# AUGIWorld

# Revit Implementation: Workflow Tricks

*Also in this issue:*

- **CAD Management**
  **Managing More Than CAD**

- **Wrangle Your Data with Autodesk**
  **Vault**

- **3ds Max:  Making the Virtual Real**

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# Editor's Note

Hello Autodesk user! So for this issue of *AUGIWorld* our focus is centered on management. Our authors take a stab at this very difficult subject from their various perspectives. Lets break it down!

Curt "Fung Fu Drafter" Moreno unveils a bit more about managing AutoCAD in the CAD environment. In today's world, there is a new cat in town and you need to keep it happy! Melinda Heavrin is showing how to find light at the end of the standards management tunnel when using AutoCAD Architecture. It isn't just about layers anymore. Christopher Fugitt goes crazy managing AutoCAD Civil 3D object styles and templates. The first step is how to break up the design!

In this issue James Salmon continue to uncover the Built – BIM to FM mystery, this time expanding on procuring integrated services. Sit down when reading it, though, he has a lot of acronyms! Then we have Michael Smith figuring out how to organize around using Autodesk Navisworks for BIM coordination. Have a clash and a meeting!

Then we dive into Revit with Ibrahim Hakki who takes on implementation issues surrounding Revit Architecture. Find out why you need to use it before you lose it! We then have a tag team in John Evans and Jon Landeros, who wrestle Inventor data with Autodesk Vault. If you have not looked into Vault, you need to read this. David Raynor doesn't mince words, organize first when using Revit MEP. His version of freedom is all in the organization.

Eric Lewis again brings the latest services and products coming out in the Autodesk community, eTransmit lives! Then we have Aaron Maller who shows us his tricks of the trade for workflow when using Revit Structure. It isn't all code! After that we get visual with David Munson, who brings the virtual real when using 3ds Max Design. Pretty renders always rock! And of course you need to stay informed via Heads Up! William Troeak has been out hunting the latest updates and patches and brings them to the table for you!

Our Autodesk Insider this issue is Steve Bedder, who hails from the manufacturing area of Autodesk in the UK and Ireland. He is an active blogger and a long time Autodesk'r, this dude is kewl! That's "cool" for you newbies. We then round out the issue with Beth Powell and her part two of AutoCAD MEP implementation. We are getting out of the MEP box this time!

So what else is going on? Still more! We have a few changes and additions in the Content Managers area. Lonnie Cumpton is sliding over into Revit Platform, focusing on topics that apply to all flavors of Revit. He is being replaced by Jay Zallan as the Revit Architecture CM. And we are adding Scott Ebert as the Revit API (application programming interface) to bring topics related to customization to you. Lastly Curt Moreno is taking over for Brian Benton as AutoCAD Content Manager. Brian is now focusing on *AUGI HotNews* and has handed his 'seat' to a very capable volunteer.

Okay, that's it for July! You salivating yet? Then go on, read away…go get your fill.

*David Harrington*

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product focus

# CAD Management Managing More Than CAD

**S**o it has come to this. After years of hard work and being a team player, you are the new CAD manager! You have finally moved into a position where you can help your coworkers have a better workplace and you can start to make a difference. Let the old regime of terror and cruelty be forgotten and make room for your new regime of terror and cruelty. Well, maybe a little less terror and a lot less cruelty. There's a new CAD manager on the block!

### THE NEW CAD MANAGER

Now that you are the CAD manager, there are some important things to take care of before you can settle into the big seat. In some offices, there is a long competitive process to choose a new CAD manager among several applicants. In other offices the new CAD manager is as surprised as anyone by the promotion. However it happened, you are now the manager and that means someone else who wanted to be the CAD manager is not. Not addressing this important person who almost had the position is a bad idea.



*Being the new CAD manager doesn't mean you can rest on your laurels!*

Do yourself a favor and take some time to let everyone else know you appreciate his or her support. Remember, your old coworkers are your new support staff. Treat them as valuable team members and let them know that you are still the same person you were before. Sit down and have that morning cup of coffee with your CAD friends and go out to lunch just as you did before. Let your former coworkers know that your move up does not mean that you have moved on.

### BEING THE BOSS

While it is important to keep ties to your former coworkers, eventually the time comes when you have to be the boss. As the new CAD manager, a huge part of your job is going to involve the delegation of work. You have to assign work to people, have them perform tasks, or ask for any number of other things to keep the CAD department moving forward. But don't forget, when asking someone to do something, do just that—ask.

You will be amazed how far a simple "please" or "can you do me a favor" will get you. Remember how you did or did not appreciate being treated when you were asked to do something. Everyone appreciates a little common courtesy. Treat your support staff with respect and show them you are willing to get your hands dirty to

get the job out the door. Your former coworkers will respect you as a CAD professional and as the new CAD manager even more for it. Always remember, your attitude is the beginning of the CAD department morale.

If your office does not have a weekly general staff meeting, or even if it does, a weekly CAD department meeting can be a great thing. A great many business professionals—Seth Godin, for example—advocate "frequent and immediate" feedback. By giving coworkers feedback soon after a task is completed it is easier to relate that input to the task at hand. This sort of frequent interaction can help improve the efficiency of the work being done and help with department communication.

A weekly CAD meeting is a great way to let the rest of the CAD department know what is going on, what jobs are coming up, and to share thoughts and ideas in general. This could be the best 15 minutes a week you can spend as a new CAD manager.

> **Being the peacemaker can be a hard job. That is probably why they nickname a revolver "The Peacemaker."**

### BEING THE PEACEMAKER

Every office should work as a well-oiled machine, with each person doing his or her part to make things work smoothly. In most cases, things will work just fine and everyone in the office will go about their business blissfully. But there will come a time when you have to pay attention to some parts of the machine because they just aren't playing nice. Being the peacemaker can be a hard job. That is probably why they nickname a revolver "The Peacemaker."

Don't wait until things have escalated to a point where people can no longer work alongside one another. When you first begin to notice a problem, try to pay close attention. CAD professionals are grown adults and will usually settle matters just fine among themselves. However, should animosities linger more than a day or two, it's time for the CAD manager to get involved. Sit down with the involved parties and listen to each side. Try to be fair in resolving a little squabble. Look for a solution that is going to make everyone at least somewhat happy while not playing favorites. When it's all done you should have team members who are getting along (at least a little better) and everyone should understand that they are an important part of the team.

### YOU WORK FOR THEM TOO

Being the CAD manager isn't all about sitting at the big desk or getting the office. No, there are plenty of small things that have to be addressed for any CAD department to run smoothly. From managing time off to asking people to work overtime, the workflow requires constant attention and adjustment.

Above we mentioned the benefits that can come from "frequent and immediate" feedback. We also mentioned CAD department

meetings. When a good CAD manager combines these practices it becomes apparent that he or she works for his support staff as much as they do for him!



*Meeting with your CAD department is the best way to stay on top of tasks and projects.*

You should take the time in your CAD department meetings to hear what is helping or hindering the individuals on your staff in completing their goals. Maybe one drafter says he could not finish the cross-sections sheets because the topo survey never came in. Perhaps another drafter could not send out production plan sets because there was no toner in the plotter.

As the CAD manager, you should discover what your drafters need in order to complete their work, and then you have to make those things happen. Call the surveyor and find out where the topo is. Call the supplier and get the toner for the plotter delivered ASAP. Remember that your work for your support staff as much as they work for you! By working together, your CAD department will reach new heights of productivity.

Being the CAD manager can be a great achievement for the veteran CAD professional. Adding the complex tasks of work delegation, project delivery timetables and personnel management could be just the challenge for the CAD professional who thinks he has seen it all. Whether you applied to be the CAD manager or the position just fell into your lap, make the most of your new position. Take a few chances, make a few changes, and turn the CAD department into *your* CAD department. But, most of all, remember CAD management is about managing more than just CAD.
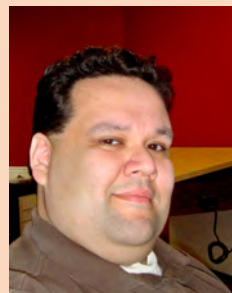


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# CAD Standards Management

The management of CAD standards is very important in AutoCAD® Architecture. "Why?" you ask. Look at this scenario: a client contacts you to obtain structural drawings for a pedway that was originally constructed 15 years ago. The pedway has a structural crack and information is critically needed. If you don't have filing standards in place, finding these drawings can be difficult. For a situation like this, you need to put your finger on the drawings ASAP! This is where an excellent system of standards comes in handy. And this is just the filing side of things!

CAD standards also bring uniformity to a world that would otherwise be in chaos. For this reason alone, they should be applied everywhere. It is important in the ACA world to use CAD standards; otherwise the same floor plan could take on many different forms and be confusing for an end user. Some CAD managers write their own standards; others use standards that are already available, such as AIA or NIBS. Some of the areas where standards are needed are:

+ File / Folder Names
+ Drawing Title Block Arnames
+ Layer Names, Colors, Linetypes
+ Dimension Styles
+ Text Fonts & Sizes
+ Drafting Symbols
+ ….and many more

## DRAWING TITLE BLOCK NAMES STANDARD

Standardizing drawing names optimizes file management, making it easy to use, store, and search. It is important to implement a system that works for you and enforce this for every drawing created within your organization. The first step in setting up this standard is to select a letter to represent each design discipline. The ones I use are as follows:

| A | Architectural |
|---|---|
| E | Electrical |
| F | Fire Protection |
| L | Landscaping |
| M | Mechanical |
| O | Equipment |
| P | Plumbing |
| S | Structural |
| X | Other Disciplines |

I use the above list for my layer standards, as well. Next, add a hyphen and then a number to designate the sheet type. Last, add a period and then a number indicating the number of the drawing within the set.

| 0 | General (symbols legend, notes, etc) |
|---|---|
| 1 | Plans (horizontal views) |
| 2 | Elevations (vertical views) |
| 3 | Sections (sectional views, wall sections) |
| 4 | Large-Scale Views (plans, elevations, stair sections) |
| 5 | Details |
| 6 | Schedules and Diagrams |
| 7 | Furniture |
| 8 | User Defined |
| 9 | 3D Representations |

For example, if you were naming an architectural drawing showing details and it was the second detail drawing, you would name it A-5.2.

You can also take this system further and standardize the folder names in which you save your drawings. For example, I have many buildings on several different campuses for which I maintain drawings. I have a folder for each campus. Within each campus folder is a folder for each building on that campus. I think you see where I'm going with this. If you implement a system that works for your organization, then searching for needed drawings is as easy as pie!

## CREATING LAYER STANDARDS

Layer standards are an excellent organizational tool for a drawing. Is the US National CAD Standard Version 3.1 (the one I use and am the most familiar with), the layer name format is organized as a hierarchy. Within this hierarchy, there are four defined layer name data fields:

- Discipline Designator – This is an alphabetic-character field that designates the discipline associated with that layer. The list I use is the same as the one I listed previously. A second optional letter can be used to further define the discipline character.

- Major Group – This is a four-letter alphabetic-character field that designates the major building system to which the layer applies. For example, wall, door, glaz, and so on.

- Minor Groups (can be 1 or 2) – This is an optional four-character field that further defines a major group. For example, A-GLAZ-INTR for interior glass.

- Status – This is an optional single-character field that distinguishes the data that the layer contains. For example, an N would represent New Work or E would represent Existing To Remain.

Each field is separated by a hyphen for clarity. For this particular CAD standard, the Discipline Designator and Major Group are mandatory, whereas the Minor Groups and Status are optional.

Once layer names have been created, be sure to finish the layer standards by designating color, linetype, lineweight, and transparency for each layer (see Figure 1).



Figure 1: Layer standards

## CREATING A CAD STANDARD FILE

Once you have created your standards, let's look at how to create and implement CAD standards files in ACA using the Manage tab of the ribbon. To begin implementing CAD standards in ACA, you must first create a CAD Standards File. To do this, begin by opening a new drawing. Next, you need to establish the desired settings for layers, linetypes, text styles, and dimstyles. You may also have your standard Title Block included in this drawing. Finally, you must save it as a Drawing Standards file by changing the file type to *.dws (see Figure 2). You can do this for each type of drawing you will be creating, for example, architectural, electrical, mechanical, and so on. You can also contain everything within one drawing.



Figure 2: Saving drawing standards file

## CONFIGURING CAD STANDARDS

Now that you've created your CAD standards file, you can associate that file with any drawing you are working on. Users should be required to do this prior to beginning any new drawing to maintain consistency throughout all drawings. Under the Manage tab on the ribbon, go to the CAD Standards panel and select Configure (see Figure 3). A dialog box will open showing two tabs: Standards and Plug-ins. Select the Standards tab. Here you will find displayed any information regarding the standards files associated with the current drawing, once they have been added.

To add a standards drawing, click Add Standards. This will bring up the standard Windows dialog box for selecting a file. Find the file you wish to use, select it, and you will see that it's added to the list.

Multiple drawings can be added to the list; however, the order in which they appear is very important. If a conflict arises between multiple standard files in the list, the standards file listed first takes precedence. To rearrange the position of the standard files, highlight the file to be reordered and click Move Up or Move Down.

The Plug-ins tab will list and describe the standards plug-ins that are installed on the current system. One will be installed for each of the named objects where standards can be defined. You can specify which of the plug-ins you wish to use when you are auditing a drawing by selecting plug-ins from this list.

The Settings dialog box under Configure Standards gives you additional settings for your standards (see Figure 4). You can choose to Automatically Fix Non-Standard Properties. When this item is checked, all of the properties of the objects with identical names will change to match the settings in the preferred file. You can also choose to Show Ignored Problems. When this is checked, it will show previously ignored problems when you perform subsequent standards checking. The login name of the person who previously checked it as ignored will be shown in the Check Standards dialog along with the problem associated with the item. There are a few notification settings you can choose from as well, including the ability to Display alert upon standards violation. Feel free to play with these settings and see what works best for both you and your employees.
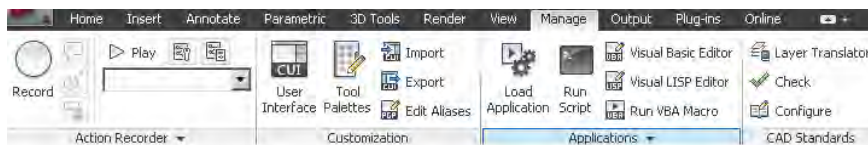


Figure 3: Ribbon Manage tab
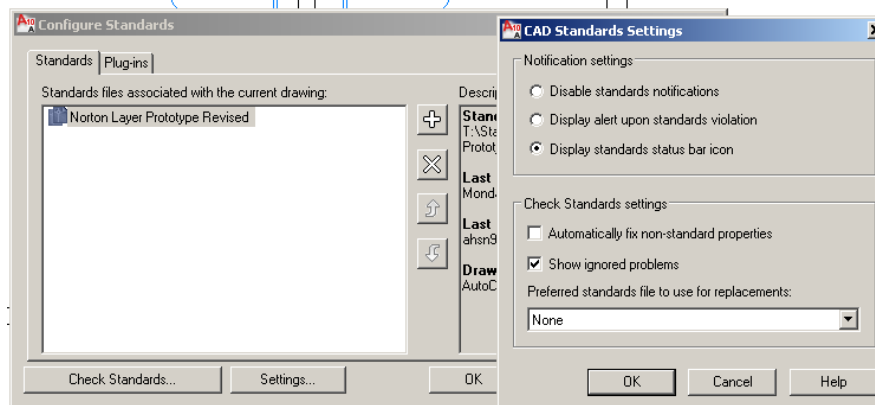


Figure 4: Dialog box with Settings

## CHECKING CAD STANDARDS

Once a standards file has been associated with the current drawing, the process of auditing the drawing for standards violations can begin. This can be done immediately from the Configure Standards dialog box by clicking Check Standards. The Check Standards dialog box is divided into three main areas: Problem, Replace With, and Preview Of Changes. Each of these interacts with one another (see Figure 5).

The Problem area of the dialog box will display a description of a non-standard object found in the current drawing. The Replace With area of the dialog box will list possible replacements for the current standards violation. These replacements are the settings from the standard file you created and inserted into the new drawing. If there is a recommended fix available, it will be preceded by a check mark. If there is not a recommended fix available, no items will be highlighted in the Replace With list. The Preview Of Changes area of the dialog box will indicate the specific properties of the non-standard object that will be changed if the fix that is currently selected in the Replace With list is applied. You may also choose to check the box Mark This Problem As Ignored. When you do this, the login name of the user will be recorded with the fact that the problem has been ignored.

In some instances, you may want to move on to the next problem without applying a fix to the current problem. To do this, you simply need to click Next. In this case, the problem will be shown in subsequent standards checks if it is not marked ignored.



Figure 5: Check Standards dialog box

## THE LAYER TRANSLATOR

The Layer Translator is another tool that helps you manage your drawings by allowing you to manage your layer scheme. It allows you to specify the layers in the current drawing that you wish to translate as well as the layers to which they will be translated. I have found this to be ex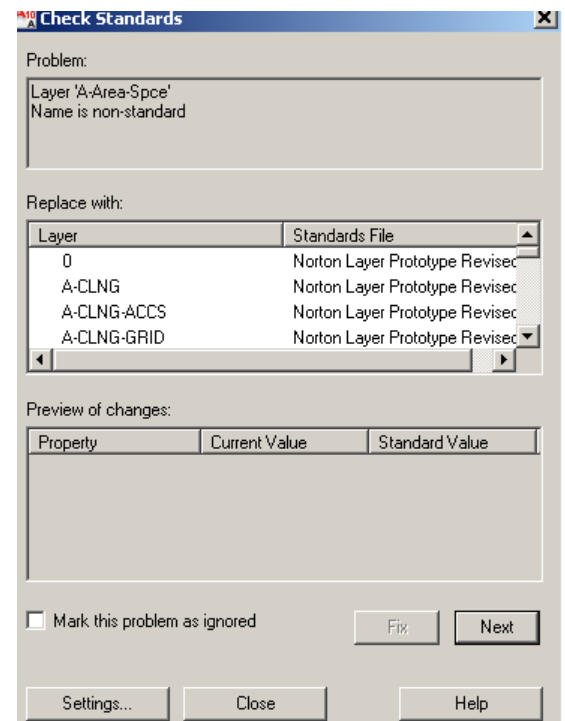tremely useful in incorporating as-built drawings from architects into my drawings. I can translate their layers into the layers I'm familiar with and vice versa.

The Layer Translator can be found under the Manager tab of the ribbon, under the CAD Standards panel. Once it has been selected, a dialog box will appear that has the current drawing's layer scheme shown (see Figure 6).

Load allows you to load layers in the Translate To list using any drawing file, CAD Standards file or drawing template file. You can also create a layering scheme from scratch in which you can enter a new layer name and assign a color, linetype, and line weight to the layer by clicking New.

Transfer From will specify the layers that are to be translated in the current drawing. Layers can be specified through selection in the Translate From list or by supplying a selection filter. You will see a layer icon to the left of each layer name. If the icon is white, then the layer has not yet been referenced in the drawing. If the icon is dark, then it is referenced in the drawing. The Translate To list box will show you all the layers that are available for translating to and can be created from more than one drawing or from scratch.

Map is a handy tool in that it maps the layers that are selected in the Translate From list box to the layer selected in the Translate To list box. Multiple layers can be selected with this feature. With the Map Same button, no selection is needed, however. It will allow you to map all the layers that have the same name in the two lists and update them to the same properties of the layer listed in the Translate To list. The Layer Translation Mappings list box shows each layer that is to be translated and the properties associated with each layer conversion. Here, you can select layers and edit properties by clicking Edit.

You will also notice the Settings button at the bottom left of the dialog box. This is where you can specify to translate objects in blocks, force object color to ByLayer, etc. Be sure to check the settings to make sure that everything is as you want it.

Once all the mappings have been set up, click Translate to finish translation of the layers you have mapped. The mapped new layers and their properties will replace the old layer names and their properties. If you have not mapped some of your old layers to new layers, they will be left as they were.
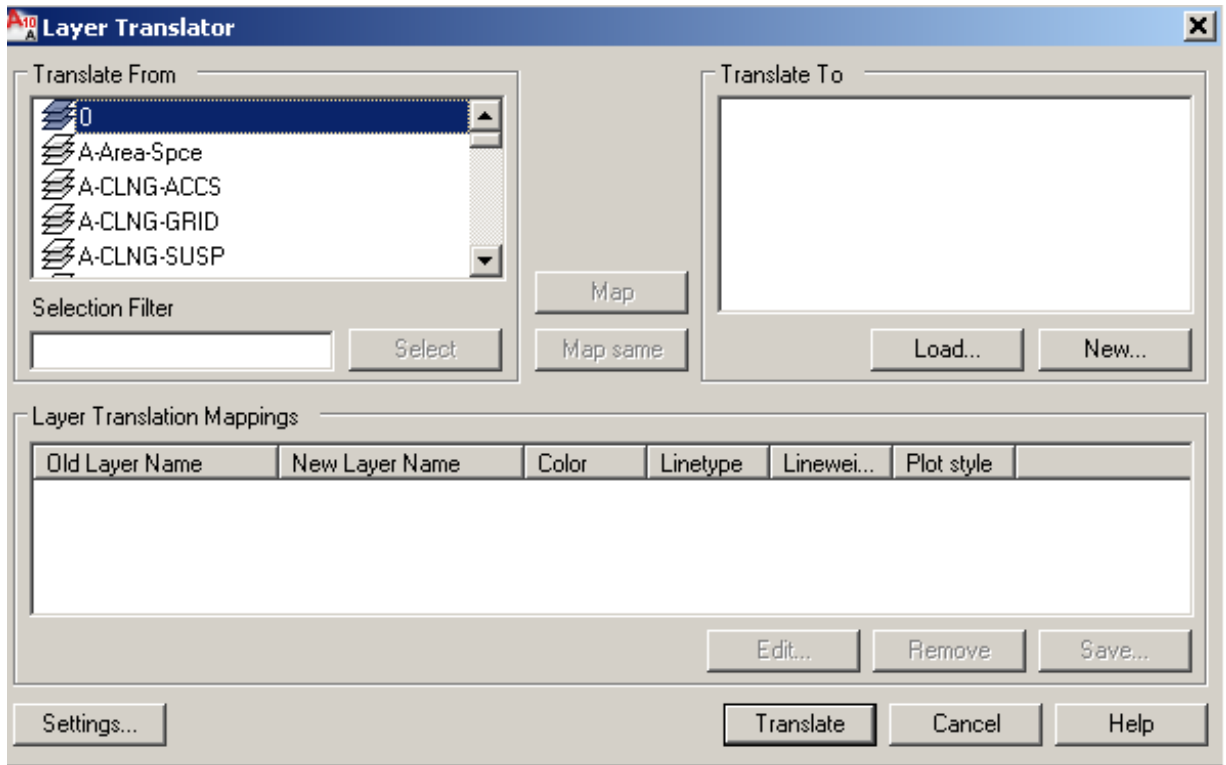


Figure 6: Layer translator

## TO CONCLUDE

CAD Standards are essential to daily CAD life. Only a portion of possible standards have been discussed here. It is important to find what works for you and your company and ensure that the standards are implemented and enforced. Organization is a good thing… embrace it!

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

# Crazy for Management



## INTRODUCTION

The first thing that comes to mind when I think about AutoCAD® Civil 3D® is not the word Management, but it really should be. Using Civil 3D is all about management. From managing object styles to label style to managing data shortcuts on projects, Civil 3D really makes you work to bring a plan set together. Granted, it's easier than with previous Autodesk software solutions, but it still takes some work to manage all of the components of a design. Before you start a project, you should really think how you are going to deliver it.

## CIVIL 3D OBJECT STYLES

Civil 3D Object styles control how Civil 3D will show the object data. It's a good idea to create a template for the project's use, if you haven't already. Take the time at the outset to make sure all the styles that are most likely going to be used work with the pen styles. There's nothing worse, in my opinion, than cutting sheets for plan set only to have to go back through and modify the style for each and every drawing because the objects don't print correctly. This is especially important if the client is requiring you to use their pens.

If you have a nitpicking engineer who likes to see the plans just so, take the time to do the first sheet, get approval, and then go through and cut the sheets. This way you know ahead of time what needs to be changed. Going back through the plan set certainly is possible, but I always
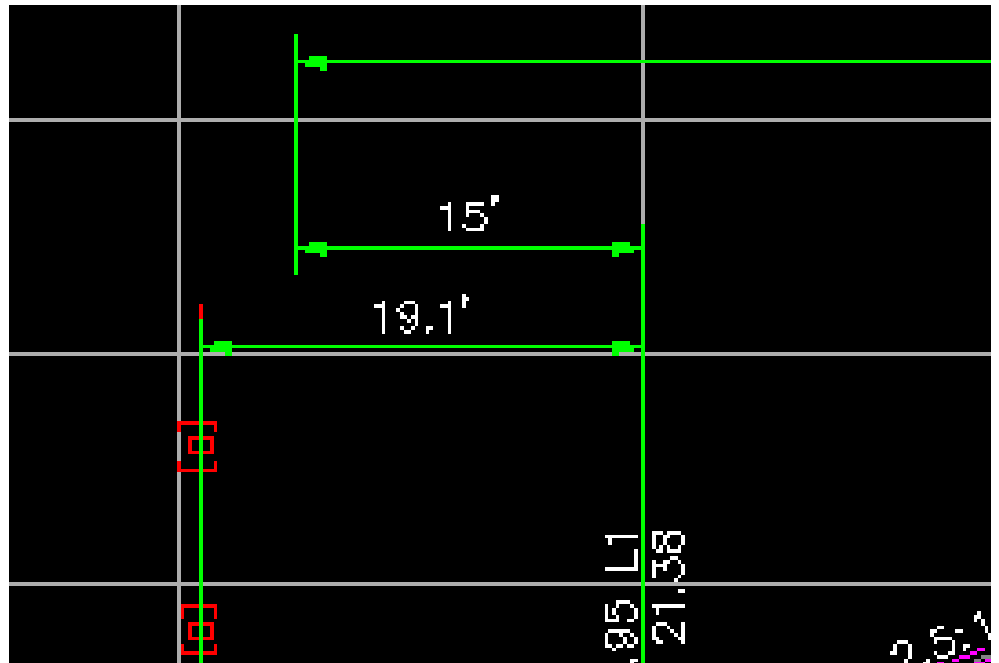
seem to miss a sheet. With the new style management tools available in AutoCAD Civil 3D 2012, it takes less time to apply the correct object styles, but it still a time waster that should be avoided.

## CIVIL 3D LABELS

Labels are probably the most important part of a project; they can also be the most troublesome to manage. In the past, I've worked in an area of the world where the information required to be shown on the plans took numerous label styles. It was always frustrating to copy the label style from drawing to drawing and try to remember where the correct style was located. The numerous label styles caused management problems because I really never wanted to hunt through a list of label styles.
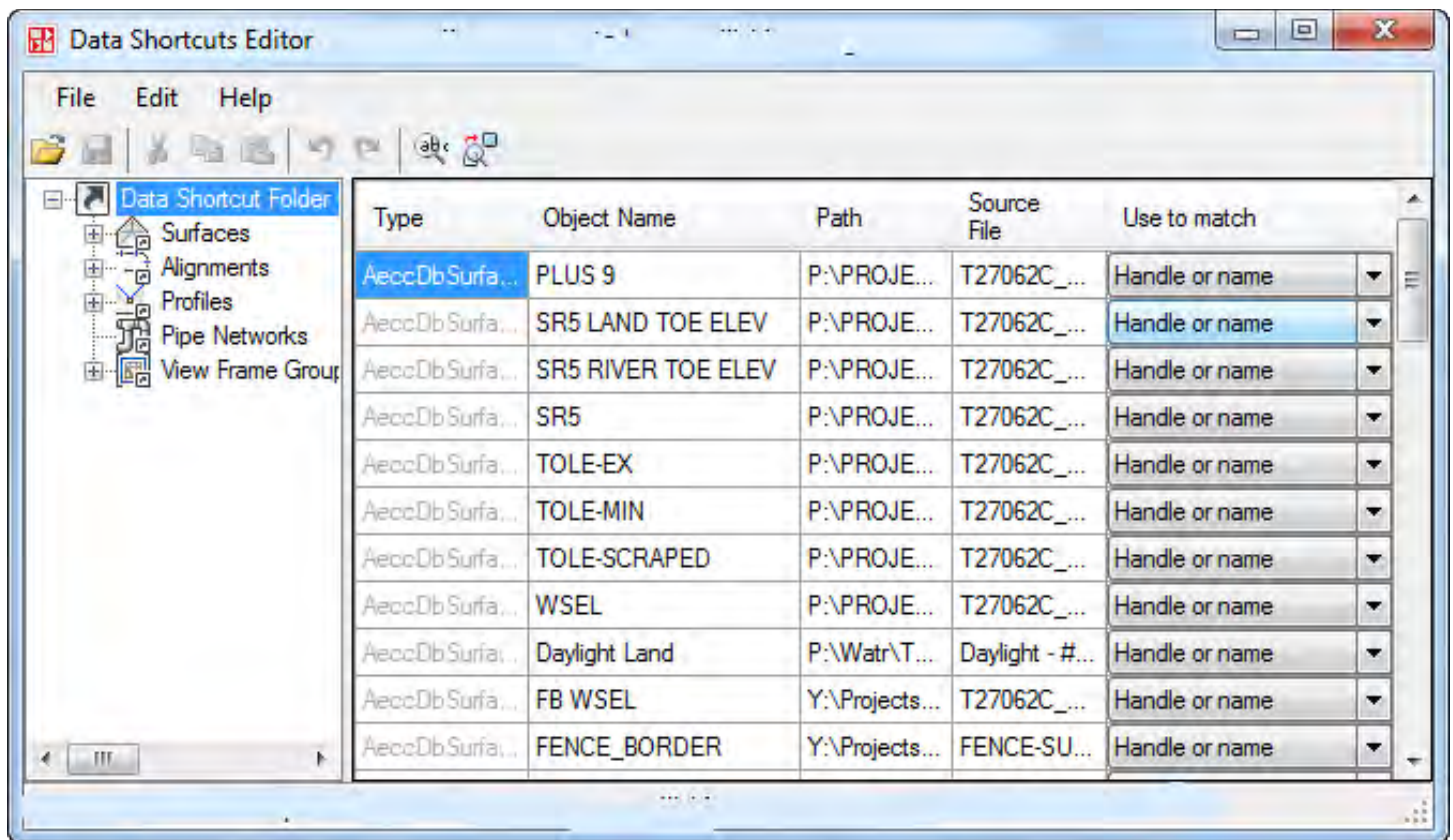
If you have a long lists of label styles make sure you create names that convey what the label does. For instance, I always try to group surface spot elevations with what they are labeling. All of my finish surface labels start with FS and then convey the direction the label is facing (Up, Down, Right, Left).

A big component of my drawings is the presence of expressions. Expressions help me consolidate multiple label styles into one. For instance, in cross sections it is sometimes required to show link widths for corridor sections as dimension labels. While it is possible to manually place dimension labels on all of the links, I find that using dynamic Civil 3D labels works much better and reflects any changes in designs. The expressions are used to transform the dimension look when the dimension arrows overlap and require rotating 180 degrees. By using this method I'm able to reduce the number of expressions utilized. Another benefit is that someone doesn't need to go in and manage the code set styles to assign a different style. The expressions do it for you.

**In deciding how to manage data shortcuts, one needs to decide how to break up the design elements.**

### DATA SHORTCUTS

Data shortcuts are an important way to share data across different drawings. Before you start a project decide how you want to manage the data shortcuts by using Vault or

another method. I've never used Vault in a production environment so I can only speak to using data shortcuts from Prospector. In deciding how to manage data shortcuts, one needs to decide how to break up the design elements. Do you put all of the Civil 3D objects in one file or does each Civil 3D object get its own drawing? This question is largely answered by how big the project is. For small projects you can probably get away with having lots of the design objects in one drawing. As the project gets bigger, drawing performance tends to degrade as the drawing side gets larger. It's much easier to start with separate files than it is to split them up once you figure out that the delays are not worth it.

If you do ultimately split up the objects, make sure you know about the Data Shortcut Editor. Changing the drawing name and path is a quick and easy way to manage the new location of all of the relocated Civil 3D objects. If Civil 3D is having a difficult time finding the relocated objects, you may want to make sure the objects have the same name and set the 'Use to match' to Name. That way if you copied the object to a new drawing and it received a new Handle, it will be able to find the object by its name.
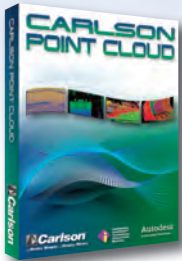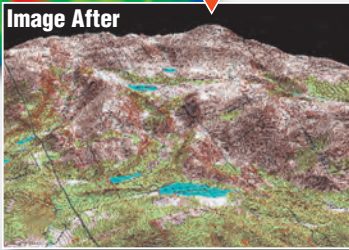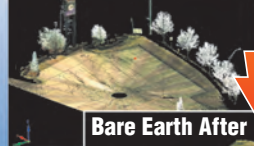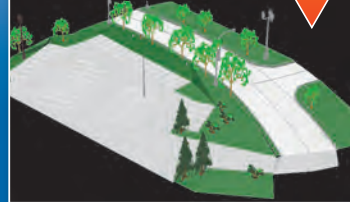
### SURVEY

In the past Survey has been the area that I haven't used to its full potential. I've never had the opportunity to work with a survey crew directly to get them to utilize survey codes. If I did, I can see this immensely helping out in my management of survey data. By using survey codes I could automate the creation of breaklines. This always seems to be a time killer in connecting the appropriate points together such as edge of pavement or toe and tops of slopes. Another benefit would be the ability to use Description Keys to assign the correct block to the points as they are imported and put them on the correct layers.

Yet another benefit would be the ability to automate the process of creating an existing surface. A while back I created a program that let the surveyor import his points, create point groups, create a surface, and assign the correct styles to the newly created surface. This would be a huge time saver in managing survey data because most of the steps would be taken care of automatically. The surveyor would be free to check the data rather than managing where the points should go.

### TEMPLATES

Templates are a great way to help manage object, label styles, and survey-related items. The only problem is that it takes a collective effort on the part of all users. Everyone involved in the drawings needs to help out by making sure that commonly used styles make it into the template for the next project. This way, when starting a new project most of the setup will already be done and you can get to work designing and labeling rather than recreating styles used on the last project.

To help manage the styles in the templates it may be useful to split the templates based on what heavy lifting they will do. It doesn't make much sense to have a drawing carry around the styles and settings for cross sections if the file is only going to contain an existing surface. So it may be advantageous to have more than one template.

### CONCLUSION

In this article I've randomly presented some of the Civil 3D items that require management. I haven't always been the best at following through in managing the data—I just find it so much fun to create label styles—but there is definitely a benefit of starting a project with a good idea of where it's going. I recommend you go out and look for solutions to the management problem. There are some third-party applications that have created workflows to help manage the data and styles.

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BUILT

by: James Salmon

# BxUILTx – BIM to FM
## Procuring Integrated Services

### INTRODUCTION

Last month's column explored increasing demand, among owners, for fully functional digital assets. Defining functional digital assets as those that enable Decisions based on Accessible, Valuable, and Informative Data Systems (DAVIDS) the column argued the real value of Building Information Modeling (BIM) is its capacity to empower owners to make DAVIDS throughout the facility's lifecycle and in support of the core business purpose of the facility.

Procurement processes now take center stage. Owners clamoring for DAVIDS need improved procurement mechanism to acquire integrated services. Doing so will require owners—in both the public and private sector—to fundamentally re-think the way they procure services, as only integrated teams can consistently and efficiently deliver functional digital assets that enable DAVIDS.

### DESIGN-BID-BUILD

Traditionally, planning, design, construction, operations and maintenance services—whether for facilities or infrastructure—have been procured and delivered separately via a series of contracts executed following an intense bidding process. Urban planners and environmental engineers deliver the first salvo—grand plans and site assessments—months or even years before actual projects are funded. The wealth of data accumulated by those professionals then grows stale in a series of three-ring binders, accessed years later, if at all, by plaintiffs' lawyers searching for additional target defendants in a complex construction or environmental lawsuits or by Ph.D. candidates researching obscure topics. Next, civil engineers endeavor to reinvent much of the same data as they prepare a site plan. Simultaneously an architectural firm designs a brand new facility from scratch. Operating in separate silos, design professionals complete so-called "construction documents," toss them

over a blast wall, and duck back in their bunkers while the general contracting community picks over the drawings. This dysfunctional procurement process is depicted in the image below.



### RETHINKING PROCUREMENT

Owners control procurement—or significantly influence the process—and must exercise leadership in this arena. Requests for Proposal (RFPs) and Requests for Qualifications (RFQs) seeking collaborative bids from integrated teams allow owners to demand functional digital assets that enable DAVIDS. Crafting RFPs and RFQs directed at integrated teams force the planning, design, and construction community to join forces when responding. The level of cooperation and collaboration required for success in an integrated environment exceeds the level required for success in the antiquated design-bid-build model, but the rewards—especially over the lifecycle—far outweigh the costs of reaching out to potential partners to form and train integrated teams.
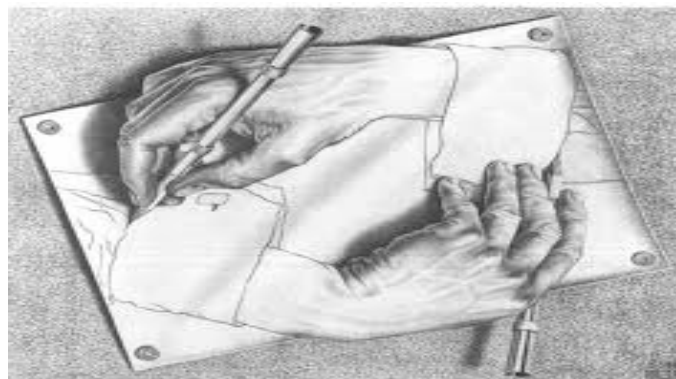
## RISKS AND REWARDS



The risks and rewards associated with integrated project delivery (IPD), BIM, and lean construction processes are largely unrecognized in the AECO industry. As innovative business processes IPD, BIM, and lean add value in many unanticipated ways. Unfortunately, as with any novel business process, these innovative new tools also carry unforeseen risks. Integrated teams must take the time to identify the scope and nature of the known and anticipated risks as well as to explore the potential benefits of IPD, BIM, and lean. The image above conveys the nature of the conundrum faced by earlier adopters of IPD, BIM, and lean processes. As an industry we are staring at the tip of the proverbial iceberg, and it behooves stakeholders in the AECO industry to aggressively gather knowledge about the rest of the iceberg.

## NUTS AND BOLTS OF PROCURING INTEGRATED SERVICES

An effective RFP and RFQ will facilitate procurement of integrated services in an IPD environment. Such RFPs and RFQs should target integrated teams capable of crafting, negotiating, and implementing integrated agreements. These agreements should include protocols related to incentive and risk allocation, alternative dispute resolution, and promotion of lean business processes—all of which increase efficiency and productivity in the planning, design, construction, operations, and maintenance of facilities and infrastructure. A good RFP and RFQ will provide potential integrated teams with a roadmap reflecting the owner's desires regarding the scope and nature of integrated services sought.

The responsibilities and scope of work expected of each integrated team member—or later joining specialty designers, trade contractors, or consultants ( Joiners)—should be set forth in the RFP and RFQ.

Key features of an effective procurement program pursuant to which an IPD owner seeks integrated services via such RFPs and RFQs are explored briefly below. Flexible elements that meet the needs of public and private entities empower owners to take advantage of the reduced costs, increased efficiency, and long-term energy savings available through the use of IPD.

Elements of an effective program for procuring integrated services:

1. **Defining the Owner's Program**: The first task in the integrated planning process is to develop criteria reflecting the business purpose of the contemplated facility or infrastructure and to formulate a Target Cost Estimate (TCE) for the project. Design professionals, planners, and schedulers can assist an owner in identifying criteria and formulating a TCE. During this phase the IPD owner and its planning consultants—or the integrated team if already formed—identify criteria detailing the business purpose of the facility / infrastructure and formulate a viable TCE. The program criteria and the TCE will guide the integrated team as ideas are translated into action.

2. **Crafting the RFP and RFQ**: If the IPD owner wishes to receive competitive bids from integrated teams it must publish an RFP and RFQ seeking responses from integrated teams that inform the local planning, design, and construction community of the IPD owners goals. Private IPD owners who have pre-selected integrated teams may skip this step, but public IPD owners will be required to issue RFQs and RFPs and to consider proposals from competing integrated teams.

3. **Integrated Team Proposals**: An integrated team's proposal should include a breakdown of integrated team members' base fees, general conditions—if such conditions are in addition to and not in conflict with the base form of Integrated Agreement attached in sample form to the RFP—a description of the scope of work for which each integrated team member will be responsible, contingencies, and an initial TCE based on best practices. Base fees should be calculated by reference to the amount of risk each integrated team member is willing to bear in exchange for a percentage share of the amount by which the integrated team beats the GMP (aka, "risk fee") after it is locked in by amendment to the Integrated Agreement.

4. **Selecting Integrated Teams**: Selection committees—either public or private—can "short list" integrated teams that meet the RFQ and submit competitive responses to the RFP. Where criteria are not yet well defined, qualifications will drive selection while selection for projects with well- defined criteria will be based on best values calculated by a weighted combination of qualifications, price, and demonstrated ability to work effectively and cooperatively as a collaborative team.

5. **Crafting and Negotiating Integrated Agreements**: Short-listed integrated teams should be required to participant in IPD owner-sponsored collaborative workshops. Those selected to deliver integrated services will need to work together and with the IPD owner to craft, negotiate, and implement an effective integrated agreement, key addenda, and protocols for the deliver of integrated services. Integrated services may be related to planning, design, pre-construction, construction, operations, and maintenance. IPD owners and short-listed firms should retain an IPD facilitator to assist.

6. **Proprietary Processes and Trade Secrets**: In exchange for access to the short-listed firms' work product, value engineering ideas, and unique design solutions—all of which require extensive preparation and include confidential and proprietary information—IPD owners must be prepared to sign appropriate non-disclosure agreements and to fairly compensate firms for access to such information. A Master Non-Disclosure / Confidentiality Agreement among the parties can be negotiated to protect the intellectual property, trade secrets, proprietary processes, and other confidential information being shared with the IPD owner and among the integrated team members.

7. **Development of a GMP**: Once the business process-oriented program criteria and TCE are mature—usually at the schematic design stage under the traditional design-bid-build delivery model—the integrated team can develop and negotiate a GMP proposal with the IPD owner. If agreement is reached on a GMP, that number is incorporated into the Integrated Agreement by amendment. If agreement cannot be reached on a GMP, the Integrated Agreement may be terminated and the IPD owner can abandon the project or invite other integrated teams to negotiate an agreed GMP.

Any IPD owner that engages a new integrated team must avoid breaching the NDA / CA signed with former integrated team members. Alternatively, the initial integrated team—or even certain members thereof—may choose to waive their "risk fee" and execute an amendment to the Integrated Agreement to perform services on an alternate pricing basis. In addition, the IPD owner may increase the budget underlying the TCE or select a different delivery model all together if GMP negotiations fail.

8. **Joiners and the GMP**: The agreed GMP takes into account the costs and fees of all integrated team members, including specialty designers, subcontractors, and consultants (joiners) that were not members of the initial integrated team. Once a base Integrated Agreement is in place, the integrated team can work to finalize the GMP on the project by inviting bids / proposals from joiners as necessary. Joiners must agree to be bound by the general conditions of the Integrated Agreement, though fee agreements, costs, and other special arrangements can be separately negotiated between joiners and existing integrated team members. In the public sector all joiners submitting bids must be prequalified by the state and/or contracting authority and the integrated team.

9. **Joining Agreements**: The award of contacts to joiners can be based on merit, value and team chemistry—preferred criteria in the private sector—or the lowest responsible bid in the public sector (responsibility having already been determined through a prequalification process). This protects the joiners from bid shopping. If bids from competing joiners exceed the estimate of the integrated team member seeking services / products for a specific scope of work, or the overall TCE / GMP is exceeded when the cost of the joiners bids are added, the integrated team has two options. The integrated team can utilize contingency funds to cover the overage of the Joiner(s) bid(s), or revise the scope of work and rebid. Upon rebid the designer of record must confirm the revised scope of work continues to meet the IPD owner's original program criteria. At this stage the integrated team must also secure all necessary payment and performance bonds for all work.

10. **Self Performance**: Members of the integrated team—usually the constructor or trade contractors who have already won work on the project—can self-perform any portion of work, provided the performing integrated team member has demonstrated its qualifications to perform the work and, on a public project, the designated integrated team member submits a separate bid to the IPD owner to perform the scope of work for the price required in its GMP prior to accepting sealed bids from others. Such bids shall be opened by the IPD owner in public. Such work shall be provided to an existing member of the integrated team only if no competing bid is received from a qualified Joiner for a number that is less than the established GMP line item number for such work. Further, no contingency funds can be used by an original integrated team member on such self-performed work.

11. **Accounting Procedures**: Progress payments during construction are based on actual costs, up to the GMP, and all the integrated teams' project accounting is open to the IPD owner for review. In addition, prompt payment, lien options, and other contractual protections, including alternative dispute resolution processes, incorporated in the Integrated Agreement, shall apply to the integrated team members, including all joiners.

12. **Incentives and Risk Allocation**: If the project exceeds the GMP price, the IPD owner's costs may be capped in accordance with the integrated team's incentive and risk allocation protocol. If the project is completed with contingency dollars remaining in the project fund, the integrated team can share those savings in accordance with the incentive and risk allocation protocol negotiated among the integrated team members. Other incentive and risk sharing mechanisms can be incorporated to align the interests of the integrated team.

## CONCLUSION

IPD owners and members of the integrated teams with whom those IPD owners craft, negotiate, and implement integrated agreements can adapt existing procurement mechanisms to obtain competitive bids for integrated services. Those who seize the initiative and implement new mechanisms for procuring integrated services on complex projects will gain a competitive advantage over those who waste time on the sideline.

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# Managing BIM Coordination

B IM coordination involves more than clicking a button and watching the computer do all the issue identification for you. It is actually a workflow that requires a team approach and preparation from the beginning. Proper management of data and personnel leads to successful BIM coordination.

## ORGANIZING FROM THE BEGINNING

In order to keep a fluid workflow and proper documentation trail, it is imperative that the BIM team meet together before any modeling takes place. This meeting is commonly called the BIM Kickoff meeting. This meeting should address, at a minimum, the schedule, file naming convention, standard modeling locations, file transfer methods, and software versions.

## COMPILING THE NWF

The real test of the BIM kickoff meeting begins when files start pouring in from different disciplines. It is not at all uncommon to compile models together only to discover that they do not line up as shown in Figure 1. Sometimes the distance between these models can be thousands of feet. This is a big problem because even if the offending model is corrected in Autodesk® Navisworks, the model will still cause issues to any other party referencing the offending model. The team member assigned as the BIM Lead needs to manage the situation and ensure the offending model is moved to its proper place.
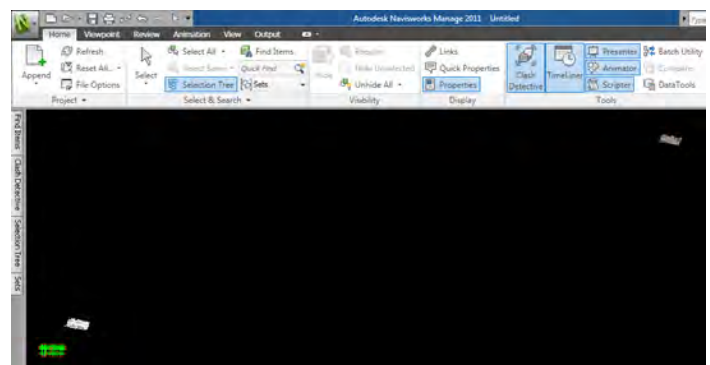


*Figure 1: Models not properly aligned.*

Once the model files have been properly placed, the analysis of the models begins. The first step to ensure an efficient workflow is to set up proper search sets and selection sets. The sets you create serve many purposes; common sets are used for Clash Detective rules, hide/unhide areas, and special clash tests. The Clash Detective sets rules that are commonly forgotten. Navisworks has the capability to allow you to quickly narrow down your Clash analysis by ignoring false positives. For example, if you are running a Clash test between the electrical system and the ceiling system you will get hundreds of false positives of ceiling flush lights. These hundreds of clashes cloud up the real problems and waste the BIM Lead's time when the clash is run. In order to properly manage this, you can create special clash rules based on sets. In the example listed above, you would create a set containing

all the flush mounted lights and name the set lights. You would then create another search set called ceilings. In the Clash Detective under the rules tab you would create a new rule ignoring clashes between the two sets as shown in Figure 2 below. Then run the clash with the rules checked, and watch as the real issues become clear.



*Figure 2: Clash Detective rules*

Another key use for selection/search sets is hiding and un-hiding key parts of the building. During the BIM process, objects in the model are hidden and un-hidden frequently. Common sets are light clouds from Revit, ceilings, walls, and any other large covering objec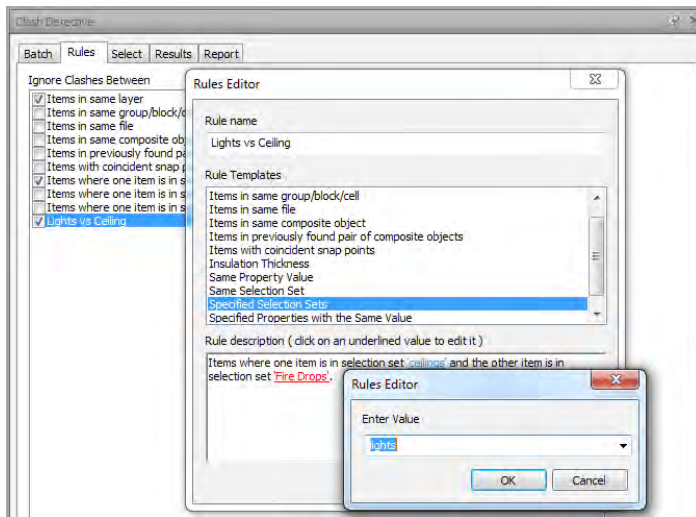t (foundations, topography, etc.). By creating these sets the BIM Lead can quickly show any part of the building without being hampered by common obstructions.

Selection sets can also be used to run special analysis on groups of objects. For instance, when running clash detection against an architectural model, it often becomes beneficial to break up the model into different systems for issue identification. It becomes beneficial to run a clash against the ceiling search set and the MEP systems. Other architectural systems are likewise clashed against other disciplines. By breaking up files, more specific problem identification becomes possible.
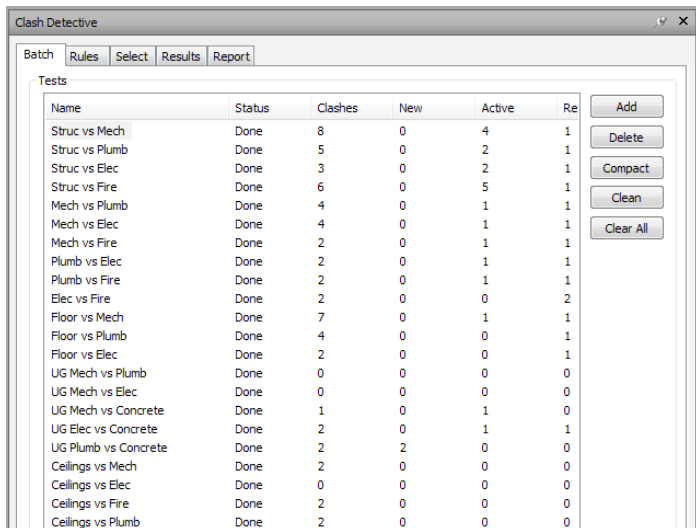


*Figure 3: Clash batches*

## PREPARING FOR A BIM COORDINATION

Once the model has been compiled and the search/selection sets have been created, it is time to run the Clash Detective. Clash batches should be created for each discipline against every other discipline. Once the batches are set up, it is time to run all the different clashes. Generally, when the Clash Detective is run, hundreds of clashes appear. A best practice is to identify true problem issues and remove duplicate issues. Because Navisworks is only clashing triangle faces against other triangle faces, one pipe fitting hitting steel could represent 20 clashes when in reality it is one issue. Therefore, it is necessary to group all duplicates into a folder and all the real issues into another folder.

An issue should identify all the clashes caused by a continuous object. For instance, if a plumbing line is running through eight wide flange beams, the eight hits should be identified by the same issue with the remaining hits being marked as duplicates. Figure 4 shows four plumbing lines going through an electrical duct bank. These four lines constitute nine different clashes, when in reality all four lines represent only one issue. The lines were marked together as one issue, placed in a folder, and the other duplicate clashes of this issue were placed into a reviewed folder.
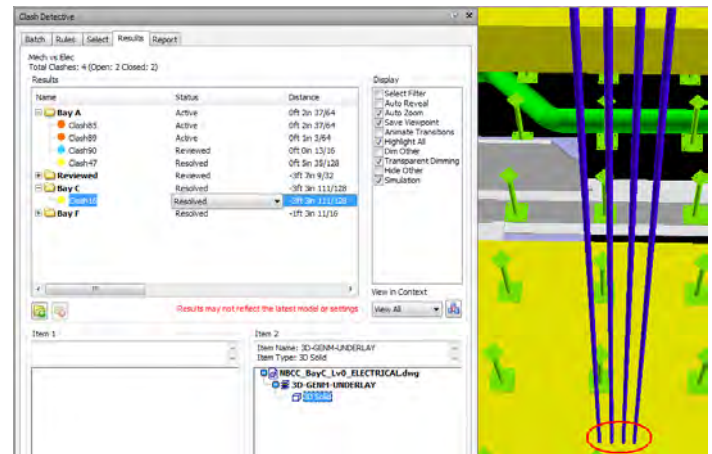


*Figure 4: Plumbing electrical issue*

One of the many benefits of separating issues from duplicate clashes is that it allows the coordination meetings to be efficient and effective. By pre-identifying the issues, the BIM team can look for solutions rather than looking for problems.

## RUNNING THE COORDINATION MEETING

Now that all of the early preparation of issue identification has been done, the BIM team meets together. During this meeting, issues are reviewed. One idea to ensure each discipline's time is respected is to stagger the attendees. Consider inviting the two disciplines with the most conflicts in the beginning and then slowly adding other disciplines to the meeting. Since no one wants to sit in a meeting without participating, this method allows each member to feel his/her time is respected, which in turn increases team collaboration.

While looking at the issues with the team, often you will need to navigate the issue to get different perspectives. If you pre-redline all the issues before the meeting begins, you can navigate the issue with the team. When you need to refer back to the original view you can

simply click the clash to be referenced back to the original view. The redline actually anchors the clash to the view in which you drew the redline. The redline also helps to clearly identify the clash for the team when they review the report from the meeting.

Once a resolution has been decided upon by the team, documentation becomes critical to help remind each party of his/her responsibility. One method of this documentation is the use of comments. You can tag each issue with a comment to notate the clash resolution and responsibility as shown in Figure 5. You also have the option of assigning responsibility to a discipline by assigning it in the Clash Detective window.
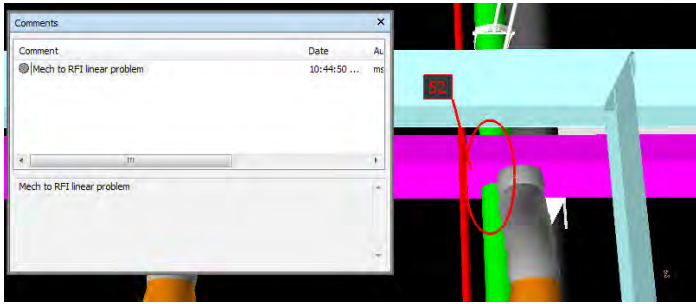


*Figure 5: Clash resolution*

After each issue has a resolution, the team should review upcoming milestones on the BIM schedule. By reminding the team about the schedule frequently, the team has the ability to properly manage their time and resources to ensure milestones are met.

## BIM WORKFLOW

After the meeting, it is the BIM Lead's responsibility to create a report detailing the resolution of each issue and responsibility of each party. This report can be generated from Navisworks in viewpoints, html, or xml formats. Often, it is advantageous to post a couple of different types of reports since each member of the team might have different internal methods for reviewing and fixing issues. Regardless of the method, the report is critical for the team's success. The type of reports the team requires should have been identified in the BIM Kickoff meeting. Typically, a NWD is issued along with an annotated report in excel or html.

> **Managing BIM coordination is more than just knowing how to click a button in Navisworks.**

When each discipline posts its corrected files, the discipline should not change the filename. By keeping the same filename, the old file can be overwritten and linked in properly to the NWF. Since the NWF is the heart of the data analysis, it is important to maintain the same name and location of all the files. Note: Never work from

an NWD—it is only a snapshot of the NWF. Some type of version control should be implemented to backup the files in case of file corruption.

Once the latest files have been placed in the proper location, the NWF is opened and the clashes are re-run. Every clash that has been resolved will have its status changed automatically to "resolved." This can prove problematic for the issues you identified because the clash on which you identified the issue might have been resolved while the entire issue was not resolved.

In cases like this, simply change the status of the issue to "active." If the issue was resolved, simply remove the issue from your current issue folder and place it in a different location. If you wish to remove all the resolved problems so they do not show up as hits in your model, remove the resolved clashes from their folders and press the compact button on the Batch tab. The compact button removes all resolved issues that are not in folders.

Now that the clashes have been re-run and the resolved issues have been archived or removed, it is time to identify all of the new issues in the compiled model. The cycle of drawings being submitted, issues being identified, the team meeting together resolving issues, and correction being re-posted will continue until the model is fully coordinated. A simple workflow diagram is shown below.
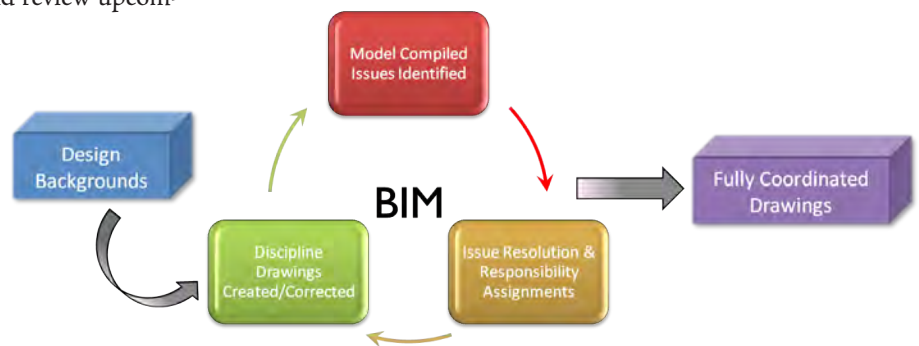


*Figure 6: BIM workflow*

To sum up, managing BIM coordination is more than just knowing how to click a button in Navisworks. It is creating a workflow between different team members and creating and regulating the rules necessary for the project's success.
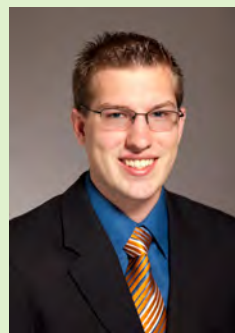


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# So you want to implement Revit?

The key to becoming a fully implemented Autodesk® Revit® firm is really quite simple. In a single word: "Mindset." Dedicate yourself to becoming a Revit user, and it will happen. Of course, there are other practical things that you should do as well—training, for example. While getting up and running and becoming productive can go rather quickly, full implementation should take about two years. You have a lot to learn in that period. With a little help from George Lucas and perhaps Walt Disney, this article will help you set a path from Revit Initiate to Revit Master.

## LEARN THE TOOLS

While Revit is different from CAD in that you a making a 3D virtual model of the building instead of a series of 2D images, there are similarities. The most important similarity is this; Revit is a drawing tool that can be used to present your ideas (the design) to others. Be it an owner, the bank, the contractor, or the end user, most everyone who will view your design will be viewing it on paper, or some similar 2D medium. No matter what you're putting together, think about the 2D presentation.

The most significant difference between Revit and CAD is the set of tools for making the drawing. In Revit, you are literally building a 3D virtual version of your building, based on general objects such as walls, floors, ceilings, and roofs. This means that you have to learn the tools to create each of these objects. In CAD, you have a set of lines that can represent anything.

This leads to your first revelation. It's the truth about Revit that nobody mentions. Every object made in Revit is made in a different manner. "Why is this important?" you may ask. Once you know this, you'll know the scope of what you need to learn in order to advance from a Revit Padawan to a Revit Knight!

Since every object in Revit is made in a different manner, you must learn a new technique for almost object that you make. Think about all of the different objects that get made for a Revit model: walls, floors, ceilings, roofs, sweeps, foundations, soffits, columns, fascias, windows, doors, pilasters, ramps, stairs, railings, and so on. Yet with all of the different skills to learn, I would admit that I wouldn't change a thing. The objects creation process is very efficient and will become second nature with a little time. Now that you know this little secret, you are ready to learn.

There are many sources of training. You can take a class at the local community college or post secondary school. Your Autodesk reseller probably has resources for learning as well. And don't forget the books you can get from the library or all of the YouTube videos. There are a plethora of opportunities for you to grab, seize, and conquer. Use them all!

## USE IT OR LOSE IT

After training, we all ask, "What do I do now?" The training was the easy part. The boss is going to come up to you and ask for a drawing "right away." You're first instinct will be, "I can get this task done much quicker with the old standby." Trust me, we've all fallen

into this trap. And when I say "trap," I truly mean it. Once you open AutoCAD to start drawing this simple little diagram, you will find it very difficult to successfully implement Revit.

Most of us forget that Revit has 2D tools as well as the 3D tools. At a minimum, when you are faced with the challenge of producing a drawing or sketch "right away," open a drafting view and use the tools that you're given.

You will be very happy to discover the drafting capabilities of Revit are far superior to the tools you had available in the old standby. Unfortunately, you probably don't think that you learned them in training. *But you did.* Every time you enter sketch mode, you use drafting tools. Trust your instincts. Let the Revit flow through you! By practicing in your drafting view, you will also hone your modeling skills.
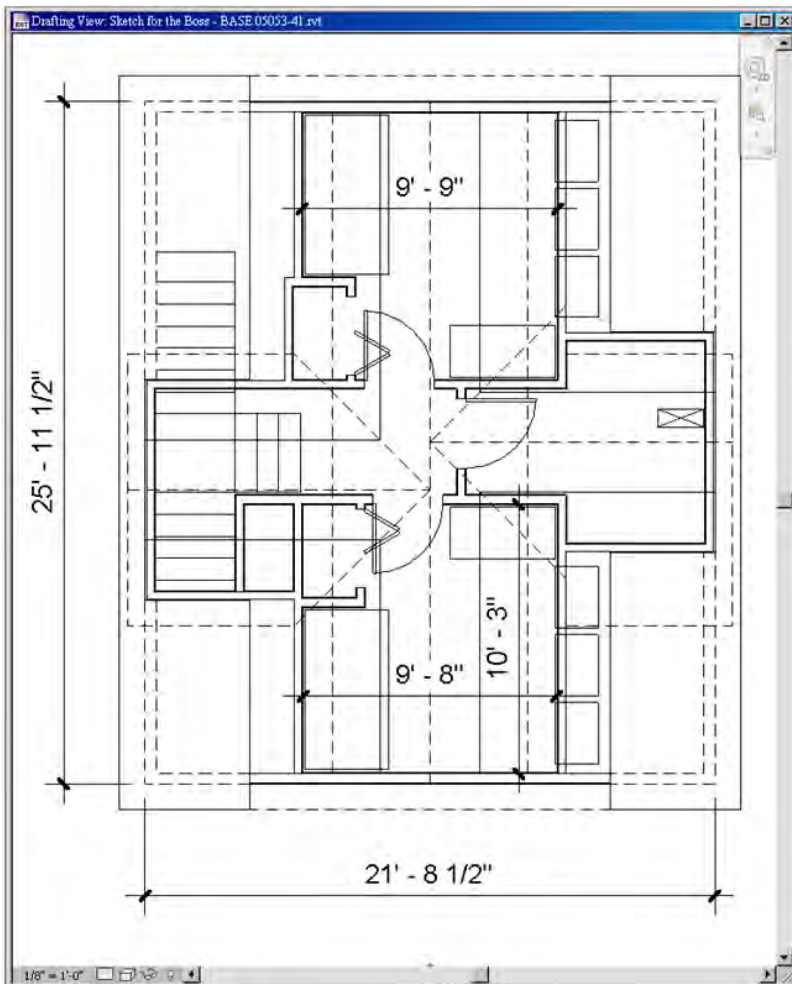


## SURROUND YOURSELF WITH OTHER USERS

Leading the way can be hard. (The previous sentence was an understatement.) However, there is no need to put yourself in that position in this day and age. Sure, you may be the first Reviteer in your firm, but there are many who have gone before you. One of my favorite resources is the local user group.

I'm confident that all of you are aware of the online forums, such as AUGI or Revit City. With a few taps of the keyboard, it's easy to find someone who has had the same problem that you're having now, along with the multiple solutions that have been offered by the community.

## SOMETHING OLD, SOMETHING NEW

Prior to the advent of CAD, architects would spend a lot of time doing calculations to find out if something would fit. There are methods we developed to make these calculations simpler. The best example would be a section through a brick wall. We learned to design the wall vertically in 8-inch increments, not 4-inch, so the mason would not have to slice bricks.

With CAD, we became a little lazy. Since we are graphically oriented folks, it was just easier to draw every joint in a brick wall section. I remember the older architects standing behind me and swearing about how I overdrew things. (How's it going, Dominic? It turns out that you were right!) We do not need to draw every joint and every brick. Get away from this habit as soon as you can! Revit will help you.

If you can get your hands on a set of drawings made in Revit, show them to your boss. There is a lot to be learned about drawings and the level of information required to get something built.
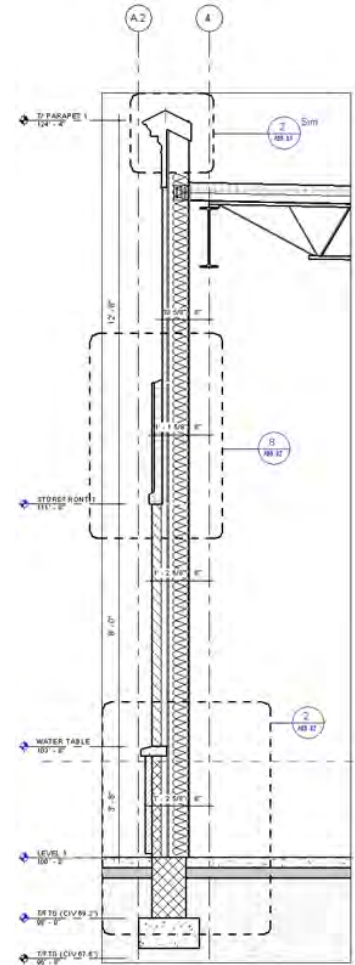


## BECOME THE MASTER

You've been using Revit for a little while now. Congratulations! You are no longer the Revit Padawan—you are a Revit Knight! For most users, this is enough. But not you. You want to become the Revit Master! But how?

Remember the goal is to communicate your design with drawings. Grab a set of drawings that look good to you. You'll notice a hierarchy to the line work. There are specific fonts and dimension styles. The drawings are in a specific and logical order. This is your answer to becoming the Master, and your saber will be a template.

1. Make a basic drawing template. Add your title block for starters.
2. Set the line weights and line styles. You may be able to reference your old AutoCAD plotter configuration file to determine a basic set of line weights.
3. Load the hatch patterns you use. Don't load the ones that never get used—they just take up space.
4. Set up all of the typical drawings you will use in a typical set. Add views to the sheets, such as plans, sections, elevations, and perhaps a perspective.

5. Set the fonts and the dimension styles.
6. Make the keynotes, symbols, callouts, section markers, and elevation markers that match you company's standards.
7. Preload all of the components that you'll typically use when producing drawings (model components _and_ detail components).
8. Add some of those typical details and notes you always have in every set of drawings.
9. Make the schedules that always appear in the set.
10. Set the view templates.

Now all you need is for someone to give you a task. With someone sitting behind you as you draw, you will add four walls to the model in four seconds. In another 12 seconds, you've added a floor and a ceiling. Take your last remaining 14 seconds to add a roof and have a sip of tea.

Now it's time to show your witness that in 30 seconds, you have created a basic floor plan, reflected ceiling plan, roof plan, exterior elevations, sections, and a really cool perspective. Not only have you drawn them, they're already placed on sheets in the drawing set and ready for printing and distribution.

There is no better feeling than hearing your witness gasp at your Revit Mastery!

## TO INFINITY AND BEYOND

Not a quote from Star Wars, but it does seem appropriate. You've learned the skills needed to master Revit for producing drawings that match your company standards. But there's always a bigger fish! Have you considered becoming the Revit Emperor?

Do you know the depth of the tools that Revit has to offer? It is almost infinite! Learn what advanced tools are available. I wouldn't recommend trying to actually learn all of these tools at once. It is better to know that tools are available to learn, as you need them.

_There's always a bigger fish._

## CONSULTANTS

You have the ability to link the models of consultants into your model and they can link yours into theirs. If you have a good consultant, let them know up front that you are moving toward Revit. This gives them the chance to learn with you. If you are really fortunate, your consultant will have already implemented Revit and you can siphon off some of their experiences.

Linking models allows you to see your consultant's designs in all dimensions. Now you will have a structural system, ductwork, piping, and electrical in your model. If you are really fortunate, your lighting designer, interior designer, technology consultant, food services consultant, fire protection consultant, landscape architect, and civil engineer will also be using Revit. I am quite happy to report to you that all of these disciplines are using Revit and using it successfully!

When you link these models to yours, it will affect the views. Update your template! It's like keeping your saber sharp.

## PRESENTATION

In my first job out of college, the boss asked me to produce a basic perspective. I modeled and rendered the building in 3D Studio. Imagine my surprise when he asked for a simple drawing, not photorealistic! After all these years, we finally have a tool that allows you to make simple black and white images. This allows you to critique the form of the building, not the color. You can change an elevation from grayscale to color then back again by applying view templates to the view. Once you've learned this skill, update your template.
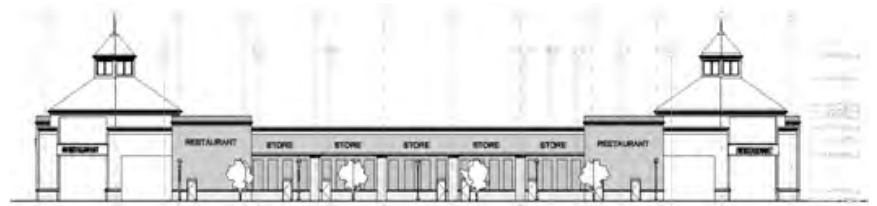
_A design presentation without color._

_A realistic presentation of the same view._
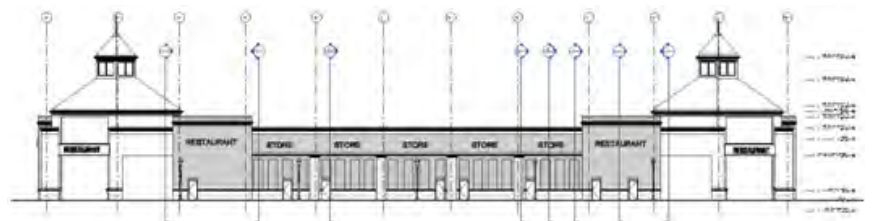
_The same view set up for construction._

## RENDERING

Revit has a rendering engine that can make some really beautiful drawings. Like other Revit tools that you've used, there are more tools to learn, such as materials and lighting. You can use the same resources to learn these. Once learned, add the basics to your template.

## ANALYSIS

The ability to analyze the building from the get-go gives the designer tools to create better buildings and better spaces. Analytical tools include sun and shadow studies and energy analysis. This may come as a surprise, but once you learn these, you should add them to your template.

## CONSTRUCTION

We should never forget that someone has to build your design, and your drawings are a means of communication. For the sophisticated contractor, the model can also be a means of communication. Perhaps the builder has Navisworks and wants to use your model. As soon as you start to use Revit, you need to discuss this possibility with your insurer. You will also need to review this possibility with your consultants before the project starts.

The Revit model is still an instrument of service. While we are "building" 3D *virtual* buildings, this is not to be confused with building 3D *real* buildings. Spend as much time as you can working with the builder in the early stages of construction. Work through RFI with the builder. Just as you've taken the time to learn that there are others who know more about Revit than you, there are those who know more about construction than you. If you can learn the insight of the builder, then you can learn some insight of how to build your model.

## DON'T OVERDO IT

It is so easy to over model! Don't fall into this trap. Know that there is seldom a need to make 3D details. You will find families online that are bigger than your model. Avoid them! Seriously. They will bog down your machine (no matter how fast it is) and muddy up your model.

## YOU'VE DONE IT

You've followed the path from Revit Initiate to Revit Master. You've kept a singular mindset, learned the tools, established a template, and gained an understanding of the possibilities of this tool. May the Revit be with you!



*Ibrahim Hakki is an architect at www.kainc.com in Cleveland, Ohio. He uses Revit, studies Tae Kwon Do and Kumdo, coaches soccer, and does a few other fun things. He's been doing these things for a while now.*

# Inventor

# Wrangle Your Data with Autodesk Vault

On many occasions it seems as if data management is placed in the same category as going to the dentist. It's a necessary evil we'd rather avoid. We deal with it because it needs to be done. Nobody gets up in the morning and says, "I want to work with data management!"

But everyone who has touched a CAD file, or for that matter, a computer, knows the pain of not being able to find the right document at a critical moment and the futility of the endless slog of hunting for the needle in the haystack in order to find the correct drawing in an endless list of files with the same name.

Document management is not only important, it's a critical part of your business strategy. Like it or not, maintaining a server with a defined structure of folders constitutes conducting data management. That being said, this question remains: "How can we perform data management better?"

Autodesk provides a data management solution called Autodesk® Vault to organize its data. By using Autodesk Vault, we move beyond the structure of files and folders on a server, and gain the ability to better manage our data through more sophisticated controls.

The following are a portion of the benefits that Vault delivers to the manufacturing industry.

## CENTRALIZED STORAGE

When a user places a file into Vault, a copy of the file is moved to a centralized location on a server. All files checked into Vault can be backed up with a simple backup script running under a scheduled task. This ensures that all files in Vault are thoroughly backed up and can easily be restored if needed.

## USER TRACKING AND FILE CHECK OUT

Vault functions like a librarian who organizes your files, checking files in and out to users as requested. Here's a simple scenario.

User "A" opens a part file from Vault in order to work on it, checking it out of Vault during the process, much like checking books out of a library. He saves and closes the file, but keeps the part checked out. User "B" opens an assembly that references the part file that is still checked out by User "A." Vault permits this process, but seamlessly restricts access to read-only mode.

Since User "B" can't modify the file, he or she can't overwrite any of the changes that User "A" is making, even when "A" is not logged in. This prevents the infamous "last save wins" scenario of design where important data and time are irrevocably lost. Simply put, that lost effort translates directly into dollars tossed away.
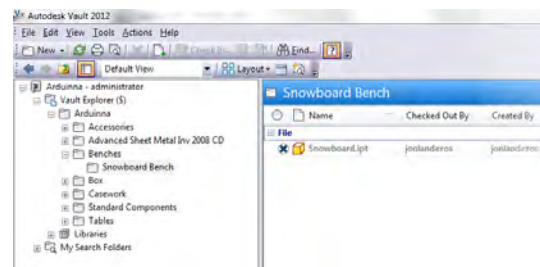


Figure **1**: File search through Vault

product focus

## VAULT PROJECT FOLDERS

Autodesk recently implemented Projects in Vault. This may sound odd, because Vault is supposed to manage our project data, right?

As each CAD application stores its data, it does so in an encapsulated application design folder grouping which is rarely mixed with other application type data and is often not even on the same server. As a result, data that is being developed for the same project is not organized together and becomes more difficult to manage.

The Vault Project solves this problem by providing a virtual collection of data related to a collaborative design project. It is, as Brian Schaenen called it, a virtual Super-Folder that contains shortcuts to all the relevant project data, not only Inventor and Publisher files.

Project managers now have a clean localized organization with links to all the data being developed for a particular project.

Categories are now applied to Vault Project Folders, adding flexibility and an additional layer of sort capability.

## DATA SEARCH AND DEPENDENCIES

Autodesk Vault indexes information about the files into a SQL database. One key feature this database provides is the ability to index more than just the filename. Vault indexes information such as author, part number, description, and date checked in, among many other fields of information about your file.

Since Vault remembers these key fields of information, it can then be searched. This means that you don't have to know the filename in order to find a file. You can know anything about the file, such as a part number, a description, or who created it. By searching for these fields, or any combination of the fields we might know, we can find a file much more efficiently than by using a search for files on a folder structure.

This ability is further leveraged across Vault Project files mentioned previously. Now we can simultaneously search across various data types that are related to the same project, but often may be on separate servers.
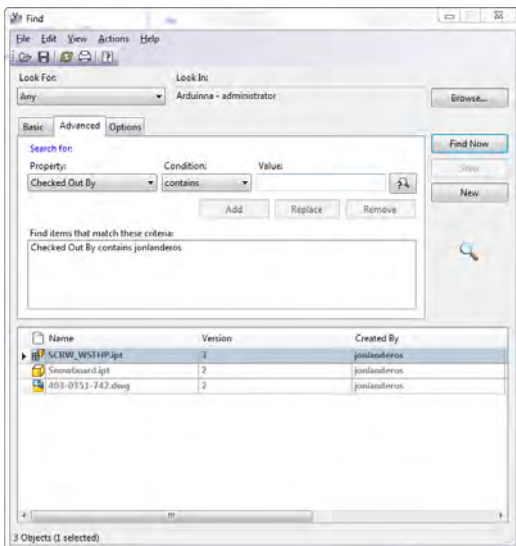


*Figure 2: Vault file check-out by user query*

The SQL database also gives us the capability of seeing the relationship between files, which allows us to see if a part or drawing is shared between just one component or several. Armed with this knowledge, we can determine how an intended change can affect other files we may not have been aware of, and prevents the unintended consequence of changing a file or assembly because there were unknown relationships in place.

Vault is unsurpassed in the realm of situational awareness, delivering information on the current state of anything that can be queried, including all the files that are referenced by an assembly or all project components that a particular user is editing right now.

## VISUAL DATA MAPPING IN INVENTOR

We can go far beyond searches and sorting by using the visual tools that are integrated between Inventor and Vault. Various aspects of sortable data can be reviewed visually in the graphics view area of Inventor using the supplied tools.
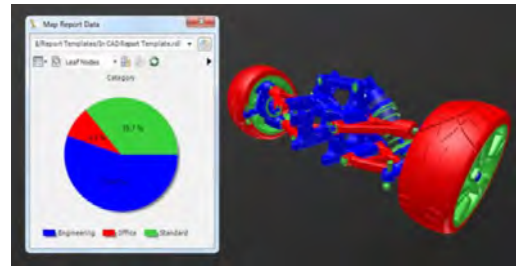


*Figure 3: Vault map data visual report (image courtesy of Autodesk)*

We can highlight component sets such as items listed in a change order and visualize which components are affected and who has been involved. This is all based on whatever query you need.

Data Cards were added in the last version of Inventor and Vault, which deliver a convenient method of displaying and editing key metadata that is associated with the Inventor Components. Global changes to iProperties can be administered right inside the Vault and distributed to all the parts and assemblies via their data cards.



*Figure 4: Data cards (image courtesy of Autodesk)*

## ABILITY TO COPY AND REUSE FILES

Finding files is half the battle. The other half is copying and reusing files efficiently. The SQL database inside of Vault sees the relationship between files such as part and assembly relationships in Autodesk Inventor and external references between AutoCAD files.

# Inventor

*Figure 5: File copy in Vault*

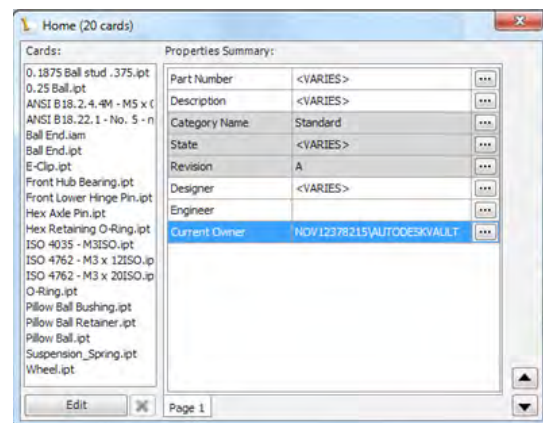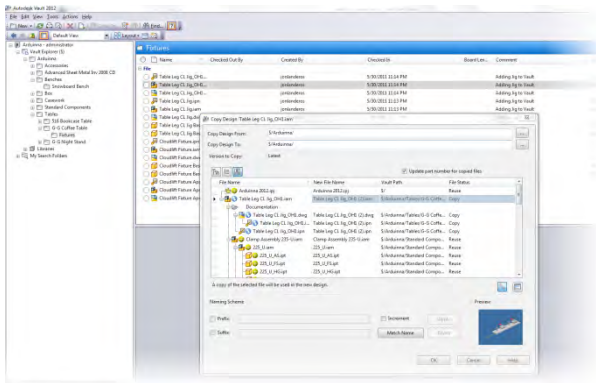By taking advantage of the SQL database, Vault grants us the additional ability to copy a top level file that has several references, such as an AutoCAD® file with external references or an Inventor assembly. However, instead of just copying files, we can use the SQL database to copy files we know we need to change, while telling Vault to reuse files that are to remain referenced. This ensures that files that are common to multiple documents aren't copied, and prevents us from creating duplicate files.

## ABILITY TO TRACK FILE VERSIONS

Autodesk Vault also keeps track of previous iterations of a file you've checked in. Every time a file is placed into Vault, it creates a new version, remembering previous versions of your files. Should you need to recall one of those versions for any reason, you can do so in minutes.

Having the ability to track and access previous revisions provide a safety net to correct mistakes, or try a new iteration on a design. Imagine the freedom to try new ideas knowing that Vault remembers a previous version of the file you can use to quickly return to your "decision" point.

## CENTRALIZED STORAGE

Files in Vault are all stored in a central location that's easily backed up with a script. You don't have to worry about copying files and folders, and making sure that when your users transfer files to the server they put them in the correct location. Vault ensures the files are stored properly and that location can be easily found and backed up.

## MULTI-SITE REPLICATION

Vault Server Collaboration and Professional can sync data efficiently between numerous users in offices that are 100 feet or 100 miles apart. It performs this using resolved IP addresses over the Internet. However, as you have certainly experienced by now, performance lag and problems due to latency in poor Internet connections can be annoying. When it's continuous, it can be a headache.

Autodesk Vault permits data to be copied from the Vault on one server to another in order to provide access to the data with no latency problems. Vault then maintains the copy of the data and syncs it with the other server when any changes have been performed. Vault server can maintain these sync orders even when the servers lose contact with one another. It syncs all the data the next time a connection is available.



*Figure 6: Replicated Vault (graphic courtesy of Autodesk)*

## SCALABILITY

Autodesk Vault is actually is available in four levels. Vault is included with several of Autodesk's manufacturing products. Increasing in value and capability are Autodesk Vault Workgroup, Autodesk Vault Collaboration, and Autodesk Vault Professional.

### Autodesk Vault Workgroup

Helps you improve productivity by making it easier to create and share design information throughout workgroups. It adds:

+ data management functionality
+ search
+ reuse
+ revision control

### Autodesk Vault Collaboration

Includes all the features found in Autodesk Vault Workgroup, plus advanced tools that aid large workgroup management.

+ Connects workgroups across multiple sites
+ Share design data downstream
+ Visual reporting and data analysis
+ Automate server tasks

### Autodesk Vault Professional

Autodesk's most comprehensive data management application, which adds even more functionality on top of Vault Collaboration:

+ Change order tracking
+ Bills of materials tracking
+ Data exchange with other business applications

These tools each expand upon the capabilities of Autodesk Vault. As you step up the ladder of products, you gain additional abilities such as those mentioned and a large list of additional features.

## THING TO CONSIDER BEFORE YOU INSTALL

Autodesk Vault contains some great tools that can simplify data management. But like anything else, a little planning goes a long way. Here are some things to think about before you get started.

## EVALUATE YOUR PROCESS

Just because you may work in a company that was around when Eisenhower was president doesn't mean we have to continue to do business that way. Take the time to look at how you do things, and retool it if it makes sense to do so. Using flawed or outdated processes with a new tool could mean that you're simply using a more efficient tool to make the same mistakes.

## CHOOSE THE VAULT THAT'S RIGHT FOR YOU

Look at your process and compare it to the tools provided by Autodesk Vault, Autodesk Vault Workgroup, Autodesk Vault Collaboration, and Autodesk Vault Professional. Your software provider can help you choose the right tool for your needs. After all, you're paying them—make them work for it!

Remember that the scalability of Vault will let you grow into more sophisticated tools at a later date.

## PREPARE YOUR INFRASTRUCTURE

Make sure that you have a server that is up to the task of running Autodesk Vault. It doesn't have to be top-shelf hardware, but make sure it's a good, stable, reliable machine. Check to see that it has enough hard drive space to hold your data for a while. Good hardware will make sure your Vault runs smoothly. Here is a link to the minimum requirements for Vault.

This also includes safeguarding your data. Make sure you have a plan to backup your data as well as a plan to maintain it. Your data is valuable. Maintain it as such.

## SUMMARY

Autodesk Vault can be a key tool in your management strategy. Not only that, it goes far beyond data management in the standard sense, and extends Inventor's reach and functionality as part if Vault's integration. It is so powerful and capable that its features truly become addictive.

By implementing Vault, you can organize, reuse, track, and protect your valuable data with greater efficiency. Combining Vault with other management strategies discussed here can help ensure that your organization runs efficiently and smoothly.

Vault can help reduce that time your designers spend less time finding data, fretting over lost data, and recreating lost data. It gets them back to what they do best.
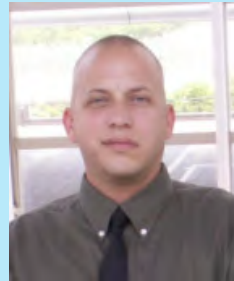


*John Evans*

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



*Jon Landeros*

*Jonathan Landeros is a Senior Application Engineer at Ketiv, and has over ten years' experience in sheet metal design, data management, and CAM. He worked as a design engineer before joining the Autodesk reseller channel as an application engineer. He also has certifications from Autodesk as a Manufacturing Implementation Certified Expert and is recognized as a Data Management Implementation Certified Expert. Jon earned his BS in Mechanical Engineering from Cal State Fullerton.*

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## *Dennis Jeffrey of Tekni Dies at age 64*

by John Evans

It is my deepest regret to inform you all that my friend Dennis Jeffrey died July 3, 2011. He suffered a heart attack Sunday evening.

Denny was my friend and business associate at his company, Tekni Consulting for a few years now. He was an Autodesk Manufacturing software implementation expert, and the most knowledgeable person I know when it came to Vault and related server problems. He was a PITA sometimes, but I'll miss him just the same.

Obituary: Dennis L. Jeffrey, 64, local businessman and proud father, went to his heavenly home Sunday, July 3, 2011. Born in Fort Wayne, Indiana, Dennis was President and Founder of Tekni Group and a technical consultant, educator and innovator. He was a senior member of the Society of Manufacturing Engineers as well as author and publisher of The Creative Inventor Magazine and several other technical books and manuals. Dennis enjoyed cooking, woodworking, gardening, and spending time with his sons. Surviving are his partner Connie DiFilippo, sons Jeremiah, Joshua, Jacob, Joseph and Jonathan, brother David of Dublin, OH, sister Jean Kruse of Fort Wayne, and grandson Kylee.

# Up-front Organization

## INTRODUCTION

I have read several blogs discussing the roles and responsibilities of an office BIM Manager, BIM Coordinator, BIM Specialist, or whatever the title may be for the Autodesk® Revit® "go to" person. One task on that long list of responsibilities is to manage all the different files associated with Revit. The other task that goes hand in hand with it is maintaining company BIM standards. This has been my responsibility at a mechanical and electrical consulting engineering firm for the last two years.

This article is intended to be a launch pad for those just starting out and to get those already started thinking about how they are doing things. The best place to begin is with the Project Template file (or files). One choice to make is deciding if it makes sense to have one master template file, or one per project type. Developing organized processes will be another big underlying task that spreads into every part of management, as I think you'll see.

## FILE MANAGEMENT

### Template Files

Revit has several types of template files. There are project templates, family templates, and annotation templates. Each version of Revit has new template files that are updated for the current version. These templates should be modified to match company standards, and as such, every user in the company will need access to these files. From the big Revit R on the top left of the ribbon, there is an options button which will give you access to the File Locations tab. From there, default locations for these files can be set to a location on the network. It would be wise to make these files read only except by those you want editing them. Also, these locations can be saved into the Revit.ini file prior to deployment, saving time for offices with many users.

What should be in your template files? I say, as much as you can put in it. Anything that will be used on most of the projects you work on should be loaded once now, or every time you need it on every project. This philosophy is well explained by Aaron Maller's blog on project templates at http://malleristicrevitation.blogspot.com. This includes tags, details, schedules, duct and piping system types, fittings, air terminals, lights, electrical panels, receptacles, coversheets, floor plans (placed on sheets, even if empty), details sheets, and anything else you might need on every project. Think of it like this: how close to finished can this template project be before any work is done? How about some design tools as well? Go ahead and create some views to be used with assisting the design, such as a first floor plan view with a duct legend already loaded and the settings preset and standardized. The same could be done for piping, plumbing, and so on. Lighting could already have a view setup to display light levels per space.
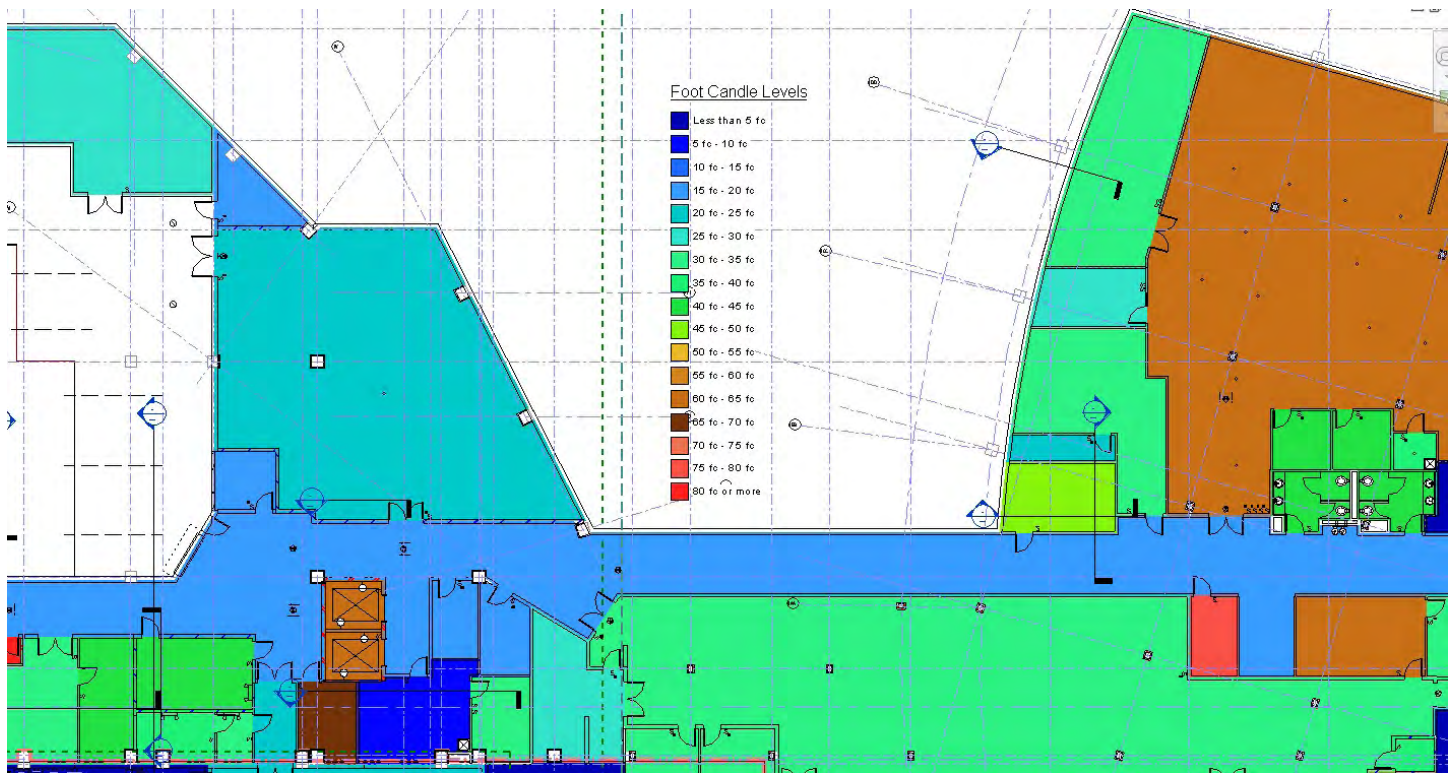
*Lighting levels per space*

If there are any tools you find yourself or others creating on every project, add it to the template and save time on the next project.

## Family Library

Surely you have spent hundreds of hours developing a library of families to be used on all projects. Where do you keep them? Each release of Revit requires the files to be updated. Otherwise you have to wait for them to be updated on demand each time they are used. I start out by copying the out-of-the-box library to a file on the network, and then I copy my existing library to a subfolder of the same directory. Then I upgrade the previous library (using the automated script provided with the installation) to a file within the out-of-the-box content. Finally I point the Library Path (found under "Places" on the File locations Tab) to the company library file. Then should I need something from the OOTB content, I insert as normal, but only need to press the up arrow on the file browser dialog to get to the OOTB location; very convenient. Another thought—as you are building content that requires the use of annotation symbols, save a copy of the annotation symbol and place it on your new symbols and abbreviations page.

Now how about the volumes of vendor-provided content? I love that they are on board with Revit and are making content for us. That makes our models much more accurate. A word of warning: while some of this content is ideal, some of it is less so for a variety of reasons. In all cases, they likely do not match, or even come close to matching, your company standards. So plan to adjust pen weight assignments, connector type and value settings (very often ignored), and add any shared parameters used for scheduling.

In all fairness these settings could not have been built into the parts and satisfy everyone's different standards. Next, the parts will need to be flexed—make sure they can stretch and adjust as expected. Lastly, make sure they are not too detailed. If every nut bolt and screw is modeled, the file size will likely be an indicator. About the worst family file I have seen available for download was an AutoCAD polymesh's that had been exported out and loaded into a generic family (with each size change loaded as a separate polymesh). They printed as black blobs of toner and had huge files sizes.

So now that some ideal content has been found and modified to meet the company standards, either adopt them as part of your standard library or keep them separate in a nearby location. I keep ours on the first level of our company standards directory, and call it vendor-provided content.

One big reason to keep it separated is to allow for the Franken-unit. The what? Many jurisdictions, state, and federal projects require three or more equivalent models of equipment to be interchangeable for use on any project. This is an attempt to keep a level playing field and prevent unfair favoritism. However, this means while we have this nice accurate vendor-provided equipment that fits perfectly in the ceiling from vendor A, Vendor B, who is 6 inches deeper, might win the project. And if theirs doesn't fit, it's our fault. To account for this on most pieces of equipment, we create a Franken-unit that has the worst dimensions of all the possible bidders for a given project. This makes a strong argument for building your own parts and pieces.

## Details & Schedules

Don't worry about details and schedules—there is already a system in place for the AutoCAD® ones, and you can just im-

port/link those into your projects. Blasphemy! Okay, that does work in a pinch, but don't let that become standard operating procedure. Bite the bullet and create them in Revit. It is absolutely worth it. Don't object on the grounds that you don't want to maintain two libraries of details and schedules. I agree—don't maintain two libraries. Revit can export out any detail or schedule needed in AutoCAD format, but AutoCAD cannot make a Revit file. So maintain one library in Revit. Then you gain efficiency threefold. First, you don't have the memory issues related to having several AutoCAD files linked/inserted into your project (they bloat the database). Second, you don't have to spend time modifying and reinserting the AutoCAD files so they print right for every Revit project you get. Finally, you can use the "Insert Views from File" tool under the Insert tab. From there, just point to the Revit Library file containing your Details and Schedules, and check the boxes for the ones you want in the current project. After they are loaded in the project browser, simply drag and drop them onto the sheets in the order desired, and voilà, done. One quick tip: in the Library file, you can specify a "name on sheet" that is different than the View name. Using this, you can name your views with a prefix that helps organize the details and the titles display as desired (without the prefix).

## ORGANIZATION WILL SET YOU FREE

### Nomenclature

A system of nomenclature will need to be developed to handle the following: Filters, Systems, Detail Line Styles, View Templates, Worksets, Annotation Symbols, and Shared Parameters, just to name the major ones. Have you ever needed a tool you couldn't find, but know you had one perfect for the job? It's infuriating and time wasting. Not only do you waste time looking, but then you have to recreate it if you fail to find it. Having a system in place for naming the tools is invaluable for saving time and frustration. For filters I like to follow the convention of: X_Object Effected_How Effected, where X indicates a Discipline Designator. So an example would be H_Duct System_Isolate. There are many different systems for each of the object categories; what works best for your firm will likely be different. Just try to keep it simple.

### Fonts

Trying to match the company font standard for drawings is one of the most difficult "simple" tasks I have come across. The challenge isn't just in changing a project setting, but in changing the font in every annotation family that will be loaded in a project. Any symbol that is using an annotation symbol with a piece of text in it will need to have the font changed. Every schedule that is created will need to be changed to the standard font. There are many places that must be updated to maintain consistency with fonts. Next, if you do decide to change the fonts, be sure to test them. Do the "I"s look like "1"s? When printed, do the periods disappear because they are too small for the printer? Remember that contractors are often reading copies of our paper drawings—do the periods disappear when copied? That could make a huge difference on your schedules if the values are

off by a couple of decimal places. A cooling coil flow value of 3.6 GPM becomes 36 GPM. Last, I should mention that Revit only supports True Type fonts. The big drawback for companies converting from AutoCAD, is the font of Romans. It is a very commonly used font in the industry and it is not a True Type font. This muddies the waters with recreating AutoCAD details in Revit.

## Browser Organization

You have control over how the project browser organizes your views and sheets. Using this you can organize any project in a fashion that makes sense to you or for the project. If any of the out-of-the-box settings don't meet your needs, you can always add a project parameter to your views or sheets, and create a new organization that sorts by the project parameter you created. So you really do have full control over how they get organized. Why not create a category of views as design tools? It sure would be nice if the print dialog could take advantage of this organization. That's on my wish list.

## Wrap up

Implementing Revit MEP in an office is as major a change as converting from pencil and paper to AutoCAD 25 years ago. Plan on spending at least six months to a year or more to get all of this set up and established. If you don't understand anything mentioned in this article, then I encourage you to get training on it. These are the foundations you are building that will impact the efficiency of your firm for years to come. This is a huge undertaking involving lots of change. William Deming said it best, "It is not necessary to change. Survival is not mandatory." With that, I encourage you to do it once and do it right. Good luck.

*David Raynor is the Mechanical Designer/BIM Specialist for Stanford White Inc., a mechanical, electrical, plumbing and fire protection consulting engineering firm in Raleigh North Carolina. He has worked with AutoCAD since 1997, AutoCAD MEP since 2001, Revit MEP since 2008, and Revit MEP Beta tester since 2010. He is responsible for training and implementation of Revit MEP for all disciplines. He has been a member of AUGI since 2004, and an active member of the local Revit user group, NCRUG. David has a Bachelor's of Applied Science from Campbell University. David can be contacted at ddraynor@stanfordwhite.com*

## AUTODESK ROBOT STRUCTURAL ANALYSIS PROFESSIONAL

Robot Structural Analysis from Autodesk  http://usa.autodesk.com/robot-structural-analysis-professional/
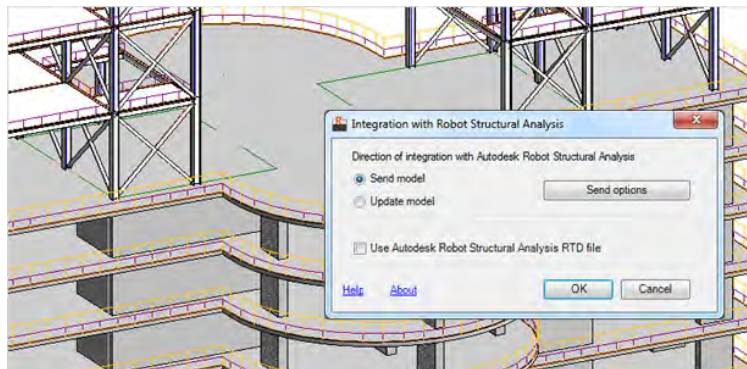
Autodesk® Robot™ Structural Analysis Professional software provides structural engineers with advanced building analysis capabilities for large and complex structures. The structural analysis software offers a smoother workflow and interoperability with Autodesk® Revit® Structure software to extend the Building Information Modeling (BIM) process, enabling engineers to more quickly perform comprehensive analysis of a variety of structures.

## REVVED

ReVVed at pkh Lineworks http://www.pkhlineworks.ca/revved.php

From the website: ReVVed is a collection of Revit extensions that have been designed with the draftsperson in mind. ReVVed turns repetitive tasks into one click commands. These commands work with architecture, structure and MEP flavors of Revit. Commands like:

- *Merge Text - merge multiple text notes into a single note.*
- *Change Case - changes the case of selected text notes to a user specified case. (Upper, lower, mixed)*
- *Web Link - opens a web browser to the URL stored in Revit components.*
- *Polyline - adjust the total length of end-to-end lines. (Like travel distances)*
- *Open Folder - opens Windows Explorer to the folder where the project file is located.*
- *Project Commander - store critical information about the currently open project in a handy place.*

Oh, and they are free. So go get'em.

## ETRANSMIT FOR REVIT

eTransmit for Revit at Autodesk Labs: http://labs.autodesk.com/utilities/revit_etransmit/

From the website: eTransmit for Revit is a technology preview of an add-in application…

With eTransmit for Revit, you can:

- Copy and detach a Revit model and associated files to a single folder for Internet transmission. This removes the typical error messages when you copy central files using the operating system.
- Locate dependent files automatically and include them in the trans-

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mittal folder, reducing the possibility of error. All dependent files are automatically converted to use relative paths to ensure that the dependent files can be located by the model.

• Choose to include related dependent files such as linked Revit models, CAD files, DWF markups, decal images, and external keynote files. You can transmit any Revit (.rvt) model that has been upgraded to Revit Release 2012.

• Transmit models that are using file-based worksharing or server-based worksharing. eTransmit for Revit will also work with non-workshared Revit models.

Also free, and what a timesaver.

## SAUBIM CODE CALCS

SAuBIM Code Calcs from Jeffrey A. Pinheiro & Fredy Teyssedou at http://saubim.com/

Overview: SAuBIM – Code Calcs v1.0 for Autodesk® Revit® Architecture is a compact, easy-to-use, time-saving program. Autodesk Revit Architecture is a BIM (Building Information Modeling) program and can be very powerful when pulling the right information in and out. SAuBIM – Code Calcs v1.0 takes advantage of the information in your BIM model and saves you hours of time.

Videos and screenshots available on the site.

## ELUMTOOLS

ElumTools from Lighting Analysts, Inc. at http://www.elum-tools.com/

Overview: ElumTools is the first fully integrated add-in for Autodesk Revit designed to calculate point-by-point illuminance on any workplane or surface utilizing lighting fixture families and surface geometry already present in the Revit model. ElumTools runs completely inside of Revit allowing quick and easy analysis of any Revit Room or Space including hosted elements and even furniture. An interactive Radiosity-based visualization is a by-product of the calculation enhancing the understanding of light and surface.

Videos available on the site.

Until next issue!

If you'd 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.



*Erik Lewis became involved with BIM after going back to school to make a career change from residential construction. He gained in-depth knowledge of various BIM authoring tools while working as an Application Specialist for an Autodesk retailer. Erik is currently a BIM Coordinator with Cogdell Spencer ERDMAN, where he is deeply involved with the pervasive process change that comes when implementing BIM in an integrated Design-Build firm. Erik spends his free with his daughters and wife and occasionally posts an interesting tidbit to his blog www.whosafraidofthebigbadbim. blogspot.com. You can contact him at erikmlewis@gmail.com.*



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# Revit Implementation: Workflow Tricks

A s an office begins the transition to Autodesk® Revit®, full immersion is typically rooted in learning the toolset and working methodologies, with standardization and office-wide management taking a backseat to "getting functional." When the dust settles, Implementation Managers find themselves looking for the handles to make the office function as a unified machine. Aaron Maller of The Beck Group, in Dallas, Texas, has spent five years working in Revit implementation and standardization and knows how to manage the office seamlessly, with a few simple workflow tricks.

## WHERE IS MY CUI FILE?

Anyone with years of supporting AutoCAD® or AutoCAD® Architecture has an intimate relationship with the CUI file editor. We know it is where we can push changes to our users, update UI configurations, alter keyboard shortcuts, file pathing locations, and so on.
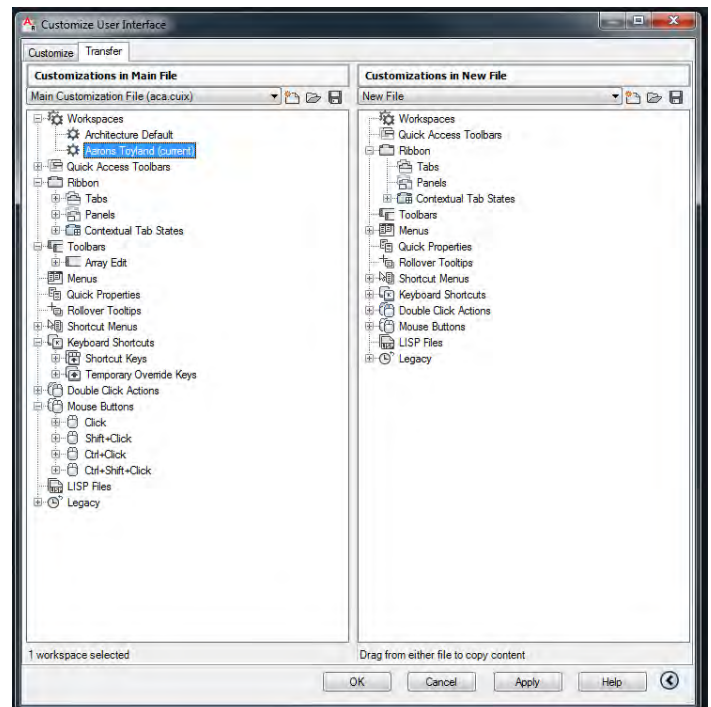


*Figure 1: AutoCAD Architecture CUI Editor*

```
HiliteColor=15764091
PreHiliteColor=16343759
ErrorColor=33023
[Directories]
FamilyTemplatePath=\\dalfs\PUBLIC\BIM\Revit\2012\Beck Family Templates
DataLibraryLocations=Families=\\dalfs\PUBLIC\BIM\Revit\2012\Beck Family Content (3d), Detail Comp=\\dalfs\PU
Groups=\\dalfs\PUBLIC\BIM\Revit\2012\Beck Model Assemblies, Drafting Details=\\dalfs\PUBLIC\BIM\Revit\2012\
\Revit\Beck Material Maps, DALFS Jobs=\\dalfs\Architecture\Job_Files
ProjectPath=C:\Temp
ImportLineweightsNameDWG=\\dalfs\PUBLIC\BIM\Revit\2012\Beck Project Template\ImportLayers-NCS40
ExportLineweightsNameDWG=\\dalfs\PUBLIC\BIM\Revit\2012\Beck Project Template\ExportLayers-NCS40
MaterialLibraryFiles=..\Data\Rendering
IESFileLocation=\\dalfs\PUBLIC\BIM\Revit\Beck IES Files
DefaultTemplate=\\dalfs\Public\BIM\Revit\2012\Beck Project Template\Beck- Project Template- RAC2012.rte
RootPathForPointClouds=C:\Temp
AdditionalRenderAppearancePaths=\\dalfs\PUBLIC\BIM\Revit\Beck Material Maps\Concrete\|\\dalfs\PUBLIC\BIM
\BIM\Revit\Beck Material Maps\Masonry-Brick\|\\dalfs\PUBLIC\BIM\Revit\Beck Material Maps\Masonry-Stone\|\
\dalfs\PUBLIC\BIM\Revit\Beck Material Maps\Misc\|\\dalfs\PUBLIC\BIM\Revit\Beck Material Maps\Paints and Pap
\dalfs\PUBLIC\BIM\Revit\Beck Material Maps\Woods\
```

*Figure 2: Revit.ini file (2011)*

While it still exists, the Revit.ini file protocol underwent serious changes that may throw many implementers for a loop as they prepare to deploy Revit 2012. First, Revit.ini no longer resides in the Program Files directory. Users who aren't aware of this change may drop it in the root directory of their deployment and discover (after deploying) that the stock Revit.ini file is used. In an effort to better support Remote computing applications and roaming profiles, Revit moved the Revit.ini file to a location in the Users directory (Win7), or the Documents and Settings/Username directory (pre-Vista). What this means, however, is that the location for the Revit.ini file may not exist until that user has logged onto the machine already. How this is handled is through a new file called "inifile.xml." This document exists in a number of places, but for our deployment I edited and replaced the one at: [AdminImage]/x64/RAC2012. (The same rules apply for all three verticals.) Bonus: With this new configuration, this one XML file serves as the installation configuration file for all three verticals, even using different templates and different file paths. (At The Beck Group we use all three Revit Platforms.) If you are accustomed to having a GUI for editing configurations, editing the XML may feel daunting at first. The downside of this workflow is you won't know if part of your XML is faulty until you launch Revit and have unexpected results.

TIP: If you don't feel comfortable editing the XML directly, Autodesk has released a Deployment Utility to help with this:

http://usa.autodesk.com/adsk/servlet/ps/dl/item?siteID=123112&id=17352374&linkID=9280927
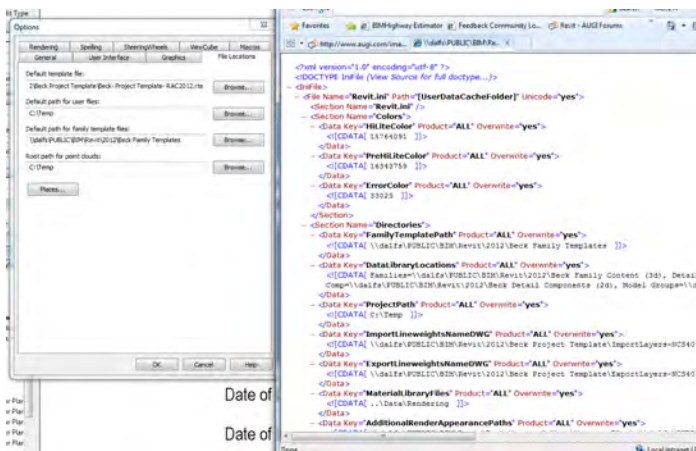


*Figure 3: inifile.xml file (2012)*

On the surface, this file may look like abstract code. These lines, however, are at the core of Office Standardization and Management. This file contains controls for all of the following and more. Highlighting and Selection Colors, Paths and file locations for: Project Template, Content Libraries, Content Templates, CAD Import and Export Layer settings, "Places" Directory Locations, Custom Rendering Material libraries, Lookup Tables, Warning message suppression, User Interface settings, Help file setup, and Content search locations. With the new XML setup, you can also locate different templates and different options for the different verticals of Revit, saving you from having to write an XML for each product.

## BUT I DON'T WRITE CODE!

No one was more up in arms about trying to manage an office with 2012 and XML than I was, to be sure. The perceived ease of use (or difficulty) of Revit lies in how accessible the right solutions are, and how inaccessible the wrong ones are. For me, this means having paths that work correctly when the user clicks on them, an Office Library that automatically shows up, and settings that don't need adjustment by every user. With the move to XML, this was daunting. So, a few notes and samples from the XML file:

What we once wrote in the Revit.ini file as:

[Directories]

FamilyTemplatePath=\\office network\Revit\2012\Beck Family Templates

DataLibraryLocations=Families=\\office network\Revit\2012\Beck Family Content (3d), Detail Comp=\\office network\Revit\2012\Beck Detail Components (2d), Model Groups=\\office network\Revit\2012\Beck Model Assemblies, Drafting Details=\\office network\Revit\2012\Beck Drafted Details, Material Images=\\office network\Revit\Beck Material Maps

ProjectPath=C:\Temp

Now gets written in the inifile.XML as this instead:

<Section Name="Directories">

<Data Key="FamilyTemplatePath"><![CDATA[\\office network\Revit\2012\Beck Family Templates]]></Data>

<Data Key="DataLibraryLocations"><![CDATA[Families=\\office network\Revit\2012\Beck Family Content (3d), Detail Comp=\\office network\Revit\2012\Beck Detail Components (2d), Model Groups=\\office network\Revit\2012\Beck Model Assemblies, Drafting Details=\\office network\Revit\2012\Beck Drafted Details, Material Images=\\office network\Revit\Beck Material Maps, DALFS Jobs=\\dalfs\Architecture\Job_Files]]></Data>

<Data Key="ProjectPath"><![CDATA[C:\Temp]]> </Data>

It gets tricky, just as it did with the old INI file. Some multi-entry fields are separated by commas, some by "pipes," and some require

the full [CDATA] tag at each entry. A longer and more in depth discussion of all of these specific entries can be read at RevitForum.org, where a core group of users were conducting Trial and Error while hashing this out. Things that are often overlooked that I would be sure to include as part of any good implementation strategy:

Places. In the XML these are the locations considered "Data Library Locations," but they show up in all of the Open, Load, and Link dialogs in Revit. I include one for the Modeled Content, one for Detail Components, one for Standard Drafted Details, one for modeled assemblies (RVT files for Insert > Load as Group), as well as one that leads to the offices Job Directories.
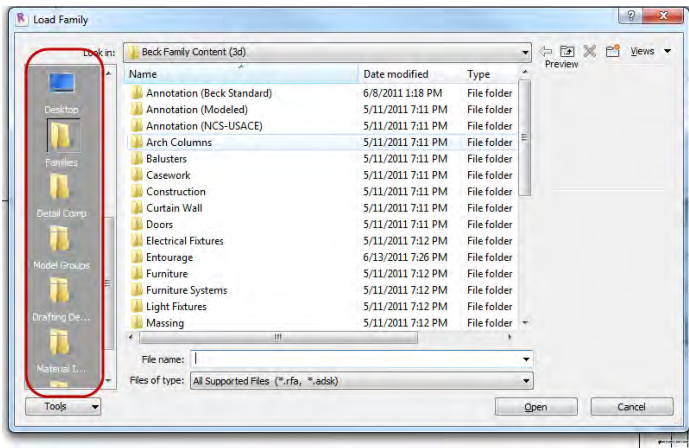


*Figure 4: Places directory (2012)*

One minor defect that can set you back hours (and gigabytes of space, if you aren't aware) is that in 2012, the deployment configuration cannot disable the Out of the Box Content Download and Install on its own. Sure, there is a checkbox that you can deselect to "skip content instant," but it will still ping the Autodesk server and download it all, onto the local machine. If you don't use the Autodesk content at all (even if you do, it's probably on your network), you'll want to defeat the content installation. This is in another XML file called: master.rac.xml, master.rst.xml, or master.rme.xml. Basically, you want to wipe out everything in the file that says Content Packs. Doing this drops your entire installation time to under 15 minutes.

## SPEAKING OF PATHING FILES….

Where do you want all of those files to live? I've had the benefit of implementing several offices making the transition to Revit, and I've found a pretty simple system that works quite well. A few rules of thumb:

1. **Separate them by Revit Version.** We have a parent "Revit" directory, and then each year's release is a subdirectory. Revit\2012, and Revit\2011. Why? Inevitably, some projects will get left in last year's version, with unwilling consultants who cannot upgrade, and so on. Only carrying one library (and having to upgrade it every year) causes headaches. There are some files, however, that aren't version-specific. You will want an absolute path for these when projects get upgraded and you still need access to them: Rendering Material bitmaps, IES files, RPC files. These we keep in our parent Revit directory, in a version neutral zone.
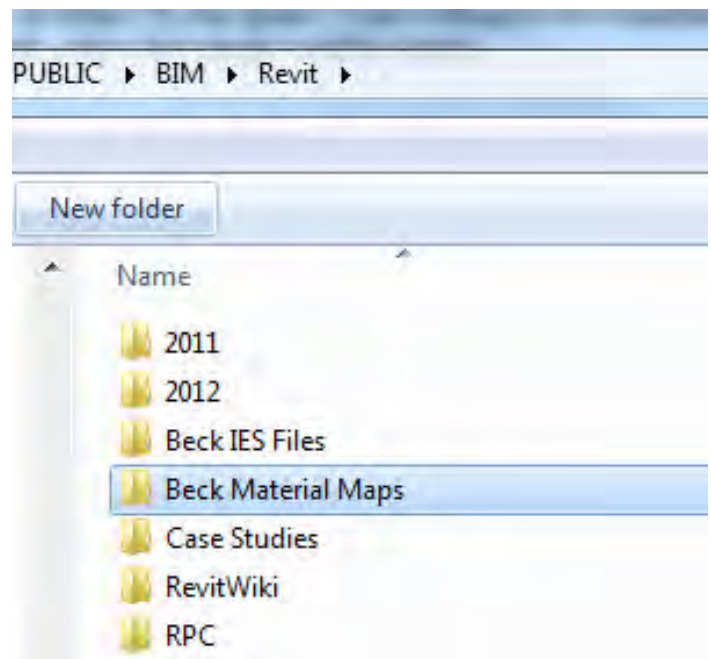


*Figure 5: Revit directory*

2. **Separate Office from Autodesk Content.** If you are in an office that still makes use of the Autodesk Content, keep them in separated subdirectories of "Autodesk Content" and "Office Content." That way, you have a quicker road when upgrading to the newer library when new versions come out, without having to sift through directories of old content. This will also help you when you copy your directory next year, to upgrade it to 2013.

3. **Location Location Location.** Now is a great time to mention that many of us have multiple geographical locations. The Beck Group has Revit in six locations, running off four servers. Depending on your office's infrastructure, you have one of two possibilities: Distributed File System, and Not. If you are on DFS, much of the library is a non-issue in most of the locations, as they pre-populate everywhere. If you aren't on DFS, I recommend making sure each locale has a similar folder structure and build the exact same "Revit/2012" directory on their server. That way, you are one Sync program away from having everything populate around the globe overnight.

4. **Templates and Configuration Files.** This is a great time to mention that all of the files Revit uses as References (text files, etc.) ought to be stored right in with your content and your template. Why? Through either DFS or Sync, you already have those directories syncing. This means that with a very simple "Find and Replace" edit in your XML file "Replace THIS_location/ with THAT_location/" you have XML files ready to go for each office. Again, for DFS this is a non-issue. This is also a simplicity issue. Do your users currently know where the office Shared Parameter text file is? If not, how can content get created and manipulated consistently?

## THE CONTENT ITSELF

Opinions vary widely on what is "acceptable" as far as content is concerned, but I have found there is actually a decent return on making sure all of your content is built in house. An arduous task, you might say, but let's go back to the discussion regarding an Office Standard Shared Parameter text file. When you adjust the "cabinet height" in two different families, are you certain they are referencing the same location in the piece of content? Are all of the parameters you need to schedule and quantify either Hardcoded or Shared Parameters, so you can schedule them? What about drawer heights? Even if you pilfer content from other locations, taking the 15 minutes per family necessary to replace all of the parameters with your office Shared Parameters means your content can get much more intelligent, much faster.
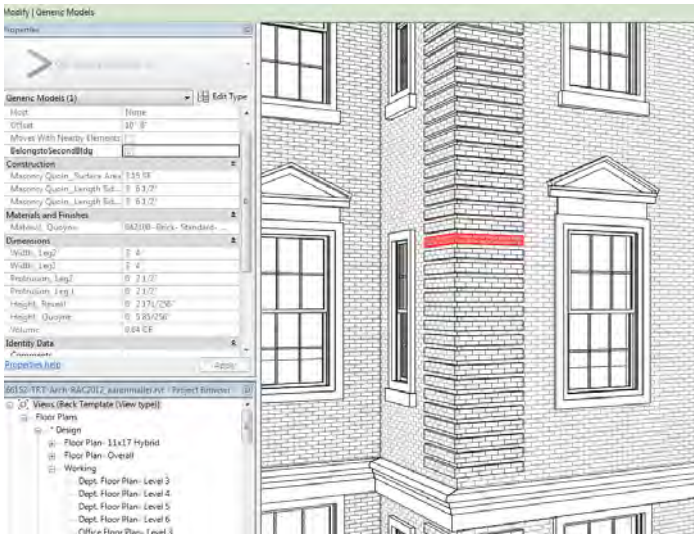


*Nested Brick Quoin Family (The Beck Group – 2012)*

It also means that since you have given that family its due diligence, making subsequent changes to family (and nested family) variants is also a much more intelligent process. This means models can get built faster (nested with parameters tied together, and you know the parameters) and that they can report a better "I" in the BIM: better data, and the data can all be scheduled.
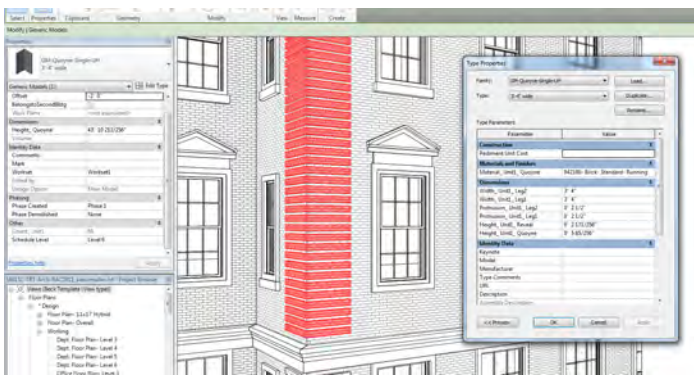


*Parent Brick Quoin Family – Instance Parameter stretchable (The Beck Group – 2012)*



*Quoin Schedule of Shared Parameters (The Beck Group – 2012)*

## THE CONTENT CREATION, AND THE CONTENT CREATOR

The above are the paramount reason why any solid office-wide implementation needs to be managed by a "Gatekeeper." If not one person, than a small and select team to be working through every category: What parameters get used, what family templates get used, who is building the family templates and the standard pieces of content, and so on.

Family Templates should be set up by the Implementation Manager, with the Shared Parameters the office is intending to use and to schedule. The gatekeeper premise doesn't negate the general office staff from building content, but I find it critical that one person or a small team be handling QC/due diligence, on content before it makes it in to the office library. Are the formulas functioning correctly, are the parameters correct, are they reporting the way the office likes?

Another tip is to have IT set up a dedicated Domain log-on for that use: Revit doesn't "live link" to the content, but the "Edit Family" button recognizes the "home location" of the originating content, and it's very easy to save over content accidentally, even when you are the Implementation Manager.

The Content Gatekeeper's function also has to be one that mitigates risk in bringing content from external sources: Free downloads, pay downloads, manufacturers, specification sites—all offering turnkey Revit content for a click. Still, when 14 family types of doors end up in a project, and there are 60 instances that will not schedule (because they do not use your Family Template with Shared Parameters), you will be stuck hacking at the 15 door families to force them to work.
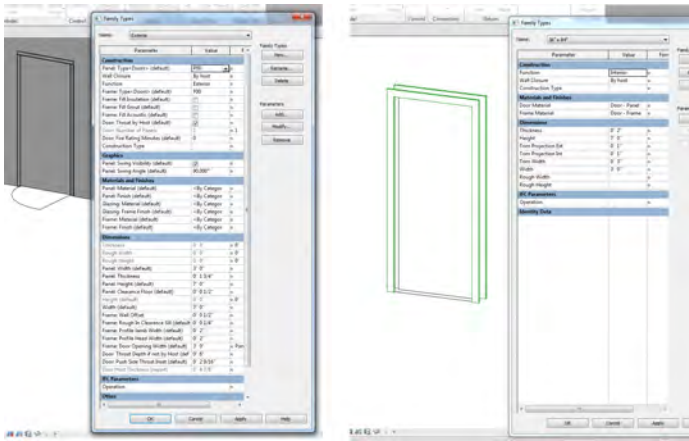
*Doors: office-built versus downloaded. Can you expect them to play together?*

## THE CONTENT DISSEMINATION

This begets the following issue. Now that I've built all of this custom content, with all of my Shared Parameters, and all of my validated Parametrics, does anyone in the office know where it is? At the risk of making this a shameless product plug (it isn't shameless; it isn't my product at all!) remember one thing: perception, for your users, IS reality. A perceived level of complexity and difficulty means Revit is difficult to use. Content Navigation should be in their hands, and instantly.

I have tested and vetted six or seven different solutions, some more complex than others, but at the end of the day, what I wanted was my Design Palette from ACA! I was ecstatic to learn last year that Kiwi Codes (Kiwi Codes Solutions Ltd.) offers an external app that functions in just this very way. Plus, since we are not employing DFS in this office, we simply make the text files that run the Family Browser at the Central location, and they populate out over filesync. The best part? It updates in real time. Once a piece of content is added to the library, it shows up immediately for the staff, without having to constantly send emails "new content added to plumbing fixtures." It will mean wanting to reorganize your library a little bit, but it's worth the effort. Remember, perceived ease of use means ease of use.

## A TEMPLATE FOR YOUR OFFICE

When it comes time to close down this article, we get to the topic that probably should have consumed the majority of it: The Revit Template, the .rte file. Think of this as your coveted Layer States, your Base file for XREF, your Max Scene ready for import. It defines everything your project could, can, and will be. How much time do you have invested in it? If you follow my blog at www.malleristicrevitation.blogspot.com, you can find the full text of what I believe a good Revit template should have, but ask yourself this question: "Am I doing something that has to be done on every single project in the exact same way?" If the answer is yes, it needs to be done in your Project Template. A complete list of things to include can be found on the blog, but don't be afraid to make them mean and massive. Ours sits currently at a hefty 45MB and I see it only getting bigger. The file needs the information regardless—it's just a matter of whether you load it in once or someone in your office does it every week.
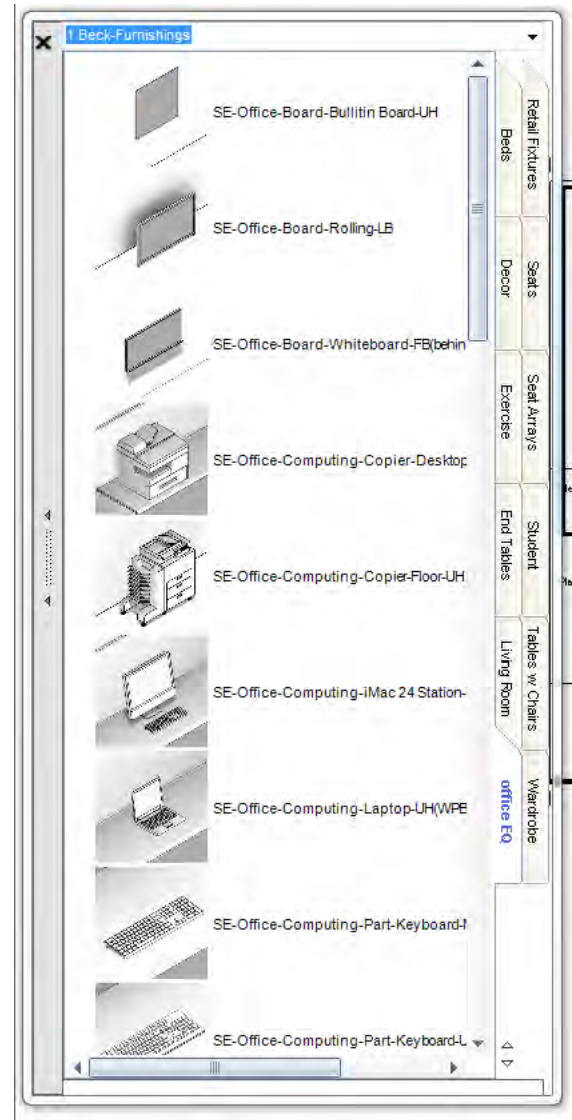

*Kiwi Codes Family Browser: lightweight, instant update, searchable, inexpensive.*
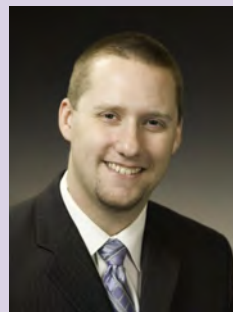

*Aaron Maller is currently the BIM Manager at The Beck Group, specializing in Revit implementation. His current role includes streamlining use of the program, exploiting its efficiencies amongst the Architectural Design and Construction groups at Beck, as well as Revit infrastructure management and training for all users. His work experience includes implementing and supporting Revit in a variety of offices, and using Revit for all phases of architecture (from Design to CA), on projects of varying scopes and genres. Passionate about Revit and architecture, he's an avid contributor on AUGI, RevitForum.org (twiceroadsfool) and is active in the Revit Community.*

# 3DS MAX: MAKING THE VIRTUAL REAL

This article discusses some of the key elements in successfully integrating and managing the interrelationship of Autodesk® Revit®, Autodesk® 3ds Max®, and 3D Printing.

Way back in the old pre-BIM days, the task of creating a 3D computer model for visualization purposes was complex and laborious. Now, for many projects, that 3D model is a gift that comes from the act of creating plans, sections, and elevations in Revit. So, rather than importing 2D reference drawings into 3ds Max Design and creating new 3D entities, we are simply importing that model. The complex, time-intensive task of creating a 3D "wireframe" model has been eliminated. So how can we make the best use of that gift in 3D?

For high-quality study images, one can stay within Revit itself and dispense with the whole step of exporting and importing. For more sophisticated visualizations, going into 3ds Max Design is a necessity. The benefits include greater control over the look and feel—the ability to create an animation or panorama and to visualize the project within its context whether that be photographic for photomontage or texture-mapped geometry.

There is an often overlooked second benefit which should be planned for when the decision is made to move between Revit and 3ds Max Design. This is the 3D Printing (3DP) of the virtual model to produce physical, real world models. 3DP models are really physical instances of the virtual model. The ease with which a 3D model used for visualization purposes can be used for 3DP can be greatly enhanced if one is aware of those needs.

The first and most straightforward item is to export as Solids from Revit as opposed to Polygons for DWG files. Visualizations tend to be stage sets where faces of geometry not seen from a viewpoint can be eliminated. This helps speed up the processing time for a rendering. From the 3DP perspective we end up with a model that needs to be rebuilt as solids in order to be reused for physical model creation. While many 3DP projects start from this point, planning ahead saves much labor time. It's always good to recycle data rather than reconstruct it.
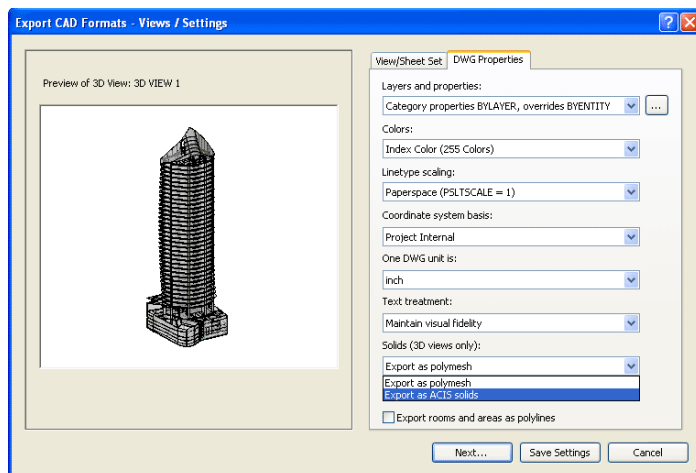


*Figure 1: Revit CAD export*

Texture mapping and the design of the 3DP model itself are also very important. There are assets such as cameras, lights, and animation tracks that intuitively aren't involved in the conversion to 3DP. Even though for color 3DP we export a VRML file from Max Design, which may contain some of this information, once that file is brought into software for checking and printing the 3DP model, that information is ignored.
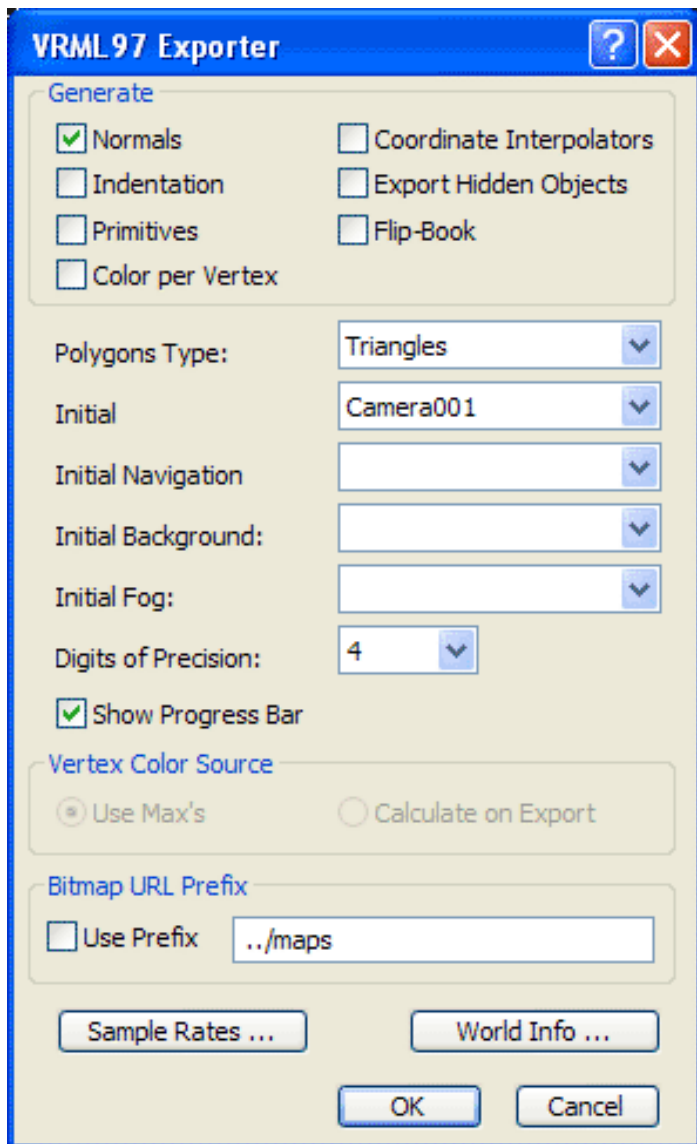


Figure 3: 3D Printed model



Figure 2: Revit VRML export

There are also plug-ins and shaders, which many renderers use to get the look and feel they want. None of these effects come through for 3DP. Not only do the lighting effects not translate, but any materials not of the standard sort don't either. So, if you have mental ray materials, they need to be redefined as standard in order to appear on your 3DP model. 3D printing of texture maps in full color is desirable for most of my projects and I believe that this new aesthetic is growing in acceptance. It is highly recommended to test-print small, almost 2D pieces with your texture maps before printing the final, larger pieces in order to nail down the look and feel.

Within our standard material limitation, we are able to use Multi/Sub-Object materials that are very helpful when using solids. Otherwise it would be difficult to have a wall with different colors on one side or the other. It is wise to test this first before going too far as I have had some issues in earlier versions with maps not sticking.

3DP-specific software such as Z-Edit Pro allows for colors to be defined with them, but we really want to do it all in 3ds Max Design if possible. Imagine needing to make some changes to your model, needing to export a new VRML file and then having to go through color changes again in the 3DP software.



Figure 4: 3D Printed model

Now let's get into how to design a 3DP model. There is no "easy button;" this is not an automatic process. Also note that Woody Allen's movie *Sleeper* was not a predictor for the future, but rather satire. Efforts to make the process more intuitive are needed and are being developed. However, to lose control of the final product is not something in which those of us at the design end of the AEC spectrum would have much interest. If these developments are able to produce a good first pass of a model design from which one could customize as needed, that would be as good as it could get. It reminds me of when CAD was starting and hearing some architects comment that the next version will have a better interface design and, therefore, would not be difficult to use. Well, 20 years later, a

# 3ds Max Design

certain level of skill and commitment is still required to create and produce with CAD or BIM and that will always be the case.

Those who have direct access to a 3DP machine have an advantage in design 3DP models. Since these are all tools, if you don't know your tool, it makes things more difficult. To create elegant solutions, you need to know the limits. The aspect of fragility pertains more to the processes internal to the machine like depowdering and handling during infiltration than to the finished product itself. We create very thin elements in our models, but understand how they need to be handled en route.
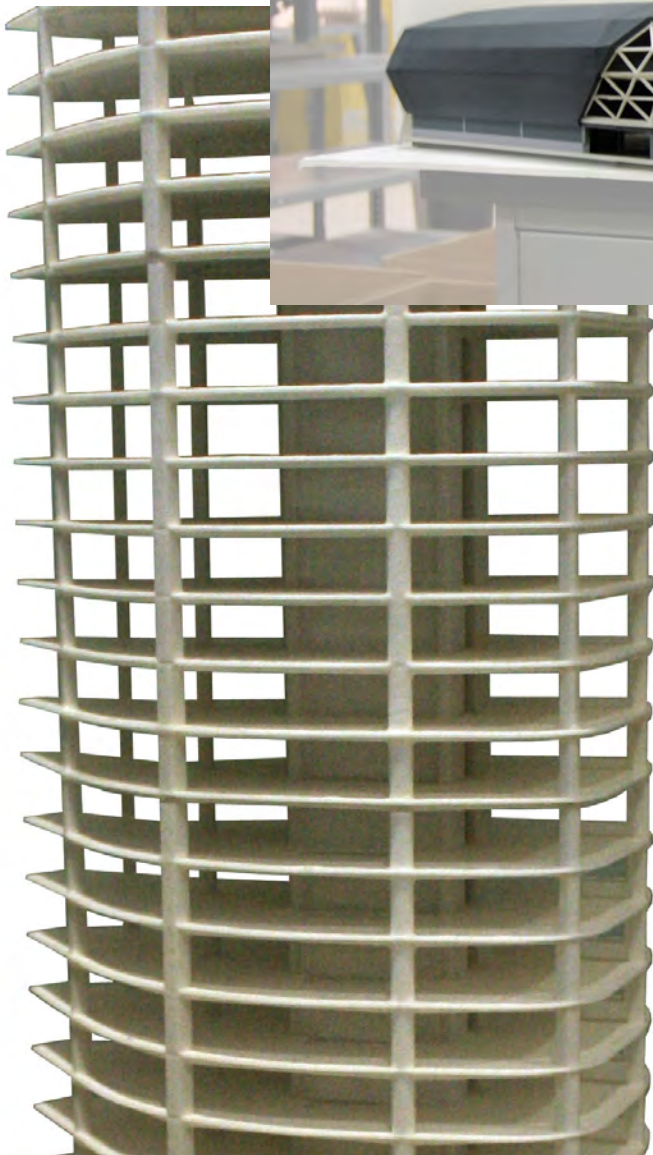



*Figure 5: 3D Printed model*

For example, I recently finished a project of an office tower that had very thin floor plates. 3d printers all have size limitations. Our projects don't necessarily respect these boundaries so we quite often make models from multiple pieces. The trick is to hide the seams. Luckily the precision inherent to this medium works in

our favor. This project had five sections of about eight floors each. Each one was printed vertically. I slipped thin cardboard underneath to move it from the machine and do the final depowdering. For the infiltration step, I brushed cyanoacrylate (SuperGlue) on the edges of the floor plates. This way I could handle it then dip the whole piece into a bath of the stuff without breaking it. The result is super-thin yet strong pieces that were not thickened for presentation purposes but true to size, which is important in maintaining the audience's interest and lends legitimacy.

*Figure 6: 3D Printed model*

Just as 3DP model creation on the software end needs to be an integrated approach, the same is true on the output end. Hybrid models using traditional materials as well as 3DP is often what the project calls for. We have had success in designing the whole model in 3ds Max Design and then going to 3DP for most elements and for other ones to derive the templates from that computer model. This way, the exchanges with the clients during the process are realistic, and in the end when it's built, the surprise factor is eliminated.

Maximizing the life of the Revit model in the visualization of our projects—even into the physical model creation realm—brings fuller, more accurate, and less expensive production efforts. 3DP models are the reincarnation of visual models in the everlasting life of AEC visual communication.

*From CAD implementation to visualization to the art of leveraging BIM in 3D printing, David has been in the forefront of exploring how we use computers in the architectural design process for almost three decades. His studio Munson3d.com, provides consulting services to architects and engineers and is based in Arlington, Massachusetts, with distant and local clients. He can be reached at David@Munson3d.com*

# HEADS UP!
## Updates, Service Packs and Top Known Issues obtained from product pages at Autodesk.com

### AUTOCAD/ACA/AMEP

2011-05-12 - AutoCAD Structural Detailing 2012 Object Enablers (32-bit and 64-bit)

2011-05-16 - 2012: AutoCAD framework issues when running at high DPI scaling

2011-03-23 - Autodesk Material Library Medium Resolution Image Library 2012

2011-05-24 - AutoCAD 2012 Performance Slowdown Hotfix (32/64 bit)

2011-05-24 - AutoCAD Raster Design 2012

2011-05-26 - How to perform an automated uninstallation of AutoCAD 2012 and Autodesk Design Suite 2012 Family Products

2011-05-27 - AutoCAD Mechanical 2011 Update 2

2011-06-03 - Vault 2012 Client Update for AutoCAD 2011

2011-06-03 - Vault 2012 Client Update for AutoCAD 2010

2011-06-07 - Open Light 2012 Object Enabler (32-bit and 64-bit)

### CIVIL 3D

**Top Knowledge Base Issues**

2011-05-24 - AutoCAD 2012 Performance Slowdown Hotfix (32/64 bit)

2011-06-16 - AutoCAD Civil 2012 Object Enabler

# Heads Up

2011-06-20 - Autodesk Storm and Sanitary Analysis 2012 Hotfix (localized Civil 3D and Map 3D versions Only)

2011-06-23 - Autodesk Infrastructure Design Suite Network License Hotfix

2011-06-23 - Understanding a Civil 3D and Infrastructure Suite mixed license environment

## REVIT ARCHITECTURE/MEP/STRUCTURE

2011-05-02 - Revit Add-In Hotfix

2011-05-06 - Hotfix – Autodesk Revit 2012 – Climate Server Error with Input string format

2011-06 - Autodesk® Revit® Architecture 2012—English (Includes Update 1)

2011-06 - Autodesk® Revit® MEP 2012—English (Includes Update 1)

2011-06 - Autodesk® Revit® Structure 2012—English (Includes Update 1)

2011-06-01 - Hotfix - Autodesk Revit Structure 2012 - UK Terminology

2011-06-09 - Revit 2012 Deployment Utility

## AUTODESK INVENTOR

### Autodesk Inventor Professional 2012

2011-06-03 - Hotfix - Length updates are not updating correct parameters

2011-06-03 - Hotfix - Options not functioning properly for Export Face As

2011-06-07 - Service Pack 1 for Factory Design Suite 2012

2011-06-23 - Hotfix - iLogic assemblies dependent on derived or linked parameters exhibit poor performance on update & Unexpected exit on close of drawing after use of iLogic form with parameters

### Autodesk Inventor Professional 2011

2011-05-10 - Hotfix - iPart with linked parameter file triggers redundant prompt for Save

2011-05-19 - Autodesk Inventor 2011 Service Pack 2

2011-06-03 - Hotfix - FileManager.GetLastActiveDesignView Representation throw COMException if active view is Master

2011-06-10 - Hotfix - OnPopulateFileMetadata event is needed to set FileMetaData File Location when using the Copy Components command & an unexpected exit when handling event OnFileInsertNewDialog with Shrinkwrap command

2011-06-17 - Hotfix - Hit entity fails when fill bend relief and causes corner to fail

2011-06-20 - Hotfix - iCopy uses the wrong components to construct the assembly patterns

UPDATED 2011-06-30 - Autodesk Inventor 2011 Subscription Advantage Pack Service Pack 2 Client Update for Autodesk Vault 2012 Server Releases

UPDATED 2011-06-30 - Autodesk Inventor 2011 Service Pack 2 Client Update for Autodesk Vault 2012 Server Releases

## MOLDFLOW

2011-03-29 - Creating Custom Deflection Plots in Moldflow Insight

2011-03-30 - Creating A Custom Thickness Plot in Moldflow Insight

## 3DS MAX/MAYA

2011-05-17 - Hotfix 1 – Autodesk® 3ds Max® 2012

2011-06-03 - Autodesk Maya 2012 Hot Fix 2

2011-06-17 - Hotfix - Imported B-Spline surfaces from CATIA V5 are over extended with DirectConnect 2012

2011-06-21 - Autodesk 3ds Max 2012 Service Pack 1

2011-06-29 - Autodesk Maya 2012 Hotfix 3

## MULTIPLE AUTODESK PRODUCTS

2011-05-05 - How Previous Version support affects license usage in Autodesk 2012 Suite products

2011-05-11 - 2012: Cascading Sequences for Autodesk Products

2011-05-20 - Not all Previous Version licenses are available after activating an Autodesk Design Suite
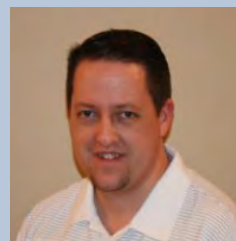
2011-05-23 - How to remove all Autodesk products from a Windows system

2011-05-24 - How to find the product key for your Autodesk product

2011-05-31 - 2012: Preparing for Installation of Autodesk products and Suites

2011-06-23 - Autodesk 2012 Block Editor Save Corruption Hot Fix

2011-06-29 - 2012: FLEXnet® feature codes for Autodesk products



*William Troeak is an Architectural Technical Specialist for U.S. CAD with over 10 years of experience in the architectural industry. Prior to joining U.S. CAD, William worked as a drafter, job captain and BIM Manager for various Architectural firms where he worked on institutional, commercial and residential projects. In addition, William is a Revit Architecture instructor at Long Beach City College and an Autodesk Certified Professional in Revit Architecture and AutoCAD. He regularly conducts seminars on the use of Autodesk technology for Architecture and sustainable design and provides implementation, customization, training, and technical support services to AEC design professionals.*

# 15 Questions with Steve Bedder of Autodesk

**What is your role at Autodesk, Steve?**

I am the Manufacturing Technical Engineer for the UK and Ireland. My role is to work with manufacturers, engineers and designers to understand what they are doing today, where they would like to go and how the Autodesk Digital Prototyping solutions can help them to achieve their goals. I work closely with Autodesk channel partners in the UK and Ireland to answer questions they have and make sure that their teams have all of the knowledge and expertise they need for working with manufacturers using our technology. I also look after a number of Social Media feeds such as the Autodesk MFG Twitter (twitter.com/AutodeskMFG) and Autodesk MFG Northern Europe Blog (autodeskmfg.typepad.com) to share tips, tricks and news.

## How long have you been with Autodesk doing this, and have you held other positions?

I've been with Autodesk since October 2007 and have been in the same role all that time. My role (or job title) has stayed the same, but what I do evolves regularly, and that's what I love about it—no two days are ever the same. Before joining Autodesk I was working with a channel partner as an Application Engineer since 1996.

## Tell us a little about your background and how you came to be doing what you do now.

I always had an interest in design, engineering, and computers. It wasn't until a chance meeting with a college teacher that he told me I could combine the two things I loved at University. To cut a long story short, this led to a degree in Computer Aided Product Design. During my time studying, I knew this was what I wanted to do for a career.

My first introduction to AutoCAD was with R10 for DOS, then up to R12 for Windows, then R13. At the same time I started with 3D parametric design using Pro\Engineer. I joined the Autodesk channel in 1996 and started with Mechanical Desktop R1 and worked with many manufacturers with MDT up until Autodesk Inventor was introduced to the UK in 1999.

I've basically spent the last 12 years working with manufacturing companies across Europe and North America to get the most out of their investment in design and data management solution.

## What does a typical day look like at your desk?

As mentioned, no two days are *ever* the same, but I'll try and give you a bit of an overview.

When not out and about I work from home in the UK's Peak District so I usually start quite early checking email, social media accounts, etc., and then get into calls and emails with customers, prospects, and partners helping them to locate information, answer their questions, solve challenges, and develop workflows and solutions based on their Autodesk technology and the questions they have. Whilst working from home I also try and use the content I am working on for customers or partners to develop blogs, YouTube videos, and images for the Flickr gallery.

A lot of my time is spent out on the road visiting and meeting with manufacturers and channel partners. This usually involves an early start as to get anywhere in the UK you have to factor in morning traffic, which means adding up to an hour to any journey! Once at my destination I will be there to listen, understand the current situation, ask questions about how they are doing things today and where they would like to be in the future and help them to understand how the Autodesk Digital Prototyping solutions can help them achieve their goals. Sometimes my visits to a manufacturer are to discuss and answer questions about Autodesk technology they have already invested in and are actively using.

Once back home, I have dinner with my wife and our 5-year-old son before having some time making robots, chasing aliens, playing hide and seek, and generally running around like a big kid. That's with our 5 year old, by the way, not my wife!

## Describe the challenges that you and those you work with face.

My primary role is to help educate manufacturers on what the Autodesk Digital Prototyping solutions can do for them. This usually involves working with various departments and people within the organization, who all have their own ways of working, their own issues and their own opinions of how technology can help them. My biggest challenge is to take everything that I have learnt from all of the people within a manufacturer and provide a solution that works for as many of them as possible whilst taking all of their requests, issues and opinions into consideration. It's a challenge that I love though—I love meeting new people and talking to them about design, engineering, and manufacturing.

> ## I love meeting new people and talking to them about design, engineering, and manufacturing.

## Can you say how many people work with you or perhaps how the work you do is shared?

I am part of the Autodesk Northern Europe Technical Sales Team, which is made up of six exceptionally knowledgeable and experienced engineers… and me. I work really closely with these guys but also work really closely with my UK and Ireland sales colleagues and channel partners.

## Do you or your team get involved in planning for future releases of the software?

I wouldn't say we get involved so much with the actual planning but we speak regularly with Product Designers, Developers and Product Managers to feed back what we have heard from manufacturers who are looking to use, or already are using, our Digital Prototyping Solutions.

A lot of my time is spent on site with manufacturers and in many cases it is working with manufacturers who are using tools like Inventor, Showcase, Publisher, Vault, etc. Whilst working with them I am always keen to know how they feel the solutions could be improved or what they feel it is lacking and I will feed this back to the relevant people within Autodesk.

## Do you do any planning for Autodesk University or other events?

I don't get involved with the planning for AU other than promoting it via my Social Media activities and submitting class proposals, but I do get involved in planning for local events like the UK Digital Prototyping Forum.

We organized the first UK Digital Prototyping Forum last year and had a very successful event at the world famous Belfry Golf Club (we didn't get to play golf). This year's event will take place on 2nd November at Aston Villa Football Club in Birmingham and will be packed full of presentations, classes and discussions for manufacturers, engineers and designers.

I am on the planning and organization team for the UK DP Forum along with colleagues from across Northern Europe and I will also be presenting at the event.

**You've been actively blogging for the Autodesk MFG Northern Europe Blog. How long ago did you start it, how do you decide what to post, and how is readership growing?**

I started the blog in 2008 using Blogger but in February of this year have moved over to the Autodesk corporate platform using TypePad.

I decided to start the blog as many of the people I spoke to across Europe were commenting that at the time there wasn't a blog for the European users. I saw this as an opportunity to provide users across Europe with localized content. Since then though, the blog has grown to be popular across the globe.

I try to post news, tips, tricks and updates that relate to questions I have been asked from new and existing users of our Digital Prototyping Solutions. If one person is asking it, then it's likely that someone else somewhere will also have the same or similar question. When I get a new question from a user, I'll respond to them directly as well as answer their question via my blog. For example, I was contacted by a user who had a question about using Adobe Illustrator vectors in Inventor. Whilst I was answering the question for the user I also created a blog post and YouTube video that I later posted so others could use the same information.

The readership is growing very well; I am thrilled by the stats recently.

> **I try to post news, tips, tricks and updates that relate to questions I have been asked from new and existing users of our Digital Prototyping Solutions.**

**Any tricks you use to help check how successful your efforts are? In other words, do you guys get enough feedback to know that you are moving in the right direction? What can AUGI members do to help?**

I am the kind of person that can never have enough feedback—I am always looking for feedback and opinion from as many people as possible.

When I am working with manufacturers or channel partners I am usually up in front of a group of people presenting so always want to get feedback to make sure that what I am presenting was relevant and understandable.

As for the blog, I get comments from readers and receive posts via Twitter and Facebook pages giving feedback but, like I say, the more feedback the better; it helps me make sure that I'm staying helpful and informative.

**Do you check out the activity of other forums like ours at AUGI? How much time do you get to do external research apart from responding to users directly?**

Absolutely! I read a lot of blogs, websites and forums like AUGI to see what is being discussed and questions that are being asked. I usually do my catch-up reading first thing in the morning or last thing in the evening, but with mobile devices now, it's great to be able to keep up to date and informed whilst on the go.

**What sort of things do you do for distraction, hobbies, travel?**

Our 5-year-old son keeps me distracted and busy when I am not working but when I do get the chance I love photography and love getting out and about taking photos. I recently invested in a mountain bike and am enjoying taking that out and riding through the Peak District countryside.

I enjoy watching most sports, in particular football (soccer) and Formula 1 and watch whenever I possibly can.



**What would we be most surprised to know about you?**

When I was younger I played in a band that performed in front of 22,000 people in Germany and also played at the Royal Albert Hall in London.

product focus

# AutoCAD MEP Implementation - Part Two
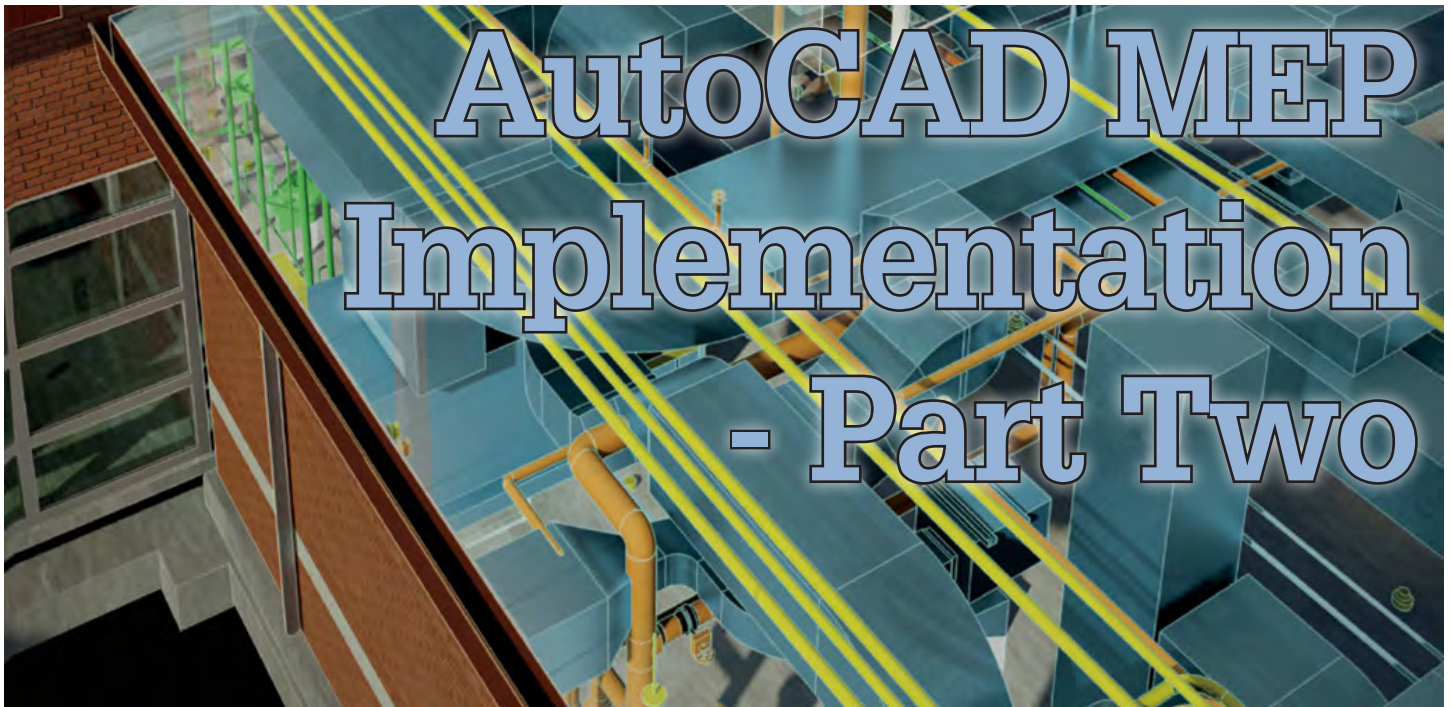
I n part one of this series (May 2011 *AUGI-World*) we started a new template based on an out-of-the-box MEP template and set basic HVAC settings. We will continue now with piping settings. As we cover each discipline (HVAC, Piping, Electrical) you should see some similarities.
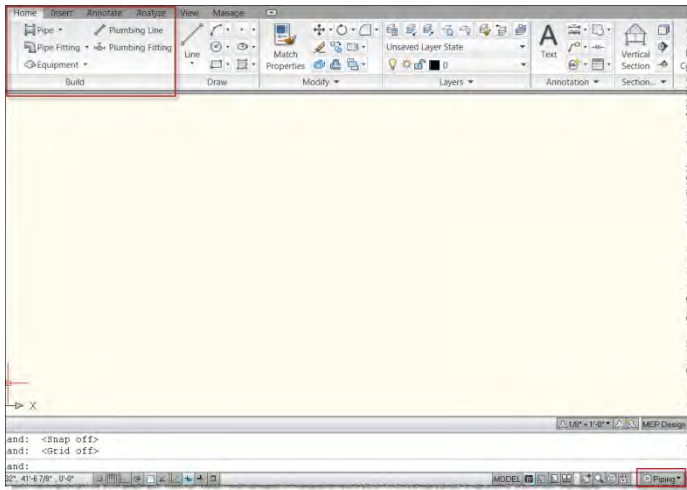
If you've followed us through the steps found in part one, you can open the template you saved. Be sure when you open the template (hopefully you saved this in the location where you keep your CAD Standards) you change your file type from *.dwg* to *.dwt*. Note that the next time you open a file after editing your template you'll need to change your file type.
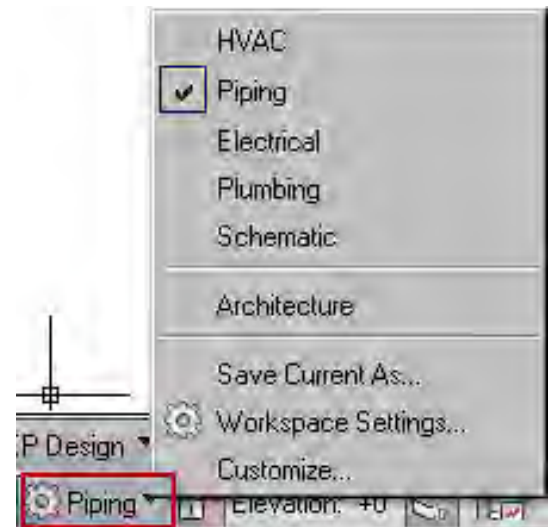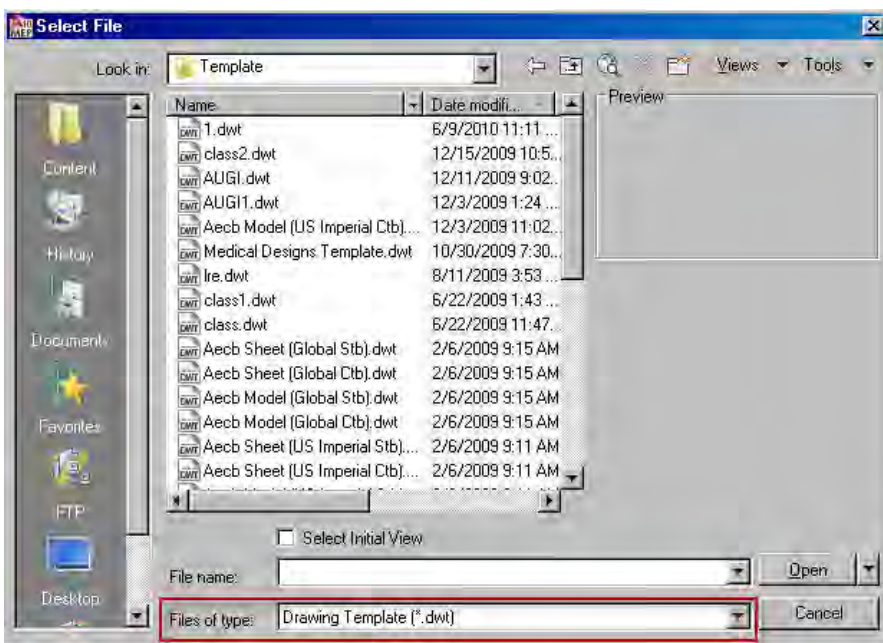
Now let's change our workspace to Piping.

Changing our workspace from one discipline to another gives us access to the tools we need for that type of work—in this case, piping. (You can edit your *.cui* file to combine HVAC and Piping Workspaces or customize your ribbon.)

Some of the differences you'll see in workspaces include:

* Home Tab Build Panel
* Manage Tab Style & Display Panel and Preferences Panel
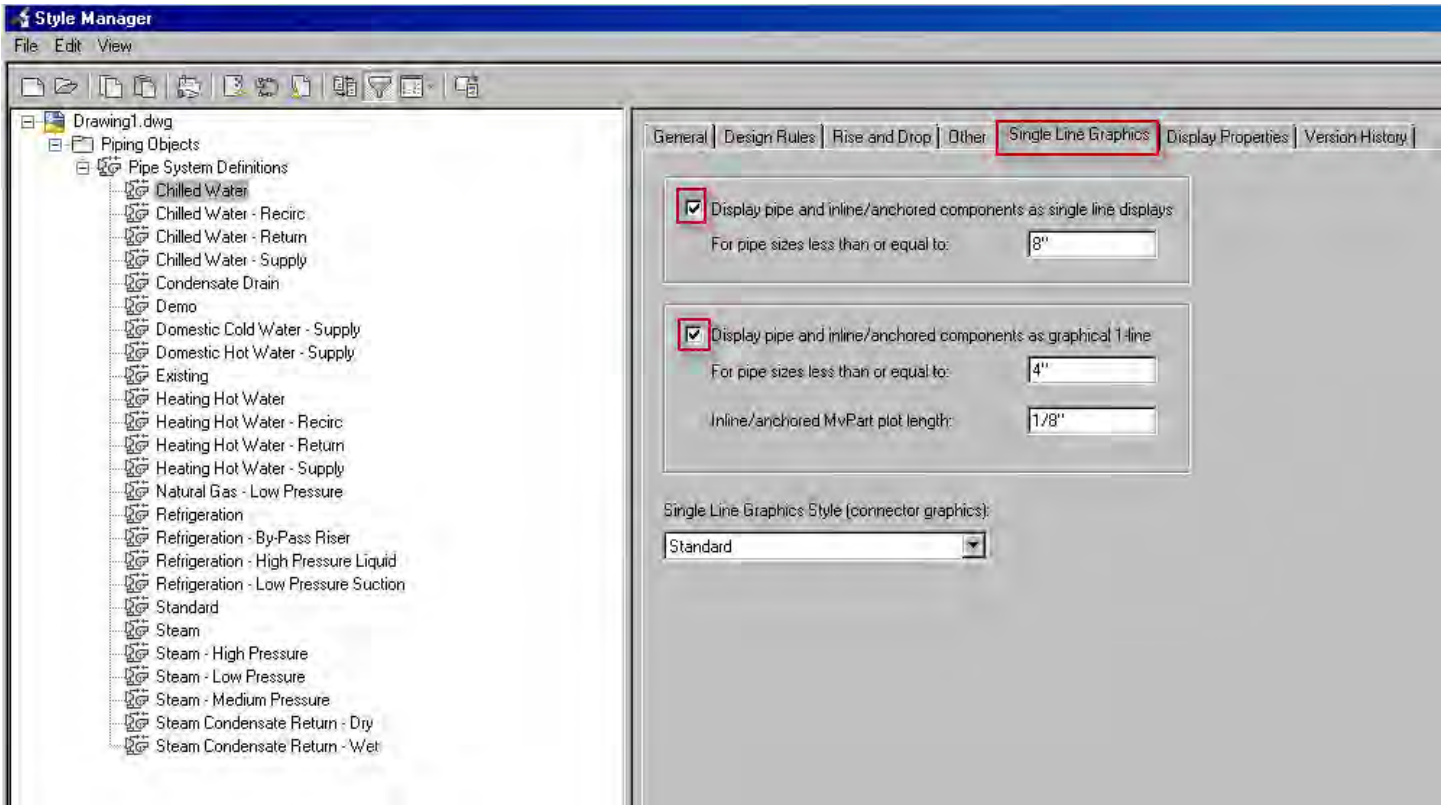* Annotation (both Annotate tab and Annotate under Home tab)

Let's start with our Manage tab and look at the Piping Styles, which include Piping System Definitions and Routing Preference Definitions.
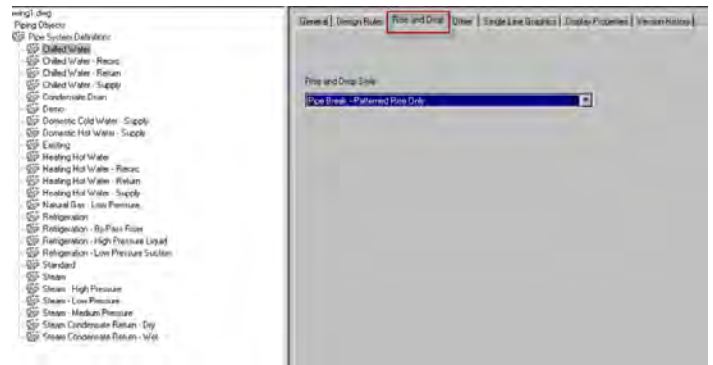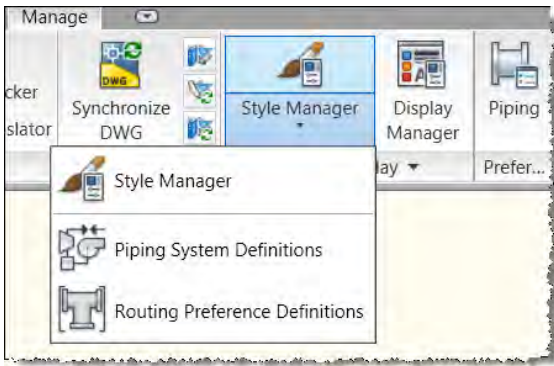


Pipe System Definitions are the core of how piping systems connect and are defined. This principle is the same as HVAC and Electrical. All have System Definitions. The system sets what can connect similar to real-life piping. It also provides information that can be extracted through tags and schedules. And it helps define how the layers are used.
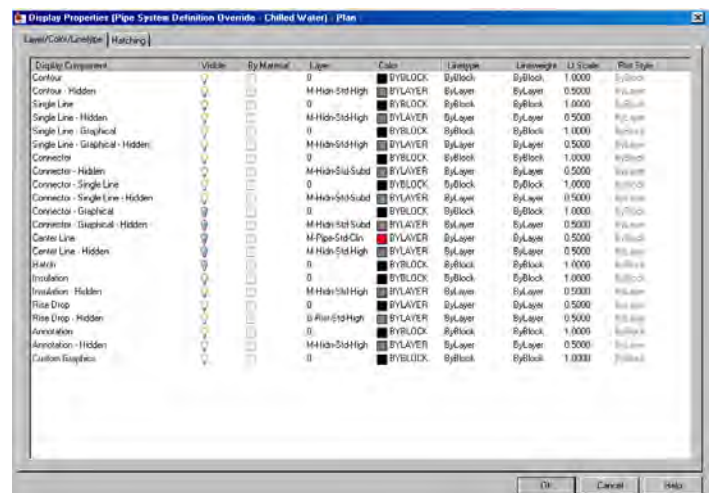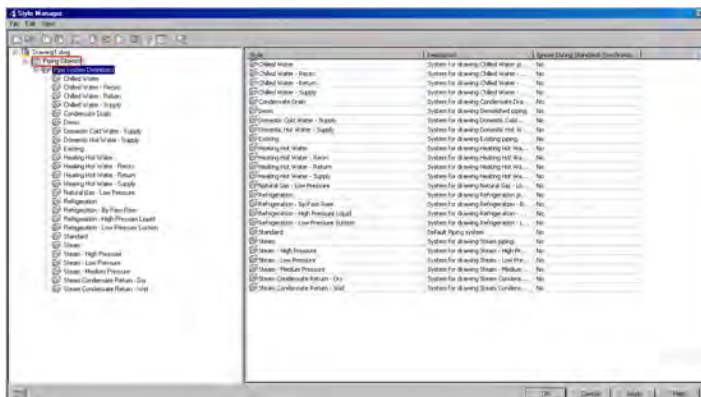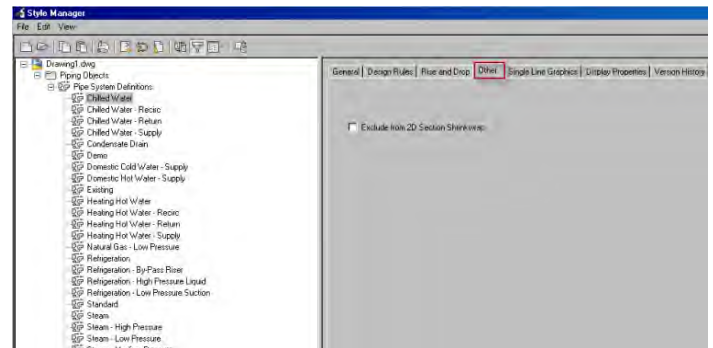


As with most of the AutoCAD MEP styles, tabs are used as follows.
1. General includes name of style, any notes (also style-based property sets).
2. Design Rules indicates layer key used (we will cover this in the future).

3. Rise and Drop shows style of blocks used for changes in elevation of piping in plan view.
4. Other is for excluding piping system from showing material assigned in a section view.
5. Single Line Graphics applies to piping only.
6. Display Properties allows editing method of display components (almost like layers within the MEP objects).

product focus



The Single Line Graphics tab is perhaps one of the more difficult settings to remember and understand. What this means is if you are designing 2" pipe, for example, it will show as single line pipe. I frequently witness people pulling their hair out not understanding why the piping looks schematic. Or a user will set this for Chilled Water System but not for Steam Piping System. To have your piping show up as 2-line piping, these boxes must be unchecked *for every system you use.*



You can right-click on any system to rename, delete, or create new systems. Just be sure that you remember to edit this one tab even if you don't change anything else about the system.

Also under Styles is Pipe Part Routing Preferences. These preferences allow us to set what size pipe will use what types of fittings. The more we set up front, the less we'll have to change along the way.
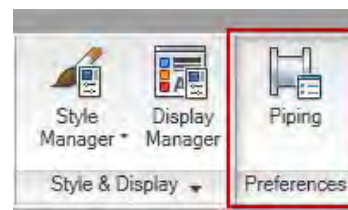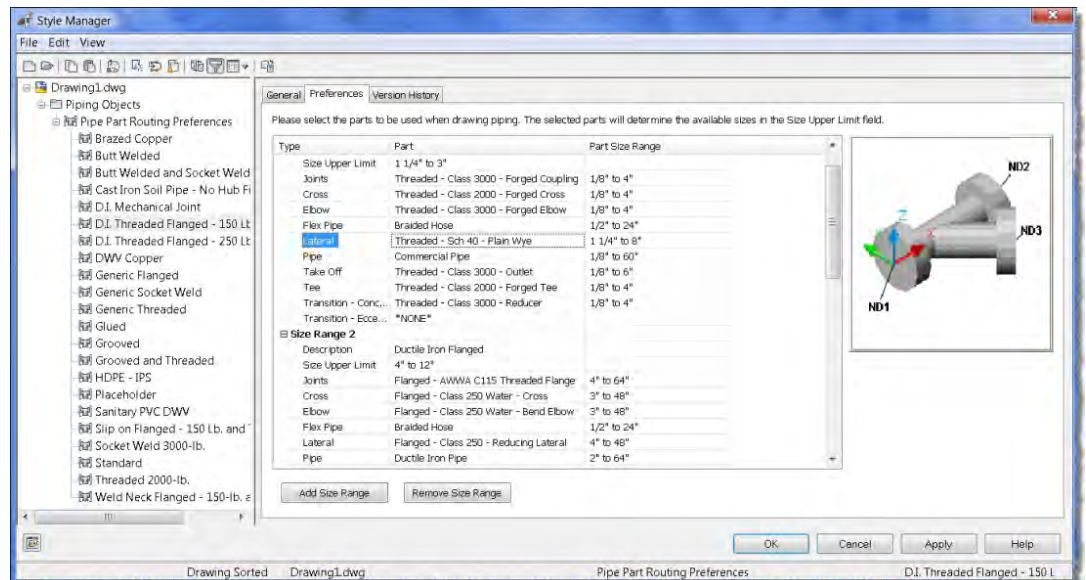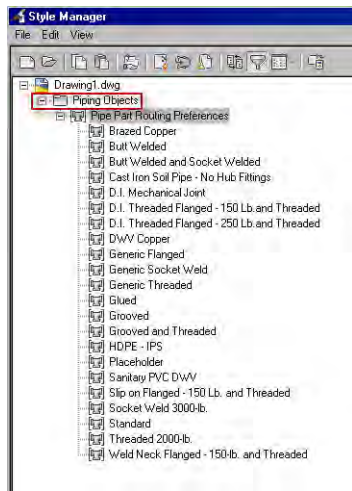




Notice how up to 3" piping a threaded schedule 40 lateral is used, but with 4-12" pipe a flanged class 250 reducing lateral is used.

Piping Preferences is the last area that we will set in our template. Found under the Manage tab, these settings are set in the template but often are changed on the fly.
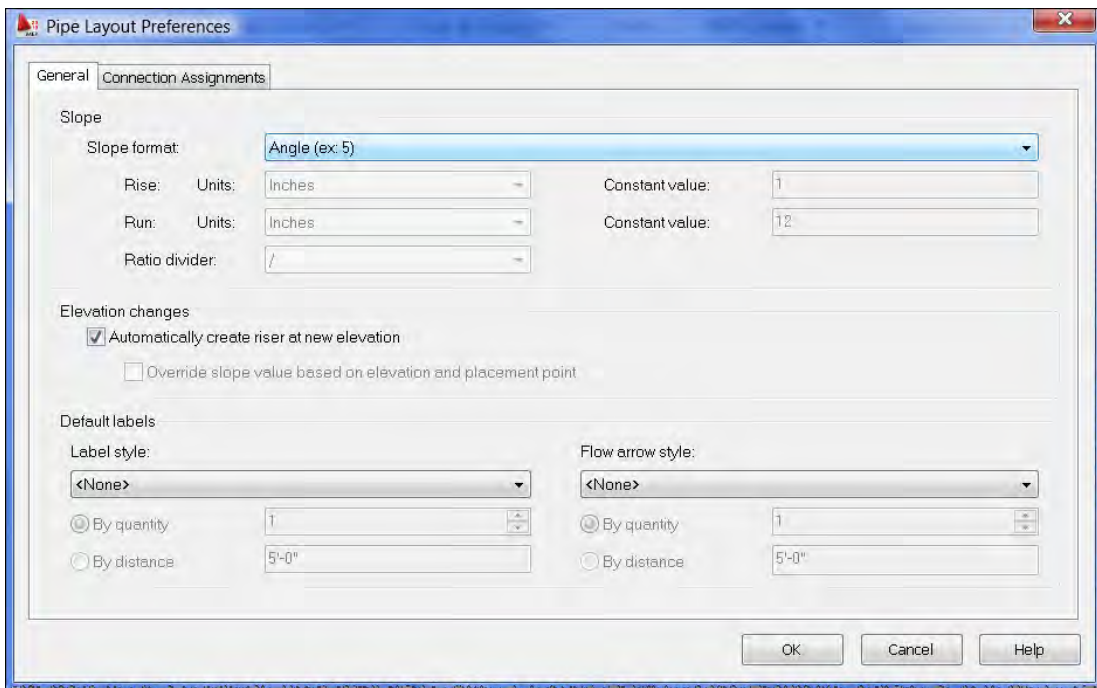
In part three of this series, we will cover electrical settings. In part four, the final part of this series on AutoCAD MEP Implementation, you will see how it all comes together as well as learn some tips and tricks to make your implementation easier. Stay tuned to AUGI and *AUGIWorld* for this valuable material.

The information on the General tab is more often set as you are designing. Label styles are available if you want to show piping labels or flow arrows for documentation purposes. If you prefer to add these where and how your standards dictate, then leave these at none.

Remember where we had rise and drop styles in our system styles? Having the box checked in the middle of this dialog box to automatically create riser at new elevation will insert the appropriate block to show the change in elevation.

Piping can be sloped in different formats, and generally we do this on the piping as we design it.

The tab that we set in our standards is the Connection Assignments tab.

I have yet to see anyone change connection assignments from the out-of-the-box settings, but should you wish to, you can use the drop-down box to select connection ends.

Now that we have set the basics of our piping settings, let's save our template again. You've made it through another step in implementing AutoCAD MEP and learning about the settings involved.
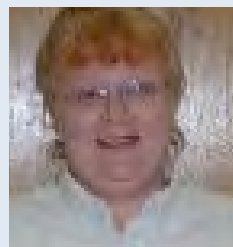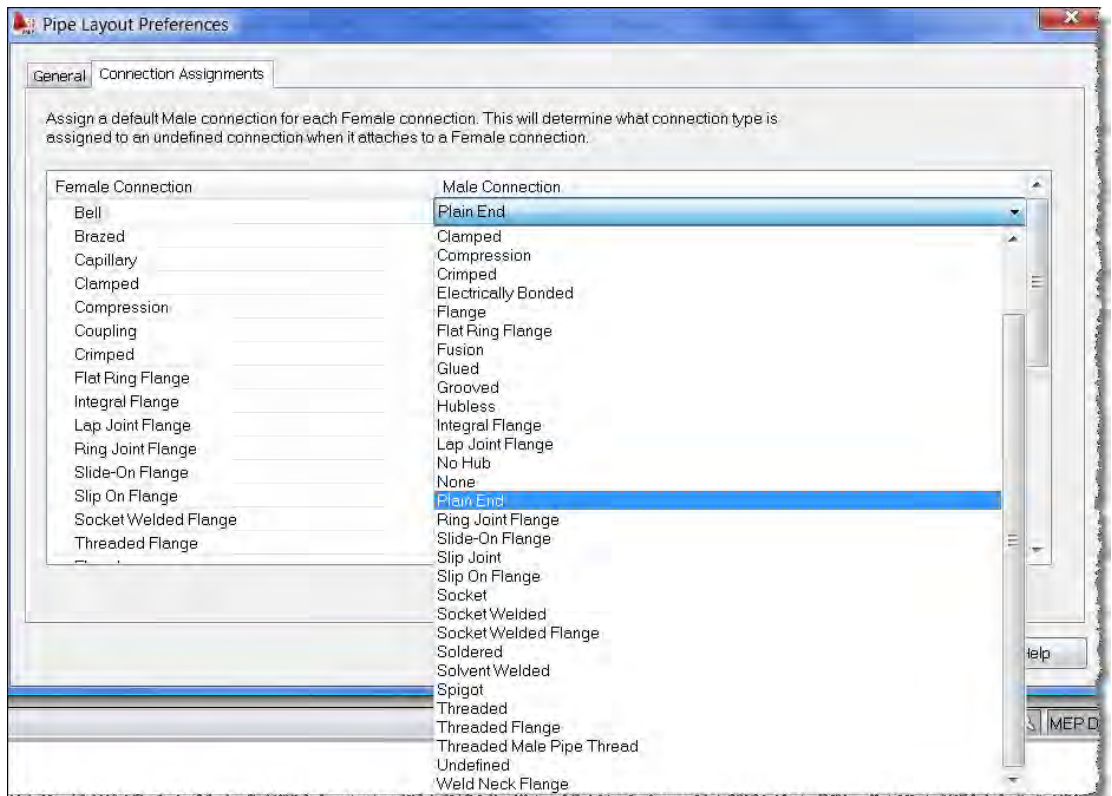
*Beth Powell owns CAD Fuel Design. She produces drawings for the fueling industry and provides training and support for AutoCAD and AutoCAD MEP. Her blog is http://bethscadblog.blogspot.com/. She can be reached at beth@cadfuel.com.*

# Been to the Library?
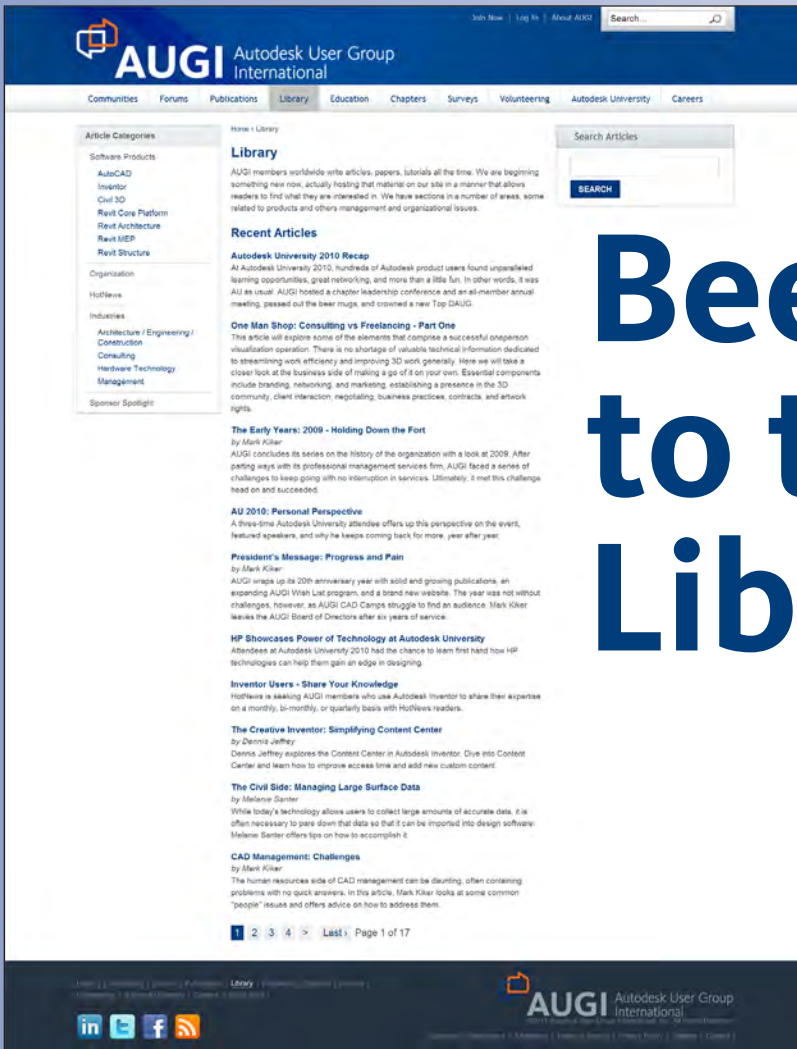
If you've visited www.AUGI.com recently, then you've seen a highly visible improvement in AUGI's member interface. But one of the most exciting features is still flying under the radar and that is the Library. The Library is the home for articles and whitepapers that the membership contribute to the organization. There is a tremendous amount of material generated by members and until now that content 'shelf life' was pretty short. Since magazines come out monthly, an article's time in the spotlight is brief. Well, no longer! As issues of *AUGIWorld, AUGI | AEC EDGE* are replaced by new ones, the staff at AUGI will be posting article content on the website in HTML. The magazine PDFs will stay, of course. Consider the AUGI Library a new area to read some great content. Finding articles from past issues is a breeze, because searching and categorization can now be applied to these articles. In addition, the Library is the real home for *AUGI HotNews,* an email-based monthly publication.

# Are you ready to write?

AUGI, through the contributions of members, produces monthly magazines such as *AUGIWorld*. Well the articles in these magazines don't grow on trees! The content comes from members willing to contribute. If you are an AUGI member, you probably use an Autodesk product. Do you know your product pretty well? Have you ever sat down with someone else to explain how Paper Space works, or how to explode polylines, or customize the CUI? These messages you share casually with others are the same messages that others outside of your area need to hear. Just imagine… even though you have been using AutoCAD since R9, today, somewhere in the world, someone started using AutoCAD for the first time. And that expert level change you made to your CUI to work better with your PGP today? Tomorrow someone else will begin that exercise as well and you could save them some time with your insight. So, get out there and join the fun – contribute to your magazines and your fellow members. Share your knowledge and expertise with beginners and advanced users alike. People are ready to hear what you have to say. For more details contact david.harrington@augi.com