



Diamond Sponsors



AUGIWorld

The Official Publication of Autodesk User Group International

November 2014

Plan Your Education & Training

Also in This Issue

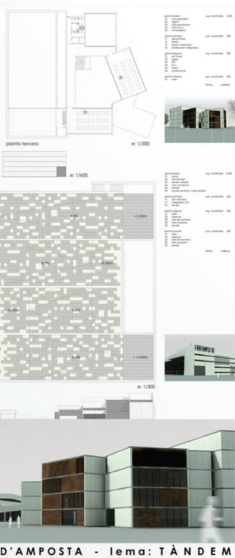
- Introduction to Revit Macros
- Cross-Training Platforms
- 5 Mistakes of a Rookie CAD Manager

The power in your hands.



Boost productivity with HP Z Workstations powered by NVIDIA graphics and Designjet ePrinters working together to deliver one complete solution for Architecture, Engineering and Construction. Benefit from high-performance HP computing with expandable memory capacities, and superior printing solutions with mobile connectivity that accelerates collaboration. This is technology built to power your business.

Find out more at hp.com/go/autodesk



contents

product focus



20

12 AutoCAD: Make Your AutoCAD Training Grow Roots

20 Revit MEP: Introduction to Revit Macros

26 Revit MEP: Revit MEP API Leveraged for Construction

29 Revit Structure: Cross-Training Platforms



32

32 AutoCAD Architecture: ACA Display Themes

36 Revit Architecture: The AECO Landscape

38 Civil 3D: Establish a Pattern of Learning

42 Autodesk Vault: Power in a Mid-Year Extension



36



38

columns

4 Letter from the President

6 Autodesk in the Classroom: An Interview with Don Carlson

8 5 Mistakes of a Rookie CAD Manager

10 Technology in Practice, with CASE & HP

47 Inside Track

Cover image:
Ecole Normale Supérieure de Cachan à Saclay
by RPBW - © 2014. Image by Giorgi Bocolishvili



Letter from the President



CHANGE CAN BE PAINFUL

As I write this letter to you, AUGI's website has been undergoing some growing pains. By the time you read this letter the site should be running smoothly. However, you may be wondering what was going on over the last month or so.

Within the last six months it was recommended to the Board of Directors that the website be moved to a better performing server. The reason for the recommendation was because AUGI's site experiences quite a spike in traffic after publications are released. This is obviously good news because it shows that you, the member, appreciate the publications and want to read them.

The Board directed that the website be moved to a better performing hardware at the hosting company. This was done utilizing the hosting company that AUGI has had for several years. The operating folks at AUGI were generally satisfied with the hosting company's performance to that point.

Then the unexpected happened. The hosting company experienced a loss of functionality. Service was interrupted, not only for AUGI, but many other sites the company was hosting. Although AUGI had priority for service restoration, so did other sites being hosted by the company. Both AUGI's operational folks and the Board of Directors were unhappy with the response and resolution time by the hosting company. It was time to make a change.

The Board of Directors accepted the recommendation of a new hosting company and directed that AUGI's website be moved to that new hosting company. The transition was not quite as smooth as planned. There are a lot of components used to provide the services to which our members have become accustomed.

In particular there were some issues with the AUGI Forums integration and password changes. The issues with the website migration have been resolved. The Board of Directors has also asked the management team to resolve the lingering issue with the website-to-forum passwords.

Most of the recent issues with the website were due to the loss of service at the original hosting company and the subsequent move to a new host in a short period of time. The Board of Directors apologizes to the AUGI membership for the disruptions in service. The Board of Directors has confidence in the management team's upcoming website refresh.

Moving forward, there will be more changes coming. These changes will be planned. The lessons learned during the abrupt transition to a new hosting company will be applied during the planning and implementation phases.

Yes, change can be painful. But when all is said and done, AUGI will be able to provide you with even more benefits.

R. Robert Bell

AUGI President/Chairman of the Board

Autodesk, AutoCAD, Autodesk Architectural Desktop, Autodesk Revit, Autodesk Building Systems, Autodesk Civil Design, Autodesk Inventor and DWF are either registered trademarks or trademarks of Autodesk, Inc. in the U.S.A. and/or in certain other countries. All other brand names, product names, or trademarks belong to their respective holders.

AUGIWorld

www.augiworld.com

Editors

Editor-in-Chief

David Harrington - david.harrington@augi.com

Copy Editor

Marilyn Law - marilyn.law@augi.com

Layout Editor

Debby Gwaltney - debby.gwaltney@augi.com

Content Managers

3ds Max - Brian Chapman
AutoCAD - Walt Sparling
AutoCAD Architecture - Melinda Heavrin
AutoCAD Civil 3D - Shawn Herring
AutoCAD MEP - William Campbell
CAD Manager - Mark Kiker
Column: Inside Track - Brian Andresen
Inventor - John Evans
Navisworks - Michael Smith
Revit Architecture - Jay Zallan
Revit MEP - Todd Shackelford
Revit Structure - Kimberly Fuhrman

Advertising / Reprint Sales

Kevin Merritt - salesmanager@augi.com

AUGI Management

President

R. Robert Bell

Vice Presidents

Desirée Mackey
Scott Wilcox

Treasurer

Donnia Tabor-Hanson

Secretary

Michael Smith

Management

Kevin Merritt - Director of Communications
July Ratley - Director of Finance
David Harrington - Director of Operations

AUGI Board of Directors

R. Robert Bell	Melanie Perry
Shaun Bryant	Michael Smith
Desirée Mackey	Walt Sparling
Kate Morrical	Scott Wilcox

Publication Information

AUGIWorld magazine is a benefit of specific AUGI membership plans. Direct magazine subscriptions are not available. Please visit <http://www.augi.com/account/register> to join or upgrade your membership to receive AUGIWorld magazine in print. To manage your AUGI membership and address, please visit <http://www.augi.com/account>. For all other magazine inquiries please contact augiworld@augi.com

Published by:

AUGIWorld is published by Autodesk User Group International, Inc. AUGI makes no warranty for the use of its products and assumes no responsibility for any errors which may appear in this publication nor does it make a commitment to update the information contained herein.

AUGIWorld is Copyright ©2014 AUGI. No information in this magazine may be reproduced without expressed written permission from AUGI.

All registered trademarks and trademarks included in this magazine are held by their respective companies. Every attempt was made to include all trademarks and registered trademarks where indicated by their companies.

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



bim @ arcat.com



ARCAT®

bim it
@ arcat.com
↗

Autodesk in the Classroom: An Interview with Don Carlson



I have had the pleasure of uncovering and interacting with the great offerings of Autodesk Education over the years when purchasing software and having Autodesk grant licenses to high schools and colleges in my area. It is a great program. I have presented to students in their environments about career options and the need to gain skills in design. I have connected with John Herridge, Program Manager, Autodesk Education, to tap into some of these features. You need to know and share this information with the educators and students you know.

Recently, I had the opportunity to interview Don Carlson, Director, Autodesk Education.

Mark: Don, thanks for taking time to let AUGI members know about your offerings. What is Autodesk Education? Why was it established?

Don: Smart design is critically important for us as a planet, and today's students will be tomorrow's creative leaders.

For 30 years, Autodesk has been providing the design tools to help users imagine, design, and create, and we're in a unique position to help inspire and equip the next generation workforce with the skills and knowledge to imagine, design, and create a better world.

So we asked ourselves, what if every teacher had free access to the same professional 3D design software that architects, engineers, film makers, and designers use every day?

What would they do differently to help prepare their students for the "real world"?

How can the democratization of technology and exponential connectivity take our classrooms into the 21st century?

This led us to transform our education business model to meet the needs of students, teachers, and schools around the country and beyond.

Mark: You have branded it a "community." Beyond access to software, what features does it have for those who join?

Don: We take a holistic approach to education:

Putting real-world tools into the hands of next gen talent so they can solve real-world design problems.

We started in 2006 by offering students and educators free access to individual licenses of our full software portfolio for their personal use via our Autodesk Education Community.

Since that time we've been working to remove the barriers to software access across the global education community.

Schools used to pay a discounted price for our software, but as of October 2014 we're proud to say that every student, teacher, and school (secondary and post-secondary) can take advantage of free access to academic licenses of our software for installation in labs and classrooms via the Autodesk Academic Resource Center.

This means that schools are no longer constrained by limited IT budgets. They can leverage Autodesk's full portfolio of solutions in the classroom at no charge. They can also take advantage of new possibilities for interdepartmental collaboration, and educators can truly facilitate a multidisciplinary approach to education that reflects today's business realities.

Mark: What offerings does Autodesk Education provide for students, educators, and educational institutions? What software can a student tap into?

Don: It's worth highlighting these are not "student" or "lite" versions, limited, discounted, or even old versions of our professional 3D design software. Students and educators get to use the latest and greatest products from Autodesk with no strings attached.

We are equipping educators with free, hands-on project-based curriculum that's aligned to industry best practices and demands for use in—and outside—the classroom.

Teachers and students as young as middle school can take advantage of visual hands-on projects available on the Digital STEAM Workshop to learn through “making,” and bring foundational science, technology, engineering, art, and math subjects to life.

Aspiring and working professionals in architecture, engineering and construction (AEC) can also leverage free, online learning content such as the Autodesk Building Information Modeling (BIM) Curriculum, Autodesk Sustainability Workshop, and the BPA Certificate Program to improve their knowledge of building science fundamentals and sustainable design techniques and tools.

We are also providing opportunities for passionate students and educators to connect with one another. We have a global organization of Autodesk Education Experts studying in design-related fields who are connected together and with us online. They can learn from one another, access job postings, and earn points that give them more opportunities including attending Autodesk events and being featured as a spotlight student.

We also have an Educator Council and Educator Experts who share their expertise and opinions with us to help us shape the learning content that we make freely available to people around the world.

Mark: Is Certification offered to students or educators?

Don: Yes, we offer Autodesk Certification to enable students and professionals to achieve academic success and advance their careers.

Autodesk Certification is an industry-accepted credential that provides a competitive edge to organizations, students, and professionals alike and we provide three options for certification:

- Autodesk Certified User – for relatively new Autodesk software users who want to demonstrate basic proficiency.
- Autodesk Certified Professional – for users who possess more advanced skills and can solve complex workflow and design challenges.
- Autodesk Certified Specialist – those who possess a competency in specialized workflow or mastery of an Autodesk Suite can earn a Certified Specialist credential.

Mark: Are there specific events and contests for students/educators?

Don: Absolutely. Autodesk University is a series of annual events that take place around the world where designers and industry thought leaders convene to learn and celebrate the power of design technology. As most of your members know, our biggest AU event will take place in Las Vegas in early December, and I highly recommend that AUGI members attend to learn about emerging technologies related to design and innovation, network and exchange ideas, showcase their work, and more.

To expose students to the possibilities of design and inspire them to pursue related careers, Autodesk also sponsors and organizes national and international competitions across disciplines. These

include F1 in Schools; the Solar Decathlon competitions in USA, Europe and China; World Skills; Games 4 Change; and many more.

Mark: What is an Authorized Academic Partner (AAP) and how does that differ from an Authorized Training Center (ATC)?

Don: ATCs deliver product training and support to commercial companies and their employees, whereas AAPs, as the name suggests, provide education services to institutions and educators. These services may include product training, technical support, curriculum integration, faculty development, and certification. They can also contribute to the development of a pool of on-campus faculty and student experts with real-world design skills.

Mark: How does someone tap into all of this? How do they join?

Don: Any student, teacher, or school can tap into any or all of this today! The first step is to register on the Autodesk Education Community, download and activate their Autodesk software at no fee.

Mark: No Fee? Wow!

Don: Yes, no fee.

We also hope that AUGI members can help bring real-world design tools to schools and classrooms near them by becoming a mentor to their local schools, telling them about how they can take advantage of professional design software today. They may want to volunteer to present industry information relevant to STEAM careers to students; share best practices and workflows with students in higher education so they can learn about business realities; and finally, promote the value of certification as a valuable differentiator for students who are entering the workforce.

Mark: Don, all of this is wonderful. Thank you for letting AUGI members know.

Don: It is a pleasure.



Mark Kiker has more than 25 years of hands-on experience with technology. He is fully versed in every area of management from deployment planning, installation, and configuration to training and strategic planning. As an internationally known speaker and writer, he is a returning speaker at Autodesk University since 1996.

Mark is currently serving as Director of IT for SIATech, a non-profit public charter high school focused on dropout recovery. He maintains two blog sites, www.caddmanager.com and www.bimmanager.com.

5 Mistakes of a Rookie CAD Manager

➔ In 2012 I sold my house, packed up my young family, and moved from England's fair capital to a quiet market town on the south coast of the UK. Why? For my dream job as a CAD manager, of course!

But it turns out my dream job has been really hard work. The toughest part of the job has not been IT networks, CAD standards, or pushing drawings out on time. And it hasn't been cash flow forecasts or departmental targets either.

The area that I've found the most personally challenging (and the most rewarding!) has been the people I work with.

I'm now two years in, and I'm not yet ready to tell you how you to become a successful CAD manager, but I'm happy to share a few of my mistakes with you in the hope that you can avoid finding yourself in the same position.

1. ARE YOU TRYING TO FIX THE PROBLEMS OF YOUR LAST COMPANY AT YOUR NEW COMPANY?

I left my previous company to become a bigger fish in a smaller pond, and yes, I had baggage.

What I've learned is that people can get really upset when you try to fix something they didn't even perceive to be a problem. So, why not make this new job a fresh start, and a clean break from everything you knew before?

Don't fall into the trap of rebuilding your familiar old routines at your new company. Take the time to deeply understand the successes and problems of your current company before you look for solutions.

If you can genuinely and honestly apply a solution from your previous experience, great!



2. ARE YOU TRYING TO FIX WHAT ISN'T BROKEN?

Many companies develop their own language and habits, as well as their more formal processes. Regardless of how much it irks you, don't get sucked into debating internal semantics.

Don't be tempted to implement change just because of your personal preferences. If it stays in-house, let people call it what they like.

I've learned to save my energy for the procedures and process that really need to comply with industry standards, and those that involve collaboration with others outside of our company.



3. DO YOU UNDERSTAND YOUR COMMISSION?

It took me some time to understand my commission at my new job. By "commission," I mean the strategic goals of the CAD manager, and how they align with the company's strategic goals.

I repeatedly interviewed the directors at my company, asking them awkward questions such as "What did you expect to get out of hiring a CAD manager?" and "What were you missing before you had a CAD manager?"

I eventually came up with some answers that satisfied my need to understand the company's business goals and my part in them. What I've realised since is that I took my foot off the gas too soon.

I've learned that it's not enough to understand what the company's senior management expect you to achieve. You need to make sure that everyone else also understands what senior managers are asking you to achieve!

If your coworkers don't understand your role, you will certainly experience frustration and resentment in your dealings with colleagues inside and outside the CAD department.

My advice is: don't let this become a barrier. Ask your management team to help you communicate your commission early and often.



4. IF I WERE KING FOR A DAY.

I'll bet we've all said "If I was the boss, I'd..." We all have frustrations at work that we'd love to change, if only we had the authority. I'll bet that, if you are determined to become a CAD manager, it's precisely because you feel driven to make these changes.

However, the truth is it's not that simple. Modern western companies no longer operate on a dictatorship system. Simply telling everyone else what to do just won't work.

If you want to make changes in the way the people at your company work, you will need to use honesty, objective facts, and good old persuasion!

I've learned to involve my colleagues in the mission to understand what the real problems are in our workflow. I've learned to involve the same people in the search for solutions. And I've learned to collect data, monitor performance, and report, report, report in order to objectively demonstrate that our solutions are working.

No one likes being told what to do. Everyone feels the need to negotiate themselves the best position. It might seem like hard work to involve many different people in every decision, but you will reap the rewards later, as people willingly comply to the system they helped build.



5. SOME OF THE PEOPLE WILL TRUST YOU SOME OF THE TIME.

Some of your colleagues will trust you some of the time; some of your colleagues will trust you all of the time; but never will all of your colleagues trust you all of the time.

As a CAD manager you are at the end of the design development supply chain. Many of the people who can make the design documentation process more efficient for your team won't be your direct reports.

These people will help you to achieve your goals—if they trust you and your motives. Building trust is one of your most important non-billable activities.

I'm learning to take the time to understand my colleague's problems and frustrations. I'm taking the time to talk to them about the goals the company has set for me and for us, and I'm looking for mutually convenient ways of getting us all what we need.



OVER TO YOU

My first two years as a CAD manager have been the toughest, yet most rewarding two years of my career so far. How about you? Are you an aspiring CAD manager? Or perhaps you've been through the mill and you have a few more lessons in CAD management you'd like to share with us.

Whoever you are, I wish you all the best in your CAD management endeavours.


Yours, Paul.

Images courtesy of cooldesign at FreeDigitalPhotos.net



By day Paul Munford is the CAD Manager at Halstock Cabinet makers in the UK. By night Paul writes the CAD Setter Out Blog and contributes to Develop3D and AUGIWorld magazines. Paul has been a speaker at Autodesk University for the last two years, and will be speaking on CAD management for the first time at AU2014. You can contact Paul via twitter @CadSetterOut.

How to control Revit file sizes

 File size is one of the vital signs of a healthy Revit project. Every BIM manager needs to monitor this statistic for every Revit file they manage. If a file grows too large it either means that something is going wrong on the project, or it means that something is about to go wrong. Large files—and files that are quickly swelling—need immediate attention. In this article, we help you identify these large files and discuss tactics for keeping them within a healthy range.

WHEN IS A FILE TOO LARGE?

In general, the maximum viable file size is determined by your RAM. The rule of thumb is that a Revit file should be, at the most, one twentieth the size of your RAM. So if you have 16GB of RAM, you are going to want to keep your file to under 800MB. If you exceed this limit, Revit will continue to work, but it will start using space on the hard drive to compensate for the lack of space in RAM. Even with a fast solid state drive, this will feel incredibly slow—perhaps unusable.

Remember to leave some space for file growth. Files that are large in the early stages will only grow larger in the subsequent design development stages. It is generally better to proactively address file sizes early in the design process than wait until the files are actually problematic. You will get a feel for which files are likely to become difficult after you have tracked a few of your projects and get a sense of how quickly the file sizes escalate over the course of a typical project. If you have 16GB of RAM, a general guideline would be that anything below 200MB is safe. If the file climbs above 300MB in schematic design or design development stages, you should consider restructuring the

model. If it gets above 500MB at any stage, you should seriously consider overhauling the model.

RAM

If your model has become too large, the fastest solution is often to buy more RAM. RAM can't fix any underlying problems with the model, but it can get you out of a difficult situation. If you haven't updated your RAM recently, this upgrade is one of the first things you should consider doing, especially if you are working with large files regularly. Having adequate RAM is just the first step however. Large file sizes can indicate that there are more fundamental problems with over-modeling, maintenance, or model division strategies.

DIVISION STRATEGIES

One way to reduce the file size is to break the model into a series of smaller, more manageable parts. The strategy for dividing the model will depend on the project. You want to divide the model in such a way that each section stands alone as much as possible. This may mean that you divide the model by buildings, floors, phases, trades, or grid-lines. Once divided, you will have a series of models that are each individually much easier to manage than one large file.

OVER-MODELING

Another cause of large file sizes is over-modeling. The model should only contain as much detail as outlined in the BIM execution plan. Any extra detail is just adding to the size of the model and potentially making changes more difficult down the line. Be sure to review the model at each milestone and remove overly detailed objects and Revit families.



MAINTENANCE

Every Revit project should undergo regular maintenance to keep the model healthy and clean. This will help reduce the file size and the potential for data corruption. Listed here are a series of steps to follow to ensure your project is properly maintained.

- **Compacting:** Compact the central and local files regularly to reduce disk space (this is done through the save and sync dialog box). Compacting the model removes superfluous code accumulated during previous file saves. Performance is not improved through compacting, but it does allow for quicker copying and easier storage, and gives you a better idea of the true size of the model. Compaction should occur at least once a week, preferably more if the schedule allows it.
- **Auditing:** An audit helps to identify problematic and potentially corrupt model elements. The audit can't be done while the model is open, so get everyone to save to central and relinquish their worksets. You can then open the project and in the open dialogue box select "audit." Wait a few minutes and the audited model should be ready to save again. Generally the project should be audited on a bi-weekly schedule.
- **Purging:** Purging helps remove unused families, views, and objects from a project. The model should be purged after every submittal and milestone to remove the surplus objects that have accumulated in the project. To purge the model, go to the manage tab, select the setting panel, and choose purge unused. Revit's automated purging only removes certain types of objects. After running the purge, you still need to go through your models and manually remove any unwanted area schemes, views, groups, and design options. You should also replace in-place families with regular component families to further reduce the file size.
- **Warnings:** Revit produces a list of potential problems in the project. These can be seen by opening the Manage tab, going to the Inquiry panel and selecting Warnings. You should prioritize warnings that pertain to model accuracy and geometry over warnings that are view specific. If there are a lot of warnings, some people find it easiest to export them as HTML and print them off. Try to review the warnings weekly since unattended warnings

slow Revit down. A frequent review also allows you to see if there are any recurring modeling problems that you need to address with the design team.

STORAGE STRATEGIES

A solid state drive (SSD) is recommended in combination with Intel® Xeon® processors for optimal performance. Complex datasets should load and save quicker, and since latency is low, Revit should feel more responsive. Random read/write access is also fast, which is particularly important when multi-tasking and swapping between applications.

SSDs traditionally come as a 2.5-inch drive that uses the SATA 3.0 interface. However, HP recently released the HP Z Turbo Drive, an add-in PCI Express card that boasts more than double the read/write performance of a standard SSD. This should be of particular interest to those working with large and complex datasets, which can be loaded and saved much quicker.

Learn more at: www.hp.com/go/zturbo

ABOUT HP

HP helps you stay ahead of the curve with professional desktop and mobile workstations designed for large and complex datasets, dispersed teams, and tight deadlines. HP Z Workstations built for Pros with Intel Inside® deliver the innovation, high performance, expandability, and extreme reliability you need to deliver your 3D CAD projects in less time. For more information and to learn how to configure and purchase an HP Z Workstation, visit the HP Workstations and Autodesk page on the HP website (www.hp.com/go/autodeskmanufacturing).

ABOUT CASE

CASE exists where building and technology intersect. We combine our experience as architects, engineers, project managers, software developers, and educators with a passion for technology to improve the way buildings are designed, realized, and operated. CASE is a building information modeling (BIM) and integrated-practice consultancy. We provide strategic advising to building design professionals, contractors, and owners seeking to supplant traditional project delivery methods through technology-driven process innovation.



© 2014 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. Intel, the Intel Logo, Xeon, and Xeon Inside are trademarks of Intel Corporation in the U.S. and/or other countries. All other trademarks are the property of their respective owners. Autodesk is a registered trademark of Autodesk, Inc., in the U.S. and other countries. Screen Image Courtesy of The ANT Group.



Make Your AutoCAD Training Grow Roots

Nowadays, with the high demand for instant productivity, training curriculum barely allots enough time to properly cover the ground needed for training let alone tackle the ever-growing list of new features and updated UIs. As a result, some of the more basic, but still important, elements of AutoCAD may be getting squeezed out. It is with my countless years of experience as an end user followed by support technician as well as AutoCAD/ AutoCAD® Architecture / Autodesk® Revit® Trainer that I am able to share with you the answers to some of the most asked questions and issues so that they may be minimized from the start.

With these topics as the foundation for your AutoCAD training/knowledge, your AutoCAD skills can really grow exponentially with a deeper understanding of the workings of AutoCAD, all the while avoiding most of the frustrations that may seem like weeds in an otherwise productive and fertile environment. Some of the features we will look at include settings/performance enhancements, drawing aids/productivity tools, and disaster recovery/avoidance.

SETTINGS/ PERFORMANCE ENHANCEMENTS

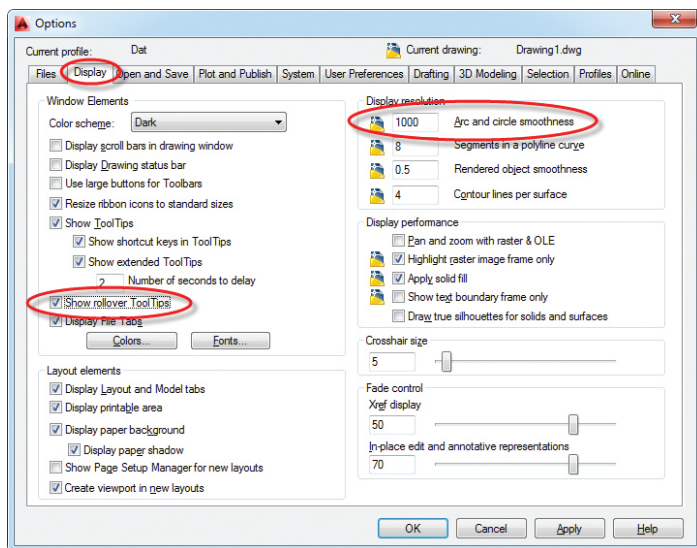
Many CAD managers cringe at the thought of users modifying some of AutoCAD's behind-the-scenes settings; however, that doesn't mean that some of these settings may not accidentally get switched on/off during the haste of drawing (as is the case when a user breaks out of a LISP routine or script before it has had a chance to complete). In fact, helping users understand what some of these settings do can only help them better understand the workings of the AutoCAD system from the ground up. After all, we want to plant the seeds for power users who can think for themselves. As a general rule of thumb when it comes to settings, most of the default/out-of-the-box settings should be left alone as just about every setting has a reason for its default setting. You may want to do screen captures of the default settings of each tab in the Options dialog for future reference. The more we tweak, the more unreliable things may become, not to mention the fact that we will have to keep transferring settings from one release to another. But we should all have an open mind when it comes to trying something new.

When it comes to performance enhancements, just because our computers are more powerful, faster, and loaded with RAM doesn't mean we should be sloppy about utilizing resources, especially since these resources are often shared with other applications running simultaneously in the background. Also, it is extremely beneficial to tune down many of the bells and whistles when it comes to virtualization (i.e., running AutoCAD in the cloud, having users login remotely, or when on a Mac using Parallels or Fusion to emulate Windows because graphics cards function differently in these modes).

Options Dialog / Behind-the-Scenes Settings

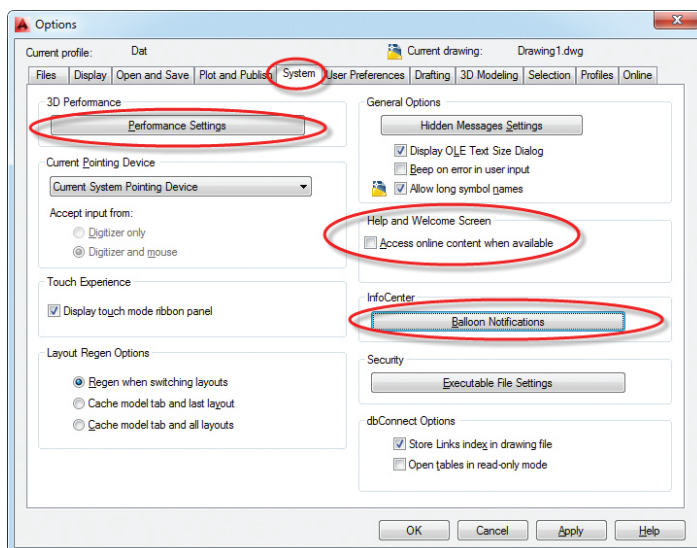
Files Tab

- Automatic Save File Location (make note of this as we will go into more detail when discussing Disaster Recovery/Avoidance).



Display Tab

- Show rollover tooltips (ROLLOVERTIPS)
- Display resolution arc and circle smoothness

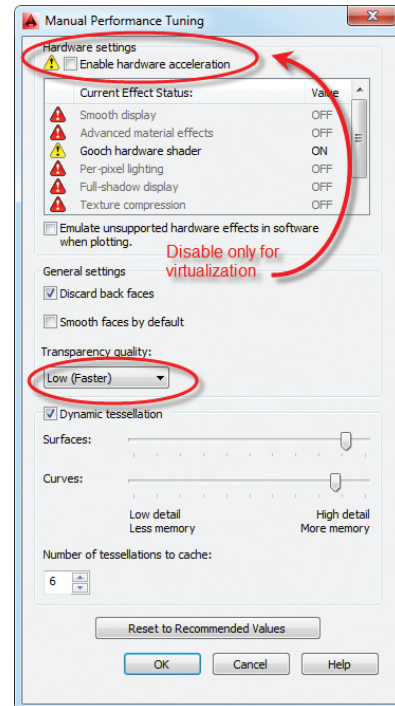


System Tab

Performance Settings

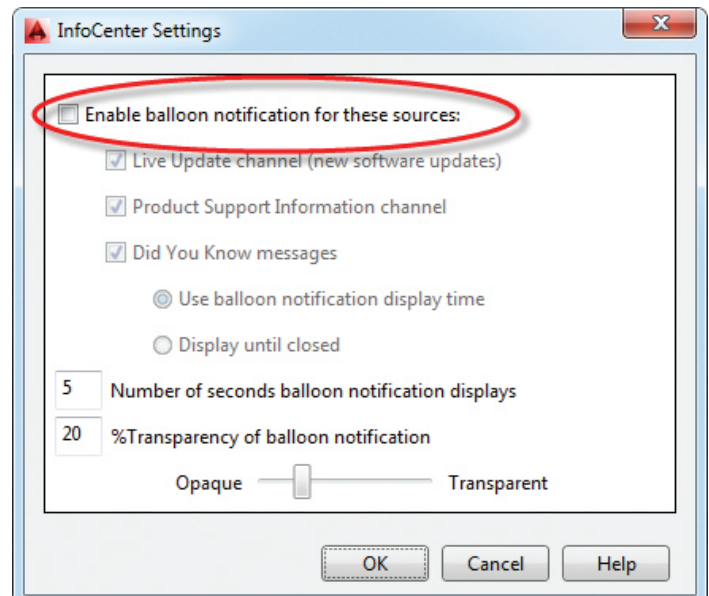
Manual Tune:

- Disable hardware acceleration on virtual pcs
- Transparency Control: Low (faster)



Help and Welcome Screen:

- Disable "Access online content when available" (Download and install local help files. Besides, users will naturally go to the Internet for help when needed.)
- Accidentally hitting F1 when you mean to hit esc for escape is a common problem

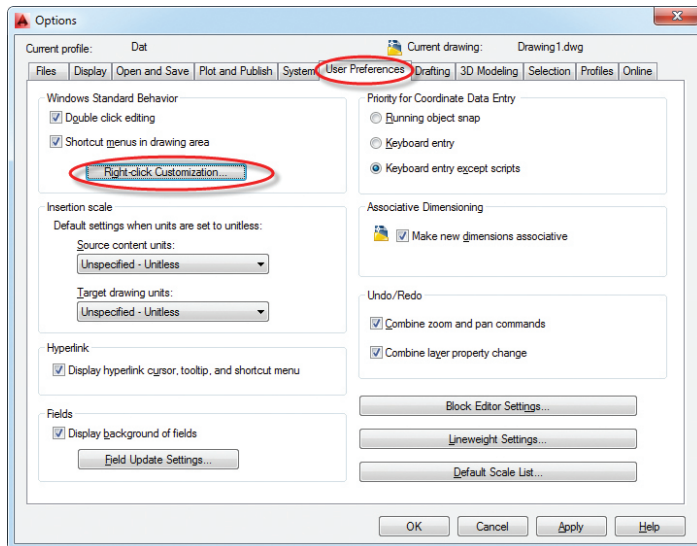


InfoCenter:

- ✦ Disable balloon notifications. The old adage “if it ain’t broke, don’t fix it” applies here. Turning off the chatter means users may focus on the job at hand. Autodesk tends to not be shy about sending emails when new updates are available anyway.

User Preferences

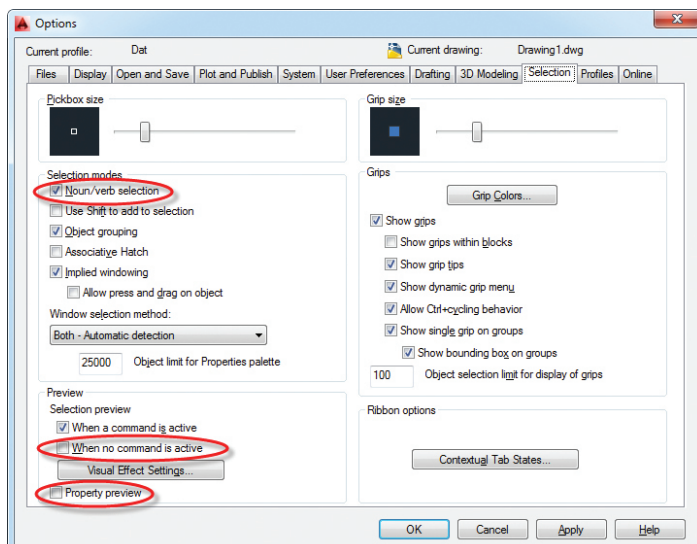
Right-click Customization: turn on all Shortcut menu options; however, enable time-sensitive right-click (best of both worlds).

**Drafting**

“Ignore hatch objects” (OSNAPHATCH=0)

Selection

- ✦ Check Noun/verb selection
- ✦ Preview: Uncheck “When no command is active” and Property preview (QPMODE=0)

**Profiles**

It’s a good idea to not only save and set your new profile current, but also export your profile to a .arg file on the network or external drive so that if you had to set up AutoCAD again, you can quickly get your settings back. Remember to modify your AutoCAD shortcut to either use your new profile (by specifying the /p switch in the “Target” section of the shortcut’s properties) or to use the last profile (by removing the /p switch altogether).

Other Notable Settings

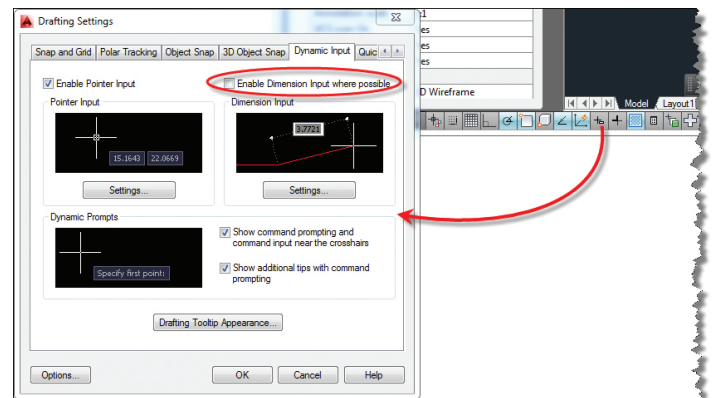
HPDLGMODE=1 (displays hatch/gradient box for items selected in drawing)

HPQUICKPREVIEW=0 (disables hatch preview, set to 1 if you’re dealing with atypical hatch pattern)

VTENABLE=0 (disables smooth view transitions, turn on if you’re viewing 3D mechanical drawings)

MBUTTONPAN=1 (middle mouse button pans)

IMAGEFRAME=0 (turns on/off the bounding box on your images. Turn on to be able to select and manipulate the image)

Drafting Settings (Right-click on Osnap Toolbar)

We will cover Drafting settings in the next section, but because Dynamic Input ties into performance, it is worth mentioning here. Dynamic input was introduced to provide users with the ability to receive and input data as close as possible to the object in question. This can be a bit overwhelming, so it was a huge request to disable it for snap tracking while keeping it enabled for other inputs.

- ✦ Dynamic Input: Uncheck “Enable Dimension Input where possible” {DYNMODE=1}

Get Your Bearings

The single most important thing you can do when starting a project is to start drawing relative to the origin. When this step is left out, you can easily get inconsistently placed files, especially when dealing with Xrefs and coordination with consultants. To facilitate the process, a few UCS tools should be set from the start:

UCSICON = ON (turns on the UCS Icon)

UCSICON = Origin (places the UCS Icon at the origin)
 UCS = World (Sets the UCS to the default world coordinate system)
 Plan = Current (orients the view orthogonal to the current UCS)

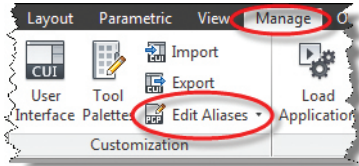


DRAWING AIDS/PRODUCTIVITY TOOLS

Many of us have seen Lynn Allen's awesome list of AutoCAD Tips & Tricks. Consider this the list that has been forgotten.

Keyboard Shortcuts Versus Ribbon/Toolbars/Dialog Boxes/Palettes/Icons

Each section so far has had one item that you shouldn't miss. In the Productivity section, this is it. Not only is it faster to get to command by typing keyboard shortcuts, it's also more consistent. Take, for instance, when a new release comes out and icons have been updated and moved around. Knowing the keyboard shortcuts means you can get right to work and hunt down the icons later. When AutoCAD launched on the Mac, things were noticeably different. But I was able to get up and running in this totally foreign environment by doing simple things like typing in "L" for line. And it worked! However, don't get too carried away with customizing the default Acad.pgp file (Manage ribbon, Customization Panel, Edit Aliases) as this could be counterproductive.

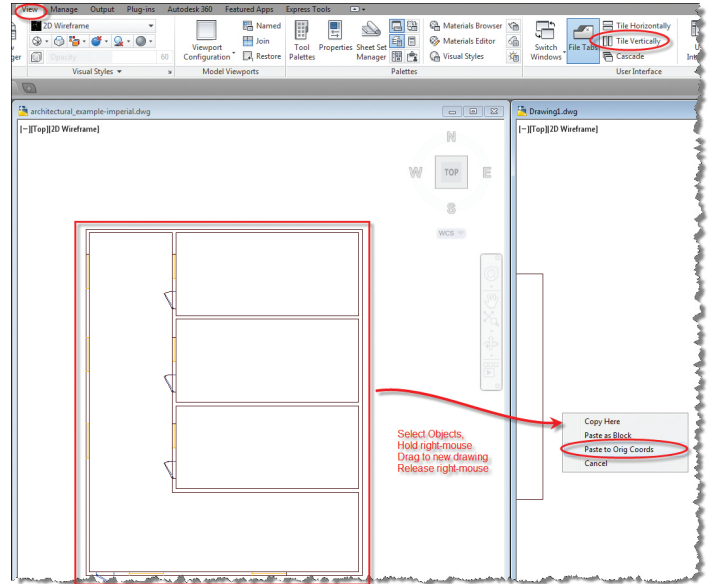


Copy between Two Files

It is good practice to always start a new drawing with a clean and approved template that contains your company's standards without all of the junk that you might get if you tried recycling a drawing from the last project. In fact, this is one of the best ways to avoid errors down the road (to be discussed in the next section on Disaster Recovery/Avoidance). However, you may wish to borrow elements from past projects. Use this technique to easily copy items from one drawing to another while maintaining its origin.

1. Open both drawings and tile them side by side (View ribbon, User Interface tab, Tile Vertical)
2. Make sure you're not in the middle of any commands in the target drawing. Select the object you wish to copy from the source file.

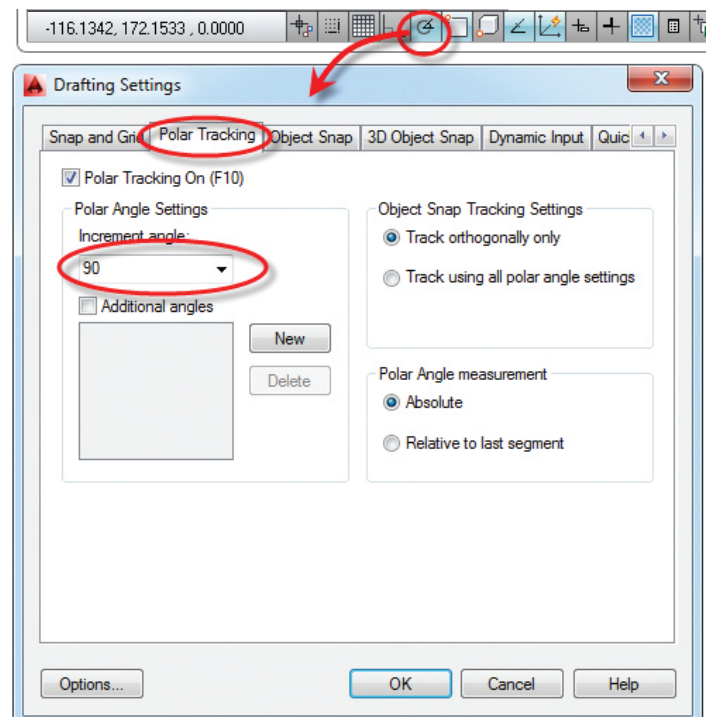
3. Hold down the right mouse button until you see the silhouette of the selected objects, then without releasing the button drag the items to the target drawing, then release the mouse button.
4. You will then be prompted to "Copy," "Paste as block," or "Paste to original coordinates."



Voila! A quick and easy way to copy elements between files.

Drafting Tools

Located at the bottom left of the drawing window, this series of tools allow you to draw accurately and efficiently if used correctly. Following are the most notable ones.



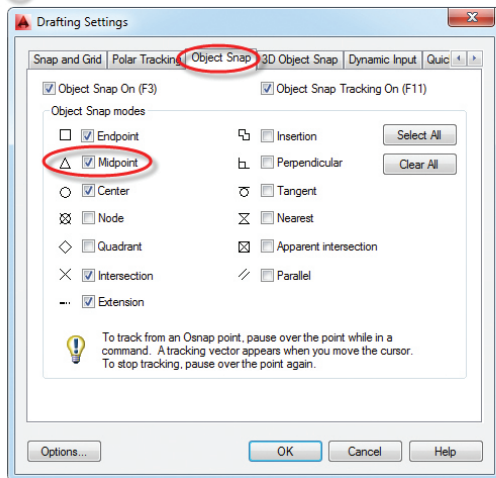
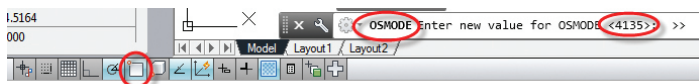
Polar Tracking:

Great option to use over Ortho as you can define multiple angles. Works in conjunction with Snap Tracking.

Object Snaps:

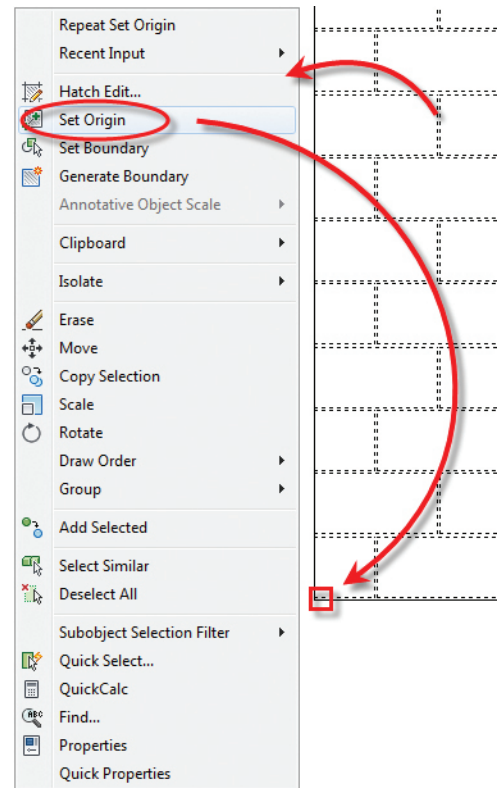
Object snaps are crucial to any accurate drawing and definitely a personal setting. However, out-of-the-box, the Midpoint running Osnap is not turned on. Also, you may want to minimize using the “Nearest” Osnap as a running Osnap and only invoke it on demand (shift, right-click). Once you find your favorite settings, type “OSMODE” from the command prompt to find your special object snap settings number so if they get reset, you can quickly get all of them back.

Speaking of on-demand Osnaps, one of the most useful is the “mid between two points” Osnap (or M2P from the command line) that allows you to find the middle of a corridor or just about any shape, saving you from having to draw temporary construction lines.



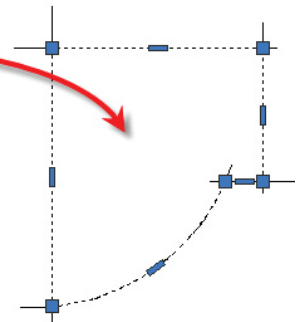
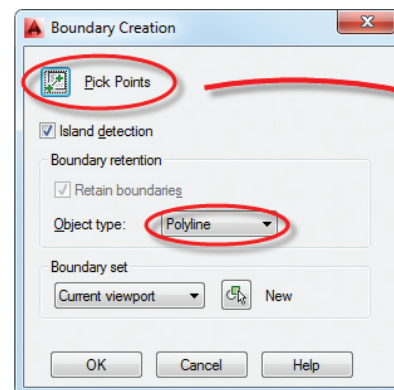
Hatch Set Origin:

In the architectural world, hatch patterns are more than just a pattern. Often, it's important to make sure the building “courses out.” By using the “Set Origin” option (select the hatch pattern, right-click → “Set Origin”), you can ensure that the pattern lines up with the building.



Bpoly / Boundary Creation

Another good rule is to always keep your shapes closed, especially polylines. Closed polylines give you valuable information such as the area of the shape. You may still find it useful to use the Bpoly or Boundary Creation tool to quickly draw a closed polyline.



Flatten / Set z Value to 0

Often when we receive drawings from other sources, not all the lines may be drawn on the same plane. You can usually tell when this happens by inconsistent dimensions or if you start to get messages such as “Points are non-coplanar.” There are many third-party tools you can download and try out including the Flatten command in the Express Tools; however, these don't work in all circumstances. A more robust method is to simply use the following routine:


```
(command "MOVE" (ssget "x") "" "0,0,0" "0,0,1e99")
(command "MOVE" (ssget "p") "" "0,0,0" "0,0,-1e99")
```

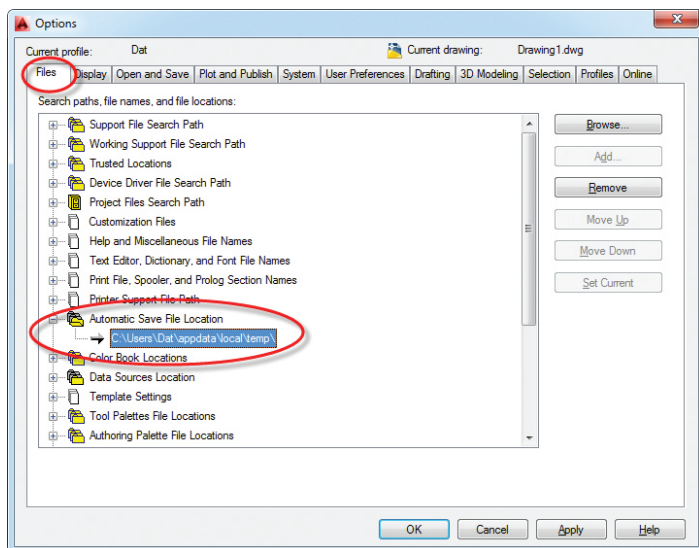
Just make sure all your layers are on, thawed, and you can either copy/paste the lines above into your drawing, create a tool palette tool to invoke this, or modify the CUI to add this as a custom command.

DISASTER RECOVERY/AVOIDANCE

Whether we like it or not, things are going to happen that are out of our control. Often, it happens for no apparent reason. Instead of wondering what happened, you can usually take immediate steps to get back up and running by being prepared. Here are some tips.

Salvage the Autosave File

If you get nothing out of this entire article, make sure you get this: In the event of an AutoCAD crash, do not let AutoCAD shut down when prompted. Instead, open Windows Explorer and navigate to the autosave file location mentioned at the beginning (Options → Files tab → Automatic Save File Location) and copy your autosave file (usually a file with a .sv\$ extension) to a secured folder. Then switch back to AutoCAD and let it do its thing. If AutoCAD crashes without any prompts, chances are the autosave file is still intact and you will get the Drawing Recovery Manager when you reopen AutoCAD. If you shut down AutoCAD, it thinks that everything is hunky-dory and deletes your autosave file, leaving you without a backup in the event that your file gets corrupted in the process.



Spring Cleaning

Keeping things tidy should not only be a task for the CAD manager. It is everyone's responsibility, all of the time. When you notice performance degrading and trying all of the above still doesn't help, it may be time for some Spring cleaning, such as the following.

Purge Command:

Everyone knows (or should know) about the purge command. However, not everyone knows that there's a difference in using the dialog box versus the command line option ("-purge"). The latter allows you to purge "Registered Apps," which have a way of sneaking into your drawings and causing demand loads to happen in the background, which turns your AutoCAD experience to mud.

Start with a Clean Template File:

As mentioned earlier, always start your drawings with a clean template file to ensure that you don't compound errors down the road. However, if there are some stubborn issues that cannot be resolved, it's time to transfer your elements to a new clean file by using the "copy between two files" method. What you get is a fresh drawing that is free from undefined blocks, extraneous layers, and one that will perform much better. Just be sure to rename the old file and put this one in its place to satisfy any Xref pathing requirements.

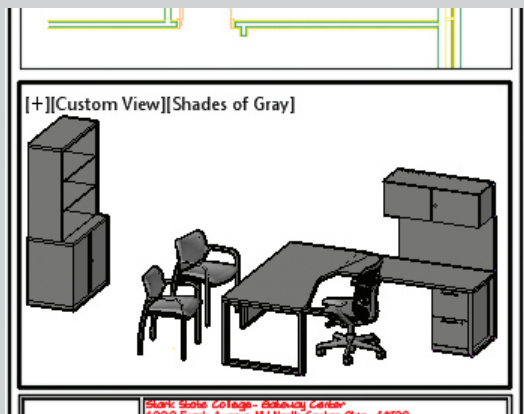
CONCLUSION

From settings and fine tuning AutoCAD for optimum performance, to simple yet productive tools, to avoiding and recovering from disasters, hopefully you'll find this guide a useful reference and can work it into your next training. It's a lot to absorb, but your labor will start to bear fruit in no time. Whether you've been using AutoCAD a long time or you just dabble, these tips will help you save time, avoid costly issues, and keep the weeds out of your AutoCAD garden.



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

And Here's How to... Set a Viewpoint from the Quick Access Toolbar



Once you have established a 3D viewpoint—using whatever method you prefer—many of you are aware that you can save that view by name so you can restore it later in other viewports or after you have gone back to the Plan view.

Named views are great, but they are saved in the current drawing. What if you would like to use that particular “eyeball position” on all your drawings?

The following procedure can be accomplished while you’re in model space or in a viewport.

HOW TO CAPTURE A NON-STANDARD VIEWPOINT

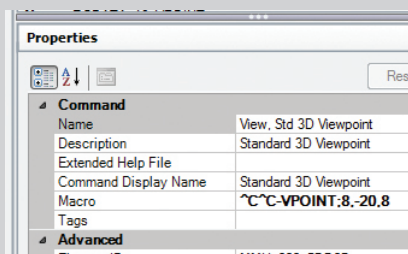
1. Set your view to a position other than one found in the standard collection of NE, NW, etc.

Hint: You can hold down the Shift key, then use your wheel-mouse pan feature and (slowly) move your cursor to kick your system into 3D orbit.

2. With the view the way you want it, enter **-VPOINT** (the leading dash/hyphen is the key to this trick), and in the history above the default command line, you see the viewpoint stated as VIEWDIR= [X,Y,Z], similar to this:

VIEWDIR = 8'-5 9/16", -20'-1 13/16", 7'-10 7/8"

3. Jot down the numbers, rounding them to the nearest whole number. You don't have to include the feet



since the values define the vector position of your eyeball. For my position, I'll use 8,-20,8.

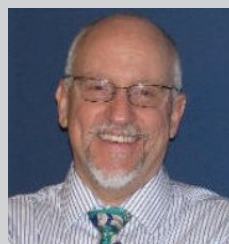
4. Open the CUI.
5. In the Command list, right click on 'View, Viewpoint' then click *Duplicate* (which is, effectively, a Copy + Paste). The copy will have an Element ID with an 'MMU' prefix.
6. Now modify the Properties to something like you see in the image shown.
7. For the macro, enter the following, replacing the X,Y,Z with the values you got from Step 2, above:

^C^C-VPOINT;X,Y,Z

Memo: It's really important that there are NO spaces in the macro string of characters.

8. In the upper left quadrant of the CUI, under *Customizations in All Files*, expand *Quick Access Toolbar 1*, then expand *Quick Access Toolbars*.
9. Now, drag and drop your new View button up into the QAT command listing.
10. Click OK to close the CUI and save your changes.

The next time you have a drawing and want that very same eyeball position, hit that button!



Michael E. Beall (B. Arch.) won the AU 2013 Speaker Award for Hands-on Labs and is an Autodesk Authorized Author. He is the owner of CAD Trainer Guy, LLC in Shelbyville, KY and has been presenting onsite CAD training around the planet since 1982. Contact him anytime at michael.beall@cadtrainerguy.com, on LinkedIn at <http://www.linkedin.com/in/cadtrainerguy/> or give him a call at 502.500.2267.



AUTODESK UNIVERSITY 2014

AU 2014 will change your perspective

You don't want to miss Autodesk University—the world's largest gathering of Autodesk software users. It's the must-attend, innovation-packed conference of the year, no matter what industry you're in.

Learn. Connect. Explore.

December 2–4, 2014 • Mandalay Bay, Las Vegas

Register today at autodesk.com/augi-au2014

Autodesk and the Autodesk logo are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document.

© 2014 Autodesk, Inc. All rights reserved.

 **AUTODESK**

Introduction to Revit Macros



BIM managers have tasks they perform on a regular basis, whether on a single Autodesk® Revit® model or on multiple Revit models. Many of these tasks are repetitive and can become boring after doing the same task over and over. Luckily, Revit has a solution to this with its integrated Macro system. There are many tasks that can be automated such as model setup, model cleanup, view/sheet creation and duplication, quality control checks, parameter validation, and much more.

Before proceeding any further, I want you to know that I'm not a professional developer and I have only been writing macros in Revit for a little over a year. I learned how to create macros by trial and error. If I can learn this way, I believe just about anyone else can also. My process has been to identify a task to automate or a problem to solve. I then break down the steps to solve using Revit as normal (if possible) and then I set out to solve it in a similar way through a macro.

Revit macros use the API (Application Programming Interface) to control the Revit application and work with the objects in the Revit model. The macros can be written in several programming languages including C#, VB.NET, Ruby, and Python. This article will show how to get started writing macros for Revit in C#, but is also applicable for the other languages.

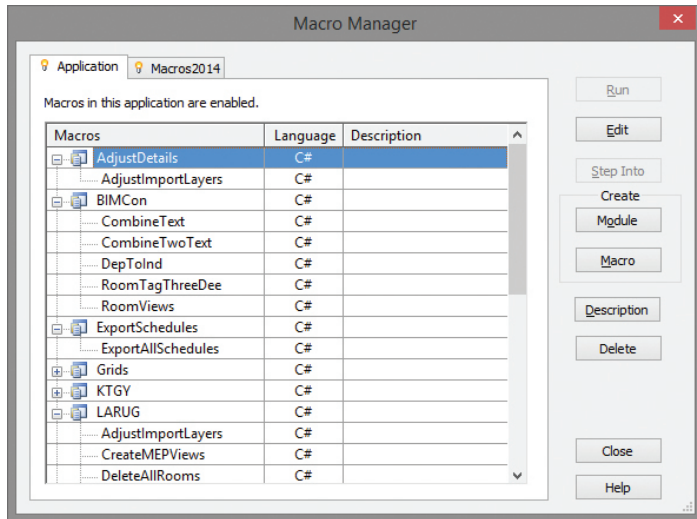


Figure 1: Sample Macro Manager dialog in Revit

Revit macros are created by opening the Macro Manager tool from the Manage tab. Macros can be created either in the application or in the model. I highly suggest creating the macros in the application tab so you can reuse the macros in any Revit model. If you store the macro inside the model, then it is only available to that Revit model. Storing it in the model will also give you a warning every time you open the model that it has macros stored in it. This can cause other users of the model to think it may contain a virus.

To get started, you first need to create a module to store the macros in. The module allows you to pick the programming language (C# in this case) to use and to create a name for the module. Think of modules as a binder of macros. You can have multiple binders (modules) that contain multiple macros. You can use these modules to separate the macros into similar types.

After creating a module, you can then create a macro that will allow you to write code that will interface with the Revit application and Revit model. While initially creating the macro all you need to do is supply a name for the macro. Macro and module names cannot contain spaces or special characters. Try to keep the names simple: "CreateMEPViews" or "CopySheets," for example.

Once you create a module or macro, Revit opens a new window outside of Revit called SharpDevelop. SharpDevelop is the IDE (Integrated Development Environment) you will use to write the macro code. Modules start out with several lines of code to begin with that you need to be careful not to change.

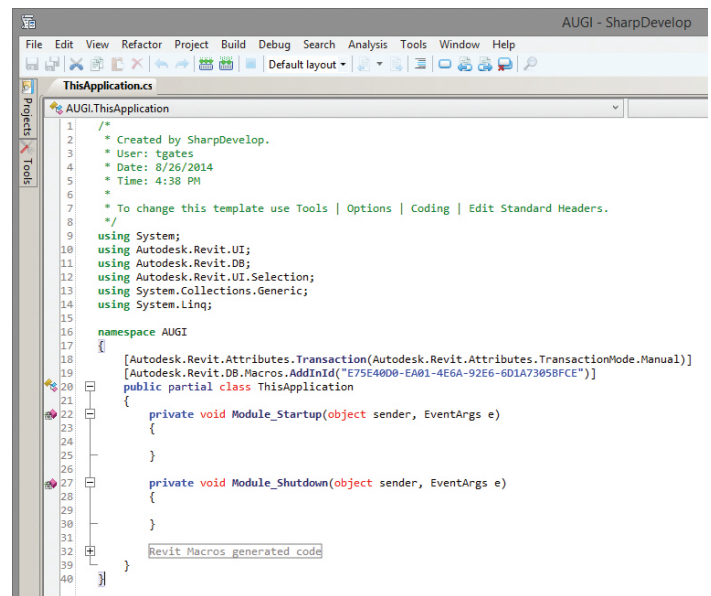


Figure 2: SharpDevelop IDE with a new module started

Before you can start coding, you need to learn some general concepts around the .NET programming platform upon which the Revit API is built. For more info about C# and .NET a free book is available at <http://www.robmiles.com/c-yellow-book/>

.NET is a programming platform created by Microsoft that many programmers use to write applications such as Revit. You can think of .NET as a library full of objects (known as methods) that you can use to create your macros. There are methods for working with files and folders, databases, graphics, and so on. The .NET library of methods is very large. Revit also has a library of methods that allow you to interface with it through the API. These methods include almost everything available to you in the regular Revit application (but not quite all).

These libraries must be defined before you can use the methods within them. To do this in C#, we use a statement called using. Here are a couple of examples:

```
using Autodesk.Revit.DB;
using Autodesk.Revit.UI;
```

In order to keep track of what your code is doing, it is highly suggested that you put comments in your code. Comments are lines text in your code that don't do anything when running your macro. To create a comment, preface the line of code with two forward-slashes //. Any text after these on this line will be considered a comment and in SharpDevelop will turn green.

Some other common C# functions you will need to know to get started with writing macros are *if-else*, *foreach*, and *try-catch*.

If-else is a function that C# uses to test if a statement is true or false. If an if-else statement is true the then statement is run. If it is false and you supply an else then the code in the

Revit MEP

else statement is run.

Example *if* and *else*:

```
if (level.Elevation == 0)
{
    // do something if level is at 0 (true)
}
else
{
    // do something if level isn't at 0 (false)
}
```

The *foreach* function is used to iterate through a collection of elements. This function is very useful for applying a set of code to each element in the model you have collected (more on this later in the article on how to collect the elements).

Example *foreach*:

```
foreach (Element e in collection)
{
    // do something to the element
    // and then move on to the next one
}
```

The *try* function contains the guarded code that may cause an exception (error). The block of code is executed until an exception is thrown or it is completed successfully. This is useful for when trying to execute some code that might result in an error. You can *catch* the exception and display it in a dialog or skip the exception and move on to the next part of code.

Example *try* and *catch*:

```
try
{
    // some code that might result in an error or not
}
catch
{
    // do something with the error info if an error occurs
    // show in a dialog to user if desired or move on
}
```

One of the most common things you will do while writing macros is to collect a set of elements that you want to do something to. Revit and C# together allow this in a few ways. The first way is to use what is called a *filter*. Filters allow you to filter the Revit model of elements down to a smaller number based on a rule set (filter) that you define. Thus filters are used to find a very specific set of elements that match the criteria in the filter.

Example filter code to collect all wall instances in the entire model:

```
// Find all Wall instances in the document by using category
```

filter

```
ElementCategoryFilter filter = new ElementCategoryFilter(
BuiltInCategory.OST_Walls);
```

```
// Apply the filter to the elements in the active document
// Use shortcut WhereElementIsNotElementType() to find
wall instances only
FilteredElementCollector collector = new FilteredElementC
ollector(document);
```

```
ICollection<Element> walls =
collector.WherePasses(filter).WhereElementIsNotElement-
Type().ToElements();
```

```
String prompt = "The walls in the current document are:\n";
```

```
foreach (Element e in walls)
{
    prompt += e.Name + "\n";
}
```

```
TaskDialog.Show("Revit", prompt);
```

In the previous example we used an object called *FilteredElementCollector*. The *FilteredElementCollector* is a collection object that will hold all of the elements that meet the filter that we apply to it. This collection of elements can then be used in a *foreach* method to cycle through all elements one at a time. The *FilteredElementCollector* can be used to hold elements from the entire document (model), from a specified set of element ids, or from all the elements visible in a specified view.

Example *FilteredElementCollector* to collect all the elements visible in a 3D view:

```
FilteredElementCollector collector = new FilteredElementC
ollector(document);
```

```
// Use shortcut OfClass to get View elements
collector.OfClass(typeof(View3D));
```

```
// Get the Id of the first view
ElementId viewId = collector.FirstElementId();
```

```
// Test if the view is valid for element filtering
if (FilteredElementCollector.IsViewValidForElementIteratio
n(document, viewId))
{
```

```
    FilteredElementCollector viewCollector = new Filtered-
ElementCollector
    (document, viewId);
```

```
// Get all FamilyInstance items in the view
viewCollector.OfClass(typeof(FamilyInstance));
ICollection<ElementId> familyInstanceIds = viewCol-
lector.ToElementIds();
```



```
// Do something to the families like reporting their id
// number in a dialog box
TaskDialog.Show("Element Ids", familyInstanceIds);
}
```

The Revit API also allows the use of Microsoft LINQ (Language Integrated Query) functions. LINQ allows you to use a database-like query system to filter the elements contained in a collection. It is much more powerful and easier to use, in my opinion, when working with collections of Revit elements.

Example LINQ query to get a collection of all the elements in the room category:

```
// get all elements in the model
FilteredElementCollector collector = new FilteredElementCollector(doc);

// filter out everything but rooms
ICollection<Element> collection =
collector.OfClass(typeof(SpatialElement)).
OfCategory(BuiltInCategory.OST_Rooms).ToElements();
```

Using *collections* to gather elements, using *filters* or *LINQ* to specify which elements are in the collection, and then iterating through the collection with *foreach* to perform a task on the elements is a core part of many macros that will assist you in managing your Revit models.

Example bringing together the concept of collections, LINQ, and *foreach*:

```
// get all elements in the model
FilteredElementCollector collector = new FilteredElementCollector(doc);
// filter out everything but rooms
ICollection<Element> collection = collector.OfClass(typeof(SpatialElement)).
OfCategory(BuiltInCategory.OST_Rooms).ToElements();

// loop through each room in the model
foreach (Element e in collection)
{
    // tell the element it is a room object
    Room r = e as Room;

    // report some room info to a dialog box
    TaskDialog.Show("Rooms", "Name:" + r.Name +
"\nNumber:" + r.Name
+ "\nBase Level:" + r.Level + "\nId:" + r.Id.ToString());
}
```

In order to access the Revit application and the Revit model database, your code needs to define objects that the Revit API will use to interface with these. These objects are called *UIDocument* and *Document*. The *UIDocument* contains access to the Revit application while the *Document* object contains access to the model

elements. You will need to define these objects before using the Revit API in your macros.

Example defining *UIDocument* and *Document* objects:

```
// setup uidoc and doc for accessing the Revit UI (uidoc)
// and the Model (doc)
UIDocument uidoc = this.ActiveUIDocument;
Document doc = uidoc.Document;
```

There are lots of macros you can write that only query the model and don't change any elements in the model. But if you do make changes to the model, you need to use what is called a *Transaction*. The *Transaction* method tells Revit that everything you do after starting the transaction should be applied when you complete (commit) the transaction. If you don't put the changes into a transaction, the macro will give you an error and your changes will not take effect.

Example macro that duplicates a view as dependent five times with a transaction:

```
// Description: Create 5 Dependent Views for currently
// active view
public void CreateDependentViews()
{
    // setup uidoc and doc for accessing the Revit UI
    // (uidoc) and the Model (doc)
    UIDocument uidoc = this.ActiveUIDocument;
    Document doc = uidoc.Document;

    // create a transaction for the current model (doc) and
    // name it (this shows in the undo menu)
    using (Transaction t = new Transaction(doc, "Duplicate
    View 5x"))
    {
        // start the transaction
        t.Start();

        // create a counter for incrementing alphabet (this
        // is an integer)
        int i = 0;

        // loop through until you reach 5 (change 5 to
        // increase/decrease the before running macro)
        while (i < 5)
        {
            // duplicate the currently active view
            ElementId dupViewId = uidoc.ActiveView.
            Duplicate(ViewDuplicateOption.AsDependent);
            // get the new dependent view
            View dupView = doc.
            GetElement(dupViewId) as View;
            // use char command to get the letters A, B, C,
            // D, E (changes each loop)
            char c = (char) (i + 65);
```

Revit MEP

```

// rename the dependent view to include the
// original name and the new Area
dupView.Name = uidoc.ActiveView.Name +
"- AREA" + c.ToString();

// increment the char each loop (A, B, C, etc)
i++;
}

// finalize the transaction and commit the changes
// to the model
t.Commit();
}
}

```

The last example shows you a complete macro that will duplicate a view as dependent five times. After typing the macro code, you need to build the code. Building the code checks it for errors and if none are found it will make it available to run the macro inside the Macro Manager. Note that this doesn't mean you won't still have errors pop up; it checks just the syntax of your code, not the functionality. To build a module you can either hit the F8 key or go to the Build menu and choose Build Solution. You need to do this every time you edit your macro to get it to be the most current before you run the macro.

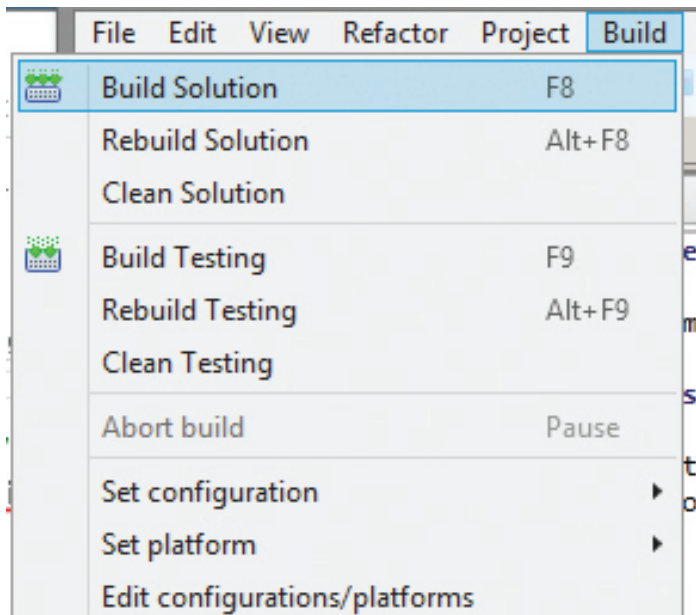


Figure 1: Run the Build Solution command before running your macro

Once the build is complete and you don't have any errors, you can run the macro. In the case of the last example, you will end up with five new Dependent Views for the view that was current when you ran the macro.

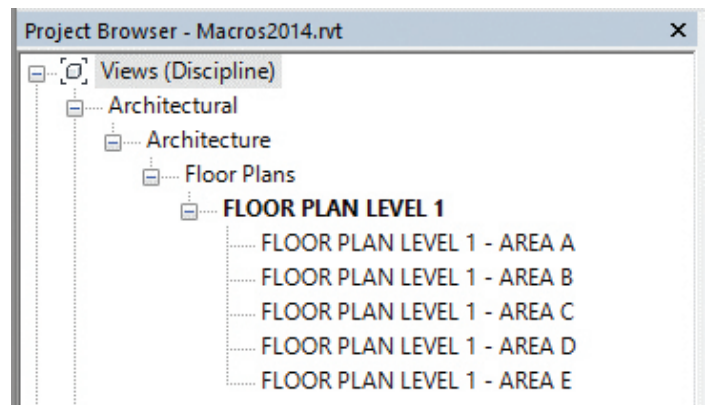


Figure 2: Results of running CreateDependentViews macro on a floor plan

While this article is not an exhaustive A-Z of how to write macros in Revit, it should give you a good starting point to begin writing your macro toolbox. In addition to my examples above, you can search the Internet as well as use the resources listed below.

Revit Coaster (my blog): <http://revitcoaster.blogspot.com/>

The Building Coder: <http://thebuildingcoder.typepad.com/>

AEC DevBlog: <http://adndevblog.typepad.com/aec/>

Boost Your BIM: <http://boostyourbim.wordpress.com/>

SpiderInNet: <http://spiderinnet.typepad.com/blog/>

Autodesk Developer Network: <http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=2484975>

Autodesk Discussions: <http://forums.autodesk.com/t5/Revit-API/bd-p/160>

RevitForum.org: <http://www.revitforum.org/third-party-add-ins-api-r-d/>

AUGI Forums: <http://forums.augi.com/forumdisplay.php?218-Revit-API>



Troy Gates, Design Technologies Manager for KTG Group, has more than 20 years of experience in the civil, architectural, and MEP engineering industries. He currently manages all BIM and Design Technology related software and processes for KTG. He has worked with several firms in the past 10 years implementing BIM-related technologies and processes. Troy is also an Autodesk Revit Certified Professional, Autodesk Revit Implementation Certified Expert, and is in the Los Angeles Revit Users Group leadership team.

USA Built Workstations! Faster & Cheaper!



New Nvidia® Quadro® K620 to K5200

Shopping for an entry level 2D Quadro® Workstation? We easily beat the \$ and Specs of the "Big Three" Major Brands, Asian Made Boxes! Looking for a top performer 4+GHz? We easily beat the "Boutique Box Builders" even by \$1000+ with Better Specifications! @Xi® Computer is building Top Performing CAD® Workstations for over 22 years. Proudly Custom Built in the USA, sided by a superior domestic technical support, Xi Computers are designed to excel and deliver for the most demanding applications.



**NVIDIA.
QUADRO®**



MTower LE

- Intel® Core™ i7 | XEON E3 v3
- Intel H81/C226 C.S. PCIe 3.0
- 8GB-DDR3-1600 or 1600ECC
- NVIDIA®Quadro® K620 2GB 2H
- 500GB Seagate® 7200 16MB C.
- 5 in 1 Card Reader, Front USB 3.0
- Xi®MTower LE Small Form Factor
- MS Windows® 7/8.1 64Bit -Linux®

XEON E3-1230 3.7 GHz TB \$1,069

4-Core i7-4790 4.0GHz TB \$ 959

PowerGo XT

- Intel Core i7-4810MQ 3.8GHz
- up to 32MB Cache, 4/6 Cores
- 8GB DDR3 1866MHz to 32GB
- NVIDIA®Quadro® K1100/3100M
- 500GB SATA6 Hybrid 8GB SSD
- 17.3" 1920x1080NR LED Matte
- Speakers, Camera, Mike & Wi-Fi
- Microsoft® Windows® 7/8.1-64Bit

w/2GB Quadro® K1100M \$1,799

w/4GB Quadro® K3100M \$2,269

MTower 2P64X

- New E5-v3 Intel Xeon®Processor
- 10/35MB L3Cache, C612 Chipset
- 16GB DDR4-2133 ECC to 256G
- NVIDIA®Quadro® K2200 4GB
- 250GB Samsung® EVO™SSD
- 27" 1920x1080 LCD Monitor
- Xi®MTower 700/1300W Thor
- MS Windows® 7/8.1Pro®-Linux®

1x4-C E5-1620v3 3.6GHzTB \$2,449

2x14-C E5-2695v3 2.3GHz \$8,169

NVIDIA®Tesla™ K40/K20 GPU HPC Clusters

NVIDIA®MAXIMUS™ TECHNOLOGY Certified

NVIDIA®GTX TITAN BLACK/Z Renderfarms

Xi®Certified for AutoCAD®2014, 3ds Max®, Inventor®, SolidWorks®, Maya® & Revit®. Custom built in the USA from 100+options to match your applications and your budget. Business Lease from \$ 59/month.

www.xicomputer.com
1-800-432-0486

Core Inside, Intel, Intel Logo, Intel Core, Intel Inside, Intel Inside Logo, Xeon, and Xeon Inside are trademarks of Intel Corporation in the U.S. and other countries. MS, Windows, are registered trade marks of Microsoft Corporation. NVIDIA Maximus available on selected platforms. Xi and the Xi logo are registered trade marks & MTower, NTower, NetRAIDer, WebRAIDer, PowerGo are trade marks of @Xi Computer Corp. Prices do not include shipping and are subject to change without notice. For more details about Xi warranty and service call or write to sales@xicomputer.com. Prices and specifications are subject to change without notice. All other trademarks of their respective companies. Copyright © 2014 @Xi Computer Corp.

Revit MEP API Leveraged for Construction

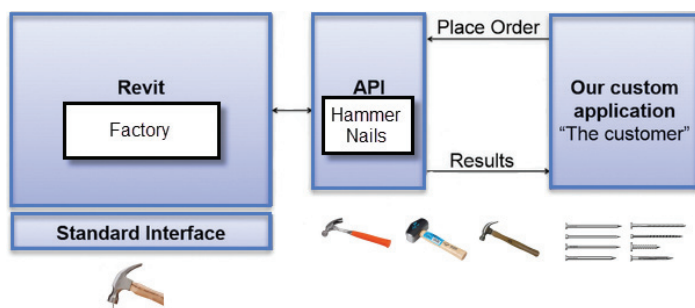


Figure 1

The Autodesk® Revit® MEP platform provides a robust API to allow programmers to take grasp of the functions inside of Revit. Autodesk uses this API internally with programmers to create specific tools and workflows to assist with the Revit MEP platform. As Autodesk puts it, “eating their own dog food.” This also allows resellers and users to utilize the API to create some unique tools.

As you can see in Figure 1, Revit provides the factory. This factory makes generic hammers and nails. The API allows the developer to create the specific hammer and the nail the worker will keep and use in his toolbox. The add-in or custom application interface is how we provide which type of hammer and nail will be used.

ADD-INS

You can see some of Autodesk’s own “dog food” in Figure 2. A huge one is External Tools Navisworks. With one click of a button it creates an NWC file, which brings over lots of pertinent information for clash detection inside of Navisworks®. Also some other great ones from Autodesk are BIM 360, COBie Extension, and Chronicle.

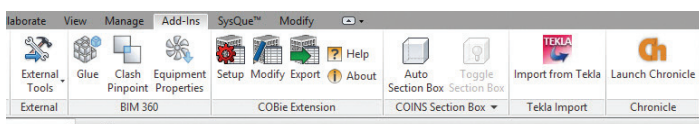


Figure 2

The Revit Exchange Store has 57 add-ins available for download (as of October 2014). I wouldn’t classify all these add-ins for construction. I see add-ins for exporting to Excel, auto dimensioning walls, creating 3D PDFs, column splitter, and model slicer.

COINS and Tekla are created outside of Autodesk. COINS is amazing for doing an isolate by a certain distance from an object. Tekla is great for bringing in Tekla Structural models.

Revit does some amazing things, but it is lacking content and connectivity for MEP construction. SysQue is bridging that gap for engineers and subcontractors to work in Revit. An integrated model is key for collaboration between architecture, structural, MEP trades, and more. No need for the architect to export out 2D CAD drawings to the MEP subs.

Now let’s see how SysQue uses the API and truly makes Revit a construction tool.

USING THE CLOUD FOR CONTENT AND CONNECTIVITY

The cloud is everywhere—music, pictures, online storage, BIM models, and data content.

SysQue utilizes Building Data, which has more than 2.9 million lines of MEP content. This gives the user the ability to download a manufacturer-specific family (RFA) from the cloud and have the ability to start using it instantly. No need to spend countless hours building a complex family as required for construction.



TM

Figure 3

This is also done by using the family editor portion of the Revit API. Each family created by Building Data has connectors associated to it. By doing this, the face-to-face connections that typically come with Revit are no more.

The same rule applies to valves that require flanges or a socket depth for soldered/threaded. Once a valve is placed, the API looks at the connectivity and will automatically add the bolt set, gasket, and flange or inset the pipe to match the correct valve.

The API loads its content at run time. Instead of having a Revit template with every family you think you might use, the API will load only the family you select from its user interface (UI) pallet (Figure 4). This gives the user the ability to have spec-driven systems instead of a large library of fittings you need to scroll through the family browser. Having the API allow for a spec-driven interface enables more route preferences based on size, materials, and manufacturer.

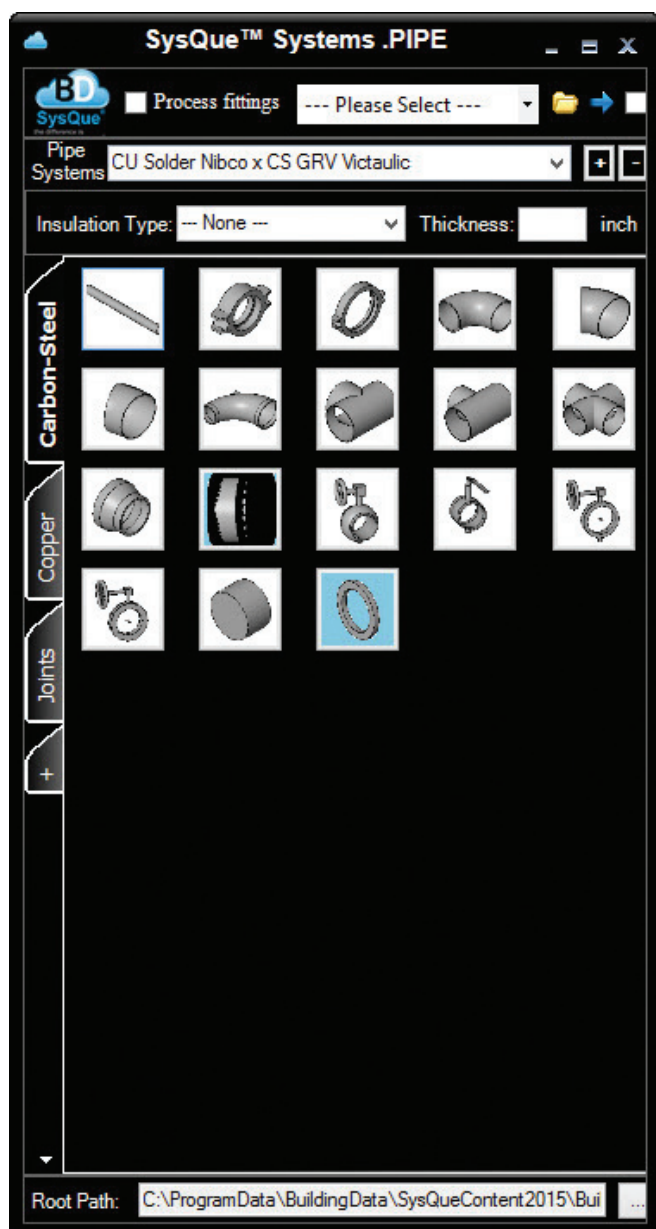


Figure 4

USING THE CLOUD FOR BILLS OF MATERIALS (BOM)

Revit is limited to specific information for the cost and weight of a particular item. For example, a 4" IPS Painted Groove Coupling Style 77 from Victaulic has only one parameter for cost and weight, not a separate cost and weight for each size of the fitting. SysQue goes to the cloud to pull down the Harrison cost, MCAA labor, and weight of each size of the fitting. It can then be saved to Excel.

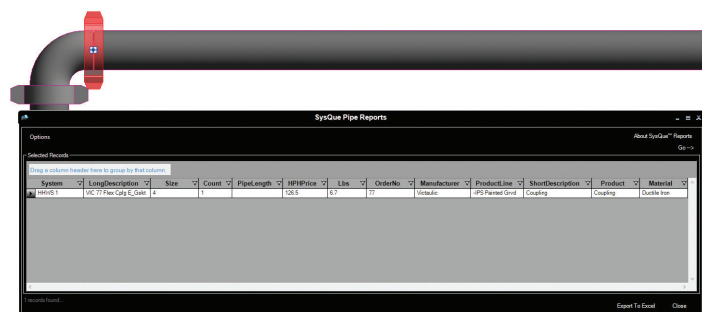


Figure 5

DOWNLOAD TO CUTTER (CAMDUCT AND VULCAN)

Having the ability to draw duct in 3D doesn't mean subcontractors can do anything with it, especially if you draw a duct that's 30 feet long. SysQue utilizes the API to separate the duct standards per SMACNA (USA), DW144 (UK), and PA (Australia). It also gives users the ability to create customize specifications per their manufacturing process.



Figure 6

SYSQUE CONNECT

The API allows the ability to rotate fittings without cutting a section view and using the rotate command, which can be cumbersome. As you can see in Figure 7, SysQue Connect is activated (Step 1), then placed on the end of a pipe (Step 2), the compass then gives the user which angle to rotate the fitting (Step 3). Press OK (Step 4) and then select which fitting you would like placed (Step 5). So with five clicks you have a fitting rotated, instead of 17 clicks with standard Revit.

Revit MEP

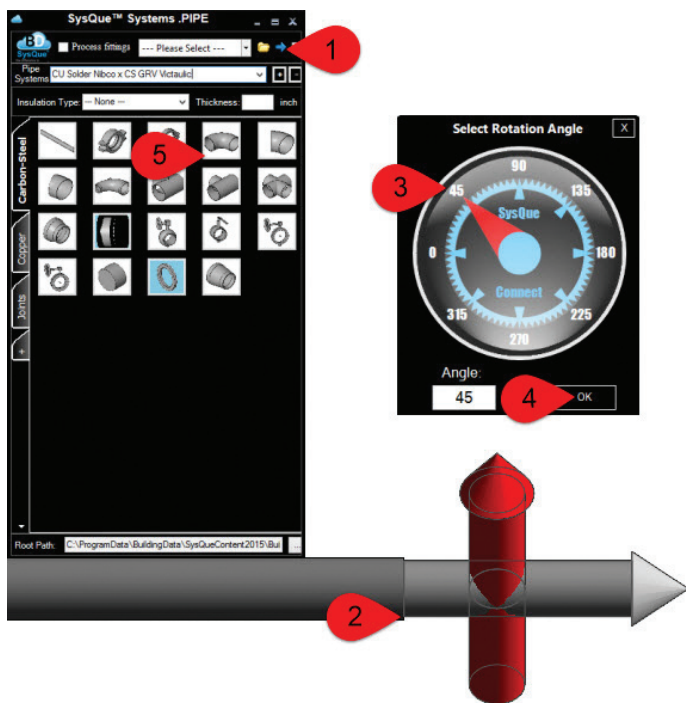


Figure 7

FIRST FITTING

After the first five steps you now have a fitting rotated at the angle chosen.

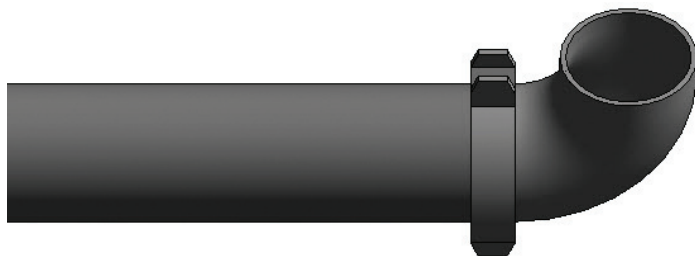


Figure 8

SECOND FITTING

With SysQue Connect activated you can continue adding fittings at the desired angle.

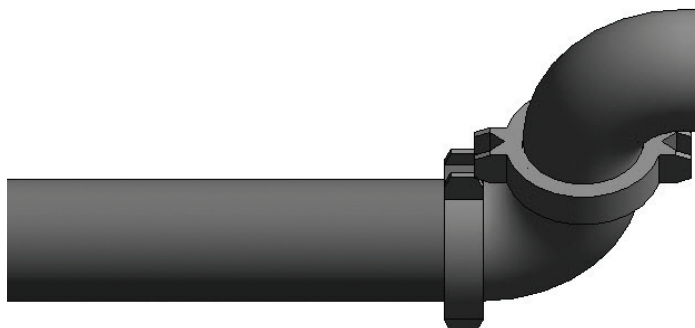


Figure 9

THIRD FITTING

With a total of 17 clicks, we now have three fittings (2 elbows and an eccentric reducer). Standard Revit is 37 clicks. That includes cutting a section view.

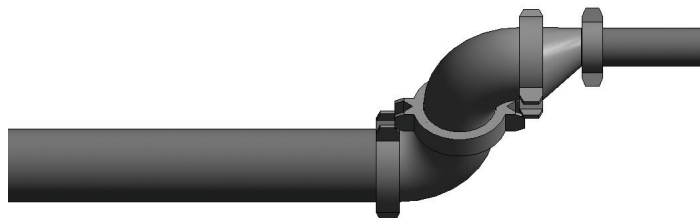


Figure 10

WHY USE THE API?

Autodesk might not give us all the tools in the toolbox we need, but it does give us the ability to create specific tools to speed up our day-to-day processes. We need to keep pushing the limits of the BIM world. Change is the only constant. So let's get creative and build that special hammer and nail that you need to be successful.

Link to the Autodesk API: <http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=2484975>



Kenneth Eastman has more than 15 years of construction/engineering experience. He was a CAD Manager for a large MEP contractor in San Francisco where prefabrication was the key objective on all MEP construction projects. Kenneth has trained users on Revit and SysQue in Australia, Dubai, Malaysia, UK, and the USA. Kenneth truly believes that when it comes to prefabrication, an hour spent in the office saves four hours in the field. He currently is the SysQue Product Manager. Kenneth can be reached at keastman@sysque.com.





Athletics has never been my thing. As I've gotten older, I've come to understand the need for regular exercise. And so, I run. Well, at least I get to the neighbor's driveway before sucking wind. I lift weights. Pretty soon I'll be able to put some on the bar. Yoga? Count me in. Extra ice on the side. The variety of exercise supposedly has its benefits, according to those "real" athletes.

What does this have to do with Autodesk® Revit® Structure? I'm glad you asked. Let me untangle myself from Child's Pose, and I'll show you.

WHY CROSS-TRAIN?

Cross-training has become standard verbiage in exercise circles. The benefits of cross-training, or a varied workout, include greater stamina, strength, and overall fitness. Doing the same thing over and over results in plateau, the point at which the body just doesn't want to change anymore. To get the scale moving again, the best thing to do is shake things up a bit (Zumba, anyone?). Change the routine. Learn something new.


We can apply the concept of cross-training to the Revit environment. Revit is not meant to be solitary. Using the platforms together in a coordinated effort benefits everyone throughout the construction process. By "platforms" I mean Revit Structure, Revit Architecture, and Revit MEP, as well as the external analysis/collaboration tools. Knowing "how" each of the platforms works gives team members greater insight into the roles and complexities of the other team members' responsibilities.

Looking back at my own career, I can see how I have unwittingly cross-trained my experiences. My career began as a drafter in an internship with a mechanical engineer. Opportunities began to emerge and I landed in the architectural field for a while. I then took a right-turn into civil engineering, with a bit of structural thrown in for good measure. After a few years, my career took a hard left back into the architectural field. Throughout the 20+ years of twists and turns, I've learned many different forms of Autodesk software, which has become an advantage in my experience.

Taking this convoluted path, I have come to realize the possibilities in cross-training Revit software. I understand the processes involved in developing each discipline's model. Typically the engineers do their thing, the architects theirs, and in the end, the building comes together miraculously and everyone lives happily ever after. Right? Revit takes this traditional process and creates a paradigm shift in the design stages of development.




Figure 1: Cross-training has its benefits in Revit



Merging the worlds of software and construction

MWF enables users to automatically frame Revit® projects, perform analysis, create dimensioned drawings & CNC output.

Visit us at Autodesk University **Booth #136**



StrucSoftSolutions.com

WARM UP...

...to the idea that learning different software is a good thing! I'm not saying you need to become an expert in another discipline...that would be unrealistic and dangerous, not to mention the legal aspects. A simple understanding of how other disciplines use Revit and what information is required for their model is enough.

By cross-training Revit software, each member of the design team visualizes the model in its entirety, understanding how each part of the Revit puzzle works. The building puzzle is put together with each team member contributing various pieces. The architect designs the building, the structural engineer gets tasked with making the design buildable (no, that was not meant to be a slam on architects...you know what I mean!), and the mechanical engineer figures out the building systems. The "aha moment" happens when each piece is placed and the overall conglomeration is complete.

Using Revit, this collaborative process happens early in the design stage. The model is created and shared, and the puzzle starts to become a tool for discussion across disciplines. Issues can be addressed and resolved early and often, long before the first block is set. Communication thrives, saving many tears and heartache.

STRETCH!

What are the advantages of an architect or mechanical engineer learning Revit Structure? Knowing what it takes for the structural model to be created, and what information is required for model integrity. Being able to create a model that, when transferred to the structural team, allows for easy translation and seamless processing. Resolution of interferences happens before a beam is placed. Is it easy to move a structural member in Revit Structure? Sure. Anyone can do that. But it has to make sense from all angles. Would a contractor move a column in the field because of a mechanical interference? As my teenage daughter would say, "probs not." The same goes for the Revit Structure model. Just because you *can*, doesn't mean you *should*. Open dialog needs to continue throughout the project.

One tool available in Revit is the Copy/Monitor tool. This tool allows each discipline to monitor changes in the other linked models. The architect can Copy/Monitor the structural grid and columns. If something changes, the architect will be notified of the change when the linked model is updated. The opposite is also true. The structural engineer can Copy/Monitor the architectural walls and be notified of changes. Whether the objects are physically copied into the other models is a discussion that needs to take place before the model is started.

NO PAIN, NO GAIN

Revit Structure, Revit Architecture, and Revit MEP are designed as cross-training tools. The debate over model ownership can sometimes rival any political debate.

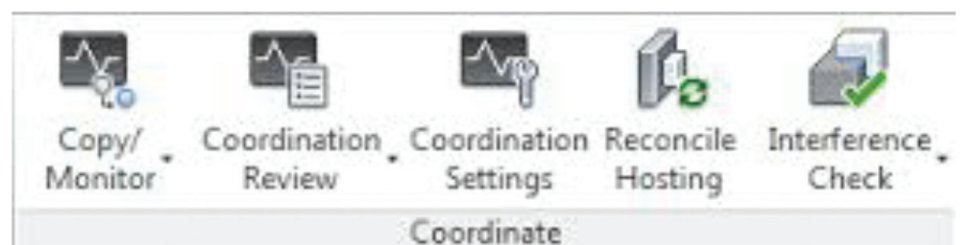


Figure 2 – Revit's Copy/Monitor tools

What works on one project may not make sense on another. Having a good BIM execution plan in place can help alleviate any misunderstandings. The hierarchy of disciplines is typically established in the proposal process, and including the hierarchy of the model can and should be a part of this process. Understanding who will be coordinating the model from the beginning eliminates questions later.

STAY THE COURSE

While every project is different, it is important to set standards for model setup and collaboration. Each team member understands the “rules” and performs the functions agreed to in the standards. This may include a schedule for coordination and set times to share models so that coordination continues to develop throughout the design phase.

Take the structural model for example. On the predetermined day, the model exchange takes place. The architectural and mechanical models are shared, linked, and monitored (or this can all take place continually through cloud storage of the model). The structural model is sent to the architect and mechanical engineer. Everyone has access to the current model, and everyone can see changes and interferences. A discussion ensues, and the issues are resolved.

Having even a slight understanding of the other platforms of Revit elevates the discussion to a whole new level. The thought process behind issue resolution now includes the consideration of the other team members’ abilities to make changes within the model. Maybe it is easier for the architect to make a change without affecting structure, or for the mechanical engineer to re-route something without affecting architectural design. Discussions expand and form the design.

FIND A TRAINER

Like I said earlier, you should not expect to become an expert in every platform of Revit that exists. Unless, of course, you have unlimited time and really love learning new software. (Probs not...) My suggestion would be to visit the Autodesk website for insights into the Revit world. Explore online how the platforms interact. Talk to the people who use the software on a daily basis. You’ll probably learn more from them than you really need to know, but they can also give valuable insight into the practical application of their particular Revit platform. The AUGI forums are another great place to learn from others in the industry.

Resources abound in this technological age. Creating time to expand your horizons and learn new software may take a Herculean effort, but being able to acknowledge the subtle differences in the software platforms is well worth the investment of a few hours of time. Being able to have an intelligent

discussion of the Revit model, whether from an architectural, structural, or mechanical viewpoint, only helps to ease the design process.

COOL DOWN

You may be thinking “Okay, I have this extra knowledge. I know how Revit works from all perspectives. Now what?” Well, keep doing what you’re doing. Only now, do it better. Structural teams should still be doing structural design. There shouldn’t be any cross-training of responsibilities. That would get into a whole bunch of legal issues that would just make a big mess of things. Mechanical engineers shouldn’t have the authority to move columns, just as a structural engineers should consult the architect before moving a partition. Design responsibilities remain aligned. The advantage of a cross-trained building design team is simply this: each team member has insight into what it takes for the other team members to create and to modify their respective models. No more. No less. Any improvement in the collaborative effort will be reflected in the design team as a whole, which makes for happier contractors, and more importantly, happier clients.



Figure 3: Cross-training supplements collaboration



Kimberly Fuhrman, LEED AP BD+C, has more than 20 years experience in both the civil and architectural fields. She is a Revit Architecture 2014 Certified Professional and the Revit Structure Content Manager for AUGIWorld. Kimberly is Revit Manager for LSC Design, Inc. in York, Pennsylvania. Contact her at kfuhrman@lscdesign.com.



ACA Display Themes

Display Themes is a feature that will work with any AutoCAD Architecture® object you have created. Manual properties of an object—such as a wall’s fire rating or a door’s manufacturer—are not typically visible in a drawing. Display themes let you incorporate such non-graphic data in your drawing (both 2D and 3D) by using certain colors, fills, or hatches to highlight objects that meet the criteria or theme rules that you have established in a display theme style. For exam-

ple, you could define a property named Function for room objects and then set up a theme rule that specifies that rooms with a function value equal to “storage” will be displayed with a solid cyan fill. A display theme can be activated in a drawing by using a display theme tool to insert a display theme legend, which explains the meaning of color, fills, or hatches specified in the theme.

CREATING DISPLAY THEMES

Display themes are an effective way to present information during the conceptual design phase of a project or when working with construction documents. With display themes you can identify changes to a project that are not in the contract, identify the staging of a project, and identify objects that meet or do not meet specific standards. If you use the drawing as an external reference (xref) in a project, the display theme is imported into the host drawing by default. If the host drawing already contains a display theme, then the display theme in the host drawing overrides the display theme in the xref. A marker appears over the disabled display theme legend.

There is a simple five-step process you can follow to create a display theme:

1. Create property data formats you will use in your theme. The formats you create will determine how your data is displayed in the display theme legend.
2. Create property set definitions for objects in your drawing. Here you will incorporate formats from step 1.
3. Create a display theme style. This will specify the format for the legend of your display theme as well as what objects will be highlighted in your drawing. The legend is a key that will incorporate property set definitions from step 2. It will specify which visual indicator will be applied to which objects in a drawing and what the content will be.
4. Attach property set data to the objects for inclusion in your display theme.
5. Activate the display theme by adding the legend to the drawing.

Now let's look at each of these steps in a little more detail.

PROPERTY DATA FORMATS

The criteria for the display theme are based on the property data attached to the objects or object styles. The property data overrides the display properties to produce the visual effects produced by inserting a display theme. Property data formats are created and edited in the Style Manager under the Manage tab of the ribbon, Style & Display panel. You can also enter the command AECSTYLEMANAGER. To create a new format, expand Documentation Objects, right-click Property Data Formats, and click new. Enter a name for the new format and click enter. If you wish, you can also select an existing property data format, right-click and copy, then paste and rename.

Now click on the Formatting tab (see Figure 1). Here, you will need to specify how you want the formatting to appear. For example, if you want the text to appear in all capital letters, you would select Upper under the Case drop-down. Fill in all information pertinent to the format you are creating. Click Apply and then OK when you are finished.

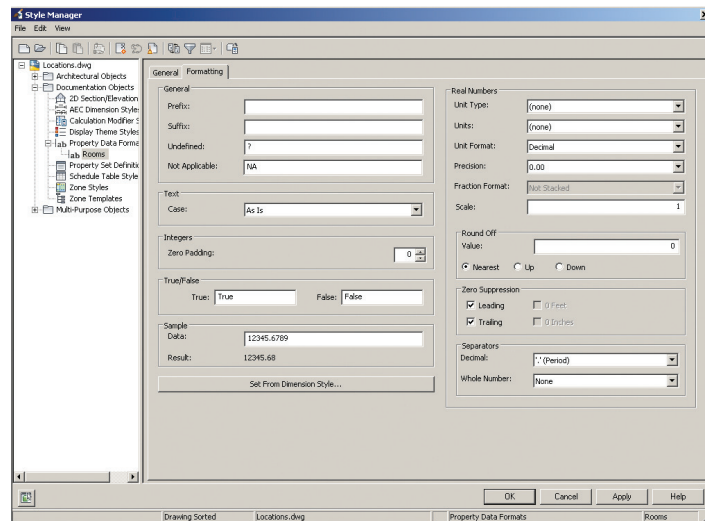


Figure 1: Property data format

PROPERTY SET DEFINITIONS

Property set definitions are created and edited in the Style Manager under the Manage tab of the ribbon, Style & Display panel. You can also enter the command AECSTYLEMANAGER. To create a new one, expand Documentation Objects, right-click Property Set Definitions, and click new. Enter a name for the new definition and click enter. If you wish, you can also select an existing property set definition, right-click and copy, then paste and rename.

Select the Applies To tab and check the box next to each Object or Style and Definition to which this Property Set Definition will apply. Now click on the Definition tab (see Figure 2) and add property definitions as needed. Using the buttons along the right side of the dialog box, you can choose to add manual definitions, formula definitions, automatic definitions, and so on. The Automatic Property Definitions button is unique in that it brings up a dialog box of preset definitions to choose from. The values for each of these properties are obtained directly from an object or its style. The properties available to select are dependent upon objects or styles selected on the Applies To tab (see Figure 3).

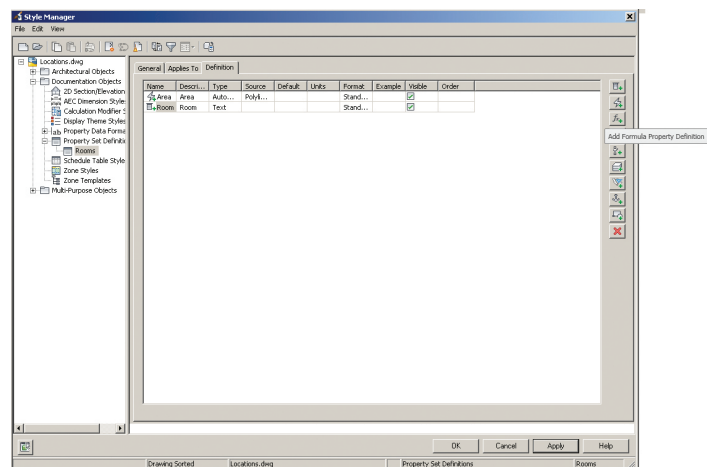


Figure 2: Property set definition

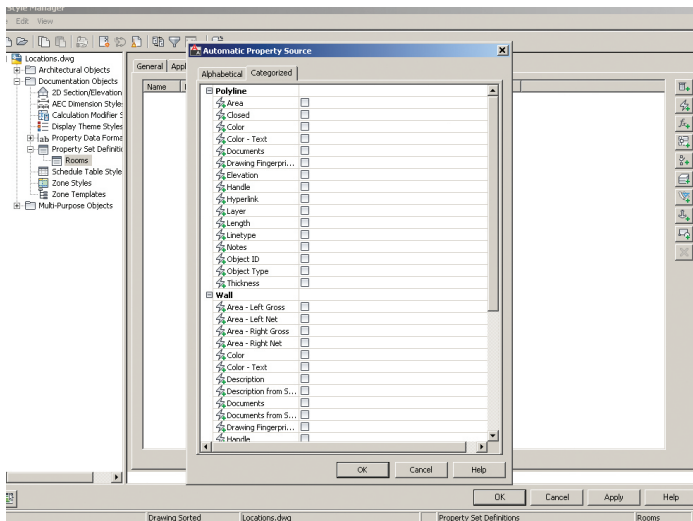


Figure 3: Automatic property definition

DISPLAY THEME STYLES

Display theme styles control the visual change to the objects as well as the content and appearance of the display theme legend in the drawing. A drawing must contain a display theme style to affect the visual changes or to add a display theme legend. When you copy a display theme style into a drawing, property set definitions and data formats specified in the style are also copied. Display theme styles are created and edited in the Style Manager under the Manage tab of the ribbon, Style & Display panel. You can also enter the command AEC-STYLEMANAGER. To create a new style, expand Documentation Objects, right-click Display Theme Styles, and click new. Enter a name for the new definition and click enter. Enter a description for the display theme style. If you wish, you can also select an existing display theme style, right-click and copy, then paste and rename.

Next, click on the Design Rules tab (see Figure 4) and click the Add Component button on the right side of the dialog box to create a new theme setting. This will create an unnamed theme setting with an index number of one. Now you can create the settings for the display theme, which will control the type of highlighting in the style.

Next, you can create theme rules for each theme setting, which will determine specifically which objects will be highlighted using each setting. When you create a theme rule, you will see an index number, which corresponds with the theme setting. If you wish, you can create multiple rules for each theme setting. For each theme rule you create, you can select a property set definition, a property that is contingent upon the property set definition you selected, and a condition that is contingent upon the property set definition and property you selected. Then you will enter a value appropriate to the condition you selected and select an operator appropriate to the formula you are creating for the theme rules.

Next, you will specify the format for the design theme legend by clicking on the Legend Format tab. Enter the information that is pertinent to your style.

Last, you will specify the display properties for the display theme legend by clicking on the Legend Display Properties tab. You will then select the display representation on which to display the changes and select the Style Override. The display representation in bold is the current display representation. Click the Layer/Color/Linetype tab, select the component to change, if any, and select a different setting for the property. Once everything is finished, click OK twice.

Once your display theme style is created, you can drag and drop it onto the tool palette for future use. Doing this creates a display theme tool. Once it is placed on the tool palette, you can right-click on it and click on Properties to add a description, change the scale of the legend, and so on.

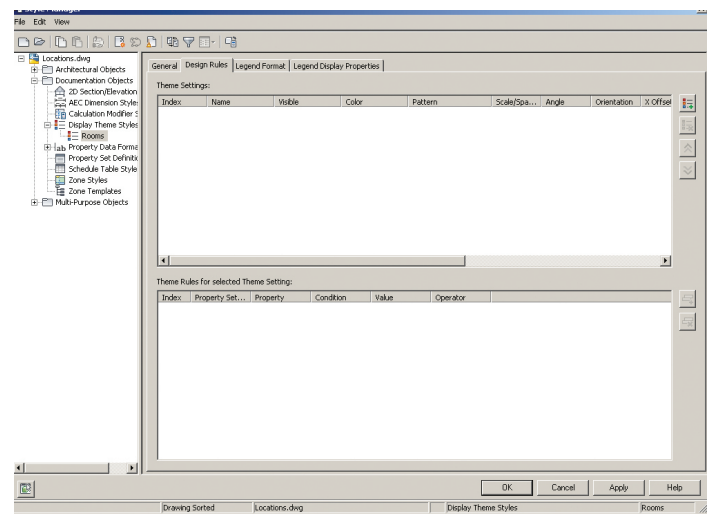


Figure 4: Display Theme Style Design Rules tab

ATTACH PROPERTY SET DATA

Now that you have created everything you need for your display theme, you will need to attach property set data to objects in your drawing. Select the objects to which you will be attaching property set data, right-click, and select Properties. On the Properties palette, click the Extended Data tab (see Figure 5). Next, click the button at the bottom of the palette to add property sets. Select the property sets to attach to the object and click OK.

The property set is now attached. You will find that the values for automatic properties are already filled in. At this point, you can enter data for manual properties for each object.

It is important to note that if you select more than one type of object, you can attach only the property set definitions that apply to all the selected objects. For example, if you select doors and windows, you can attach only those property sets that apply to both doors and windows.

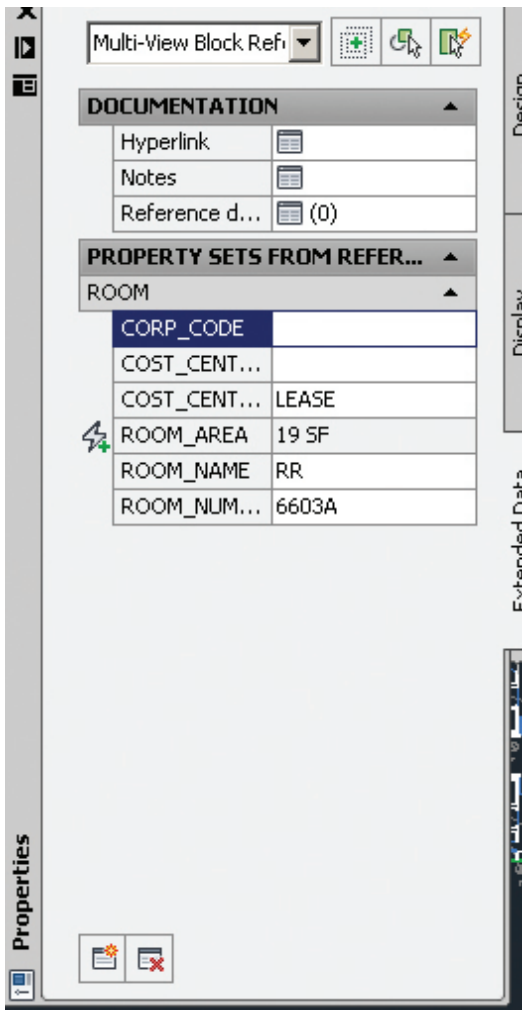


Figure 5: Properties extended data

DISPLAY THEME LEGEND

A display theme legend provides a key to the display theme, mapping specific colors, fills, or hatches to properties of objects in a drawing. You insert a display theme legend into a drawing to activate a display theme and visually change the appearance of objects by overriding the current display properties.

The tools provided let you quickly place display theme legends by selecting a display theme tool with a specific display theme style and other predefined properties. When you place display theme legends using display theme tools, you can use the default settings of the tool or you can change settings for the display theme properties. You can also use display theme tools to apply the settings of a display theme tool to existing display themes.

The default Scheduling palette in the tool palette set contains three sample display theme tools that you can use and customize as needed. Custom palettes created by your CAD manager or other users may also contain display theme tools with display theme styles and properties that are customized for your projects or office standards.

ACTIVATE DISPLAY THEME

The display theme legend activates the display theme in the viewport and identifies the meaning of the different colors, fills, or hatches used in the theme. The data for the display theme legend is collected from the property set data attached to the objects or object styles, as specified in the display theme style. When you add new objects to a drawing, data is added to the legend if it meets the criteria you specified in the display theme style.

At this point, you are ready to add the theme you created into your drawing. The display theme is added to the drawing through either the scheduling tool palette or the command DisplayThemeAdd.

Open the tool palette that contains the display theme tool you want to use and select the tool. In the drawing area, specify the insertion point for the upper-left corner of the display theme legend. Then specify the lower-right corner of the legend or press enter to scale the display theme legend to the current drawing scale. The display theme is now activated. At this point, you will notice that the objects affected by the display theme visually change in the drawing as indicated by the legend.

You can add more than one display theme to your drawing; however, only one theme at a time can be active. If you add a display theme to a drawing and there is already a display theme there, the older one will automatically be disabled when you add the new one. If new data is added to your drawing that meets the criteria of your display theme style, it will be added to the legend.



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



The AECO Landscape



The AECO Landscape in relation to Autodesk® Revit® and furthermore, BIM, is still a volatile place for many teams and firms.

This is due to several components, but I feel it is primarily one of Perspective. I find too many players either do not realize or they mis-strategize projects. In order to get the best possible results in a predictable manner, one must have an honest perspective as to the ultimate success drivers; too often the success of BIM is left to chance.

I would like you to take one idea on-board and if we can agree on this one point, I think it will show that there are myriad good and bad ways to approach BIM; whether the (final) Building, the Information or “the” Model. The concept is:

THE WORST POSSIBLE PROJECT FOR EVERYONE IS BAD

That’s it—that’s all we need to suppose.

With that one assumption we can easily postulate that there is a positive converse; a ‘Good’ if you will, creating a continuum where there are myriad possible ideals and plateaus that are all certainly better than the worst possible project for everyone on the planet. (Yes, I am also invoking a bit of the butterfly effect, too.)

There is no one “best,” outright, and as I see it there are many possible good to great places on the continuum to be. But again, every increment toward “the best possible project for everyone” we can get our projects and firms, obviously the better off we’ll be.

THE BEST POSSIBLE PROJECT FOR EVERYONE IS GOOD

If we can agree on these ideas then we can honestly discuss strategies and furthermore, strategies for success. First though, let's dive into some approaches that are too oft used in AEC and O: No explicit strategy.

NO STRATEGY IS STILL A STRATEGY—JUST A TERRIBLE ONE

Having no consciously devised strategy leaves intact an unpredictable approach at best and a disastrous one at worst.

Holding such an inadvised business model is further an untenable path and ultimately and consequentially will negatively impact project outcomes, firm growth, profit and reputation, if not its viability as the business climates cycle.

Using no explicit strategy can be thought of as a generator (of a sort) of AECO climate change. Similarly, (but to a more complete degree) as in the Earthly climate change, “we” are in control of it—we are its generator, though a main distinction between these examples is that in AECO there is arguably still time to reverse bad approaches.

THE STRATEGY CONTINUUM | THE AECO LANDSCAPE

Much like “The Moral Landscape” (see Figure 1), I propose there is “An AECO Landscape.”

Does it have moral components to it? Perhaps.

I do see business morality, as it were, to be affected by this concept, but human morality? That I will discuss at length in a future installment, but for now I am simply looking at our industry in a new light—a continuum or landscape of possible states of being where there is a good (or best) possible, as well as a bad (or worst) possible, and nearly infinite possibilities in between.



Figure 1: The AECO Landscape principle was inspired by some of Sam Harris's concepts in *The Moral Landscape*

The closer we can drive our projects and firms toward the good end of this spectrum onto one of the peaks, the closer we'd be to achieving our short- and long-term objectives: success and growth.

In future articles I will be expanding these principles and will make the effort to get solid numbers as to BIM adoption rates and successes, etc. to try to model an AECO Landscape based on the current state of our industry with real data calculated to be able to compare “what is” with the “The Best Possible Project for Everyone” and see where we may each fall on such a continuum. Then I will put forth some ideas about how we might achieve results in line with the place we want to be: “The Best Possible AECO Environment for Everyone.”



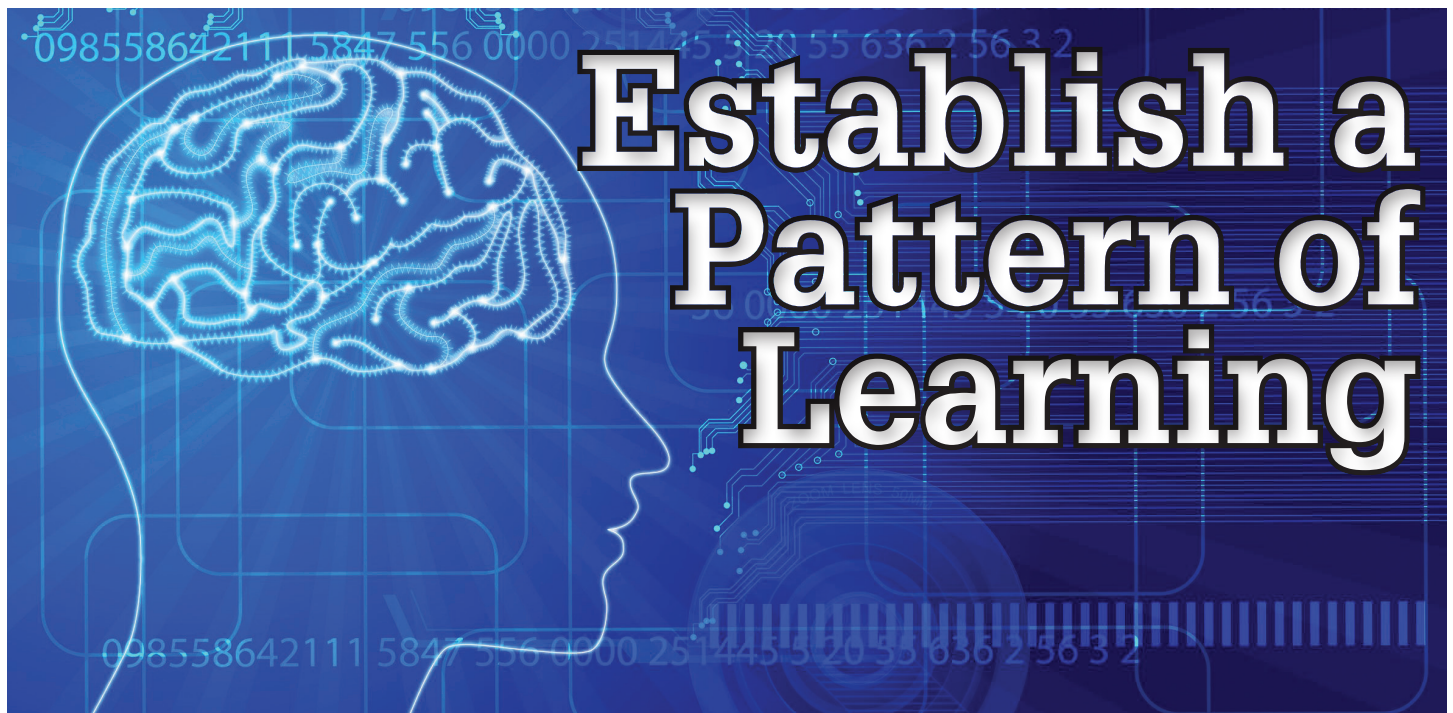
An oft intense and well experienced VDC BIM Leader. Jay is also an Artist and AECO technologist; has worked in AECO running the gamut from Designer to Project Manager and on into the VDC BIM leadership realms.

Bringing unique & qualified insights into the business & creative processes of AECO Jay focuses on helping teams deliver on project success goals. Building efficient project delivery, communication and collaboration strategies Jay leverages technology and teamwork toward such ends.

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

Jay is an Autodesk Expert Elite member, Autodesk Implementation Certified Expert, he is the AUGIWorld magazine Revit Editor and Graphic Standards' BIM Advisory Board contributor, as well as President of the Los Angeles Revit Users Group.

Jay is and has been a highly rated speaker at Autodesk University, Revit Technology Conference North America as well as Europe, The BIM Workshops and a lecturer on Creativity & Architecture at the University of Southern California, Cal Poly, LACMA, as well as various AIA & CSI events. Portfolio: <http://jbzallan.wix.com/portfolio>. Email: JayZallan@gmail.com. Twitter: @JayZallan.



During my years in architecture school perhaps the thing I learned the most was not so much the theory behind architecture, the technicalities of various software programs, or the science of building. It was something else entirely. Don't get me wrong, each of these is very valuable to me, but underlying the knowledge of my industry I gained through a formal education was something deeper. From my classes and studio projects what I really learned the most was, in fact, the process and essence of learning. And I began to understand that self-guided learning continues well beyond the diploma into the various phases of my life and career. Moreover, the beauty of education is that we can become aware of what makes us as individuals "tick." We develop our likes and dislikes, our strengths and weaknesses. And if carefully nurtured, our strengths allow us the privilege of contributing to society as a whole.

*"Hide not your talents. They for use were made.
What's a sundial in the shade?"*

-Benjamin Franklin

FOCUS ON YOUR STRENGTHS

All too often in our busy day-to-day work environment, our natural talents go untapped. In our respective industries of building, mechanical, or infrastructure design, we frequently find ourselves putting out fires and meeting deadlines. It seems more and more that I spend a majority of my own day simply answering emails. If people have the opportunity in their respective work environments to focus on their strengths every day, they are much more likely to be engaged in their jobs and more likely to report having an excellent quality of life in general.



The beauty of the AEC industry is the variety of projects in which we can become involved. This variety can allow us to stretch our knowledge if we are willing, and to really focus on our strengths. I have always been fascinated with CAD and BIM programs and they were a real reason I pursued a career in this industry. It is an exciting time to be involved in such work. The AEC industry is overflowing with new tools—each containing fantastic parametric capabilities designed to increase efficiency.

Find the tools and workflows in the programs you are good at and grow your understanding of them. Become the in-office expert. For example, I enjoy building parametric families in Revit. During work on my projects and when I find time elsewhere, I continue to build and develop the company library of family components. Because of this I frequently find myself being asked to provide input on design possibilities by architects. This provides huge value—not only to yourself, but also to the company as a whole.

GROW YOUR STRENGTHS

Once you learn what you are good at, continue to make it better! There is such a variety of software for the AEC industry. We use AutoCAD in all its varieties, Civil 3D, Revit and its different versions, Inventor, Navisworks, ReCap, and many more not listed here. You can't know everything about every program, but you can have a good general knowledge of their capabilities.

My approach is to have a general knowledge of the main programs being utilized as a whole, but to hone my skills on the software that helps me best perform my job functions. And I certainly spend time making sure I'm a specialist in key areas of a program or two. This gives me an edge above the competition and makes me a desirable employee and collaboration partner for design teams. In addition, it is important to have a visibly proactive approach to solving design problems in any given program. I call this "being flexible." Try to become someone (if you aren't already) who will assist teams in figuring out how to construct a building component in a certain piece of software. Strive to be the one who will find solutions. This will require you to do research on the Internet, or through other means, about what has been done in a similar situation and what were the results.



With access to information on the Internet such as blogs, videos, and forums, there really is no excuse to not try to figure things out. There are enormous benefits to doing this, primarily because you'll probably find a solution! Beyond this, though, is the fact that you just increased your knowledge, you shared it with your team, and they think more of you now. Perhaps in a forum you make some comments or ask additional questions—and from these come potential connections with others.

GAIN WISDOM, NOT JUST KNOWLEDGE

Knowing how to do something is knowledge. Using software such as Revit or AutoCAD to design a building is applying that knowledge daily with a series of picks and clicks in an effort to make a building model come together. Your role in a company is vital to its well-being. The technology will always be changing, and updating your knowledge of it is crucial to career success. However, behind this knowledge should lie a firm foundation of industry understanding. How do building systems integrate? How are wall systems constructed? What does it take to support a load from a concrete deck on a freeway bridge? These questions address the wisdom side of the coin.

Beyond college, employees gain wisdom by working on projects, and through experience it is picked up. I've personally had the privilege of working for proactive companies that were concerned about employee success and education. Junior staff members can benefit between integrated overlap with various members of management. Senior staff can share their wisdom on the design and building process, assisting junior staff with an understanding of building methodologies. In return, junior staff can accomplish in greater detail and efficiency the many tasks involving the complexities of the software. It really is a win-win situation.

DEVELOP A NETWORK OF TALENT

Knowing what you are good at and focusing on it is critical to success. Knowing where you fall short in certain areas is equally important. I've found at points in my career that I've been more successful with software when I reached out and asked for assistance from others versus stubbornly trying to go it alone for long periods of time. Not to say that it's a bad thing to be stubborn. It's good to be tenacious, but just realize at some point it is best to move on and acquire some assistance. As mentioned previously, blogs and forums are a great resource. But beyond these, having connections with real people are invaluable.

While on a recent training trip, a staff member and I were struggling through a particularly tough problem with an adaptive curtain wall system being applied to a complex organic form in Revit. We were both very persistent in our efforts to come to a solution, but none were presented. Finally he made a few phone calls to people in his network and they suggested a couple of approaches we hadn't tried. While their suggestions didn't completely solve the problem, they did point us in the right direction, which saved us at least a few hours of effort. I'm grateful he made that call and that he has built up his network. Connections with others are really what make life worth living and a career worth doing.

Civil 3D

Social media sites such as LinkedIn and Facebook are gaining such a foothold in the industry. They are a perfect medium in which to establish a network and be part of a community with likeminded individuals. A key part of this is joining groups where you can transfer knowledge. Join a group, ask questions of your own and answer the questions posted by others when you can. You will quickly find yourself learning more than you ever thought possible, and you will find others coming to you for assistance. It is a great way to increase your influence in an increasingly crowded market.

ATTEND CONFERENCES WITH YOUR COLLEAGUES

I am grateful that the many employers I have worked for have encouraged professional development through conferences. Events such as Autodesk University, RTC, the AIA convention, or the ASCE Conference are huge opportunities for learning and sharing. Having grown up in a small community with very little architecture to admire, travel to these conferences has been, for me, a huge learning experience in itself! Classes and breakout sessions contain a plethora of information, and they are available for all levels of expertise. I appreciate the chance to listen to keynote speakers, many of whom I studied in architecture school. I always strive to deepen my network by mingling with other people from around the world. It is fascinating to learn alternate approaches

to design problems and see other industry leaders strive to better themselves. If you are unable to attend these conferences due to budgetary limitations or because of your remote geographic location, look for other opportunities.

Many communities hold software user group meetings on a monthly or quarterly basis. These groups, established by users, are instrumental tools to help you learn and grow. I find myself asking my contemporaries who work in other firms many questions and most of the guys are happy to share information. If a particular user group doesn't exist, be the proactive individual you are and get one started! Contact your associates in other firms and get together. If you are asking questions, you can bet others are as well.

In addition, look to your software reseller for training events they hold. Typically a reseller will hold an annual event designed to reward existing customers and bring in new ones. Many local and Autodesk experts hold classes at these events, which usually have a minimal cost, if any, associated with them. Regardless, take advantage of the resources your reseller provides. They have very intelligent people who usually hold trainings outside of your area and can bring back valuable information for you.





TEACH OTHERS

Many people cross our paths in the journey of life. And it takes many people to educate just one. When someone takes time to share something with you, don't be selfish, pay it forward and do the same for someone else. It raises the level of understanding for everyone around you. It allows you to take on bigger and bigger challenges. That knowledge transfer also connects us personally. Your coworkers will appreciate you, and management will certainly take note. You will be regarded as a team player and a person who has the best interests of others in mind.

A primary benefit of helping others is that you will reinforce your own understanding and wisdom. I chose to be an educator for this main reason. It's rather selfish of me, but I do find myself more able to retain what I have learned when I simply share it with others. There are so many opportunities to educate others. Look at establishing a weekly learning session with the staff in your office. Invite various staff members at different levels to come and learn something. Perhaps it is something technically related to the software; maybe it is management explaining a process of building; it could simply be a session where engineers and architects explain contracts and specifications. Just make these sessions valuable, and choose topics that will speak to the various roles of the staff.

Using current projects as examples is an excellent and relevant choice. Work with management to obtain their buy-in for these trainings to inspire their staff. Good management should encourage training, and they will certainly see less turnover if they allow for, and elevate, the knowledge base.

CONCLUSION

Individuals and organizations need to work together to address continuing education. Of course, a certain amount of knowledge is required to obtain employment, but as a team the employer and employee should set goals and create a plan for continued growth and success. Learning is an investment individuals should make in themselves, and a company should make in those individuals. As a partnership, the rewards in this investment will yield strong returns in company efficiencies and personal satisfaction.



David Barker holds an M-Arch degree from the University of Utah and has more than 15 years of experience in architectural practice, higher education, and corporate training. David has trained users in corporate environments on Revit, Navisworks, AutoCAD, and other programs throughout North America. He currently is employed with the Davis Applied Technology College as the lead faculty for the Architectural and Engineering Design program. He is excited about the future of the AEC industry and shares his vision with enthusiasm to anyone who will listen. He can be reached at david.barker@datc.edu.

Power in a Mid-Year Extension



At Autodesk University 2013 I delivered a class about Revision Management within Autodesk Vault [PL1341 - Whose Version Should We Believe?—Revising the Story with Autodesk® Vault]. At that time there were two distinct methods of managing revisions: files and items. Although the two could kind of coexist, they weren't really designed to work together. Fast forward almost one year and everything has been turned on its head and requires a revision to this revision presentation.

Autodesk recently released Vault 2015 R2, a mid-year extension for Vault Workgroup and Vault Professional. This “extension” adds a significant amount of new features and functionality including Vault Office, a new Copy Design “experience,” and a merger of file and item lifecycle management and execution.

Note: This is a subscription only release, meaning it's only available to subscription Vault Workgroup and Vault Professional customers.

WHAT'S THE VERSION OF THAT REVISION?

Before diving into what's new, let's first review what an Autodesk Vault Revision is. In engineering, it is important to understand the nature of changes to files and the information they contain.

Autodesk Vault Basic provides Version control, but no tools to manage and track change. Vault Workgroup and Vault Professional move from a simple data management tool that just tracks versions to a system managing the change of your files, from creation to retirement.

Looking at the three versions of Vault, we have:

- Vault (Basic) = Version Management “Organize, manage, and track data creation, simulation, and documentation.”
- Vault Workgroup = Vault + “Project lifecycles”: tools to manage change on files, workflows, lifecycles, and other revision management tools.
- Vault Professional = Vault Workgroup + items and tools for managing changes to items (change orders).

A Version should be looked at as an iteration of something—like having multiple copies of it; something that is different from the previous copy.

A Revision is a milestone. It's the act of making a change and completing the work required for that revision. A revision can be made up of multiple versions. The versions are the steps to get to the revision; the revision is what gets released to everyone else.

We could maintain history (revisions) within Vault by appending the revision number to the file name. This would be a manual process, but would create multiple copies of the document, which would quickly become a nightmare. This isn't why we all moved to Vault—we did not want more nightmares.

All flavours of Vault maintain versions of all files checked into Vault. The previous versions can be restored as the current version at any time. These are very important during the design and modification phase, but once the project is completed and released they start to lose their importance.

LEARNING FROM THE PAST: PRE-R2

Prior to R2, files and items had two distinctly different processes of managing revisions and lifecycles. The item process came first, but never really grew from its initial release. The file lifecycle management process came later and was much more flexible and configurable. With Vault 2015 R2 the item lifecycle management system has been integrated into the existing file and folder system to get the same workflows, processes, security, and configuration as files and folders.

What Are Items?

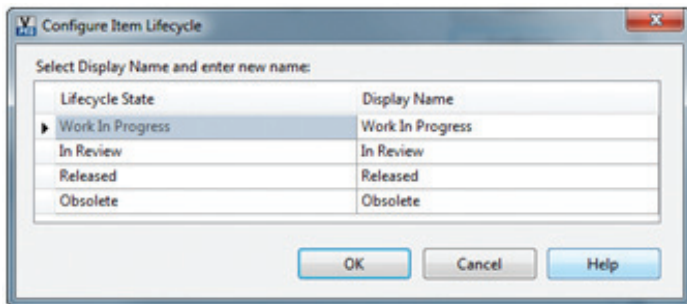
Items represent the components that the company manages, assembles, sells, and manufactures.

Within Vault Professional, items are records stored within an item master. The item master is a master list of everything within the engineering system. Each item is assigned a unique item number (identifier) which is used to locate, edit, update, and track changes to an item.

Items are used to:

- Provide access to the data for everyone who needs access. This will also include non-engineering staff without access to a CAD application.
- Provide a mechanism for the exchange of data between systems.
- Issue new numbers (i.e., stock numbers).

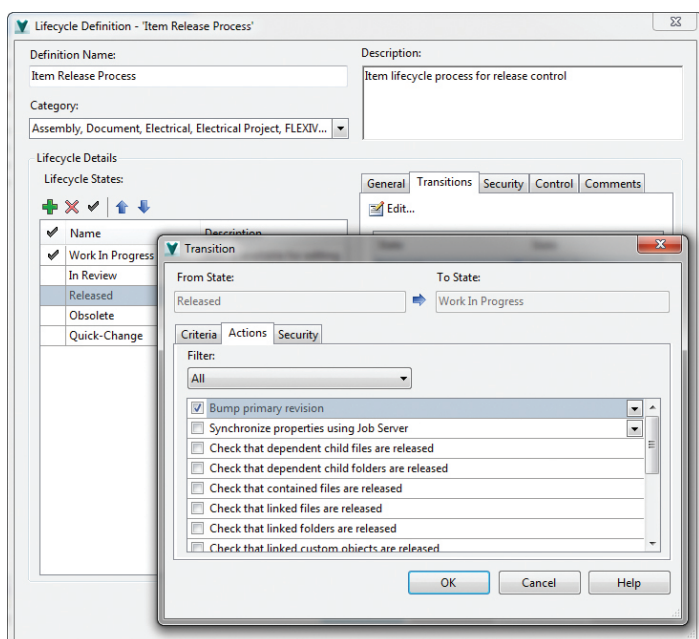
In pre R2 Vault, the “out-of-the-box” lifecycle states provided were *Work In Progress*, *In Review*, *Released*, and *Obsolete*. The names of these states can be adjusted, but cannot be deleted, nor can additional states be created.



WHAT'S NEW IN R2?

“A New Unified Lifecycle, Category, Numbering Scheme, and Revision Experience.”

File, folder, and custom object lifecycle management is nothing new. However, items now belong to the same lifecycle club, meaning everything you can do with the others including building your own workflows, adding reactions to state changes, revision schemes, and changing categories, is now available to Items.



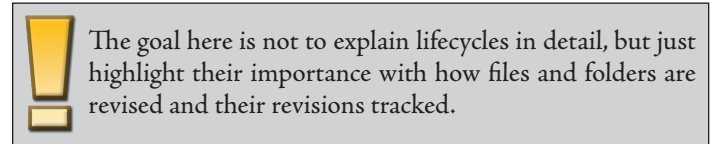
Vault 2015 R2 Lifecycle Definitions Item Release Process and Vault 2015 R2 item admin dialog

LIFECYCLES

You have Vault Workgroup or Vault Professional and are ready to take the step to Revision Management.... now what? You need to familiarize yourself with Vault lifecycle definitions.

The Autodesk Wiki describes lifecycles as:

A lifecycle definition is an engine that can be configured to automatically assign security, behaviors, and properties to Vault objects based on where the object is in the life of the design process.

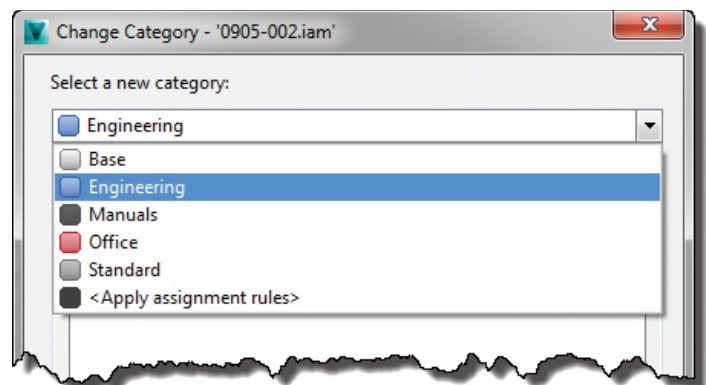


General Steps

1. Assign the category
2. Change the state
3. Revise the file
4. Change the state
5. Repeat

WHAT ARE CATEGORIES?

Vault Categories provide a grouping method for a set of files, folders, custom objects, or items. They are a key aspect of using Vault lifecycles as they are configured to assign user-defined properties to the objects, the available lifecycle definitions, and Revision schemes.



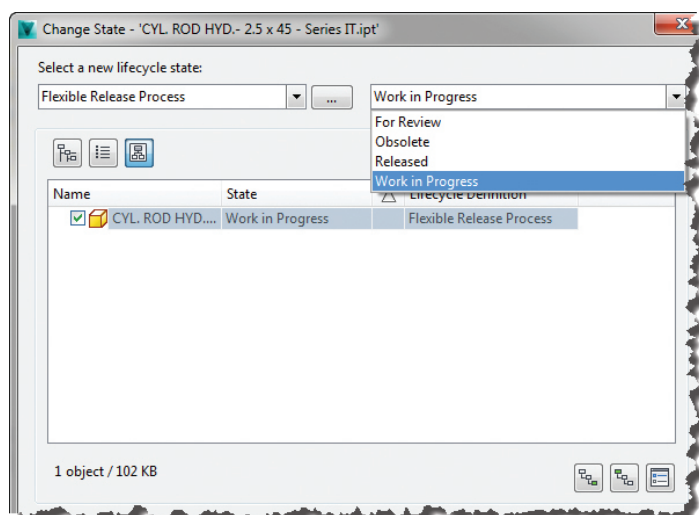
To change the Category assigned, select the object(s) and click the Change Category button. The subsequent dialog will allow you to select from the existing categories.

Autodesk Vault 2015

STATES

With Vault lifecycles the *state* identifies the current status within the lifecycle—for example, Work in Progress (WIP) or Released. The number and type of *states* the object transitions through in its lifecycle is based on the Lifecycle Definition Transition Rules.

To change the state, select the file, folder, or custom object and click the Change State button. In the Change State dialog you can adjust the lifecycle state (what's listed is controlled by the category assigned to the object) and the state you want to switch the object to. Depending on the settings you might also notice the revision value change as well.



REVISION SCHEMES

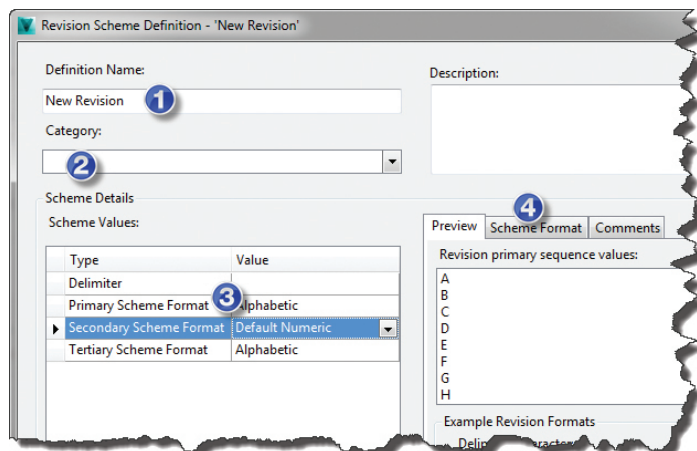
Revision Schemes define the Revision value applied to the file and the sequence of subsequent values. You specify how the primary, secondary, and tertiary revisions appear. The scheme forces the users into predefined values, so they cannot stray away from the standard.

The “out-of-the-box” Revision Schemes

- Standard Alphabetic (A, B, B.1, B.1.1 to ZZ)
- Default Alphabetic (same as standard but starts at rev “-“)
- Standard Numeric (1, 2, 2.1, 2.1.1 to 99)
- Default Numeric (same as standard but starts at rev “-“)
- Default ASME Y14.35M (-, A, B, A.1, A.1.1 | no I, O, Q, S, X, Y)¹

For example the Standard Numeric Format (which is out-of-the-box) starts at 1 and increments by 1, not skipping any numbers.

To get started, access the Vault Settings dialog (Tools > Administration > Vault Options) and navigate to the Behaviors tab, “Edit and Manage Lifecycles and Revisions” section, and click the Revisions... button. Note: You can either copy an existing scheme or start from scratch.

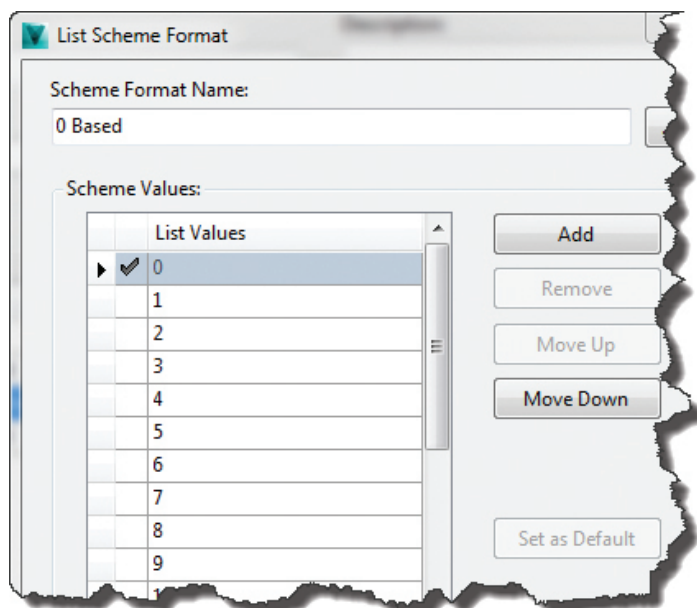


1. Name the new revision definition and enter a description.
2. Select the categories in which you want the new scheme to be available. This can include files and items.
3. Assign the three scheme formats (primary, secondary, and tertiary) and the delimiter.
4. If the desired scheme format is not available, create a new scheme format.

The scheme definition is simply the list of values available to the Revision. In most cases it's easiest to copy an existing scheme and tweak it; otherwise, if you start from scratch you'll be defining each and every value in the scheme.



Once a scheme is used it cannot be modified, so make sure it's what you want before you start using it.



1. The American Society of Mechanical Engineering (ASME) standard that defines the practices for revising drawings and associated documentation, includes the methods of identification and revision documentation.

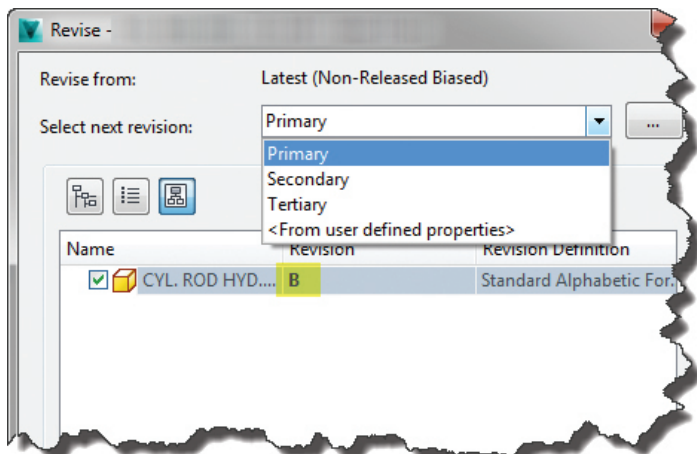
For example, we start at Rev 0 which is the initial release to manufacturing. The “out-of-the-box” numeric options either start at – or 1. We created a copy of the Default Numeric called 0-BASED which is identical but starts at 0 instead of –

You can mix schemes in the revision scheme definition, for example, using “Alphabetic” for Primary, “Numeric” for Secondary, and “0-BASED” for Tertiary.

MANUALLY ADJUSTING THE REVISION LEVEL

Revision Bump

To “bump” the revision to the next available value in the current revision scheme, select the file(s), and click the Revise button. Select the level you want to bump (i.e., are you going from 1 to 2 or 1 to 1.1?) and the Revision value will automatically go to the next level.

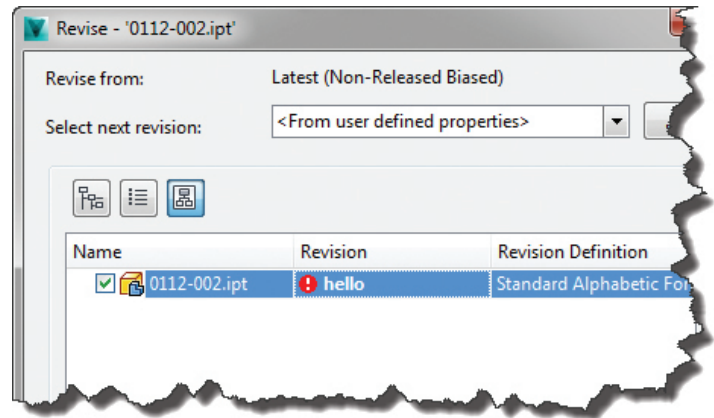


! The ability to adjust the revision of the file will depend on the permissions assigned to your Vault user account, the category the files belongs to, and the current state of the file.

User Specified Revision Value

To adjust the revision, manually click in the Revision field and type the value you want. Again this value needs to “fit” within the scheme definition. I couldn’t enter “hello” if my revision scheme were A, B, C or 1, 2, 3.

In the image shown below, note the red exclamation mark beside the revision level as the current entered value “hello” does not fit within the Standard Alphabetic Format.



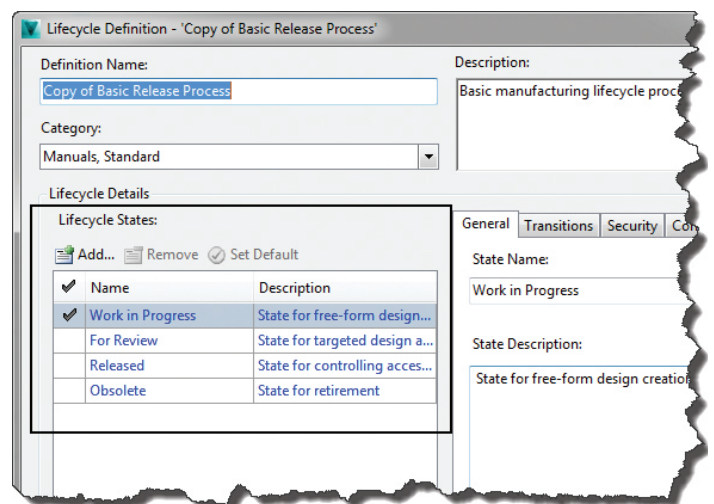
This is extremely useful with files with historical revisions occurring before they were put into Vault. If I add a drawing to Vault that is currently at Rev 14, I don’t want to have to bump the revision 14 times. I can Revise the file and set the revision to 14.

! Once a Revision level is achieved, there is no going backwards. If I take a file and manually adjust from 1 to 11, I will not be able to assign revision levels 2 through 10 to it.

AUTOMATIC REVISION BUMPING

Automatic Revisions

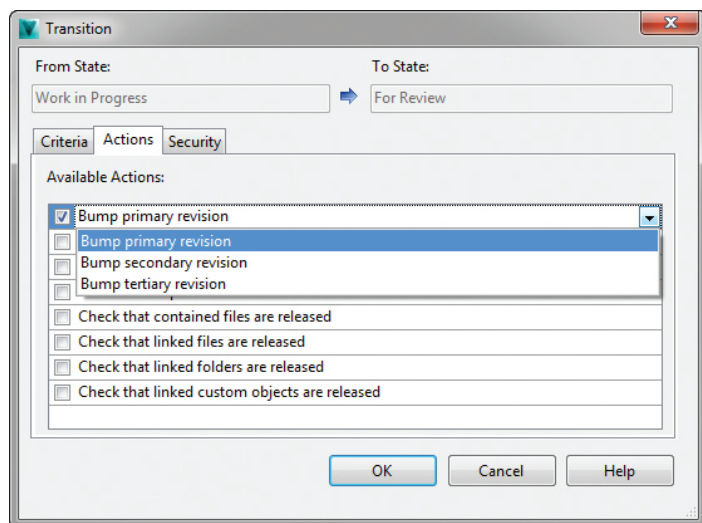
Lifecycle states identify the current status of your file within the lifecycle definition. A very basic workflow would be two states (such as Work in Progress and Released). By themselves, the lifecycle states are simply labels that represent various stages you want your files to transition through.



The Transition of a state determines many things, but with Revisions it manages the actions that happen during the state change (such as revision bump), and the Security, as in who can make the specific state change.

Autodesk Vault 2015

In the state configuration dialog, use the Actions tab to define what occurs during a state change and the Security tab to specify who can make the transition state change.



There is no turning back the clock. Once a revision level has been used, you cannot go to a lower value!

Item lifecycle changes can be rolled back to a previous state using Roll Back Lifecycle State Change.

THE R2 CATCH



Isn't there always a catch? Before installing R2, it is important to understand that the following features are disabled in R2. Autodesk is confident that it can implement the new R2 functionality and restore the missing features with 2016, so many, especially those with fully implemented items, might be waiting for 2016.

The following Item features are not available in R2:

- ✦ Compare Bill of Materials
- ✦ Item Import
- ✦ Item Export
- ✦ Item Package Service APIs
- ✦ Purge Item
- ✦ Purge
- ✦ Purge All
- ✦ Item Restore
- ✦ Item Rollback Lifecycle State Change
- ✦ Item Effectivity
- ✦ Restricting Item Lifecycle State Change to Change Orders

As with all new features, there is a list of limitations and restrictions. Here is a link to the readme: <http://bit.ly/1tmGnUi>. Make sure you have read through everything so that there are no surprises with installation and deployment.

I think the new functionality is great, especially bringing the file lifecycle options to items. File lifecycle management has had all this flexibility and customization and the item workflows have remained stagnant. Those just moving to Vault Pro or who have only partially implemented items will love this new flexibility.



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

Welcome to *AUGIWorld* Inside Track! Check out the latest opportunities to advance your skills, processes, and workflows in your firm, with the most current AEC-related software and hardware updates available.

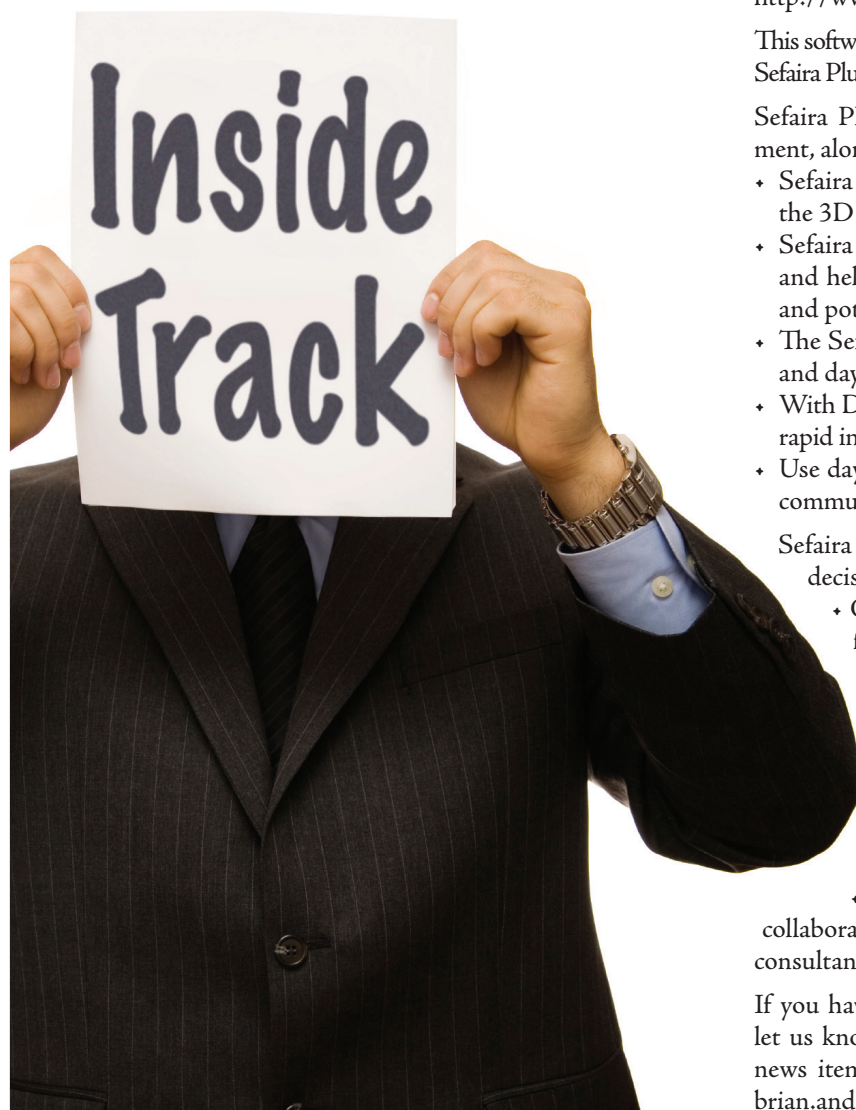


<http://revizto.com/en/>

This is the easiest way to collaborate with your project team on any device along the whole building lifecycle by sharing your BIM and CAD models with one click.

The product works as a platform, with three modules:

- Revizto Editor: Converts Revit, SketchUp, AutoCAD, and other CAD models into lightweight navigable 3D environments that can be shared with anyone via the Revizto Workspace.
- Revizto Workspace: A cloud-based repository for storing and sharing Revizto scenes with anyone using a free Revizto Viewer.
- Free Revizto Viewer: Lets you view and collaborate on Revizto scenes. Free Viewers are available for PC, Mac, iPad, Android tablets, and web browsers.



www.xicomputer.com

@Xi Computer Corporation has announced the immediate availability of the newest line of MTower workstations sporting the latest edition Intel Core i7-5930K and 5960X (codenamed Haswell-E) and configurable with the newest generation of NVIDIA Quadro video cards. Top workstation performance is now delivered by the Xi MTower PCIe with a full six-core clock speed of 4.3GHz, four channel 2800MHz DDR4 and utilizing a whopping 8GB DDR5 Quadro K5200.

"This latest edition of the Xi MTower PCIe Workstations raises the performance bar at a new unsurpassed level, without compromising reliability, essential for the most demanding CAD/CAE, and still maintaining a great price advantage with the competition..." says Robert Bragaglia, Marketing Director at Xi Computer.

The new Xi Workstations can be custom configured and ordered directly from the company website or from his worldwide chain of resellers by visiting www.xicomputer.com.



<http://www.m-six.com/index>

This software platform for performance-based design includes two parts: Sefaira Plug-in and Sefaira Web App.

Sefaira Plug-in: Get real-time feedback in your design environment, along with these benefits:

- Sefaira provides performance analysis where you need it: inside the 3D modeling environment.
- Sefaira makes it easy to understand how a design is performing and helps you connect the dots between geometry, energy use, and potential improvements.
- The Sefaira Plug-in provides constant feedback on both energy and daylighting metrics as you work.
- With DAYSIM and Radiance-based rapid daylight analysis, gain rapid insight into the daylight performance while you design.
- Use daylight visualization to improve daylight distribution and communicate with clients.

Sefaira Web App: Analyze your existing models for informed decision-making:

- Quickly compare multiple design options and iterations to find the best designs, explore tradeoffs between options, and see whether you're heading in the right direction.
 - Sefaira's Strategies and Bundles framework helps you identify the design strategies that will have the biggest impact on performance.
 - Sefaira's Response Curves can be used to optimize orientation, glazing ratios, shading devices, thermal mass, R-values, and everything in between.
- With all your sustainability data in one place, collaboration within your practice and external consultants has never been easier.

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

INTRODUCING...

The thinnest, lightest mobile workstation we've ever offered!

GoBOXX 15 SLM

Intel® Core™ i7 Mobile Processor

NVIDIA® Quadro® 2100M graphics

3K IPS Display

4.5 lbs, 0.78" Thick



The GoBOXX 15 SLM is a compact, ultra-thin, high performance mobile workstation featuring an Intel® Core™ i7 and professional NVIDIA Quadro graphics. Weighing a mere 4.36lbs and just 0.78" thick, it is the perfect mobile workstation for a variety of professional applications.

GoBOXX 15 SLM also features a 15.6" 3K resolution display providing ample room for design space and all the toolbars necessary in your software. The GoBOXX 15 SLM is the powerful workstation you can take anywhere that won't break your back—or your budget.

BOXX Technologies, Inc. manufactures workstations and rendering systems for VFX, film and television, game development, architecture and engineering, product design, simulation, higher education, government and defense, science and medical and general business industries.

WWW.BOXXTech.COM/GOBOX15SLM

BOXX



"Intel, the Intel logo and Iris are trademarks of Intel Corporation in the U.S. and/or other countries."

512-835-0400