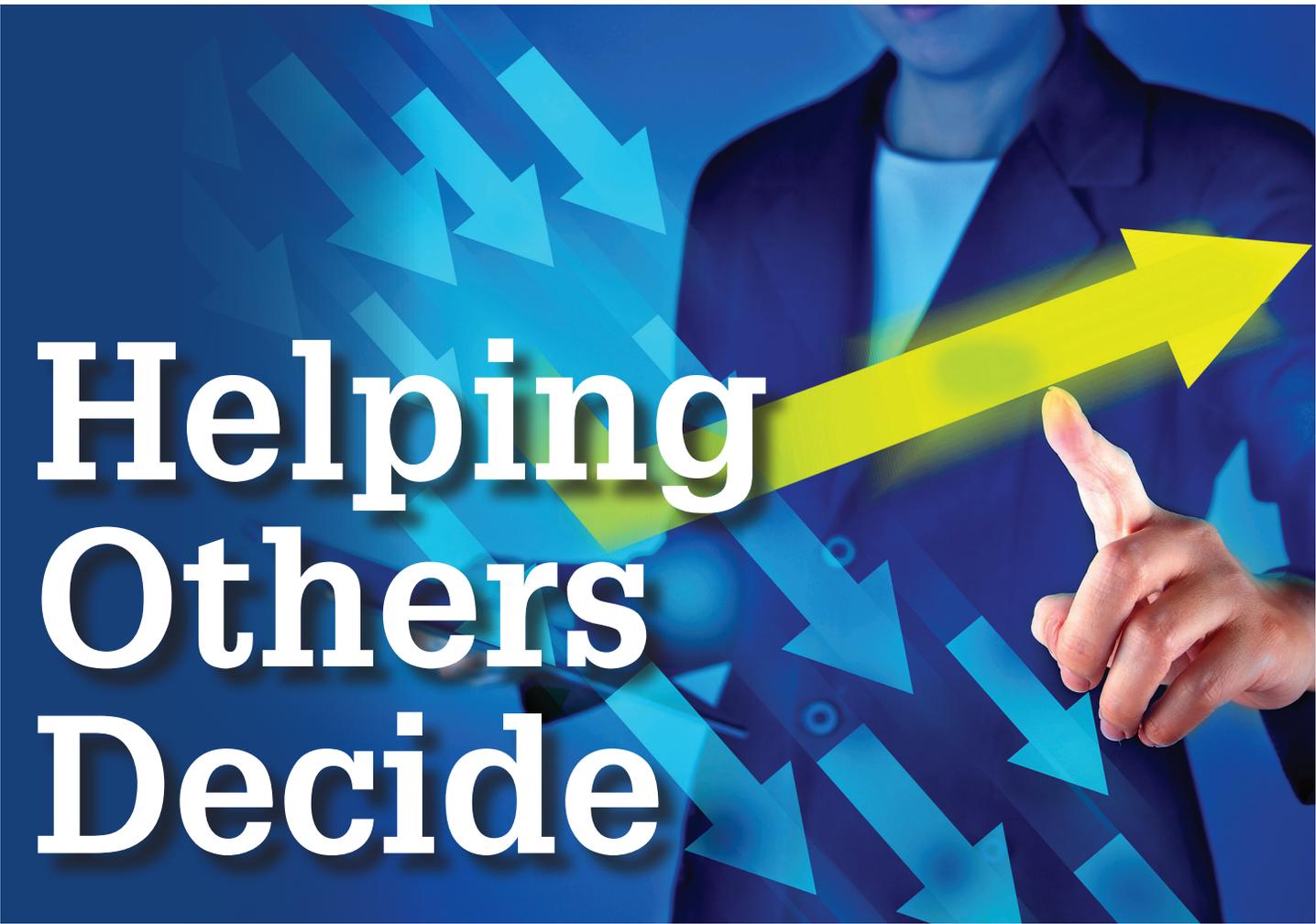
ABOUT ROBERT GREEN

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. Based on HP's internal analysis of all mobile workstation models from any vendors with >200 thousand unit annual sales as of October 29, 2015, having Quad-core CPU's, with Intel's Ultrabook™ Certification.

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Helping Others Decide

 I have written a lot on my blog and other places about how a Tech Leader needs to constantly improve his or her decision making skills. We have to get better at investigating, analyzing, and deciding. The better you are at defining and deciding, the more successful you will be. But what happens when you are not around to make the call? What if you are at a conference or on vacation? What if you have delegated a process or project to others and they need to make good decisions?

Good leaders not only improve their own skills, but they also improve the skills of those around them. Call it coaching, mentoring, or just advising. You need to be assisting others at refining their talents. I wrote about this effort in the January and February issues of *AUGIWorld*. You might want to go back and review those articles.

Now I turn to actually helping you to help others. Specifically, how to help others make good decisions. I frame the decisions that you and others need to make into four categories. Not all decisions will easily fall completely in one category, but they will in general have some identifiable characteristics. Once identified, these characteristics will assist others in making the right call.

Note: This article does not include the first responder types of decisions that you and others may make to just “stop the bleeding.” Acting quickly to avoid additional damage in a tough situation is not really in the scope of this decision making discussion.

Here are the general decision making environments or categories I will discuss:

- Easy and Obvious – often thought of as “no brainers”
- Complicated but Known – many moving parts, but all are evident
- Complex and Unknowns – many undefined areas that are unpredictable
- Chaotic and Unknowable – many decisions to make; no facts; no time to think

EASY AND OBVIOUS DECISIONS

Starting with the easiest, you may think that there is little to say about it. When problems or decisions arise that appear to have a solution that is obvious to all, what more can be said? Decisions in this environment usually rise out of past decisions, best practices, policies, and defined procedures. We have been here before; we just need to do what we always do. Most times that is a good route to take, but sometimes it is not. Here are a few things a leader can bring to bear on even the most obvious decisions.

Pass it to Others. The easy and obvious are the best decisions to pass on to those you are leading so they can practice the decision-making tools you are nurturing. Too often I find myself blurting out the answer, when I should have paused and asked, “What do you think we should do?” The simple process of allowing others to decide encourages proactive thinking and accountability.

Pause and Think. Make sure that the obvious is actually the best. With clear cause and effect connections, the easy decision is arrived at quickly. The most obvious decisions are sometimes not the best. They may be quick and clean and effective, but may lack the longer reaching thought that tougher questions cause us to stop, analyze, and develop options. When others come up with a quick answer, help them pause, think a little more, and then act. Sometimes a *good* decision can derail a *best* decision if it is arrived at too soon.

Avoid Complacency. Don't just do things the same way all the time. Don't fail to look at an issue and derive new perspectives. Don't fall into the trap of “we have always done it that way.” Even though others may have heard this kind of speech before, you need to remind them if you see a pattern of easy answers. The simple can quickly devolve into chaos if the wrong decision is applied too quickly.

Build on it. What can be connected with this decision to make it better? With obvious choices laid out in front of those you lead, they might want to just decide and then stop thinking. They need to ponder what might naturally be connected to the decision to capitalize on the momentum. Connect a maintenance call to a discussion of legacy hardware. Link a project archiving choice to a review of new cloud-based tools for document storage. By connecting a new conversation to a good decision, people are more likely to want to travel the path toward better solutions.

COMPLICATED DECISIONS

Complicated contexts contain multiple options or answers that are not obvious, at least not to everyone. There are still cause and effect trails to go down, with analysis being critical to making the right choices. Most components are knowable, either obviously or after research. Most people can recognize problems or deviations from what they normally see, but often experts are needed to uncover root causes. Someone has been there before, but it may not be someone on your team. Framing these decisions for those you lead may include the following.

More Than One Right Answer. Several options may present themselves after people have collected and analyzed the situation. No single answer may rise to the top. If the decider thinks they have found only one answer and they stand alone among others who are looking at the same data and options, then they need to keep looking.

Encourage Interaction with Experts. You should increase the level of interaction with experts when things are complicated. Areas of concern may be swept away when there are conversations with those who have been down this road before. They may also uncover areas of focus that were not indicated by the obvious.

DON'T JUST DO THINGS THE SAME WAY ALL THE TIME. DON'T FAIL TO LOOK AT AN ISSUE AND DERIVE NEW PERSPECTIVES.

Things are complicated, but someone knows more about these areas and should be tapped into. It might be a vendor, a colleague, or even a competitor, but they need to be involved on some level. Hiring consultants might even be an option.

Weight Watchers (on the Org Chart). Not all input is the same. When panels or teams are convened, not every voice carries the same weight. Those higher up the org chart might have more political understanding of clout, but they may not be subject matter experts any longer. Authority does not equate to expertise. Encourage the decision maker to analyze input based on facts and let politics be taken into account during the processes, but not drive the outcome. Let the technical voices weigh heavier on technical issues, but do not overlook the cultural impact of any decision.

Pose More Questions. Validate the findings of a team, per person, by asking them how they arrived at an answer. You are trying to uncover incomplete research and not necessarily challenge the findings. You might ask if they have looked into a specific area, or talked to a particular person. You are probing to encourage deeper investigation and analysis.

Avoid Easy Answers. Complicated environments may have elusive conclusions. When the person is unable to uncover facts or verify assumptions there may be more to the story than what is thought. When deductive reasoning and logic do not unfold as planned, the environment of the decision may be complex rather than complicated. What is the difference? Come back next month to find out.



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.

Industry Insights



Well the anniversary of the future from *Back to the Future* has passed, so now it's all history. We are supposed to have flying cars, hoverboards, self-lacing shoes, food hydrators, and the Cubs were supposed to win the World Series. Some of these things have come to fruition in some form, but we don't have flying cars, and well, the Cubs tried, right?

Although these things didn't all come to pass there are still some pretty cool things regarding our industry and focused on the world of Building Information Modeling (BIM). It's an interesting time to be involved in the technology side of things, but it's also a good time to just be involved in BIM. I want to look at an old truth of working in BIM, the people creating the models, and some technology that we should be implementing with our modeling.

COLLABORATION, COLLABORATION, COLLABORATION

Using BIM should drive collaboration, or we aren't doing anything but modeling. We know that, we have been told that from the beginning, yet we still don't collaborate. We should be having BIM kick-off meetings to have an understanding of what is expected. We should be having coordination meetings early on to avoid a bunch of rework and we should be having clash detection meetings to make sure what we pushed through coordination is going to work in the field. Are these meetings going to catch every issue? No, but if we are having the conversations up front we will be more apt to catch the things that are simply taken care of early on.

Many firms claim to be using BIM, but only in the regard that they are using the software that creates a model. They aren't creating fully developed models that other disciplines can use, or at least

USING BIM SHOULD DRIVE COLLABORATION, OR WE AREN'T DOING ANYTHING BUT MODELING.

use and feel confident about. If I had a nickel for every time a consultant referred me to a section that is covered in 2D elements and lines to coordinate what hasn't been modeled correctly, I would be a rich man. There isn't anything more frustrating than when you are down to the wire and you realize the model isn't done properly so now you have to "fake" your model and sections to make it work.

BIM is supposed to be an answer to these type of issues. What I find interesting is you can always tell which firms don't use the software as more than a drawing production tool because they are always the ones that use every buzzword in the industry. They read the latest news on the world of BIM, but don't actually apply it in their modeling practice. I always breathe a sigh of relief when I hear a consultant answer questions with a straightforward yes or no, or with an idea of what they did on another project that turned out well.

As an industry we need to have legitimate expectations of what it means to work on a BIM project and how not to hinder other disciplines that are utilizing all the letters of BIM.

THE MODELER

We have come a long, long way from the days of the CAD drafter of yesteryear. That being said, not everyone has made that transition yet. Many are staying in a 2D world when the rest of the consultants are working in the 3D world. This truth becomes evident very quickly on many projects.

The industry as a whole has not taken the role of modeler and integrated it into the entire design process and it is something that needs to change. No longer are you handing off red lines or details to a drafter who recreates them in AutoCAD®, whether they work or not. You are now giving them the tools to create the model virtually and to prevent issues in the field from happening. They can no longer just recreate details and must be more involved if you expect to get more out of them.

We have taken a different approach in our office, and we aren't the only ones. There was a time where the model was locked down

only for the modeler, and viewer mode was used by all else. This kept the model safe from the amateur user, but didn't promote collaboration. Since that time we have integrated our EITs and our PMs into modeling roles. The rule of thumb is if you can fix it as quick or quicker than marking it up, just take care of it yourself. There is still a necessity for markups and for someone whose role is to model, but when an EIT or PM can just change sizes on structure as they are designing it, it saves much time as well as costly mistakes.

Essentially, the drafter no longer exists in a BIM world. You have to be able to see and understand how the building is going to be put together to be able to deliver a good model that can be used for collaboration. This has always been the case with BIM, but definitely isn't instituted in many cases.

LIDAR SCANNING

One of the goals of BIM is to reduce errors and RFIs by having a more complete model, but why aren't we starting with a more accurate existing conditions model?

The typical method is sending out two technicians, or perhaps more, to take pictures and dimensions of the existing conditions. Even with the use of laser distance measurers and lots of photos there is always going to be a dimension missed that is critical to the project or an area won't be photographed. When that happens we either send someone back into the field to verify the dimension, or we state the infamous VIF (Verify in Field) note on our drawings.

That's where LiDAR scanning comes into the picture, or actually creates a 3D picture. Also known as a point cloud, it is the most accurate existing building conditions tool that you can utilize. It is a line of sight laser that creates a 3D point cloud based on the intensity of the laser. Once you are done scanning you have a 3D mesh representation of the existing conditions that is accurate down to 2 millimeters. With the scans it also takes pictures that can be overlaid with the mesh to give you a panoramic view of the area that was scanned.

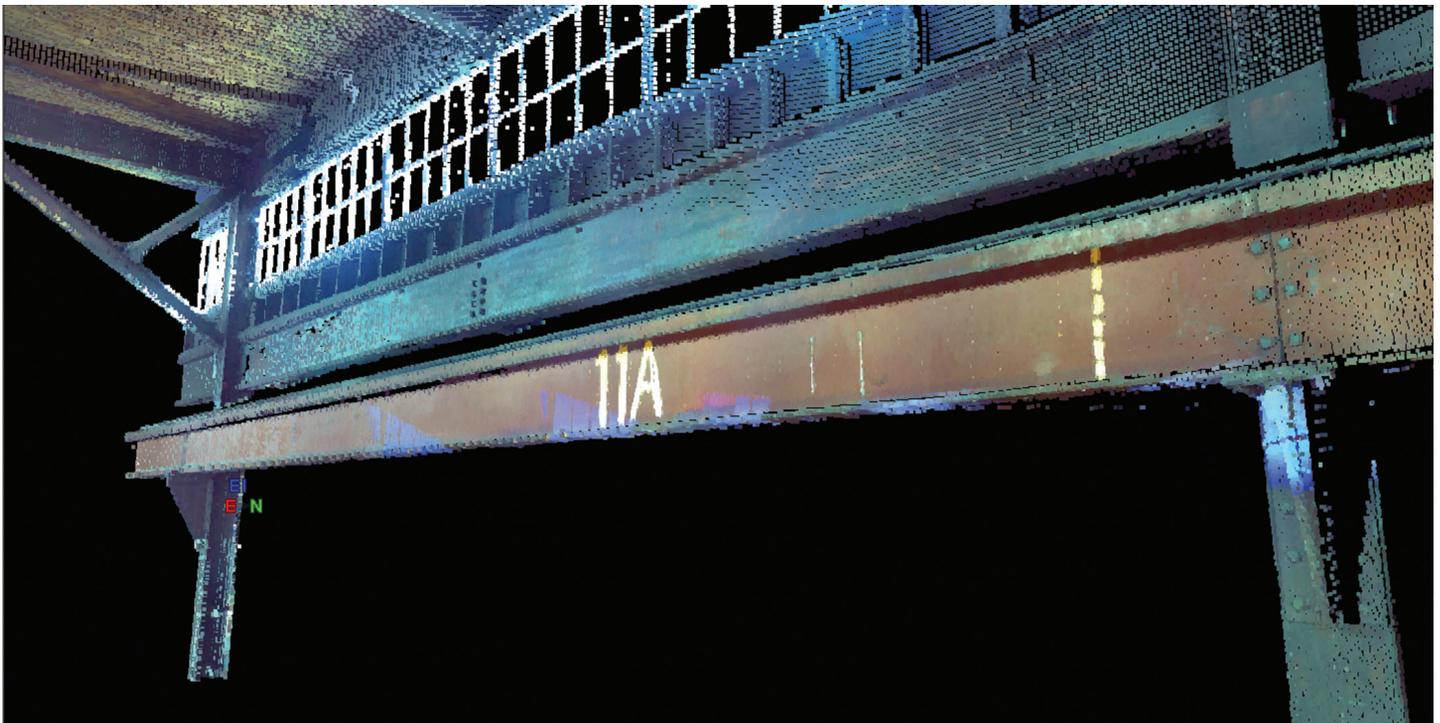


Figure 1: Point cloud imagery

Many people in the industry have heard of this technology, but very few are utilizing it. Many are scared away by the cost of buying the machine or the hassle of bringing on another consultant into the project. Others would like to do it, but aren't sure what to do with it when they have it and others just don't like to try new things.

The cost of the machine has been dropping rapidly as more companies get into competition with one another. Depending what your needs are you don't have to have the top of line that scans for 330 yards when all you are doing is interior renovations. The machines are much more affordable and will continue to become so.

I think the biggest hold up is the group that says, "What do I do with it after I get the point cloud?" If you are working with a consultant that just sends you the scan and walks away, you need to find another consultant. They aren't bringing any benefit to the process and are just taking your money. The consultant should be able to give you an option to create a level 300 model from the scan for your use that includes walls, floors, roofs, major structural components, as well as piping and ductwork. You should also be able to quickly set up a rough floor plan from the scan in a matter of minutes that you can use for layouts in existing buildings. They must also have a fast turnaround time.

For those who don't like change, it's inevitable. Otherwise we would still be drawing by hand. There was a change from hand drawn to CAD and again from CAD to 3D design software. Change is going to happen at a greater speed as technology continues to be developed at breakneck speeds. If you don't start adapting you will be forgotten.

I believe the industry needs to start using this tool on all projects that involve existing conditions. It will create a better collaboration from start to finish.

There are also roles it can play in new construction and many other avenues of business. I believe the possibilities are limited only by us.

WHERE DO WE GO FROM HERE?

The technology is going to get more exciting and cutting edge is the new norm as we move forward. But if we aren't looking at our process of using the technology, properly staffing the people using the technology, collaborating with the technology we have, and not looking for bigger and better ways to use this technology we may as well go back to the days of drawing construction documents by hand.

If we utilize the right process, the right people, and the right technology we should be delivering well thought out and designed plans that are much more valuable to the end client. We are now capable of delivering so much more than just a piece of paper, and the possibilities are endless.



Joshua Geimecke is Senior BIM Technician and Modeling Manager for Carney Engineering Group, Inc. in York, Pennsylvania. He has been involved in the CADD industry, working in many different disciplines and sectors, for more than 14 years with the last seven years focused on structural BIM.

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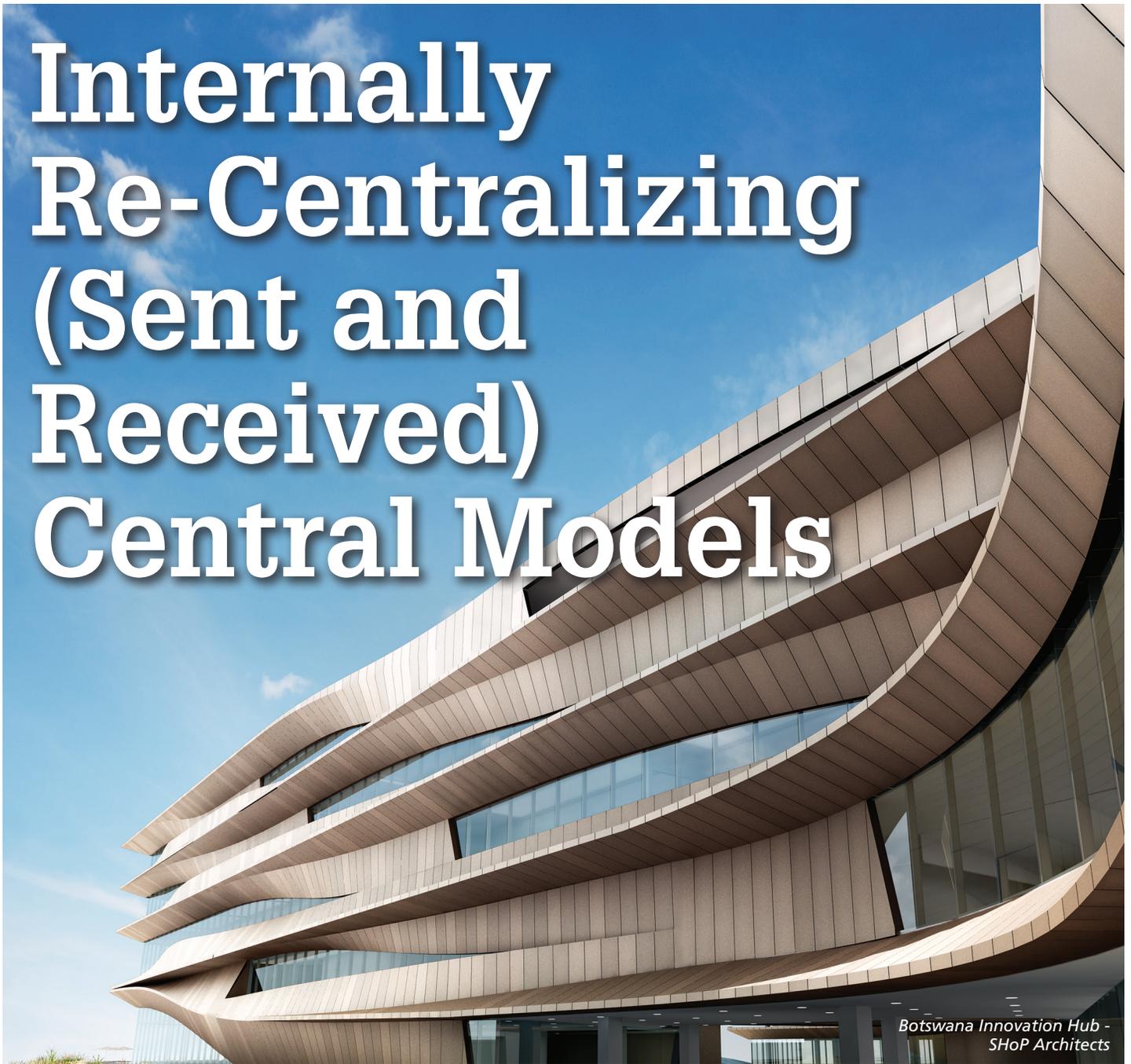
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Internally Re-Centralizing (Sent and Received) Central Models



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Before one can get to work with other disciplines' central models there is an obvious need to obtain and then use their files. Easy so far... but to use we need to save them to our networks. If we are on a different network than the original file author then we need to do a bit of housekeeping first. Or else!

Well, as life has it, and with everything in BIM being distinct from drafting processes (digital drafting included), there need to be some special procedures used to ensure we are working with files that won't break our internal file setups: namely **creating new central files of all Revit® worksharing files from every "player" we collaborate with**, then saving on our internal networks, then synchronizing, then getting to our work ;)

This is an imperative whenever files are transferred off-site to or on-site from others.

WHY?

Revit central files know (yeah, scary but they "know" ;) when they are moved, copied, renamed, etc. More than that, they are no longer central models!

If any of the above actions occur the model will try to find the now non-existent central... cyclical-redundancy, or better, cyclical-non-existence will become the rule of the day and we don't want to see errors or corruptions due to lazy, er, uh, improper file handling. Without further ado, use the text below and copy/share at will ;)

When models and ancillary Revit files are updated by others and shared with distributed teams there is a need for each recipient to create new Central Models—only if worksharing has been enabled in them obviously ;)

1. Download all of the files into approved network locations
 - a. Revit (.rvt)
 - b. AutoCAD (.dwg)
 - c. Others
2. Open “detached” per image below
 - a. Tap into the drop-down next to the “Open” button (ensure that “All” is the choice)
 - b. Check the box for “Audit”
 - c. Click “Open”
 - d. Choose “Detach and Preserve Worksets”

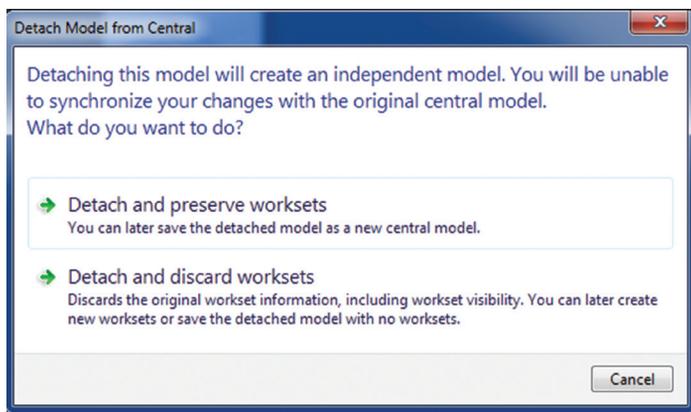


Figure 1

3. Save-As
 - a. Choose the proper network location
 - i. Place all files to be linked into the live project into one subfolder for all of these copies
 - ✦ This will ensure streamlined updates in the future
 - ✦ Always save future updated files on top of these
 - ✦ Follow all of these procedures herein each time—each and every time updates are shared
 - b. Tap into “Options”
 - i. Ensure that Maximum Backups is at the very least 20 (50 is recommended)
 - ii. Change the “Open Workset Default” to “All” (not shown below)
 - iii. Name the files the same as the original name from downloads
 - iv. Click OK
 - v. Click Save
4. Once the “Save” is complete (see Figure 2)
 - a. “Synchronize with Central”
 - i. Relinquish EVERYTHING
 - ✦ Ensure all five boxes under “After synchronizing...” are checked if available to be checked. (In other words, if they are NOT grayed out, then check them!)

- ✦ Check “Save Local file before and after synchronizing with central”
- ✦ Check “Compact Central model” when closing the file (this cleans the database of now null entries)

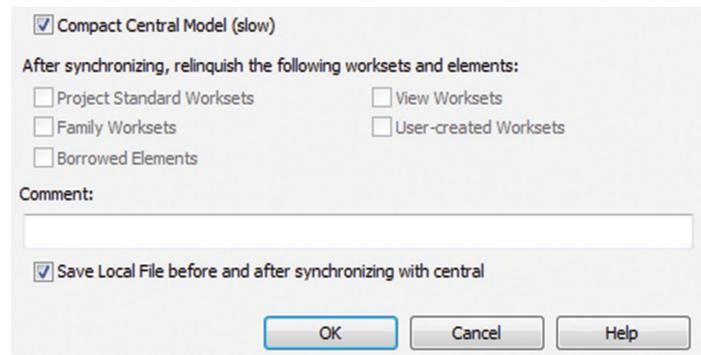


Figure 2

5. Repeat this process for each and every Revit file

Now the files are ready to link into the project file and we are ready to get to the fun stuff ;)



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

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

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

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

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

@JayZallan

JayZallan@gmail.com

InfraWorks 360, What Can You Do for Me?



With the introduction of 3D visualization programs, many industries have wondered about the opportunities and limitations of each new tool available to us. We ask ourselves: What software/platform is the most convenient for my company? What training tools and support are available to learn and proactively apply these new resources? Is it going to make my job easier, or at least less complicated? Do I really need this? If my competition is not using it, why should I?

Some of these questions (and many more) come into play when we talk about InfraWorks® 360, formerly Autodesk Infrastructure Modeler (AIM). Since its first application, we have found how powerful, versatile, and simple a 3D program can be. With its introduction in 2012, when AIM was released as a conceptual design program for infrastructure projects, it was the first tool that offered the possibility of integrating and combining civil, architectural, and geospatial data while simulating the different project components in both 3D and real time.

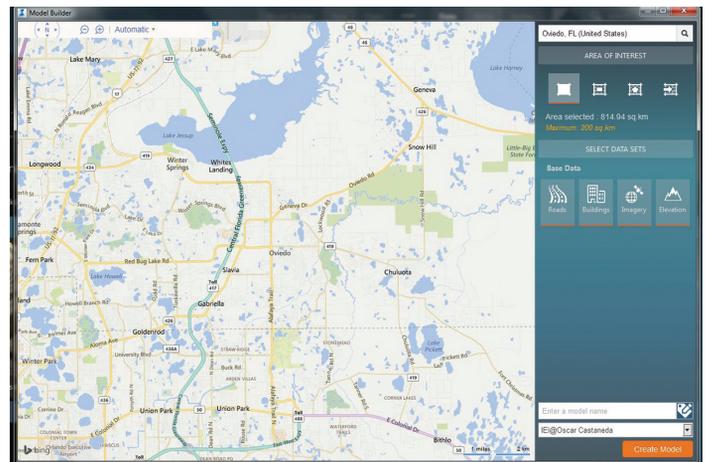


Figure 1

What makes Autodesk's InfraWorks 360 different than any other program is its commitment to our industry and its capacity to continuously evolve around a designer's needs, industry inputs, and even programmers all over the world. For those of us who have been

given the chance to work with this new platform, we remember the days when the only way to access data was by painfully searching online for the individual files with the necessary information to put models together (surfaces, roadway baselines, hydrography, geological conditions, etc.). Autodesk listened to the challenges we faced and our requests for tools to make our jobs easier. As a result, they have developed, in my opinion as a designer, one of the more practical tools for developing conceptual images: Model Builder. The development of this program speaks highly of Autodesk and what we can expect from them in the years to come.

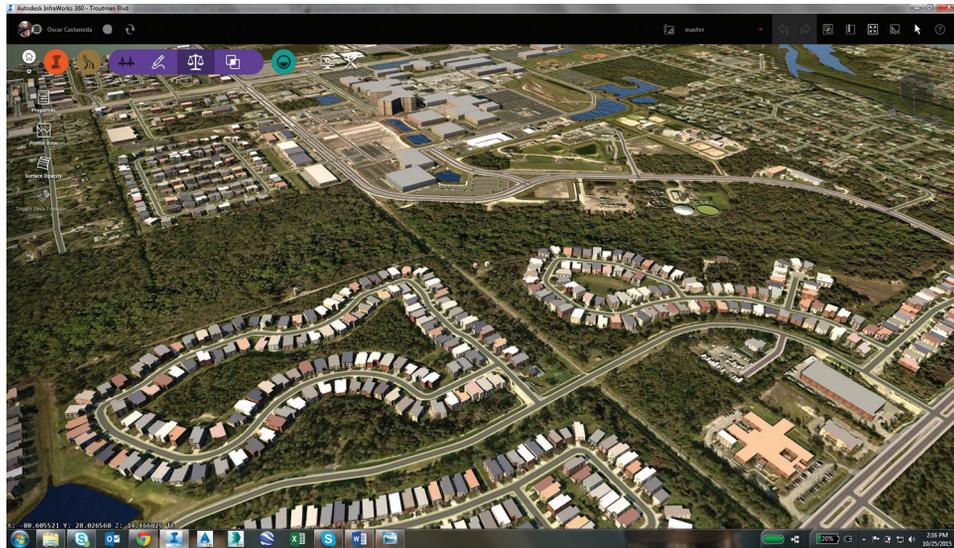


Figure 2

Let me put use of this tool into a practical scenario: you have been assigned to a roadway design team and the project scope requires a modification to the main road alignment to allow better traffic flows and safer driving conditions. You have the option to develop more than one alternative as a solution, which will require preliminary design for each one.

Do you remember doing this before InfraWorks 360? How much time do you have to apply to each alternative development and how can you determine the best solution for the problem at hand?

Here is where the InfraWorks 360 tool comes into play. With a clear understanding of the project scope and its limits, as well as the defined critical components such as roads, drainage conditions, current structures, and demographics (among many others), you can simply command Model Builder to create an intelligent, three-dimensional model of the existing elements. You can then use the model to create, edit, and detail the many different recommended alternatives, as well as produce elegant presentations through its visualization options. These features create an easy bridge of understanding and communication with clients and project stakeholders.

With the adjacent icons, we have access to the different modules that over the last few years InfraWorks 360 has introduced and improved upon: roadway, bridge, and drainage design. More recently, the impressive display of new traffic simulation, profile and corridor optimization with sight distance analysis options,



Figure 3

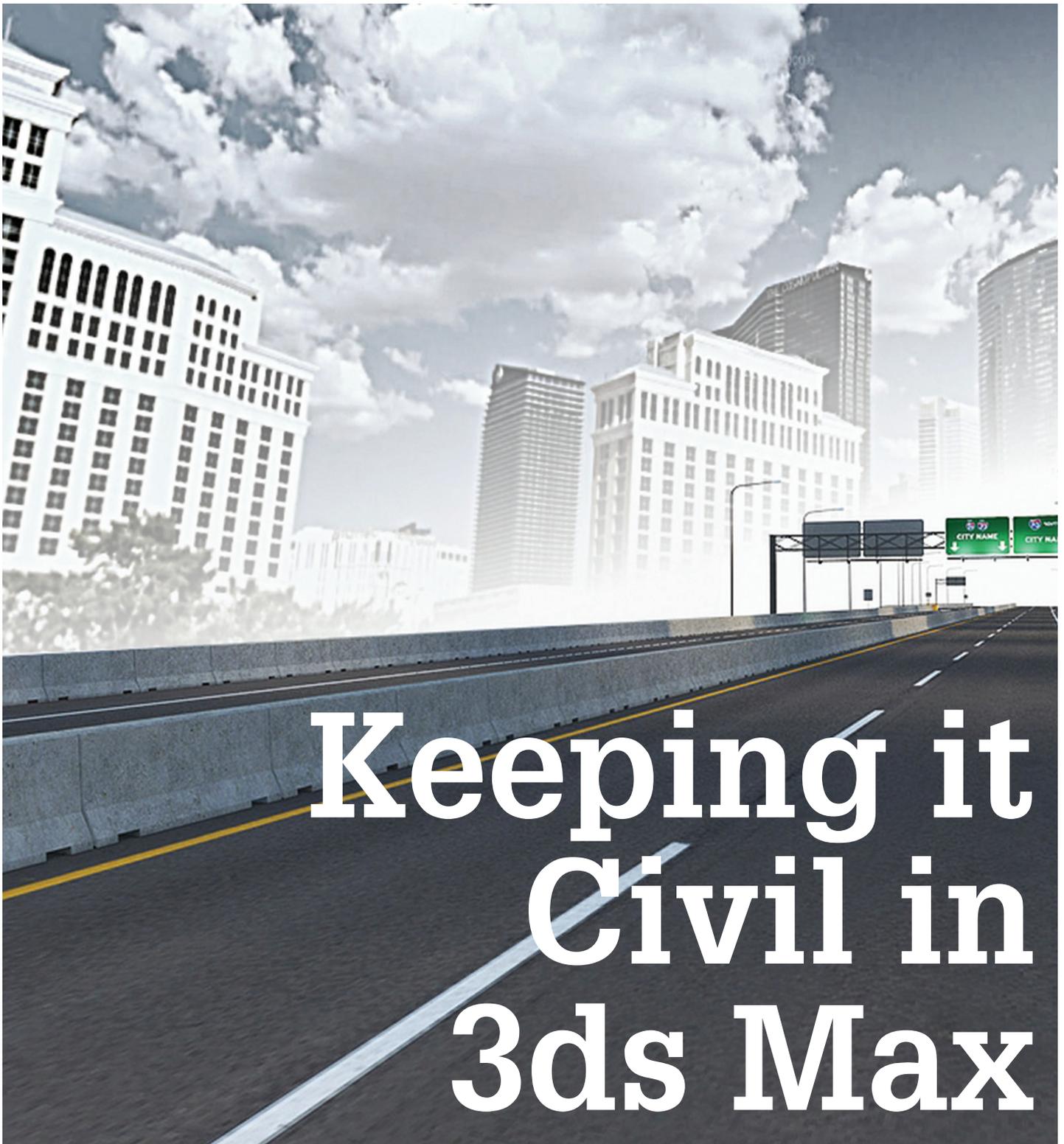
and new features within the 2016 release are incredibly helpful and easy to learn and use, whether used as a preliminary or final design tool for presentation and interpretation.

Nevertheless, like all things in life, nothing is perfect. As much as InfraWorks 360 is a dynamic and easy program to use in approaching design challenges, its biggest limitations are based on the lack of data reliability obtained through Model Builder, hence its inability to provide trustworthy information for actual design processes. The platform is constantly evolving, but when approaching InfraWorks 360 at its current stage, we need to ensure that it remains a marketing and preliminary design tool to help determine the best possible approach into the formal final design phase, which saves time and money and provides our clients with more visual and understandable elements with which to make decisions.

Regardless of its limitations, Autodesk provides us with a family of programs that interact with one another in a way that complements every aspect of our design process. InfraWorks 360 works closely with AutoCAD® Civil 3D to encompass every aspect in our projects, making an efficient combination for infrastructure design.



Oscar Castaneda is a Transportation Design Engineer and AutoCAD Manager at Infrastructure Engineers Inc., in Florida. Oscar received his bachelor's degree from Universidad Pontificia Bolivariana in Colombia (South America), and also has an education in Architectural Design and Construction Technologies from the Northcentral Technical College in Wisconsin. With more than 10 years of experience in the transportation industry, Oscar is a practicing Civil Design Engineer (EI), and recently has spent his time leading Infrastructure Engineers' transition into Civil 3D, InfraWorks 360, and Civil View with their current design workload, to make the most from Autodesk Suite Packages, and breaking barriers between Bentley and Autodesk product users.



Keeping it Civil in 3ds Max

Figure 1

The cost of infrastructure and development is constantly rising, and as the industry advances toward providing visual solutions to expensive and complex design problems, the ability to provide alternatives quickly and professionally can mean getting or keeping a client. With the use of AutoCAD® Civil 3D® and 3ds Max's Civil View, this process can be made simpler.

Civil View for 3ds Max® allows the import of Civil 3D content with an automated approach. Upon import, materials are mapped and assigned automatically. The Civil View tools assist with the import and addition of 3D content. In addition, as a project continues to change and evolve in Civil 3D, the changes can quickly be translated to 3ds Max.

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3ds Max 2015

The first step is simple. We'll export our Civil 3D file using the Civil View export option, where we choose to place our .vsp3 file and proceed to import the file into 3ds Max.

IMPORTING GEOMETRY

Start by selecting the menu, then choosing Civil 3D (VSP3D) file under the Geometry Import Option shown in Figure 2. Once complete you'll see the import panel, where you can select the objects you wish to import. This might include points, pipe networks, surfaces, alignments, sites, or corridors. It is recommended importing only the objects we know we need to use. Additional elements could potentially be difficult to manage or slow down production.

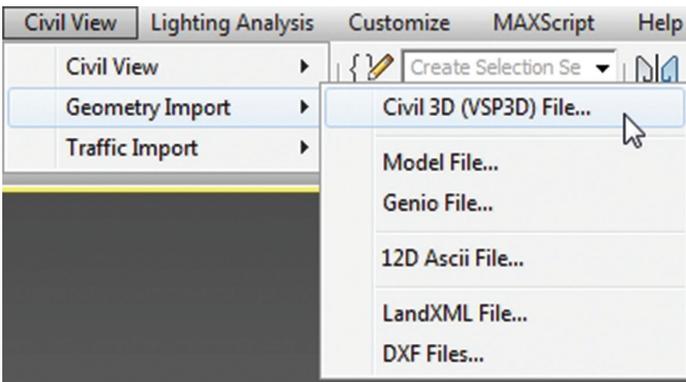


Figure 2

After selecting the objects, 3ds Max will prompt to globally shift the coordinates as shown in Figure 3. There are several reasons it asks this question, but ultimately Civil 3D is used for real world applications, and coordinates often range in the thousands or even millions place. 3ds Max was constructed to perform very complex calculations, but its accuracy deviates the larger the numbers get. By automatically applying a shift to the file in 3ds Max, it places the geometry in position where it can present it without error. With that understood, we'll want to choose the "yes" option.



Figure 3

DRAPING IMAGES

Orthographic imagery has become a necessary component in both design and visualization. Autodesk understood this and ensured that Civil View recognized world coordinate files associated with orthographic images, allowing for easy import. Simply by selecting the target surface in 3ds Max Design, then choosing the Draping tab as shown in Figure 4, users can apply the appropriate image to their surface effortlessly.

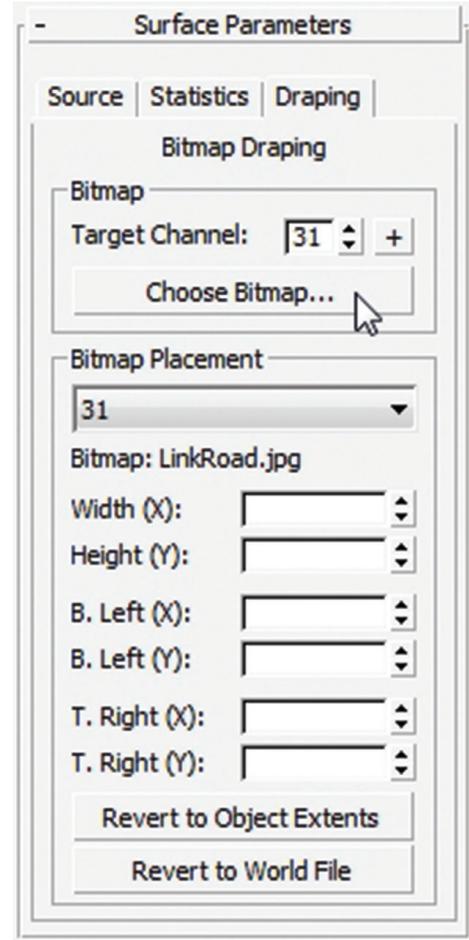


Figure 4



ROAD MARKERS

Civil View recognizes baseline and alignment geometry and gives us the option to place roadway markings at that location, or alternately parametrically place markings at other locations with various gap lengths and widths as needed, as shown in Figure 5. These markings maintain a permanent connection to their alignment. In addition, specific marking styles can be associated with feature lines in Civil 3D, allowing for visual accuracy directly on import from Civil 3D.

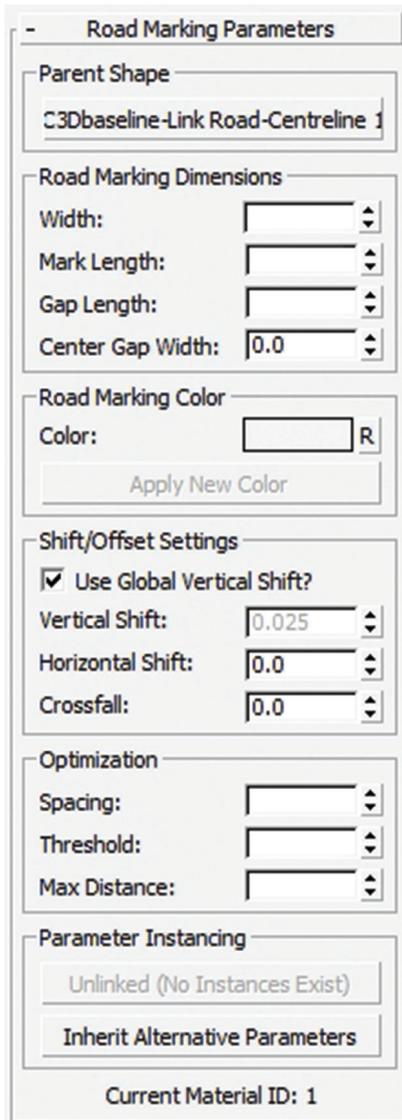


Figure 5

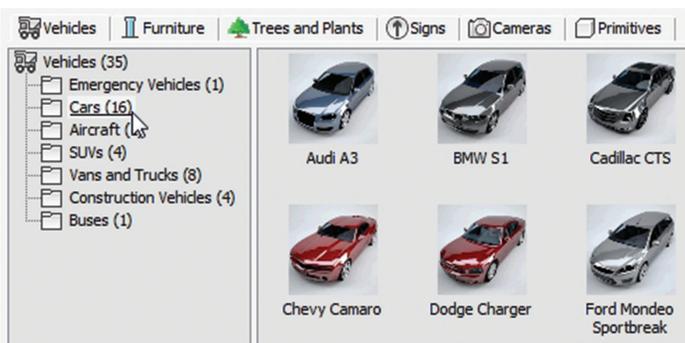


Figure 6

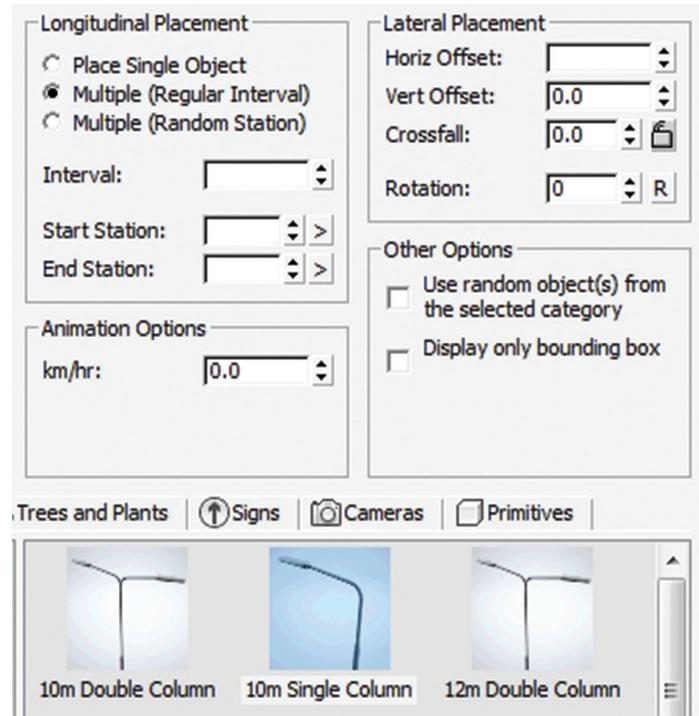


Figure 7

ADDING STREET FURNITURE, VEHICLES, AND SIGNS

Adding street furniture, vehicles, and signs is simplified by selecting Object Placement Style Editor under the Civil View menu. Here we choose the Parent Shape (in our case, being the centerline of the road), and then select the Add New Element icon. Here we have the option to add vehicles as shown in Figure 6, furniture such as street lights and gantries, trees and plants, signs, cameras, and primitives. Once selected, we are asked for longitudinal and lateral placement options shown in Figure 7.

At this point we've completed our scene and have completed this tutorial covering the basic steps for constructing a scene using 3ds Max Civil View and Civil 3D.



Brian Chapman is 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.

The Importance of AutoCAD in the BIM World

If you haven't been stuck under a rock or hiding in a cave you've probably heard about building information modeling (BIM) by now. According to Autodesk, "BIM is an intelligent model-based process that provides insight to help you plan, design, construct, and manage buildings and infrastructure." But when you talk about BIM you're usually referring to software such as Autodesk® Revit®, ArchiCAD, Navisworks®, or some derivative thereof.

Although these are tools most often used for BIM, they are not the only tools. Many forget about the AutoCAD®-based modeling tools such as AutoCAD® Architecture, AutoCAD® MEP Fabrication, and the like. Then there's exporting to .dwg for compatibility between external team members. AutoCAD and .dwg, however, are not without their faults as there could be issues with object enablers and loss of information when passing through to a CAD format. We'll discuss AutoCAD's role as a BIM authoring tool, as a conduit for model pass-through, and some limitations of the .dwg format, all while citing tips and tricks along the way! (Throughout this article, you'll hear from our industry leaders who will share valuable insights on how they do things and what they think. Please keep in mind that these are their individual opinions and may not reflect the views of their respective companies.)

I know, I know... depending on your interpretation of BIM, your discipline, and what you're using it for, just about anything can be deemed BIM worthy, or nothing at all. Just take a look at this list of BIM applications and providers, courtesy of cad-addict.com

- ✦ Architecture
 - ✦ Autodesk Revit Architecture
 - ✦ Graphisoft ArchiCAD
 - ✦ Nemetschek Allplan Architecture
 - ✦ Gehry Technologies - Digital Project Designer
 - ✦ Nemetschek Vectorworks Architect
 - ✦ Bentley Architecture
 - ✦ 4MSA IDEA Architectural Design (IntelliCAD)
 - ✦ CADSoft Envisioneer
 - ✦ Softtech Spirit
 - ✦ RhinoBIM (BETA)
- ✦ Sustainability
 - ✦ Autodesk Ecotect Analysis
 - ✦ Autodesk Green Building Studio
 - ✦ Graphisoft EcoDesigner
 - ✦ IES Solutions Virtual Environment VE-Pro
 - ✦ Bentley Tas Simulator
 - ✦ Bentley Hevacomp
 - ✦ DesignBuilder
- ✦ Structures
 - ✦ Autodesk Revit Structure
 - ✦ Bentley Structural Modeler
 - ✦ Bentley RAM, STAAD and ProSteel
 - ✦ Tekla Structures
 - ✦ CypeCAD
 - ✦ Graitec Advance Design
 - ✦ StructureSoft Metal Wood Framer
 - ✦ Nemetschek Scia
 - ✦ 4MSA Strad and Steel
 - ✦ Autodesk Robot Structural Analysis

- ✦ MEP
 - ✦ Autodesk Revit MEP
 - ✦ Bentley Hevacomp Mechanical Designer
 - ✦ 4MSA FineHVAC + FineLIFT + FineELEC + FineSANI
 - ✦ Gehry Technologies - Digital Project MEP Systems Routing
 - ✦ CADMEP (CADduct / CADmech)
- ✦ Construction (Simulation, Estimating and Const. Analysis)
 - ✦ Autodesk Navisworks
 - ✦ Solibri Model Checker
 - ✦ Vico Office Suite
 - ✦ Vela Field BIM
 - ✦ Bentley ConstrucSim
 - ✦ Tekla BIMSight
 - ✦ Glue (by Horizontal Systems)
 - ✦ Synchro Professional
 - ✦ Innovaya
- ✦ Facility Management
 - ✦ Bentley Facilities
 - ✦ FM:Systems FM:Interact
 - ✦ Vintocon ArchiFM (For ArchiCAD)
 - ✦ Onuma System
 - ✦ EcoDomus

This is by no means a complete list (some entries may even be controversial), but hopefully it paints a picture of the different players involved that you may not have even considered. The question is, does BIM have to always be represented in 3D? What if you have a pipe that spans several thousand feet? Sometimes it make more sense to represent information in schematics such as P&IDs (Piping and Instrumentation Diagrams). What about details where it makes more sense to represent information two dimensionally? Take Garrett Hardy of Page, who says, "Currently

we use CAD for a few different things. Depending on the scale and the complexity of our MEP flow diagrams and one line diagrams we will use CAD to develop and manage them. This is happening less and less now that our BIM template has views set up for these with legends for all of our fittings. We still use it for details, though, and ONLY on drafting views. Anytime we use an old detail we will convert it to Revit and change all the line types and clean it up. Then it will be put into our Revit details library file, then we archive the old CAD detail. So it is still being used to bring in details until we end up going through them all. That is about the extent of our CAD usage at the moment. I know that civil still uses CAD extensively in their BIM process but as for MEP and Architecture, we get farther and farther away from it with each release of Building Design Systems as they add features that reduce the need for CAD."

Construction is where we see other examples of AutoCAD-based authoring tools. The screen shot below (Figure 1) is an example of a federated model that consists of Revit components for the architecture, plumbing pipes, electrical conduits, and cable trays whereas the sprinkler lines and ducts were created in AutoCAD-based applications where each of the disciplines have their own methods of contributing to BIM and virtual design and construction efforts.

Speaking of MEP, Revit 2016 uses fabrication parts from AutoCAD Fabrication MEP in a sort of hybrid approach to further shorten the bridge between AutoCAD-based BIM (that's right, I said AutoCAD-based BIM) and full-blown BIM applications such as Revit. Speaking of hybrid, another widely used method for integrating BIM models has to do with the .dwg format itself.

In the federated model example in Figure 1, the different pieces had to be brought into clash detection software such as Navisworks and because different applications were used in the creation of the models, AutoCAD .dwg is a natural choice as it is most compatible with external applications. Although Revit can export straight to Navisworks via .nwc format, most deliverables also require a companion .dwg so that different trades can reference one another's work (.nwc is a dead end as far as useful data is concerned.) during coordination efforts. When exporting from Revit to .dwg for coordination efforts,

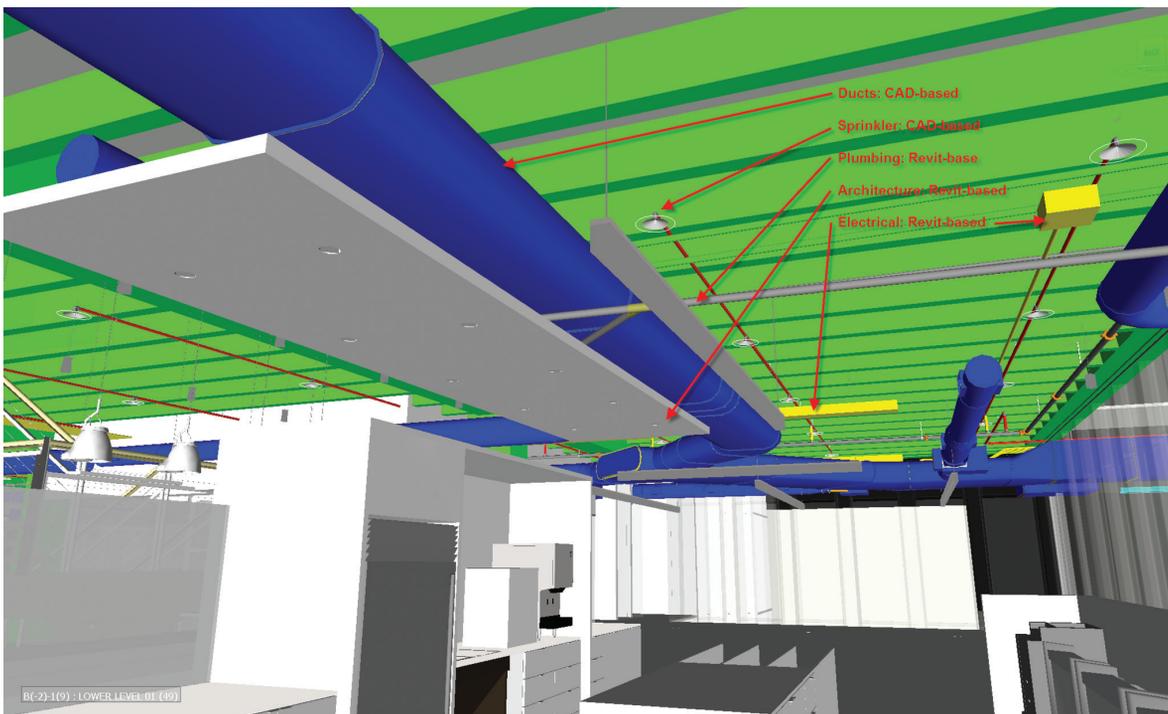


Figure 1

AutoCAD 2016

here are a few things to keep in mind:

- Set solids export to “ACIS solids” to preserve the integrity of the object properties and geometry as much as possible. If you export as mesh geometry, you’ll end up with individual facets for geometry, which are of little use (Figure 2).

It has the experienced designers in a quandary of either keep using CAD, or the large investment of time into software other than Revit for conceptual design. Thus the need for IFC conversion to Revit (even if Dynamo pans out to be a great workflow) as there are technological bounds that need to happen with designers that have been in the game the longest,” says Cesar.

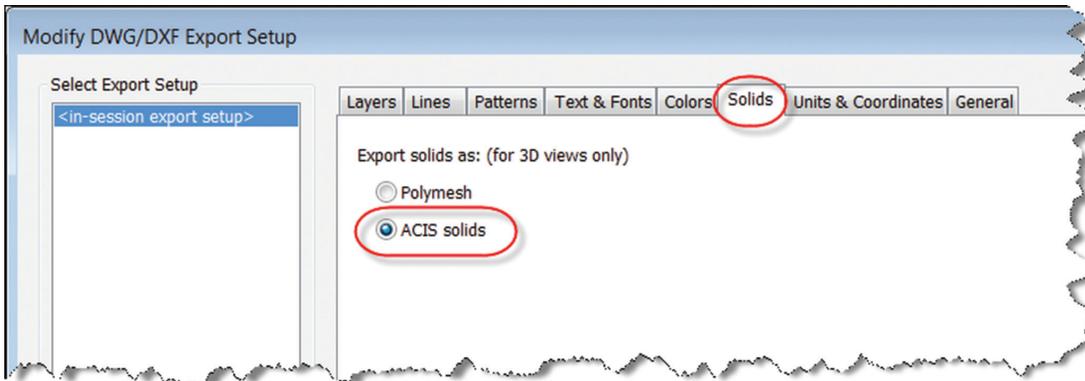


Figure 2

- Layers: you have the ability to modify and export objects to whatever layers you need or export to consistent layers for certain discipline specific components. To do this, modify the layer settings in the export options so that they may appear as consistent colors. Also make sure to not create any overrides (Figure 3).

quo.” Perhaps this is why some feel that AutoCAD should be left out of the BIM equation. I sort of agree. Having trained folks on AutoCAD/AutoCAD Architecture versus Revit, I’ve noticed a common issue with adopting change. It is challenging to learn any new software, but the temptation to revert back to old behavior is too much for some to handle, especially with the pressures of a looming deadline.

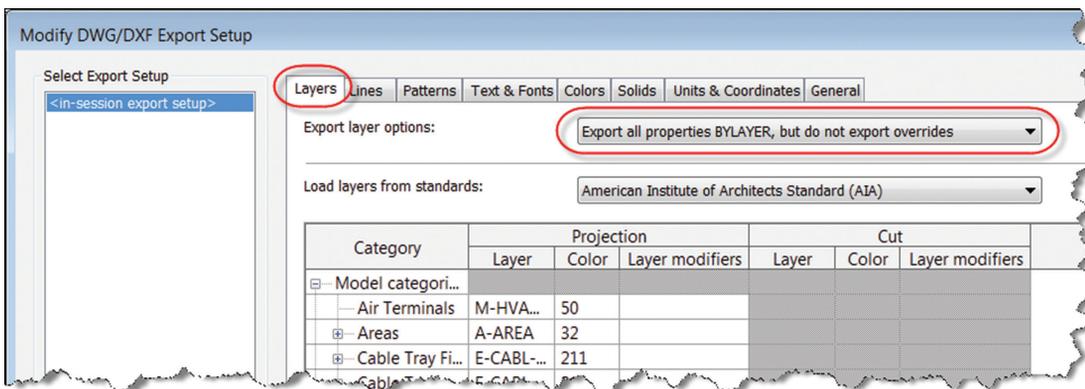


Figure 3

The above steps will minimize frustration and extra work to get items represented properly for coordination processes. Then there’s the issue with communicating between external team members during the design process. As Cesar Trevizo from PGAL puts it, “More often than not we’ve been using CAD as an export from Revit to share with consultants who use other applications.”

However, if there are those who don’t want to contribute to a BIM effort, it really causes issues for the entire project team. Take it from Michael Kennedy of Morris-Huitt Zolars, who says, “It is my opinion that the BIM process has little to no room for AutoCAD files. In an environment that is based on 3D and information-laden files, why would it? We are considering charging (reducing fees) for those consultants

not engaged in a model as a deliverable service. It takes much more coordination and thereby time to work with AutoCAD files, which are often out of date as soon as we import/link them into our models. We are now seeing less drawings required as the contractors use the model to build from directly. It can be done and in some cases has to be done, but the ARC industry will be better off when all our teams and consultants are working in intelligent 3D files.”

In these cases .dwg seems to be the most widely used and the most compatible format. Then there are the designers who may find that BIM software may not be the most conducive to a free-flow design process. “With Revit’s lack of user friendliness (the need of a large time investment to become a great modeler) for conceptual design with off-the-wall capabilities like either Dynamo and/or Rhino, which require just as big of a commitment to training as in Revit,

Aside from being a crutch for industry progression, there is the issue of preserving meta data when crossing different formats. There are enough issues between BIM applications and an agreement on formats such as IFC and COBie that when you add .dwg to the mix, it gets even more diluted. Looking at an example of properties for an object in a review application such as Navisworks

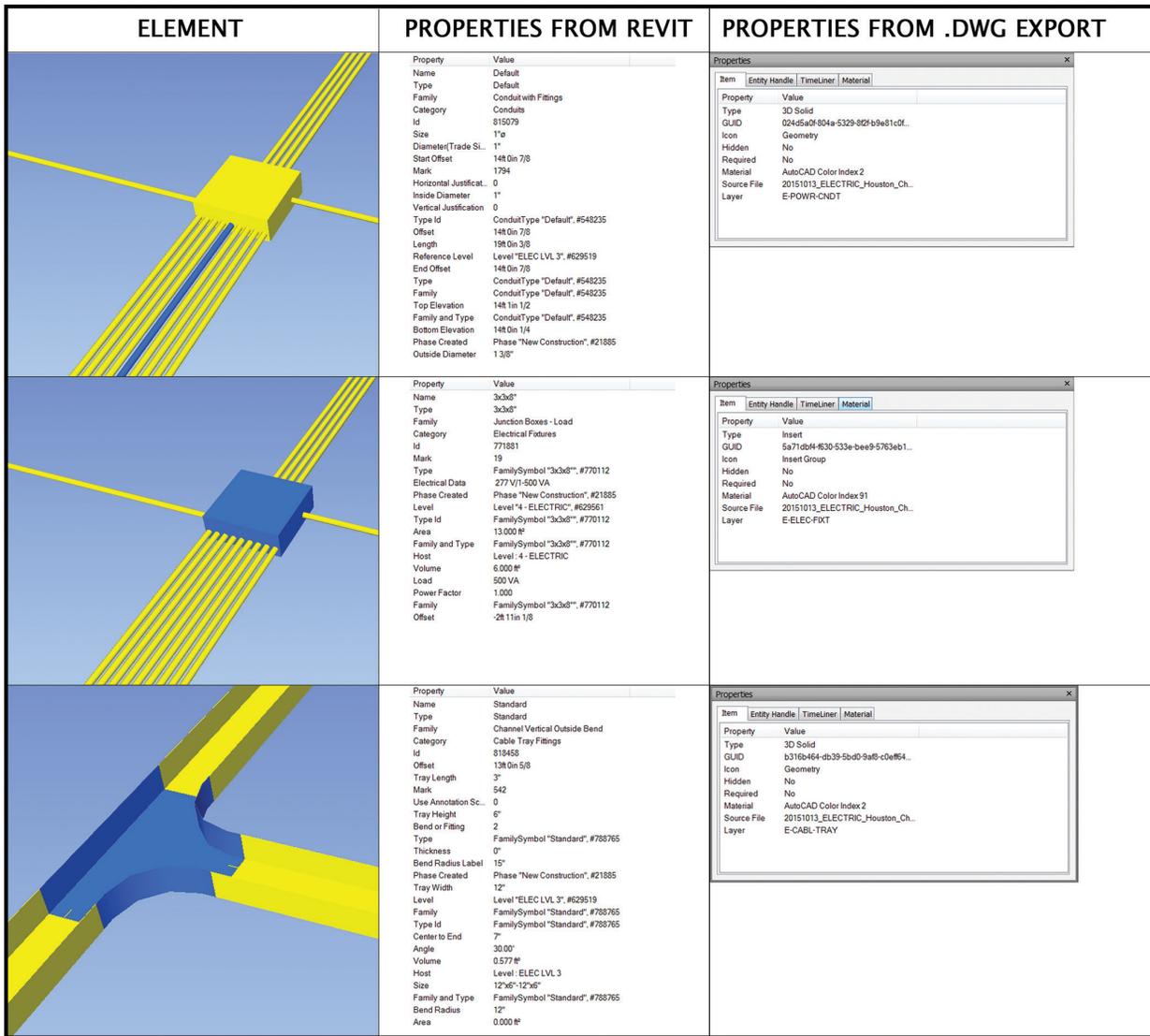


Figure 4

taken from their native application (Revit in this case) versus .dwg export, we'll see that although there may be some information that is retained, much information is missing or lost in translation. This may not be that big of an issue if you're just interested in using the models for clash detection, but until this gets resolved there will continue to be issues with BIM and AutoCAD, not to mention the plethora of other applications out there. However, the advantages of having a common format far outweigh the issues.

When we talk about AutoCAD's role in the industry trends of the BIM world, it's evident that this is a transitional time for the industry and that it is commonplace for there to be a melting-pot of CAD and BIM models. After all, CAD is where it all started and it would be difficult to imagine not having AutoCAD in the BIM world. From BIM in construction, to design to analysis and engineering, there is not one-size-fits-all; however, there is one default format that all players can relate to: AutoCAD. Like it or not, AutoCAD and the .dwg format coupled with IFC standards with LOD specifications and the wide range of BIM authoring tools are what make up our building information modeling landscape today. In order to be successful we should find the best use for all these tools.



Dat Lien has traveled all over the globe for renowned architectural firms such as Gensler, PGAL, and Morris Architects. After managing a team of experts at Total CAD Systems, an Autodesk reseller, he has now added entrepreneurship to his repertoire with the formation of Axoscape, a service-based company offering BIM, CAD, and Visualization solutions. With over a decade of architectural experience, Dat combines leveraged technology with the AEC business so clients can stay competitive while maintaining flexibility. Dat also keeps busy with organizations such as the Houston Area Revit Users Group, A Child's Hope, and helping out other non-profits. By utilizing his education, experience, and eagerness to educate, Dat enjoys helping and sharing his knowledge with others.

Exploring Schedule Tables in ACA

Schedules are tables you can insert in drawings to list information about selected objects in your building model. Objects are made up of properties that contain data. Schedule tags provide an efficient tool for collecting the property data attached to the objects for display in a schedule table. You can create schedules with varying levels of detail by defining and attaching sets of properties to object styles or to individual objects and then extracting and displaying the data in a schedule table. You can produce basic schedule tables using the default tools provided with the software.

OVERVIEW

Before delving into schedule tables, it is important to understand some of the terminology associated with them. Here's a brief overview of some important terms that apply to creating and managing schedule tables.

- ✦ **Schedule Tags** – You can use project-based or standard schedule tags in your drawings to graphically display the property data of an object. By linking the schedule tag to a property in a property set, you report property data of the object. When you anchor the tag to an object to which the property set is applied, the value of the property displays in the tag. The information in the tag is updated if the object or the property changes.
- ✦ **Schedule Tools** – AutoCAD® Architecture provides default tools for project-based and standard wall, door, and window schedules on the Scheduling tool palette and in the Content Browser. Selecting one of these tools that has a style and other properties predefined allows you to quickly place a schedule table in your drawing.
- ✦ **Schedule Styles** – A schedule table style specifies the properties that can be included in a table for a particular object type. The style also controls the table formatting such as text height and spacing, columns and headers. Display properties in the style control the visibility, layer, color, linetype, and linetype scale of table components.
- ✦ **Property Sets** – A property set is a user-definable group of related object properties. When you attach a property set to an object or a style, the property set becomes the container for

the property data associated with the object. Property sets are specified using property set definitions.

- **Property Set Definitions** – A property set definition is a documentation object that specifies the characteristics of a group of properties that can be tracked with an object or style. Each property has a name, description, data type, data format, and default value.
- **Property Data Formats** – A property data format is specified for each property definition within a property set definition to control how the data for that property displays in a schedule table, in a schedule tag, or on the Property palette. Property set definitions and schedule table styles use property data formats to control the display format of values for each property.

CREATING SCHEDULE TABLE STYLES

Schedule table styles are used to control the appearance and content of schedule tables. A schedule table style for the type of schedule table you want to create must be contained in the drawing. When a schedule table style is copied into a drawing, data formats and property set definitions specified in the style are also copied. Property data formats and property set definitions will be discussed shortly.

Like many entities of ACA, schedule table styles are created and edited in the Style Manager under the Manage tab of the ribbon. To create a new style, expand Documentation Objects, right-click on Schedule Table Styles, and click New. Enter a name for the new style and hit Enter.

Next, you will edit the options for the schedule table style. The eight tabs you have to choose from are as follows:

1. **General** is where you add a description, if desired. You can also click on Notes and add a note and/or a reference document.
2. **Default Format** allows you to specify the format you want for your new schedule table style. This includes text appearance, matrix symbol, and cell size.
3. **Applies To** allows you to specify which objects you want the schedule table style to track. This could be as simple as a polyline or a door. This could also be several ACA objects, depending on what information you wish to include in your schedule table.
4. **Columns** allow you to add columns to represent properties that are reported in the schedule table style. You can also add column headings, edit column data, and edit column placement in your style (see Figure 1).
5. **Sorting/Grouping** allows you to specify the sort order of each row within the schedule table style. You can also group

columns together with this feature and specify if you would like to display subtotals for the group.

6. **Layout** allows you to specify the format of the table title, the column headings, and the matrix column headings.
7. **Classifications** allows you to assign a group of named properties to various objects. They assist in controlling how objects are displayed and scheduled.
8. **Display Properties** allows you to specify the visibility, line type, layer, and other display properties of the schedule table style you are creating.

Once your style has been created, you can drag and drop it on to your tool palette for quick access. You can also add the schedule table to the Annotation tab on the ribbon by using the CUI. I highly recommend doing this if you plan to use your new schedule table style frequently.

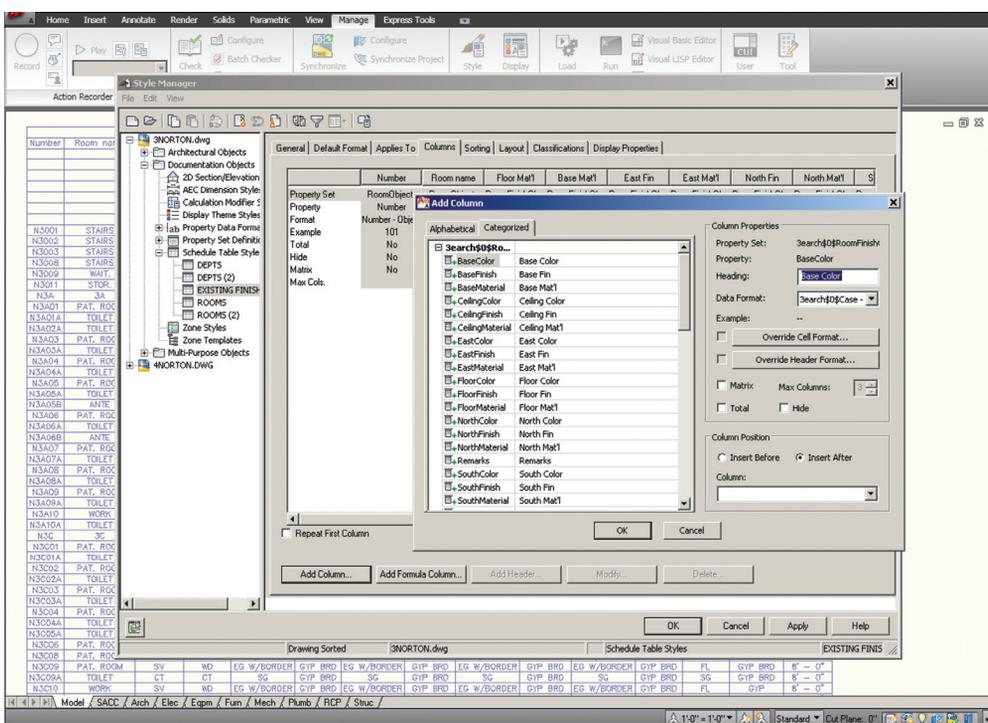


Figure 1: Schedule table style—Add Column

PROPERTY DATA FORMATS AND PROPERTY SET DEFINITIONS

Before you create a schedule table, you will need to attach the property sets that are referenced in the schedule table style to the objects and object styles. These attached property sets become the containers for the data that will appear in your schedule table. A schedule table extracts the data from objects and displays it in the table. Data is not saved in the table itself.

A property set definition is a group of related properties of the objects and object styles to be reported in the schedule. Once attached to an object or its style, a property set becomes the container for the property data associated with the object. Values for properties are obtained directly from the object or are entered manually for the object or the style. Property set definitions are

AutoCAD Architecture 2016

created and edited in the Style Manager under the Manage tab of the ribbon.

To create a new property set definition, expand Documentation Objects, right-click Property Set Definitions, and click New. Enter a name for the new definition and click Enter. As with the Schedule Table Style, you will want to check which entities your new definition applies to. Now you will want to click on the Definition tab and add Property definitions as needed (see Figure 2). Click Apply and OK when you are finished. Property Set Definitions are added to objects through the Properties palette, Extended Data tab.

A property data format is applied to each definition within a property set definition. Property data formats are created and edited in the Style Manager under the Manage tab of the ribbon. To create a new property data format, expand Documentation Objects, right-click Property Data Formats, and click New. Enter a name for the new format and click Enter. Now, you will want to click on the Formatting tab. Here, you will need to specify how you want the formatting to appear. Fill in all information pertinent to the format you are creating. Click Apply and OK when you are finished.

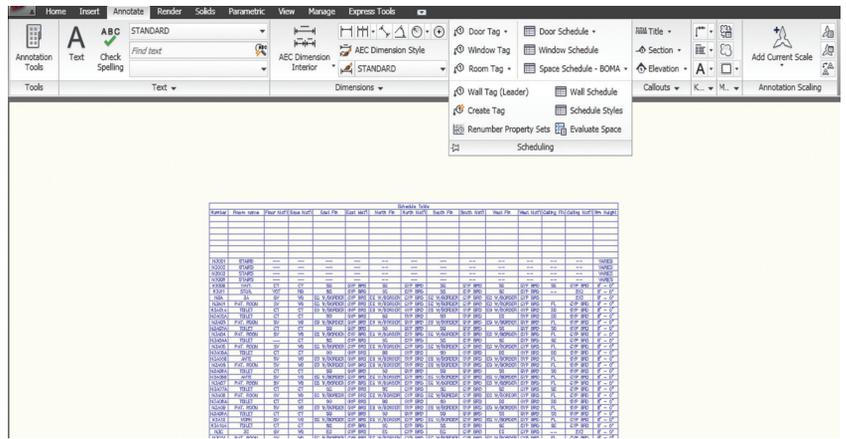


Figure 3: Annotation ribbon

corner of the table, or you can press Enter to scale the schedule table to the current drawing scale (see Figure 3).

If your schedule table contains question marks in any of the cells, the property set definition that contains that property is not attached to an object or object style. Empty cells or dashes within cells indicates that the property set definition is attached, but data is either not available or is not entered for that object or object style.

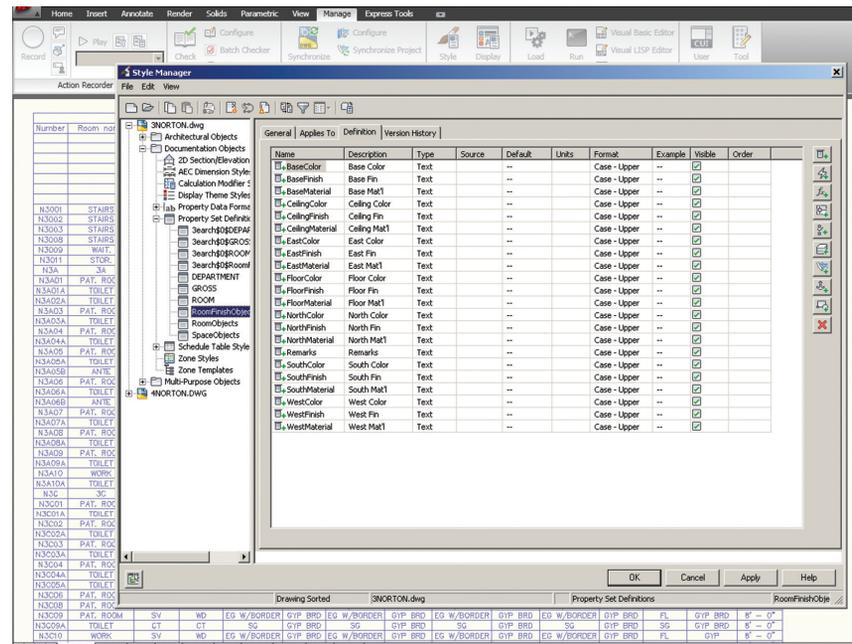


Figure 2: Define a property data format

INSERTING A SCHEDULE TABLE

Begin by opening the Annotation tab of the ribbon or opening your tool palette (depending on where you placed your new schedule table style) and selecting the Schedule Table you created. Next, select the objects you wish to include in the schedule table or you can press Enter to schedule an external drawing. Objects selected that are not of the type specified for the schedule table will automatically be filtered out of the drawing. Next, you will need to specify in the drawing area the insertion point for the upper-left corner of the schedule table and then specify the lower-right

It is important to note that property data formats, property set definitions, and schedule table styles cannot be changed through RefEdit. Changes made through RefEdit seem to work, but the drawing will revert to the previous settings when saved back to the xref file. If you are using an xref file and need changes to be made to the schedule table, you will need to open the xref drawing directly and make changes there.

UPDATING A SCHEDULE TABLE

A schedule table will update changes automatically when the automatic update option is turned on. This option can be turned on by right-clicking on the schedule table style on the Tools palette, and selecting Properties. Under Selection you can choose to Add New Objects Automatically. If, however, the option is turned off, you can manually update a schedule table. To do this, select the schedule table, right-click, and click Update Schedule Table. Please note that when you select a schedule table in your drawing, the Schedule Table Tab appears in the ribbon. Updates and edits can be performed straight from the ribbon! (See Figure 4.)

You can also add objects to or remove objects from a schedule table after it has been inserted in the drawing. All you have to do is select the schedule table, right-click, and click Selection. Next click either Add or Remove, depending on which you want to do. You then select the objects in the drawing that you want to add to or remove from the table and press Enter.

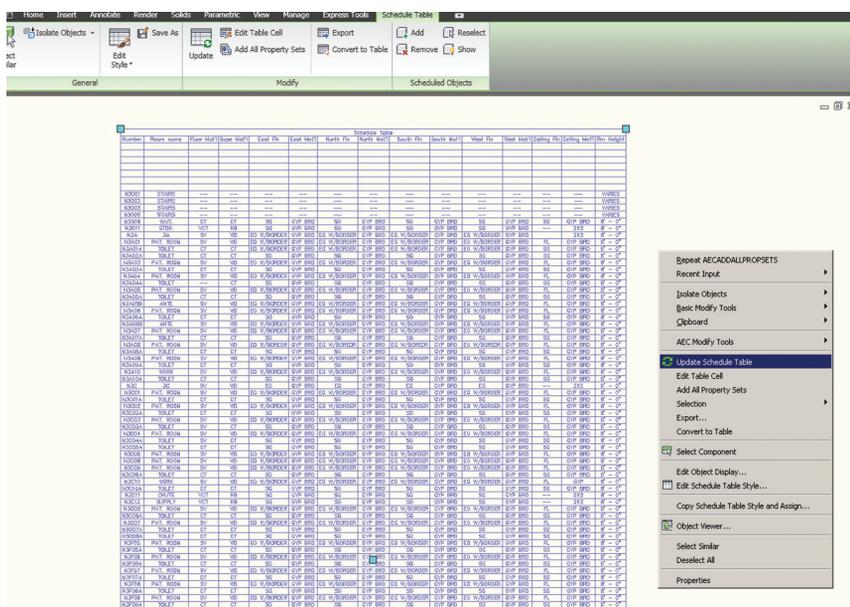


Figure 4: Update schedule table

You can even add hyperlinks, notes, and reference documents to the schedule table. Double-click on the schedule table and then on the Properties palette, click on the Extended Data tab, and expand Documentation. Now click on the icon next to hyperlink, notes or reference documents, depending on which one you wish to add.

CREATING A SCHEDULE TABLE IN A PROJECT

Schedule tables can contain information from external references and block references, which typically must exist in the same drawing as the schedule table. Schedule tables now optionally specify an external drawing, which is scheduled as if it were an external reference in the same drawing as the table. The advantage to this is that the graphics of the external drawing do not need to be generated in order to fill out the data in the table.

To begin, open the sheet to contain the schedule table. Now, open the tool palette that you want to use and select a Schedule Table tool. On the Properties palette, expand Basic General. Select a style and instead of selecting objects in the drawing, press Enter. Specify the insertion point of the schedule table and specify the size of the schedule table. A schedule table with no rows is inserted into the drawing. Select the empty table, right-click, and select Properties. On the Properties palette, expand Advanced External Source. For Schedule External Drawing, select Yes. The External Drawing settings are displayed with a list containing all drawings in the Views directory of the current project. Each drawing should correspond to a view defined in the project. If no project is active, the list contains all drawings in the last directory browsed. Select the view you want to schedule. If the desired external view drawing is not displayed in the list, select Browse and find it.

EXPORTING A SCHEDULE TABLE

You can export the contents of a schedule table to a separate file, such as Microsoft Excel spreadsheet (XLS), comma-separated values (CSV), and tab-delimited text (TXT) files. In order to export to Microsoft Excel format, you must have Excel installed.

To begin, open the drawing file that includes the table you want to export. Select the schedule table and then click the Schedule Table tab, Modify panel, Export. The Export Schedule Table dialog box opens (see Figure 5). Select a file type to Save As. Enter a name for the file or click Browse to select a file and click OK. The Format dialog box opens if you selected an XLS file type for Save As Type. Now, convert the schedule values in the exported file by selecting Use Unformatted Decimal Value or Convert to Formatted Text. It is important to note that the format of values

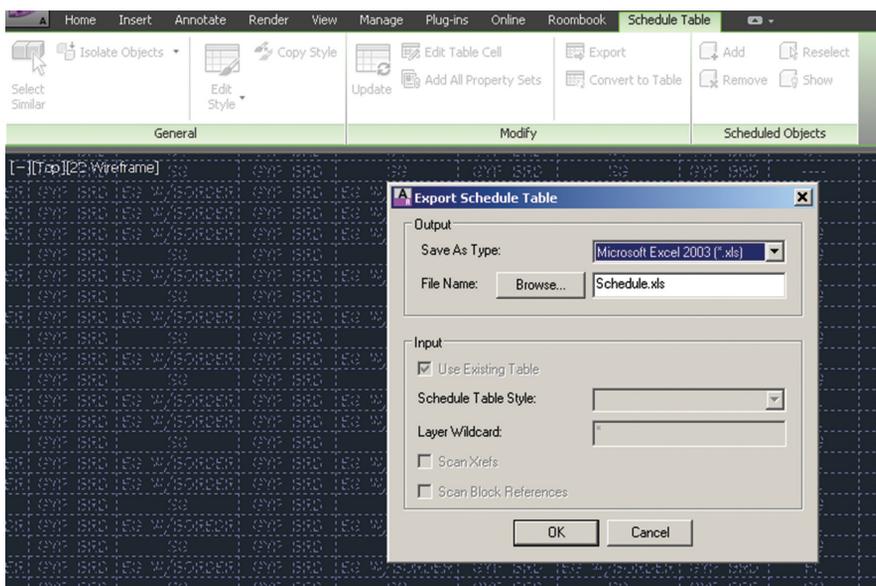


Figure 5: Export schedule table

does not change in the drawing file. Selecting Convert to Formatted Text displays the architectural format (6'-0") in Microsoft Excel. Click OK to format columns one at a time or select Apply to All Columns and click OK.



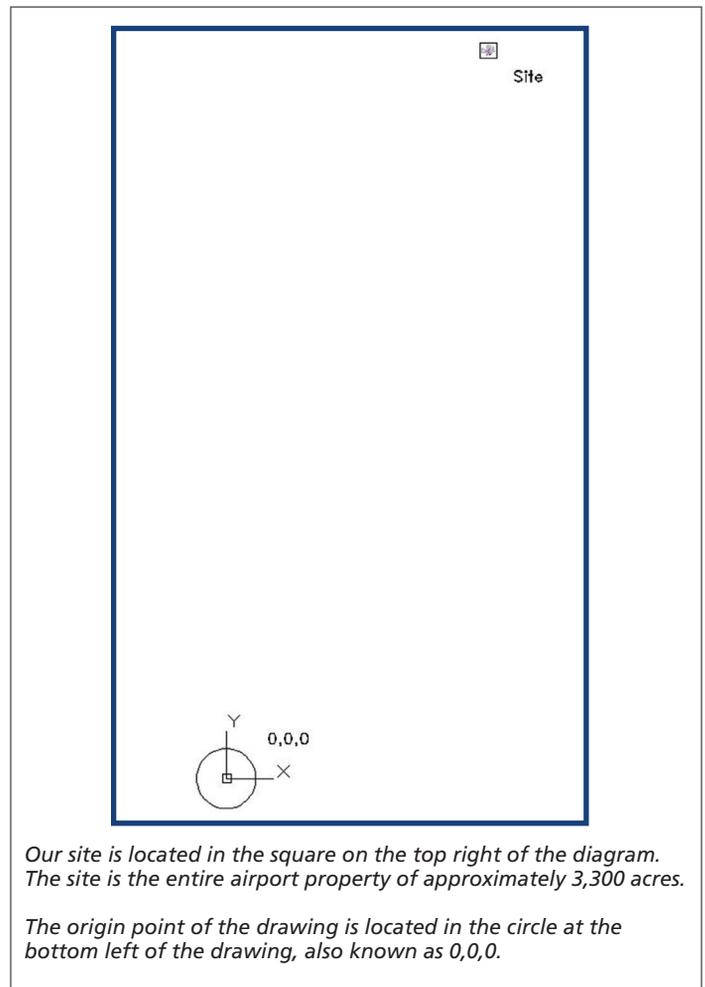
Melinda Heavrin is a CAD Coordinator & Facility Planner for Norton Healthcare in Louisville, Kentucky. She has been using AutoCAD Architecture since release 2000. Melinda can be reached for comments and questions at melinda.heavrin@norton-healthcare.org.

Shared Coordinates and Civil State Plane Coordinates

Understanding shared coordinates can feel like trying to find and unlock the “Dark Web.” You might be better if you just didn’t try. Unfortunately, some of us are forced to deal with things we don’t understand. In this article, I will break it down for you as simply as I can. We’ll also go over the use of shared coordinates with a CAD civil file with State Plane Coordinates—another “black magic” practice—although the two don’t always work well together.

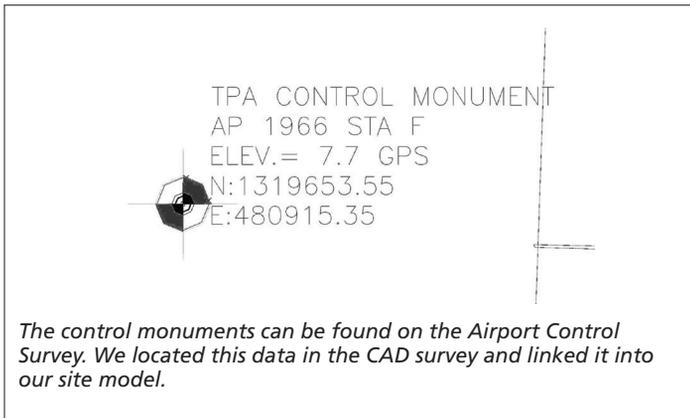
Let’s first start to understand what shared coordinates do for Autodesk® Revit® users and their projects. Shared coordinates are a coordinate system you establish specific to your project and can be communicated by acquiring or publishing to or from a linked model. Sounds simple enough, right?

Okay, so what are State Plane Coordinates? The U.S. Geological Survey defines the State Plane Coordinate System (SPC or SPCS) as “a plane coordinate system (N-S and E-W lines are perpendicular) in which each individual state has from one to six zones, depending on the state’s size and shape.” In other words, State Plane Coordinates are defined points on one of more than 100 Cartesian grids that each overlay all or part of a U.S. state. When you get a SPC civil CAD file (such as a site plan) from the surveyor or civil engineer, open the file and perform a “Zoom Extents” command. You will normally find that there is some minuscule point or marker way off in the distance that makes your site really small. This point is most likely the geo-reference point, and it will be in a different location in relation to your site on each project. The point will normally be located at the origin point or 0,0,0 of the drawing.

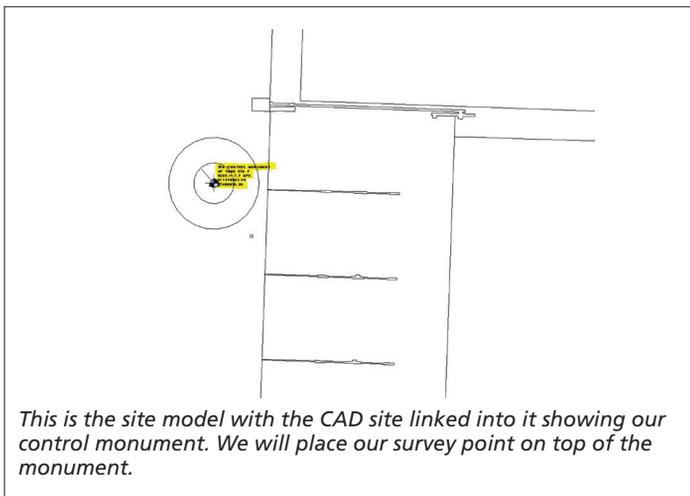


We know that Revit does not like site files or models larger than 20 square miles. You will more than likely encounter this error, and we will discuss this workflow later in this article.

Now, we get to the nitty gritty: Revit's shared coordinates. Due to the size and complexity of the work on my last project, using shared coordinates made the most sense. This was a large-scale aviation project in Tampa, Florida, with 18 different consultant firms and 135 Revit models (10GB of data) exchanged weekly among the team. I first created an architectural site model and linked in a site plan provided by the airport. This file was not geo-located, so it was a perfect start for locating our project using shared coordinates. In this case, we located some of the airport control monuments and designated one of them our shared coordinate point. We also located a second monument and used it as a secondary control point to make sure we had everything dialed in. The control monuments had northing and easting values, which we used to actually locate our project in Revit.



The control monuments can be found on the Airport Control Survey. We located this data in the CAD survey and linked it into our site model.

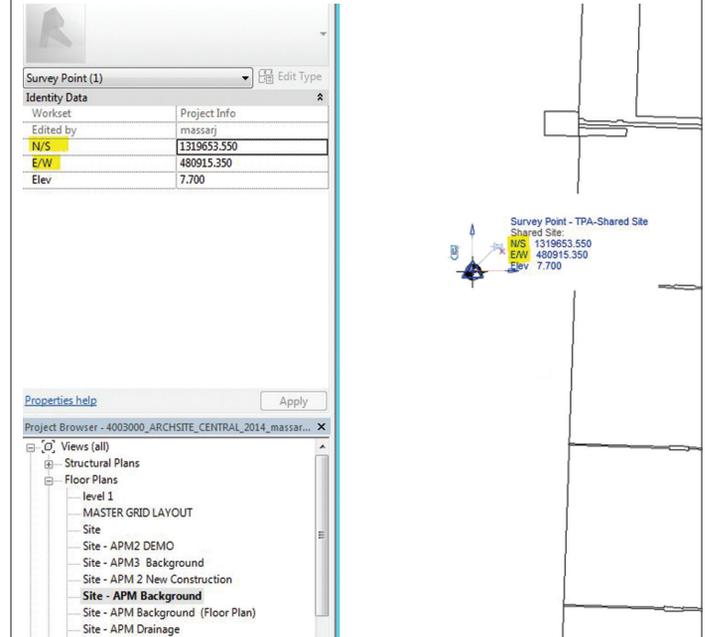


This is the site model with the CAD site linked into it showing our control monument. We will place our survey point on top of the monument.

To clarify, we are setting up our shared coordinates in our ArchSite.rvt model and "sharing" them with the other models. Our project has seven different buildings or structures on one large shared site, so we used the same shared coordinate point for every building, although we could have used a different point with each building. We felt that one common coordinate point would be much easier than seven. Now, back to our process. We have linked in our site plan and found a reference point (airport control monument).

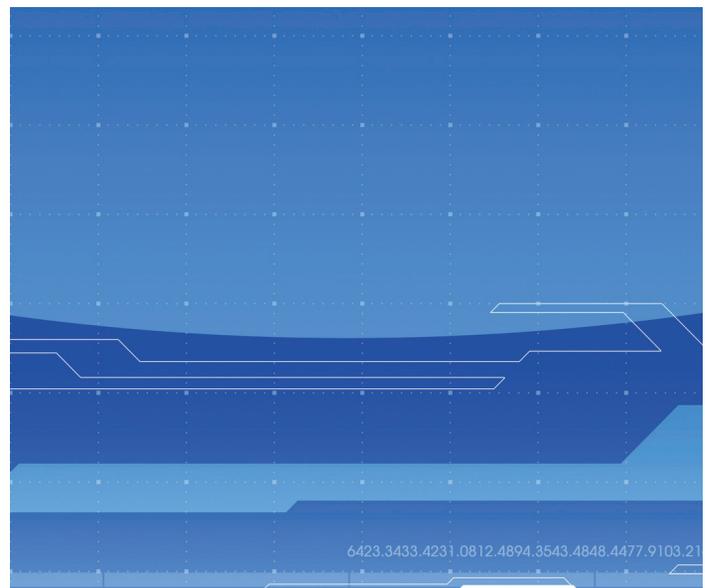
Next, we will place the survey point on our control monument, assign the northing and easting information, and save the location. This will establish our shared coordinates. It is also important to save the location or position of the site. We are actually saving the position of the building even though we have not yet placed our building model on our site.

You will have to unclip the Survey Point in order to record the coordinates.



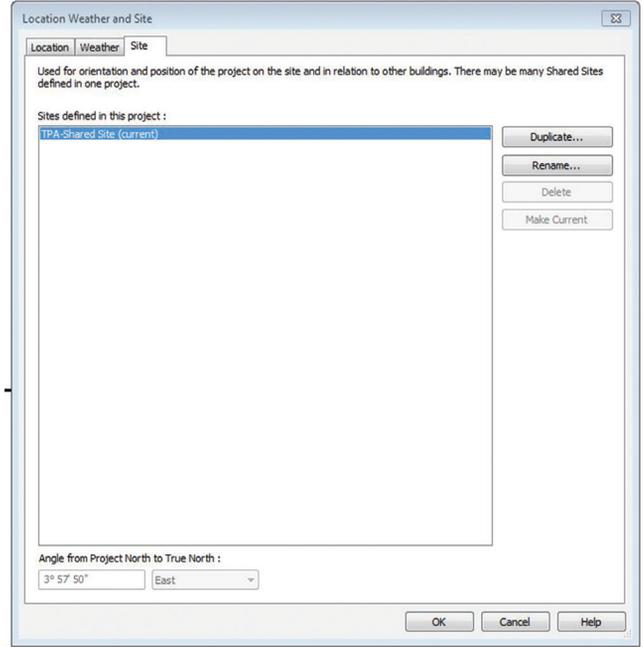
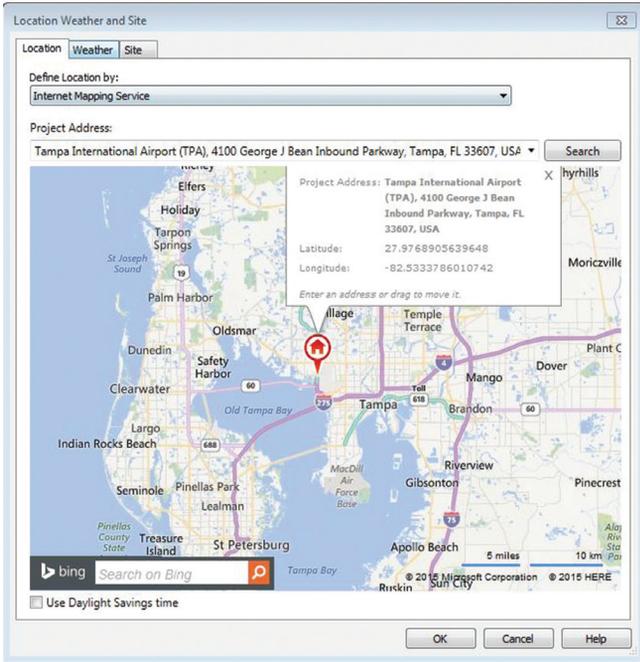
The survey point has been placed on top of our control monument, and we have assigned the northing and easting values and elevation to it.

At this time you will also want to place the project base point. The project base point sets the origin of the model and preserves the position of the building on the site, whereas the survey point locates the project within the physical world. I recommend that you designate a common reference point for the project base point as well.



Revit Platform 2015

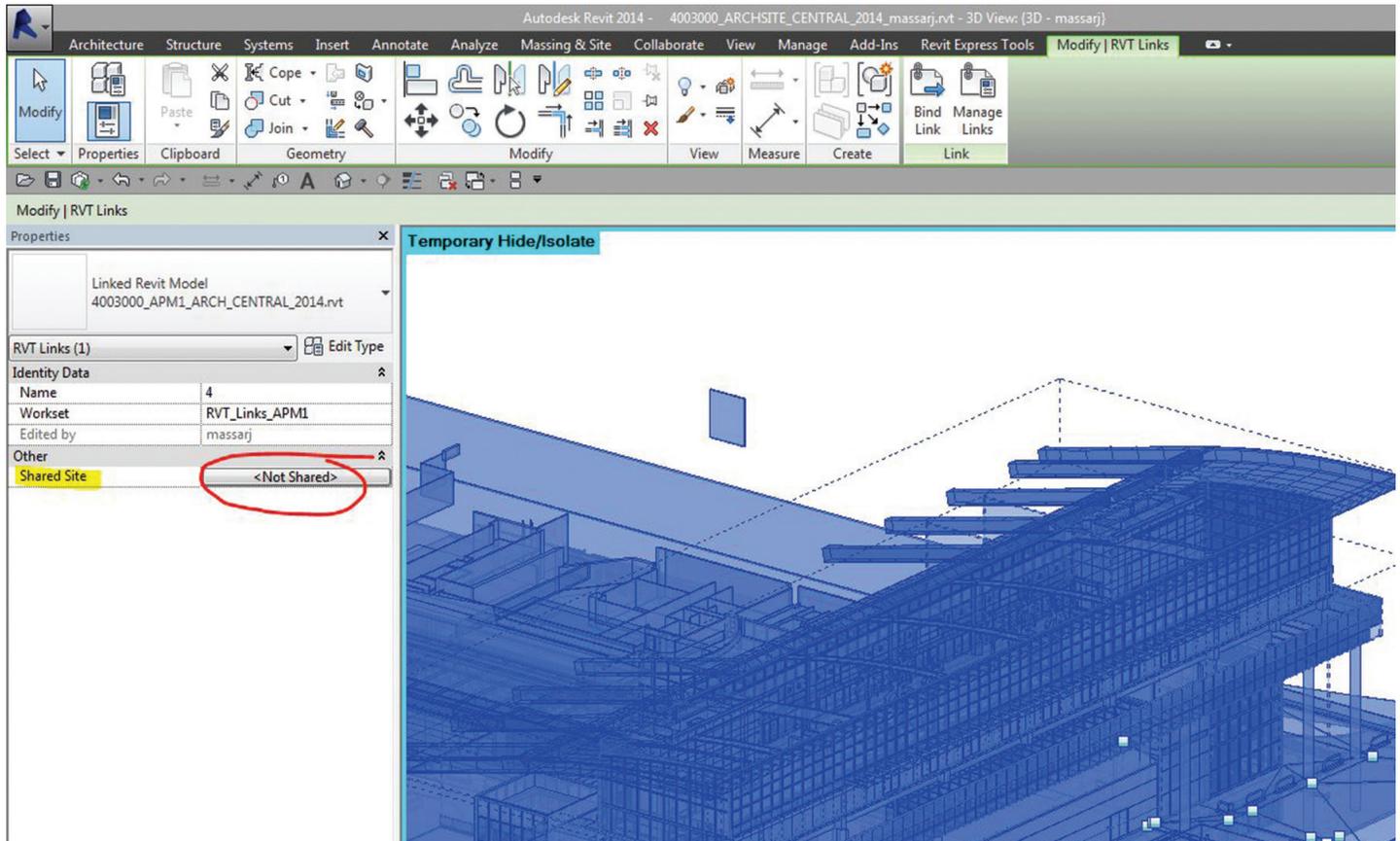
The next two diagrams show the location of the site on the map and the saved location or position.



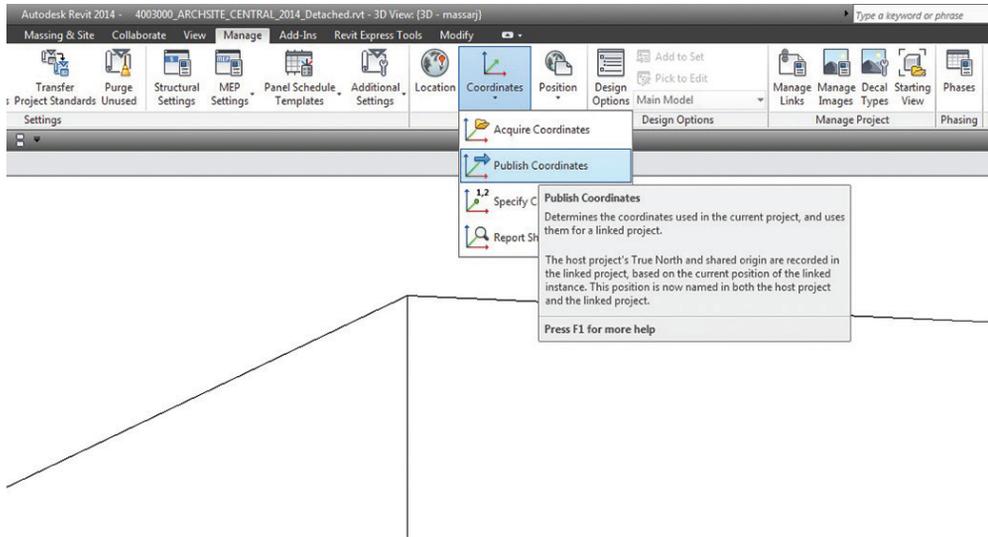
LET THE SHARING BEGIN

Let's assume you already have a building model developed and you are ready to place it on the site. Link your building model into your ArchSite.rvt model and locate it in the desired location. Be sure to also locate it in the Z axis as well. I use Manual Center to place

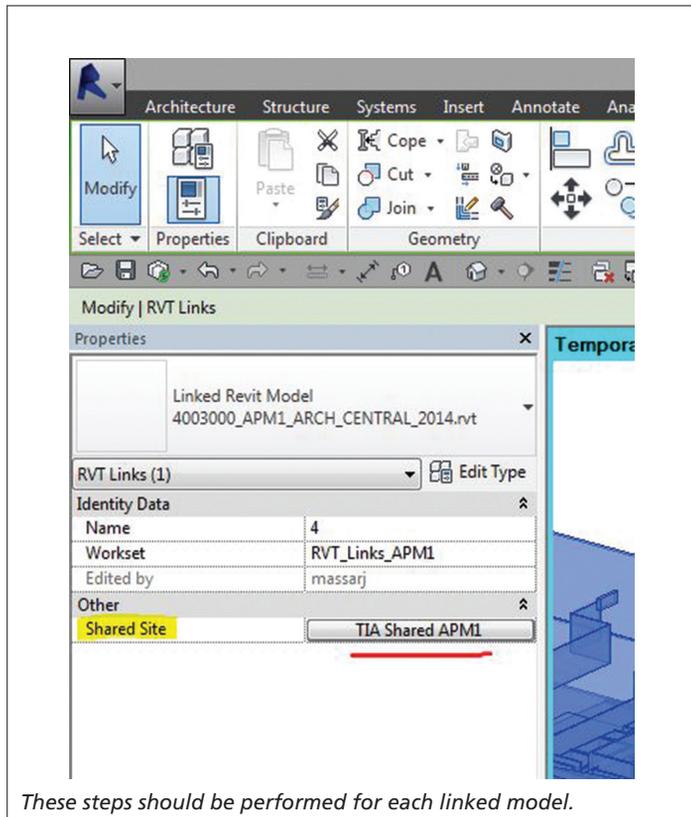
my building and then rotate or position as needed. Once this has been completed, you can now share your coordinates. Select your building model from any view and look at the Properties dialog.



You will see a button in the properties dialog next to Shared Site that says <Not Shared>. This is one of the places Revit displays the shared position of the project. To share the coordinates to the linked model, you will select the Coordinates pull-down, then Publish Coordinates, which can be found on the Manage tab.



The Location Weather and Site dialog will pop up. It will display the current position of the linked project, which will be Internal. I like to rename the internal position to identify that I have designated shared position or coordinates for the linked model. Once you synchronize your project, a dialog will pop up and ask you to do one of three things. In our case, we will select the first option, Save. As the option text states, this saves the position back to the linked file. To confirm the coordinates saved back to



These steps should be performed for each linked model.

my linked file, I normally select the linked file and look at the Properties dialog next to Shared Site to make sure it displays the name of my shared position. We can also open the linked model, go to the Manage tab, and select the Location button and then the Site tab, which will display the project position.

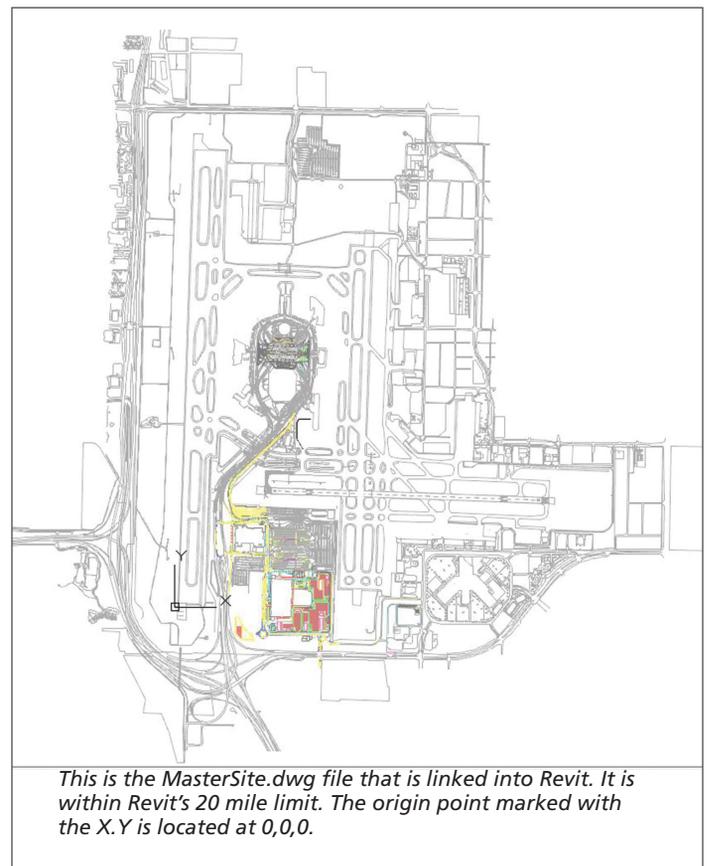
When I create my BIM project execution plan, I typically include some instructions and require that my consulting engineers use my Revit site model to set up their shared coordinates. Before taking this step, double check that your shared coordinates are correct and everything is set up exactly the way you want.

STATE PLANE COORDINATES

If you only need to do shared coordinates and have no need to work with State Plane Coordinates, your work here is done. If you do need State Plane

Coordinates or are just sick and want to continue reading, then by all means let's continue.

As I mentioned earlier, my firm recently used State Plane Coordinates to coordinate with our civil team when we exported our Revit models for a project that contains a 1.4 mile-long elevated train structure with four train stations. Making sure it all fit and was in the correct place was important, to say the least.

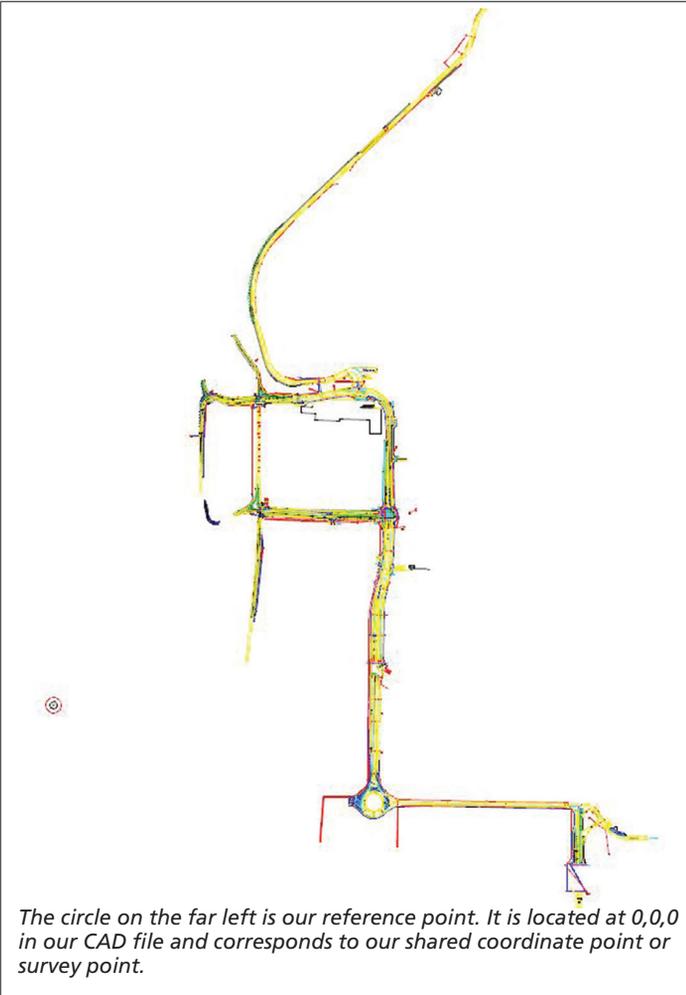


This is the MasterSite.dwg file that is linked into Revit. It is within Revit's 20 mile limit. The origin point marked with the X.Y is located at 0,0,0.

Revit Platform 2015

In your Revit models, locate the Survey Point and mark it with an annotation symbol that will export with the model and show up in the CAD file. This will act as a reference point to help you position everything in the correct place. Next, turn on all the layers in the CAD file that you exported from Revit and move everything until the exported survey point is placed at 0,0,0.

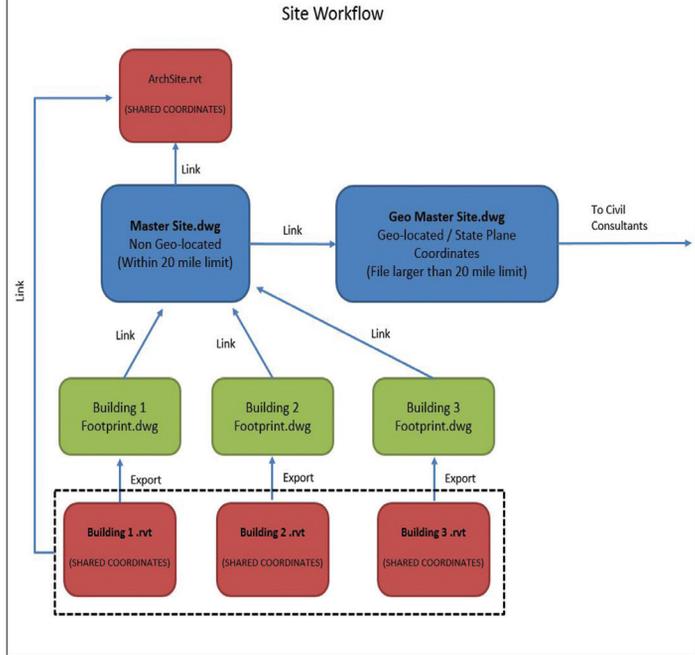
You will need a similar workflow for the other civil files that will be included in your Site Model. In your civil file, draw a circle and enter for the x and y coordinates your northing and easting values that correspond to the shared coordinate survey point. Now, turn on all the layers and move all the CAD data so that your circle or reference point is placed at 0,0,0.



Once all these files are correct, link them into your master site and place the circle or reference point on your located CAD survey point. You still need to make your MasterSite.dwg file geographically correct, so link it into your geo-located survey and share it with your civil team.

Using Shared Coordinates and State Plane Coordinates will help your team keep things consistent with common reference points. Don't forget to check these reference points from time to time to make sure no one has moved them. Autodesk has given us these tools to help establish and locate our projects within the physical world. If that doesn't work you can always try black magic or consult the Dark Web.

The diagram below shows the workflow and file associations for Revit and CAD files that pertain to the Shared Coordinates and State Plane Coordinates workflows.



Jonathan Massaro is a technician with Gresham, Smith and Partners, a leading multi-disciplinary design and consulting firm for the built environment. He has worked in the architectural field for almost 20 years on projects of various size and type ranging from single family homes to airport terminals, and he began working in Revit with Revit Architecture 2009. He was initially hired by G&P to work on some of the first Revit projects for the firm's Healthcare Division. Since January 2014, Massaro has worked in the Aviation Division on projects such as the terminal renovations and expansions at both Fort Lauderdale International Airport (FLL) and Tampa International Airport (TPA). Currently, he is the BIM Model Manager for the firm's new work at TPA, which includes a 2.3 million-square-foot, five-level rental car center with 4,400 ready/return spaces and a multi-level quick turnaround area (QTA). The project also includes a new automated people mover (APM) with three stations along a 1.3-mile guideway system that will take travelers from the baggage claim area in the main terminal to the consolidated rental car center and the economy parking garages.

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REVITEA SELECT TOOLS

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



Everyone knows that Select all Instances means all similar elements in the entire project or visible in the active view. It's one of the popular commands that almost everyone uses daily.

Select all Instances of RevitTea extends the supported elements. It supports almost all elements that you could select in Revit. Select all Instances of RevitTea supports multiple selected elements. You can select multiple elements to find all of their similar elements together.

Inside
Track

**AUGIWorld
brings
you recent
developments
in Autodesk
and related
software
items**

Select All Elements – 3D Models in View: All the 3D model elements visible in the current view are selected. **2D Belongs to View:** In Revit some 2D elements belong to the view such as details and annotations.

Filter Elements – You can filter selected elements—elements visible in the current view or in the project.

Select Hidden Elements – Select permanently hidden elements in the view. You can hide individual elements in a view permanently.

Unhide Elements – Unhide the selected elements in the view if they are hidden permanently.

SWITCH JOIN ORDER

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



To satisfy an industry requirement, it is required that columns (slabs) should join to beams or floors, and beams join to floors in some cases. This tool will analyze the desired models and update the join order effectively between columns versus floors, or columns versus beams, or beams versus floors to guarantee the join order meets such restrictions.

ARCHITECT'S FORMULATOR



<http://apple.co/1kfFRVz>

The ARCHITECT'S FORMULATOR is the perfect tool for any architect, containing 400+ helpful formulas. ARCHITECT'S FORMULATOR combines all the formulas from our Electrical, Carpentry, and Plumbing Formulators. In addition, this product also includes Concrete and Excavations formulas that perform calculations for excavating or filling soil, the concrete required for a job, and the bricks required for a wall. The program also includes special formulas just for architects for concrete and steel design, parking area and sidewalk design, and even swimming pool design, as well as basic formulas for wind load and wind overturning force.

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

THANK YOU!

The AUGI Board of Directors and the Editors of *AUGIWorld* wish to thank the following authors and volunteers for their contributions to AUGI in 2015. The growth and success of our organization would not be possible without the dedication of these talented individuals who share their knowledge with their fellow AUGI members. The editors of *AUGIWorld* wish everyone a wonderful holiday season and a happy new year. See you in 2016!

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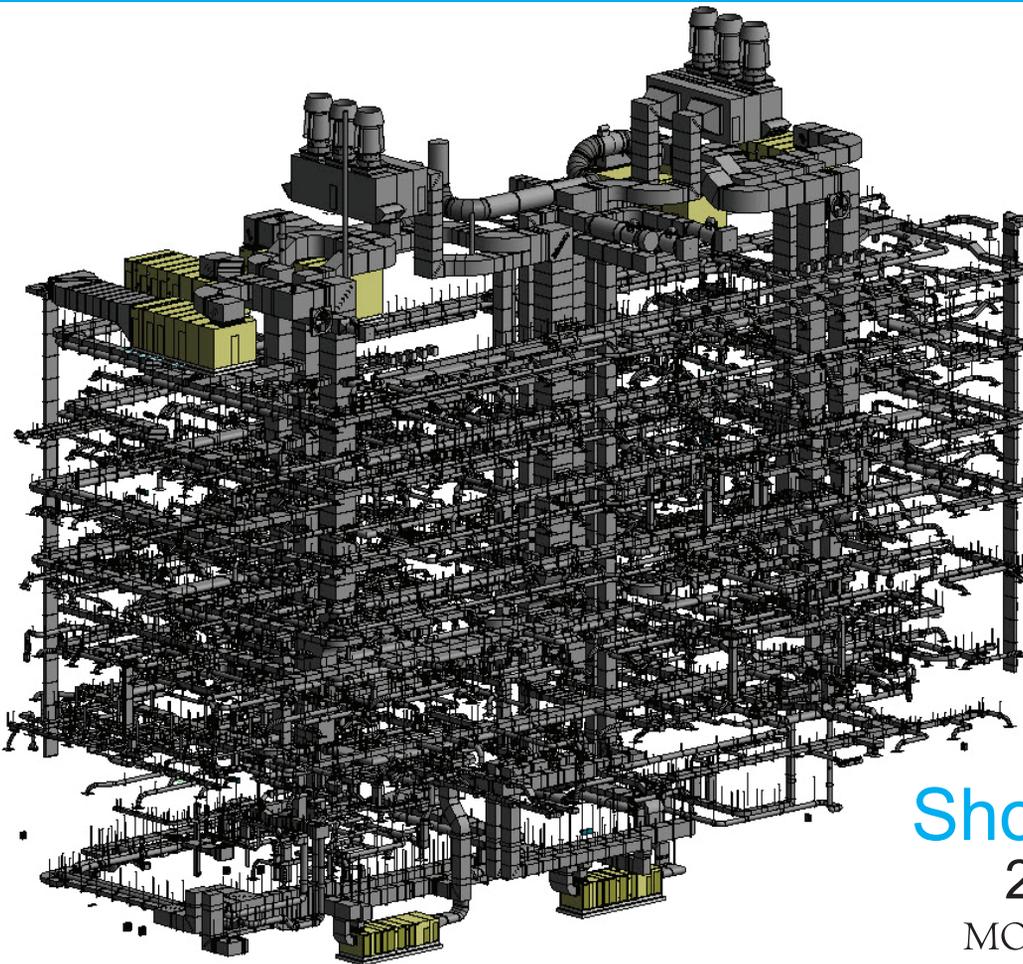
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MODEL OF THE YEAR

MEP Design Team

- 1 Mechanical Piping
- 1 HVAC Duct
- 1 Electrical
- 1 Med. Gas and Domestic water
- 1 Plumbing

9 Month Detailing

Design team coordinated the MEP systems: Condenser water, Chilled water, Steam & Condensate, Acid Waste, Med Gas, Domestic Plumbing and HVAC

BIM Field Tablet PC's

Foreman tools included Motion R12 Rugged Tablet PC's to view Spools printed to 24x26" PDF Sheets. 3D models are viewed with Navis software on a 12.5" Wide Display in Full-HD Resolution (1920x1080) with Windows 8.1



16,792 Layout Points

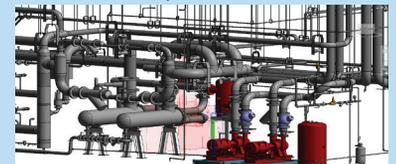
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