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# AUGIWorld

The Official Publication of Autodesk User Group International

June 2016

# A Collection of Third-Party Apps

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- **Praising Employees:  
How, When, and Why**
- **Revit in the Global  
BIM Toolbox**
- **Implementation Tips**

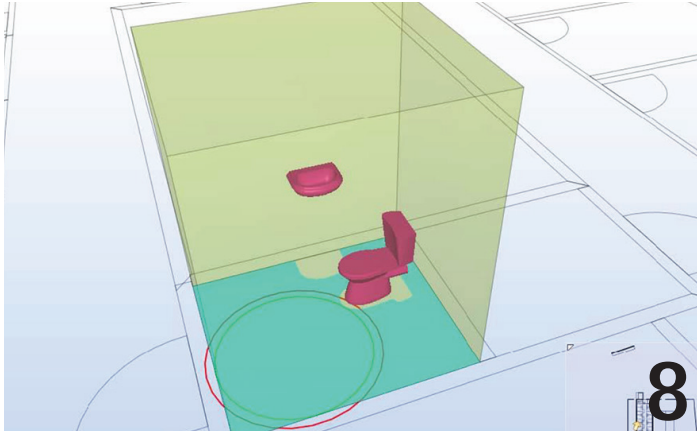
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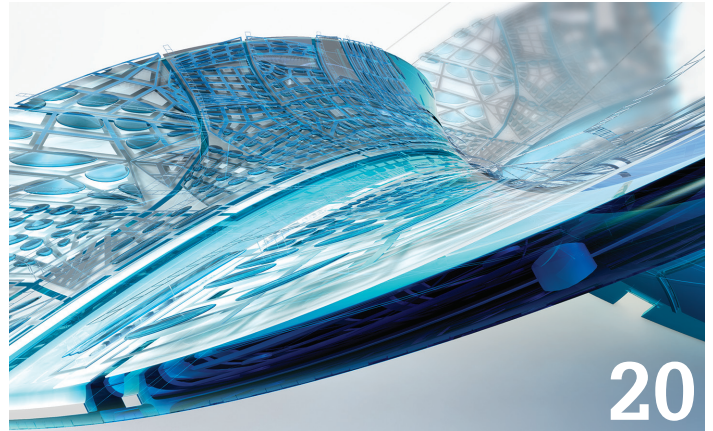
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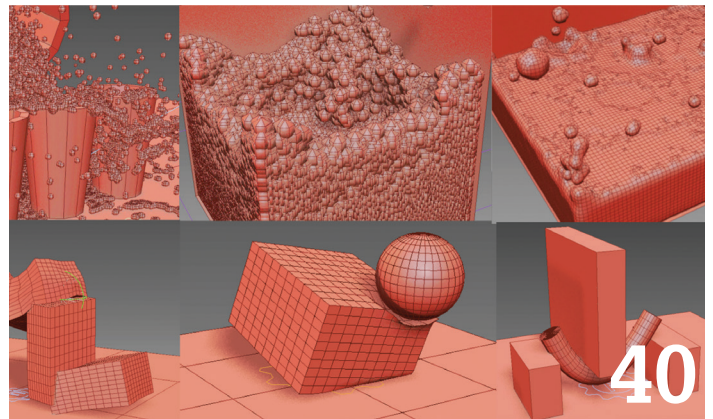


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Cover image:  
Downtown Los Angeles, CA, USA. 2016  
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# Letter from the President



# AUGI

## “WINTERING” AT RTC AUSTRALIA 2016

**F**irst, I have to say that early winter in Australia reminds me of early summer in Seattle. The weather is warm enough for a Seattleite to wear shorts and almost think about jumping in the pool. Then again, for someone from Seattle, whenever that bright shiny ball of fire is up there in the sky you think about donning shorts.

Those of you who know me or have read earlier letters from me know that I am a fan of conferences and user groups. I feel that there is incredible value in meeting folks face-to-face. Conferences provide the opportunity to talk with people who have the same issues that you do. They also give you the chance to have conversations with people outside your specific line of work to give you much-needed perspective.

This means that you need to be a bit bold and approach people you don't know. This is not in my personality by nature, but has become easier the more that I do it. I highly encourage you to attend conferences and approach people you don't know. You never know what interesting things you might find out by doing so. There are several conferences happening in North America over the summer, including RTC North America and several BIM Workshops.

Only one day of the conference has finished at the time of this writing yet I've already learned interesting things in sessions and have had several stimulating conversations with people I've never met before.

User groups also offer the chance to network with your peers. Have you attended one recently in your area? If not, give it a try. If you don't know of a local user group, you can try to locate one using AUGI.com or Meetup. I'm sure that your local user group would love to see a new face.

Several local user groups have changed the format of their meetings. Lectures and demonstrations are still prevalent, but the roundtable format has become popular, too. If your local user group has not tried the roundtable format yet, you could suggest they try it.

The great thing about the roundtable approach is that it gives everyone the chance to actively participate. It's like conference networking on a local level. The roundtable usually starts with a topic and then goes in interesting directions from there.

If you are a CAD/BIM/Design Technology/Digital Practice Manager you may also find it useful to attend/form a small group of just your peers. This gives you the chance to discuss issues that normal users do not face.

Now I have to get back to day 2 of RTC...

R. Robert Bell  
AUGI President

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# Praising the Praises of Praise

**F**ace it, everyone likes to receive praise. But do we like to give it? Most people do not, or at least it seems as if they do not like giving compliments because they seldom give them. Demanding bosses seldom give out compliments. They demand superior work that constantly improves as if the demand itself will cause the improvement. It's like driving a car faster and faster as if it could always accelerate more just by pressing harder on the gas peddle.

## WHY WE DO NOT PRAISE OTHERS

We are drawn to the negative side of observations. Remember the “what is wrong or missing in this picture” games you might have played when you were a kid? We are often trained to see what is below par or missing. We also think that to improve, we have to define what is lacking. These mindsets lead to spotting flaws in people or their work. Flaws are so easy to see sometimes, while improvements and effectiveness are harder to spot. You have to work at noticing them. We will notice bad service and delays in delivery of our food at a restaurant, but do we compliment good service (with a big tip)?

Some do not give compliments or praise to staff and coworkers because they think it might detract from their authority or leadership. They might think that complimenting coworkers will make the workers think they can rest on that input and stop moving forward. They may see everything as a competition (and some environments are like that). If others are praised, it detracts from them. It is exactly the opposite on all fronts.

Sometimes it may be as simple as thinking that staff already know that we appreciate them. We have said it before, so why say more? Don't want to overdo it, do we? Or maybe we just do not know how to give a compliment, or how to start a conversation like that.

## WHY WE SHOULD PRAISE OTHERS MORE OFTEN

Encouragement motivates people to actually work harder. Someone noticing and addressing superior work and efforts energizes coworkers. They activate even more reserves to move even faster, make more quality choices, and deliver earlier.

Encouragement lets workers know that they are on their game. It reinforces great behavior. It defines exact achievements and why they are important. It locks in the message that you are trying to deliver to your team and others that quality matters, deadlines are to be met, and that planning aids production.

Compliments convey respect. When you praise others, they get the signal that you are paying attention, are not so self-centered—that you appreciate their devotion and respect them as a person. It builds trust via reinforcing shared goals, characteristics, and perspectives.

## HOW TO PRAISE OTHERS

Start small. It does not have to be some grand achievement to open the door to a compliment. It can be the small things, like how the person phrased a statement. When someone gives corrective feedback to another without demeaning them, that is praiseworthy.

When someone offers help to another to get the job done, then it is praiseworthy. When someone passes on assistance via quick instruction, that might deserve some applause.

**Don't praise ordinary performance.** In a desire to praise, do not start admiring average work. People are expected to do their jobs and to do them well. Tributes should not be given when people are just doing their work. Praise is reserved for someone who goes above or beyond, or when someone improves or displays positive traits that you want to reinforce.

**Be timely.** Praise should be delivered at the time of the event, or when you notice it, or very soon after. Don't let the opportunity pass. I have done this so many times. I delay or forget to offer a compliment and then time slips away and it never happens. Oh how I wish I had grabbed the opening and offered praise. Since consistent top behavior is often sporadic in people, I have missed opportunities that faded away.

**Be direct.** Pull the person aside and deliver a direct commendation and appreciation for their efforts. Get to the point and tell them that you appreciate their efforts. Focus the conversation on just this message. They did a superior job and you noticed.

**Praise in public and/or private.** Your environment will define the call on this one. Sometimes it is good to praise someone in a group. Receiving the accolades in an environment where others can hear reinforces the appreciation. I strive to provide positive feedback in larger groups of people because it also reinforces the message of what is appreciated. But sometimes it might deflate others. If you are stingy with your compliments, others might think that they have done great work without receiving recognition and scowl. You could mix a brief public thank you with a private, more detailed conversation later.

**Be specific.** Never just say, "Frank, you are doing a good job. Keep up the good work." If Frank is unable to connect to the exact effort he gave that generated the praise, then the accolades have less impact. Frank may have just goofed off for the entire morning and surfed the web. He will think you are out of touch and that he can glide for days. Dive into the exact things you appreciate. For example, say, "Frank, when you delivered early on the Thompson project, the client was impressed and so was I. Thank you for going the extra mile." Frank will hear this message: early delivery is great, the client was happy, the boss noticed and appreciated it.

**Make it personal.** Start by saying the person's name. Give them no room for not thinking you are talking about them. Do this when you are in a crowd or alone with them. Always start by using their name. Make eye contact. Most people will shy away when you give a compliment. Look the person directly in the eye. Stop and say something that makes them look at you. I usually use a question like, "Do you realize how effective that was?" By asking a question, they will tend to look at you in response. Maintain that eye contact.

**Make it stand-alone.** Do not use praise as an introduction to a discussion on improvement. Do not give a compliment and then lead right into a correcting conversation. Do not tack on "and we

can do even better – right?" at the end. Do not tell someone they achieved a great thing with this, but need to work on that. A mixed message like this will have them walking away focusing on the reproof and not on the praise.

**Be honest and real.** Just like making eye contact is crucial, delivering a heartfelt compliment is also. It has to be real. Contrived admiration is very thin and most folks will realize that you don't really mean it. The praise should honestly address the efforts of the person that resulted in very positive outcomes. Include words like "really" and "obvious" as in, "Pam, I really appreciate your planning on the new project. It is obvious to everyone that you save us time and money."

**Don't overdo it.** Don't gush over someone or draw out the compliment too long, especially in public. Others will be annoyed. Don't start passing out too many uplifting appreciations. That will water them all down. I have received compliments with wording that exceeds the accomplishment. Scale the compliment to the achievement. If someone does a really outstanding job, then possibly a gift card or lunch might be appropriate.

**Avoid comedic compliments.** Telling someone, "You didn't screw it up as much as I thought you would" is not a compliment. Avoid making a compliment a joke. Do not poke at someone's failings as part of praise. How would you like to hear, "You did a pretty good job, considering that you had no idea what you were doing." The group may get a chuckle, but the person who was the butt of the joke does not take away any uplifting message.

**Pass on compliments.** When someone gives you a compliment in the form of your team doing a good job, pass it on. Let your team know that they did a good job and who told you that. Tack on a "rider" and tell them that you really are proud of their efforts and that you appreciate their output.

So if you have read all of this, make it a goal to give a compliment or praise to someone today and tomorrow. Start a healthy habit of looking for what is worthy of commendation and let people know that you are thankful for their labors.



*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](http://www.caddmanager.com) and [www.bimmanager.com](http://www.bimmanager.com).*

# Revit in the Global BIM Toolbox



As the “BIM Revolution” takes over the world, we have been seeing an almost evangelistic response to this technology adoption. We speak of BIM as if it is the panacea to all of our problems—magically our projects will be on time and under budget; they will be strikingly complex, yet ridiculously easy to build; and no one will even need to talk to each other ever again.

We may get there someday, but at the moment BIM is just another tool in our increasingly robust arsenal and can be wielded for good or bad depending on how comfortable we are with technology and our personal approach to design. What is not debatable, however, is how valuable combining data and design can be.

If we can examine our models for data standards already established by our industry, code requirements or building performance goals for example, we can only advance the quality of our design. This power to interrogate and enhance our approach is a natural fit for public and government agencies, which are tasked with ensuring that buildings are suited to and comply with standards both normative and informative.

This has led to BIM adoption as the basis of design delivery for public projects across many parts of the globe. Many of us are familiar with the US government agencies’ BIM requirements (GSA, et al.) and some of you may also be familiar with the fact that starting in 2016 (that is now!) the UK government has required a BIM mandate. There are, in fact, many more agencies working toward requiring BIM on their projects, as a means of quality control as well as a repository of intelligent data that can be repurposed throughout the life of the building.

So in the next few months, over a series of installments we will highlight different BIM mandates around the world. We won’t be able to do a deep dive into each mandate, but instead will focus on

what is unique about each of these requirements. I hope that we can absorb some new ways around thinking and executing in BIM from these global standards and find ways to incorporate them into our projects.

The key takeaways, or what is most important to these agencies, are generally two-fold:

1. BIM must be software agnostic. As a matter of fact, many of the mandates drive specifically towards the IFC (open source) file format; and
2. The model must have the ability to hold a design accountable. This could take the form of checking for code compliance or to hold the design to a high sustainability requirement.

Let’s begin with the early adopters—the Nordic countries. With a relatively smaller footprint and progressive approach to new technologies, these countries have been at the forefront of what I am calling the required BIM revolution. Though not a “mandate” per se, their large public institutions have encouraged and even required BIM as part of their project delivery process for almost a decade.

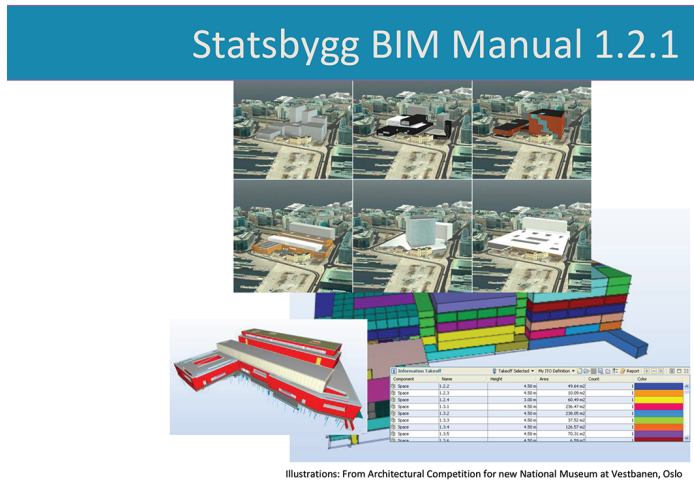
## NORWAY

Statsbygg in Norway is described as a “public sector administration company that is the governments key advisor in construction and property affairs, building commissioner, property manager & property developer” (<http://www.statsbygg.no/Om-Statsbygg/About-Statsbygg/>).

In 2005 Statsbygg started piloting the use of BIM as part of their delivery requirement and the over the next few years, in partnership with Senate properties and the GSA, expanded upon the need for an Open BIM, one that was built around the idea of the IFC file format, a platform neutral format that allows exchange of data and geometry between various stakeholders and their preferred software.



In 2008, they released their first BIM manual and Version 1.2 was updated in 2011; the most recent version 1.2.1 was released in 2013.



Illustrations: From Architectural Competition for new National Museum at Vestbanen, Oslo

**Statsbygg Building Information Modelling Manual  
Version 1.2.1 (SBM1.2.1) – Date: 2013-12-17**

Statsbygg - P.O. box 8106 dep., N-0032 Oslo, Norway  
[www.statsbygg.no/bim](http://www.statsbygg.no/bim) - [bim@statsbygg.no](mailto:bim@statsbygg.no)

Figure 1: Statsbygg BIM Manual 1.2.1

The manual contains a lot of what we now expect from any owner/client-driven BIM requirements—naming conventions, for example—but its main focus is building a consensus on how BIM should be executed on a project.

Large sections are devoted to “Modelling Quality and Practice” where the document goes into detail on how the model can be used to conduct “situational analysis,” a generic term to describe how the model (and therefore, the design) can be analyzed for a whole host of design parameters.

Checking the model for consistency is one of the highlights of these documents. It describes a process beginning from simple accuracy checks within the authoring tool to more comprehensive checks in additional software, such as Solibri Model checker.

D.2 Analyses applied by Statsbygg (Informative)

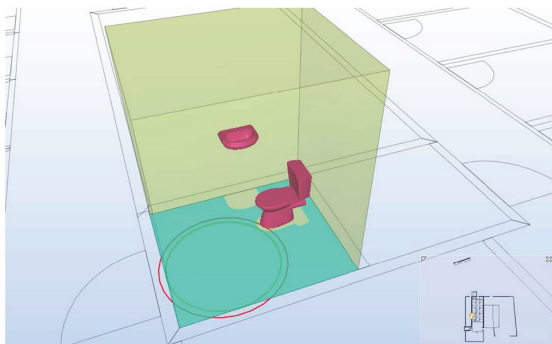


Figure: Checking the turning circle for a wheelchair in a handicap toilet

Figure 2: Statsbygg BIM Manual Consistency Check

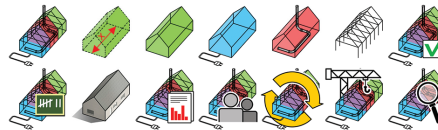
These sections begin to take this manual from a checklist of deliverables to a more cohesive thought on how to approach a design project with clear expectations on what is important to the client—not just lines drawn on paper, but instead how thoughtfully design must be approached.

## FINLAND

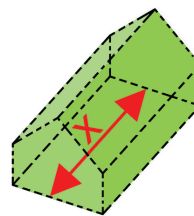
Senate properties in Finland is a “government owned enterprise under the aegis of the Finnish ministry of finance and acts as the governments experts on the working environment and working premises.” (<http://www.senaatti.fi/en/senaatti/senate-properties>)

They have worked in conjunction with Statsbygg and the GSA to build their own BIM requirements, which was later rolled into the Common BIM Requirement 2012 (COBIM) for Building Smart Finland. As it shares much of its DNA with the Statsbygg manuals, the emphasis on open source and design interrogation remains, but perhaps reflecting the maturity of BIM in the industry, focuses more on engineering and downstream applications.

There are 13 series to this document, which begins appropriately enough by talking about how a model should be created in a starting situation (such as a renovation project), with ideas and procedures for laser scanning an existing location and to what level of detail such a model is expected to hold.



**COBIM** Common BIM Requirements  
2012  
v1.0



## Series 2

Modeling of the starting situation

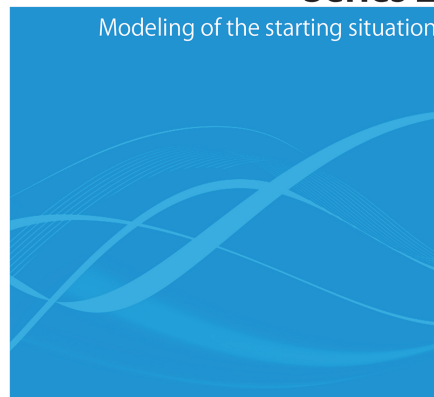


Figure 3: COBIM model requirements for existing buildings

## 5.3 Modeling requirements in different project phases

This chapter describes the requirements of modeling the starting situation in different project phases.

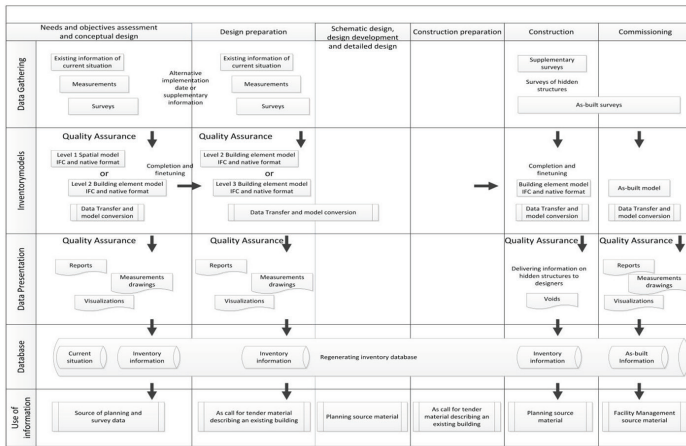


Figure 4: COBIM phasing of “inventory modeling”

The series then walks us through what is now pretty standard for a BIM manual, from design parameter to quantity takeoffs and using the model for visualization. The latter sets of the series also cover topics not usually covered by most BIM requirements, one of which is titled “Use of BIM in MEP analyses.” This section talks about the expected protocols for CFD simulation, but then also covers techniques for using BIM to analyze for MEP lifecycle costs and dives into methods for creating technical visualization images for MEP—a section not usually covered by such owner based requirements.

Using the model for construction and in facilities operations round up this surprisingly comprehensive manual, focusing not only on what an owner needs from the BIM, but also why this approach is preferred.

## SUMMARY

As we have seen thus far, BIM requirements for a project can be much more comprehensive and informative than simply a list of “BIM standards.” Over the next few series we will move to explore what the UK BIM mandate means (even if you are not currently working on a project that requires it) and spend some time in Asia, which is leading the way in exploring new ways to receive and manage models completely electronically (no inked stamped drawings required).

In the meantime, the manuals referenced above are available (in English) at the following links. I encourage you to spend some time looking through them if only to see some glimmers of how this intersection of intelligent data and design will transform our industry in the years to come.

<http://www.statsbygg.no/Files/publikasjoner/manualer/StatsbyggBIM-manual-ver1-2-1eng-2013-12-17.pdf>

<http://www.en.buildingsmart.kotisivukone.com/3>

The goal of CFD simulation is to predict indoor airflows and produce computational data to facilitate making system selections.

CFD simulations enable the determination of temperature conditions, comfort level, air quality, speed, humidity, carbon dioxide level, age and other factors affecting indoor air conditions in a space by means of visualization using images and animations.

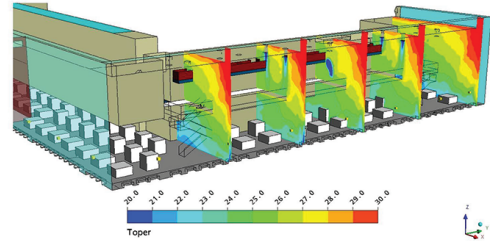


Figure 3.2.1: Temperature distribution in a glassed entrance hall space.

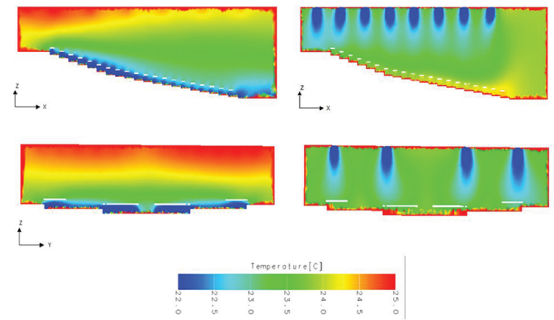


Figure 3.2.2: Temperature distribution in an auditorium when comparing two different ways of air distribution (displacement ventilation / mixing ventilation)

Version 1.0 March 27, 2012 Parties to the © COBIM project

Figure 5: COBIM CFD Analysis and technical visualization



Natasha Luthra is a Principal on Jacobs Engineering’s Practice Technology team and has over 12 years of experience in development, implementation, and management of technology environments for the design, construction, and operation of large federal and private sector facility programs. She routinely engages with clients and A/E’s on all things BIM from formulating execution plans and setting up templates to managing the flow of data from conceptual programming to facilities management. Natasha leads a group of talented designers that look to solving complex problems, develop “new” standard ways of working and act as the tip of the spear as it relates to technology in design. Holding a Bachelor’s and a Master’s degree in Architecture, Natasha defines herself as an ultimate problem-solver.

# BIM Is More Than Software



## It's Part Technology, Part Balancing Act

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*by Robert Green*

# Innovation at the Component Level

**W**hen you think about the components of a workstation your mind tends to focus on the big components like the Intel® Xeon® processor, high speed RAM and a powerful graphics card right? But what about the components that support these major workstation parts so you can get the best performance from your workstation investment?

Recent component innovation from HP allows you to configure their workstations using add-ons that greatly increase the speed of disk access and cooling while decreasing acoustic noise and dust infiltration into their desktop workstations as well as providing high bandwidth docking capabilities for Thunderbolt™ equipped mobile workstations. In this month's Tech Insights, we'll examine these innovations.

## HP Z TURBO DRIVE QUAD PRO

Autodesk users tend to work with large data sets that can grind workstations to a halt as conventional hard drives become a system bottleneck. To address this issue solid state drives (SSD's) offer a high speed alternative to mechanical drives but the new HP Z Turbo Drive Quad Pro (starting at \$779 for the 512 GB model which has 2x256GB modules) takes the SSD to an entirely new level.

Housed in a PCIe Gen3 compliant card hosting up to four 512GB NVMe solid state drives (for a total possible storage of 2 TB) sequential performance of up to 9.0GB/s<sup>2</sup> - 16X faster than a single drive of

prior generations of SATA based SSD's – can be achieved. With its own cooling fan (at rear of card), and heatsink (shown removed for clarity), the HP Z Turbo Drive Quad Pro remains cool at full performance without throttling under the most aggressive processing loads. With a bank of super capacitors, it provides enterprise class power loss protection, and can power itself through a safe shutdown procedure during power outages.

While the huge capacity of the Z Turbo Quad Drive Pro elevates the amount of SSD storage possible in a workstation it is the up to 9X throughput increase over older SSD drives that allows the workstation to maximize its performance with large data sets like CAD files.

The bottom line? Your workstation's Intel® Xeon® processor can only process data it can access quickly and the HP Turbo Drive Quad Pro delivers.

## THERMAL PERFORMANCE CONSIDERATIONS

A workstation is, after all, a heat producing appliance that runs better when properly cooled. Therefore, it behooves you to configure your workstations so they can run cool to achieve maximum processor output. HP's innovation in thermal performance can be seen in two new products.

## HP Z COOLER

To relieve high processor heat levels in workstations performing demanding applications, like rendering or analysis, liquid cooling and/or high air volume fans have traditionally been employed to facilitate maximum heat transfer. The problem with these solutions is that they are either bulky (liquid cooling subsystems) or noisy (fans) and therefore lead to larger and/or louder workstations.

The HP Z Cooler add-on (\$189) utilizes a 3D vapor chamber and 100% passive staggered hex fin cooling stack to provide liquid cooling level efficiency with no fan that allows the system fan to





spin slower resulting in a 12.8dBA<sup>1</sup> reduction in noise at the user's desktop. Shown here for the HP Z440 Workstation (left) and Z840 Workstation (right) you can see how the vapor chamber attaches to the processor to conduct heat into the hex fin stack.

## Z240 DUST FILTER

If your company utilizes workstations on the shop floor, in construction trailers or other dusty locations you've likely seen how dirty the inside of a workstation's case can become over time. As dust coats the components of a workstation's mother board and memory components your system runs hotter than it should which reduces performance.



The cleanable/reusable HP Z240 TWR Dust Filter (shown in exploded view above) maximizes system performance by preventing dust ingress into the workstation's case and is easy to clean<sup>2</sup>. The TWR Dust Filter is offered for the smaller Z240 Workstations that are often deployed in high traffic public spaces and industrial environments where airborne dust is common.

## HP ZBOOK DOCK WITH THUNDERBOLT™ 3

Getting the most from your mobile workstation investments is not just a function of its component performance on the road but also a matter of offloading and connecting to/from peripheral data devices back in the office. To maximize the efficiency of your in-office use of HP's ZBook Studio 17G3 or 15G3 Mobile Workstations the new HP ZBook Dock (\$229) provides not only power and high bandwidth Thunderbolt™ 3 connection ports but traditional docking station connections like LAN, USB, Display Port connectors for 4K desktop monitors and a legacy VGA port for projectors<sup>3</sup>.

The ZBook Dock's compact, stick like size allows it to go with the travelling worker facilitating easy in office connectivity at construction trailers or remote offices for workstation level connectivity on the go.



## IN SUMMARY

No matter what type of HP desktop or mobile workstations your company uses you always want to get the best performance you can from them. So while you'll always want to equip your workstations with high performance Intel® Xeon® and Intel® Core™ i7 processors and plenty of RAM be sure to remember the supporting cast of components that allow your processor to function cool, clean and at maximum data transfer rates. Innovative components like HP's Z Turbo Drive Quad Pro, Z Cooler, Z240 TWR dust filter and the ZBook Dock will help you realize the full value of your workstation investments.

## 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 deliver the innovation, high performance, expandability, and extreme reliability you need to deliver your 3D CAD projects in less time. To learn how to configure a HP Z Workstation, visit the HP and Autodesk page at [www.hp.com/go/autodesk](http://www.hp.com/go/autodesk).

## ABOUT ROBERT GREEN

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



1. Up to 12.8 dBA lower in the Z840 as compared to HP's prior generation Z820 workstations with liquid cooling solution.
2. See User Guide for cleaning instructions.
3. Your mobile workstation must support Thunderbolt™ 3 to enable the docking station. Docking station, and monitor must all support USB-C™, USB 3.0 and DisplayPort 1.2 to benefit from the advanced speeds or features that these technologies provide. If one of the devices does not support these technologies, you will still have USB 2.0 and DisplayPort 1.1 functionality.

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# Enhancing Reinforced Concrete Detailing with GRAITEC Advanced PowerPack for Revit

Every year, more and more engineering companies take the step into the 3D modeling world and embrace Autodesk® Revit® as their software of choice, and create, design, analyze, and produce construction-based documentation using Autodesk Revit Structure.

So those who are using Revit to create a detailed model, maybe in steel or concrete, produce all the necessary drawings (plans, sections, elevations, details, etc.) in a 2D format from Revit. From these, the design team, client, contractor, and subcontractor construct.

When working on concrete structures, most engineering companies tend to export the information out of the model in 2D format and then, using a 2D detailing application, produce reinforced concrete drawings. So with this new era of BIM (Building Information Modeling) and with programs such as Autodesk Revit, we can now design and build a fully three-dimensional electronic model of a building or structure. So why are we not using the reinforcement detailing tools in Revit at the same time? You only have to look at all the new tools and enhancements Autodesk has made over the last three to four releases to see that there is great potential.

## WHY 3D DETAILING

I used to spend a lot of time creating a model only to then spend even more time setting up all my 2D views to export into AutoCAD®. Once they were referenced in, I could spend the time detailing using a third-party application to detail the reinforced concrete. This was certainly a time-consuming process and something I wish I did not have to do.

If something changed on the project, I would have to repeat the process, update the model, export the views again, amend the external references in AutoCAD, and then adjust any necessary

reinforcement to suit revised information before finally reissuing my drawings and schedules.

This was just creating twice as much work for me and the other members of the design team. We can still provide the information in a 2D format to contractors and fabricators in the form of drawings and bar bending schedules they require created directly from Revit.

Modeling the reinforcement in the 3D Revit model can only help reduce errors, save time, and eliminate waste either when you first create the detailed model or when it's updated due to any design changes.

## NEW KID ON THE BLOCK

We are hearing about more and more companies across the globe using Revit to detail reinforcement concrete structures and there is a new kid on the global block, GRAITEC ([www.graitec.com](http://www.graitec.com)), that is helping to enhance the rebar tools in Revit.

GRAITEC is a global Autodesk Platinum Partner that provides cutting edge technology solutions for improving customers' business activities and design processes. A year ago, GRAITEC launched the Advanced PowerPack for Autodesk Revit. Packed with powerful tools and utilities to increase productivity and efficiency for Revit users across all disciplines in English, Czech, French, German, Italian, Polish and Romanian. Early this year, the tools were enhanced to include reinforcement tools.

The GRAITEC Advanced PowerPack for Autodesk Revit is available as a free trial and to purchase from the Autodesk Exchange App Store (<https://apps.autodesk.com>). A variety of subscription



Figure 1: Advanced PowerPack for Revit

options can be purchased directly from GRAITEC. Any GRAITEC customers (who hold a current Revit product subscription with GRAITEC) can gain access to the PowerPack for free as part of their standard subscription contract.

This add-on to Revit should help reduce some of those repetitive tasks, enhance the functionality of Revit, and help you work more efficiently.

## POWERPACK REBAR TOOLS FOR REVIT

There are more than 20 different tools for reinforcement available on the PowerPack ribbon. These tools allow for controlling the rebar visibility, copying rebar between elements, adding transversal distribution bars to beams, splitting rebar sets, trimming bars sets to the shape of the element it has been placed, and many more. To find out about all these tool check out [http://www.graitec.com/en/pp\\_revit.asp](http://www.graitec.com/en/pp_revit.asp)

**Rebar Visibility** – Controlling the visibility of reinforcement can be a challenge, but this is made much easier with the Reinforcement visibility tool. This allows users to change the view's visibility state in order to show reinforcement bars unobscured and/or as solids in 3D views, or to hide certain bars. This can be done for every type of reinforcement element such as rebar, fabric, area, and path reinforcement.

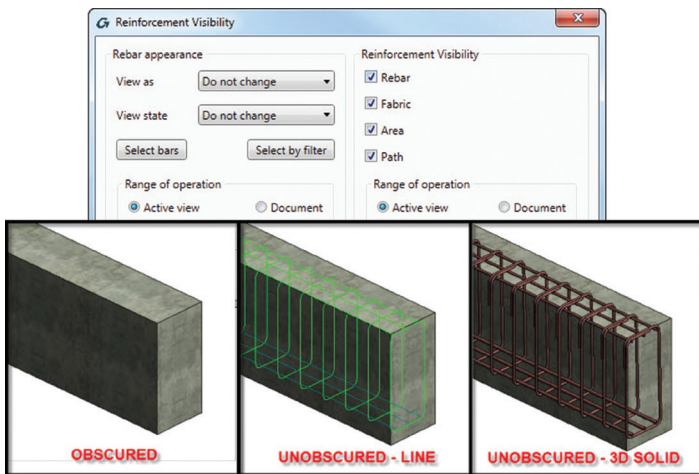


Figure 2: Reinforcement visibility

**Copy Rebar** – Placing reinforcement into a component such as a column, beam, or foundation can take some time. So when you need to do it multiple times over, that can take a large amount of time. The Copy Rebar tool allows users to select the rebar in an element, then copy it over to an identical or similar element that has no reinforcement assigned.

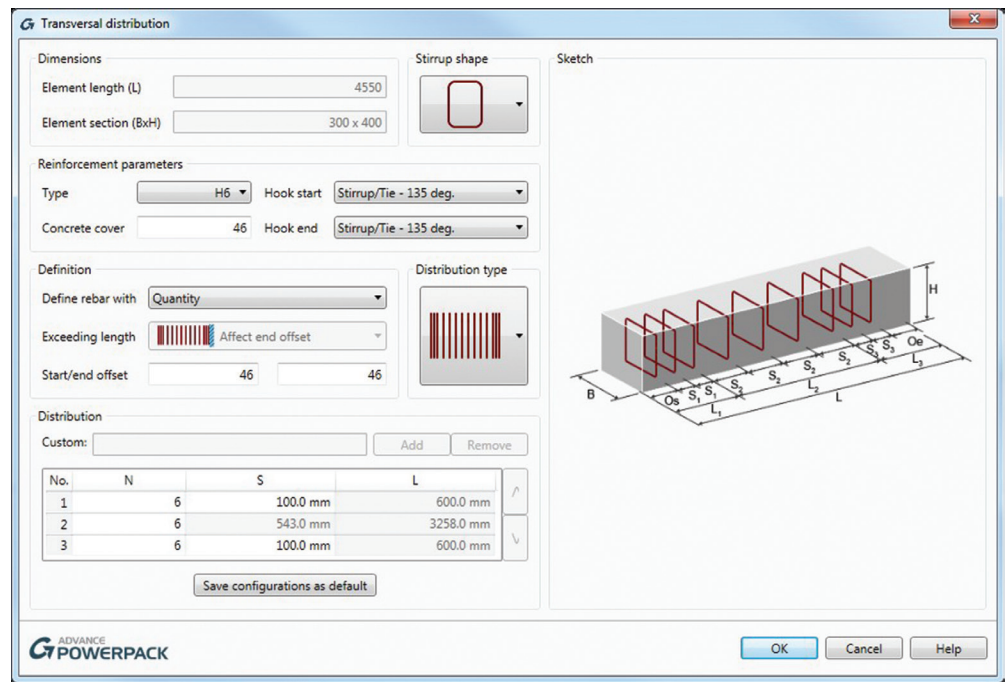


Figure 3: Transversal distribution

**Transversal Distribution** – When placing distribution bars into a beam within Revit, you can only add the bars either by fixed distance between them or the number of bars. So setting out to zone is a manual process. The Transversal Distribution tool speeds up productivity by automatically generating the transversal rebar sets with multiple spacing for linear elements. With only one command, the user has the option to quickly create different configurations of the transversal reinforcement in a cage.

**Trim/Extend** – Changes are always going to happen during construction. For example, a hole is drilled in the wrong place or something was missed and further holes or openings are required to a slab or wall. This is then going to affect your current reinforcement so amendments are necessary. These changes are made easier by the trim/extend tools. You no longer need to spend time adjusting bars and adding bars, you can just simply use the split rebar set and then the rebar to face tool. The bar bending schedule will automatically update. Area reinforcement can be easily stretched to fix an area. Openings in rebar sets or area reinforcement can be cut by the Cut Openings in Rebar Set and Cut Openings in Area, respectively.

## MORE TO OFFER

The GRAITEC PowerPack has loads more to offer—it isn't only for reinforced concrete detailing. It provides a suite of commands and functionality to increase productivity while working within Autodesk Revit.

**Family Manager** – One such tool is the Family Manager, which makes it easier to manage all your Revit families either on your local computer or across the company network. The families are listed in a simple tree format and further locations can be added at any time. The user can easily search, select, or filter the list to choose which families they wish to import into their project. This will reduce time users spend searching for their families.

# Revit 2017 – Structure

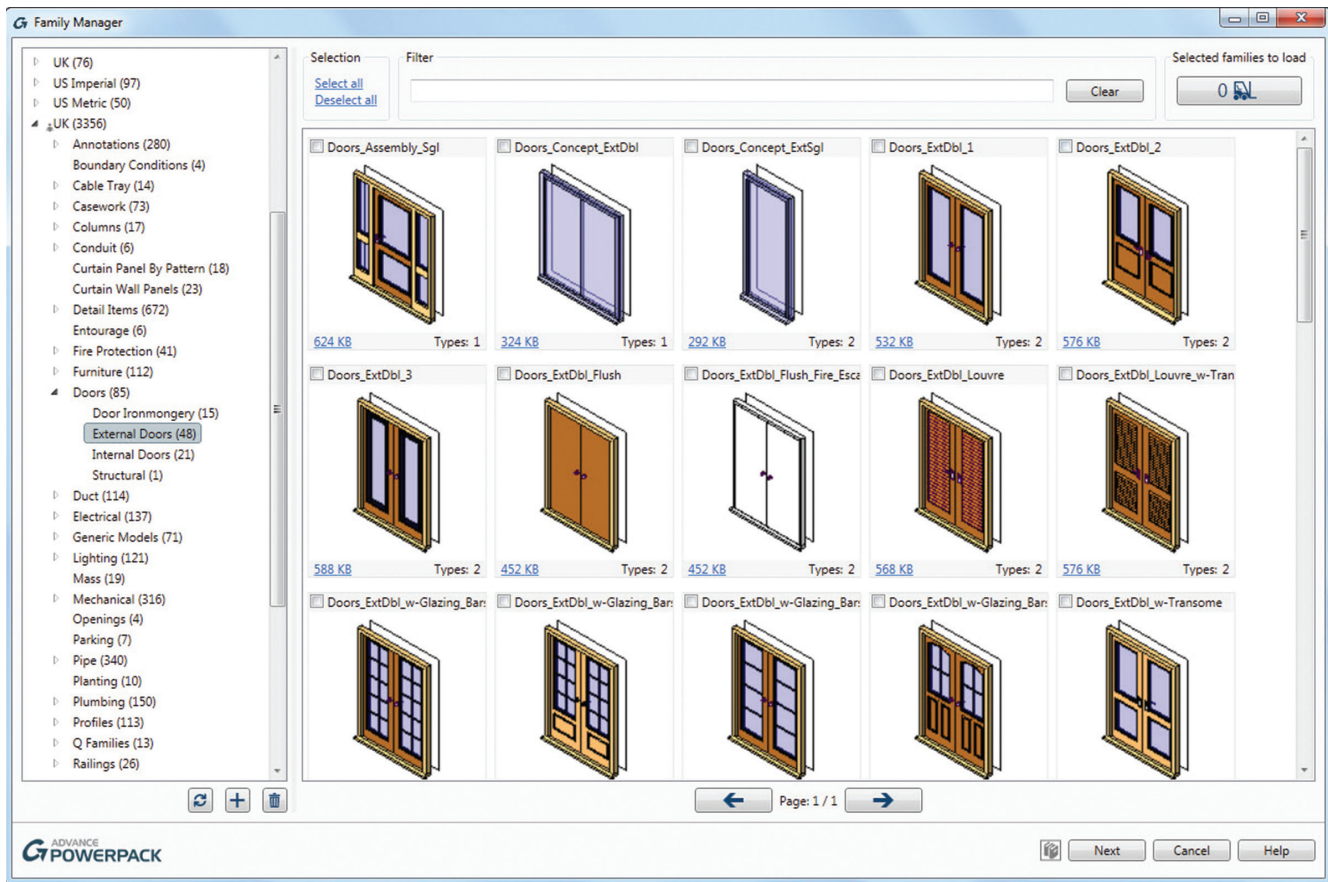


Figure 4: Family Manager

**Family Exporter** – While working in a project you may have created some great new families or you loaded some manufacturer families you would like to add to your own library, but you can only select one or all the families using the out-of-the-box tools in Revit. GRAITEC has taken that tool and enhanced it a little bit further with the Family Exporter tool. This tool works in a similar way, but you can select all families and/or the types as well.

**Auto Section Box** – GRAITEC has made creating a section box a little bit better. You can still create a section like the Selection tool, but with added functionality the user can select which 3D view they wish to use and even duplicate it. An offset to the extends of the section box can also be added.

**Dimension Annotations** – There are also some enhanced tools for dimensioning in the PowerPack. These tools automatically generate dimension lines for overall dimensions, grids, external geometry, structural, and openings. Join dimension lines together and turn a line into a run dimension, crossing walls with quick dimensions.

The user can even configure which dimension style is to be used while using the Auto dimensioning, quick dimension, and join dimension lines tools.

## REVIT TEMPLATE

One tip I would like to finish with: “Your model is only as good as the template you started with.” If you want to display the information as per your company standards, then you need a company template.

If you continually start with a standard template from scratch, you are going to be spending unnecessary time setting up your project to suit your company standards—time that could be used more effectively elsewhere.

Having a good company template set up before you start work is worth its weight in gold and is really important. It is going to improve efficiency, quality, and consistency on your projects. Once the template is created, it can always be amended or updated accordingly when and where necessary.

## REINFORCED CONCRETE AT AU2015

If you don't know much about reinforced concrete detailing in Revit and would like to know more, then check out my class ES10883: Should We Move from 2D Detailing to 3D Detailing for Reinforcement Detailing? at the Autodesk University website (<http://au.autodesk.com/>). It should give you a better understanding.



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# Reseller MEP Apps for Revit

**L**ast year we took a look at third-party apps from industrious developers for MEP users of Autodesk® Revit®. This time around we will review what resellers have been putting together. With their close relationship to Revit users, resellers are often the first point of contact when Revit isn't working as desired. Resellers are uniquely positioned to identify trends and opportunities with their client base. They are also in close contact with Autodesk and can leverage relationships there to guide decision making on what apps are going to be long-term winners.

Besides being in the sweet spot between the creators and users of Revit, resellers are in constant competition with other resellers. This means they need to find ways to differentiate themselves. Resellers are therefore driven to discover their clients' needs and provide solutions in order to survive in an ever-tightening market. Understanding that resellers are confined to their market areas and not every reseller listed in this article may be known to any given user, their applications are typically not.

When it comes to purely MEP applications, there is not much. Is this because the MEP tools native to Revit are so perfect? I haven't found a user who thinks so. More likely, the problems with MEP tools in Revit are deep rooted in engineering units and internal calculation constrictions, which are not completely exposed in the current API for programmers to attack. Adding to the problem, engineers are a particular bunch and finding tools that satisfy all, while seeming easy, is not.

In the middle, resellers have taken their best shots. Let's take a look at what resellers have been putting out there for our use (in alphabetic order by reseller name). Where I thought detail mattered to a MEP focused person, I have added an explanation of the tools' intended use. Where it didn't, I didn't.



Advanced Solutions, based out of Louisville, Kentucky, has bundled its applications and branded the utilities BIMAssist. Availability is limited to the United States, but BIMAssist

is free for clients whose subscription to Revit is through Advanced Solutions.

BIMAssist combines 12 tools.

**Case Update** is a tool to change text case supporting upper, lower, and title case. The tool can be applied to elements, views, or whole projects. Add to that the ability to filter by type and a zoom to feature; this is a handy tool for most any user.

**Door Mark Manager** (Whoop-de-do)

**Fire Rating Coordinator** links a fire rating on hosted elements to a host element, then can verify and align one way or the other.

**Match Instance Parameters** is pretty much what it sounds like. Works on selected elements, all in view or all in project.

**Note Block Creator** (Is this really a need?)

**Project Cleaner** helps users compress linked files by taking out plans, views, schedules, legends, and more.

**Room Phase Replicator**

**Room Renumber**

**Room Surface Parameter Extractor**

**Sheet Number Update** adds and removes sheets, then renumbers the sets to eliminate gaps in sequencing.

**Space Synchronize**—everybody has one, including Autodesk.

**Text Find and Replace** is just what you think. Includes a zoom to that can be helpful for finding elements.

Find out more about Advanced Solutions BIMAssist for Revit by visiting [AdvancedSolutions.com](http://AdvancedSolutions.com).



CAD Technology Center out of Bloomington, Minnesota, has been one of the most prolific producers of Revit apps of any of the resellers I reviewed. Advanced users will enjoy having the heavy machinery CTC provides and inexperienced users will be able to do amazing damage really fast. The CTC arsenal is large (35 applications by my count), which is great; they have your

# Revit 2017 – MEP

tool no doubt. It is also cumbersome in that the average user may gravitate to 10 percent of what is offered and be burdened with an overstuffed ribbon. Some users may have anxiety over the sheer volume of tools and simply ignore them.



**BIM Data Suite**

For a cool \$7,000 the **BIM Data Suite** will export a snapshot of the BIM data in your model to SQL, XML, or a CTC Model Compare file.



**BIM List Server**

**BIM List Server** centralizes Revit content and provides a customizable family browser to help users find the right content no matter where it is or they are.



**BIM Manager Suite**

The **BIM Manager Suite** includes a Batch Family Loader, Project Cleaner, Revision Cloud Remover, and Family Tools at no cost. For \$1,250 you can add a Dimension Checker, Family processor, Import and Link Manager, Shared Parameter Manager, Type Swapper, and a Watermark tool to brand your content.



**BIM Batch Suite**

The **BIM Batch Suite** includes a Family Exporter and Family Loader for free. For \$324 a Project File Upgrader and a Plotter and Exporter tool can be added. The Plotter and Exporter tool allows users to schedule plots to PDF or exports to other formats. Considering all the time you might spend plotting, having it happen automatically overnight may make the cost of this tool a non-issue.



**BIM Project Suite**

The **BIM Project Suite** includes seven free tools: the BIM List Browser, Detail Link, Length Calculator (displays the length of a pipe, duct, conduit, or cable tray run), Project Link, Quick Select, Revit Properties, and a Renumbering tool. Twelve more tools can be added for \$450. These include Fire Rating, Model Compare, Schedule XL, Parameter Jammer, Revision Manager, View Creator, Spreadsheet Link, Spreadsheet Drafter, Spreadsheet Link Express, Schedule Parameter Resolver, Room Family, and FAB Sheets.

Find out more about CAD Technology Center's applications at [ctcexpresstools.com](http://ctcexpresstools.com)



If you have been waiting for something directly applicable to MEP, Design Master out of Lynnwood, Washington, boasts actual help for electrical users. Offering include:

**Breaker and Wire Sizing**, which calculates based on connected loads and allows user overrides.

**Feeder Sizing** calculates based on overcurrent protection and allows user overrides.

**Voltage Drop** is calculated using selected feeder sizes and Revit supplies the feeder length. Users can override as required and create a schedule for easy manipulation.

**Fault Calculations** for equipment and document in a Revit schedule.

**Arc-Flash** calculates incident energy and required PPE. Create a schedule to document values.

**One-Line Riser Diagrams** automatically creates one-line diagrams that allow customization per company symbology.

Find out more about Design Master's applications and pricing at [designmaster.biz](http://designmaster.biz).



Ideate Software, San Francisco, California, offers three applications.

**BIMLink**, which can pull BIM data from a model and put it into Excel where it can be modified and pushed back into the BIM model.

**Ideate Explorer** simplifies project navigation, searches, filtering, quantifying, indexing, and selecting elements.

**Ideate Sticky** has a memorable name, even if it is not immediately understandable. The idea here is that Excel rules and wouldn't it be cool if you could place whatever spreadsheet desired on a sticky note and post it inside of the Revit database? You can with Sticky.

Find out more about ideate applications and pricing at [ideatesoftware.com](http://ideatesoftware.com)



IMAGINiT also provides a host of tools free utilities for its clients.

**Adjust Pipe** provides tools to adjust pipes, so the Trim and Extend tools will always work.

**Room Renumber** allows users to number rooms by function, not order placed.

**Element Renumber** applies the same power of the Room Renumber tool to grids, levels, spaces, and other elements.

**Room Phase Copy** is a common tool because rooms cannot exist in multiple phases.

**Space Update** syncs space properties with linked room properties.

**Grid Select** allows users to select elements based off the grid they are on.

**Change Case** is clearly something that should be native to Revit because everybody provides the tool.

**Earth Connector** bridges Revit to Google earth and even allows phases.

**Parameter Copy** is a powerful tool to switch parameters in an entire project between type and instance types, or host and element, or room and component.

**Parameter Concatenator** is a highly useful way to combine two separate parameters into a single parameter.

#### DWF Plus

**Translate** uses Google Translate to quickly translate notes and text to more than 50 languages.

**ViewSetUp** uses your View Templates to instantly create the views you need based off levels and phases. Personal note: I can't live without this one.

**View Cleanup** is just what you think. Drop the hammer on linked files before you link them.

**Dependent View Copy** is new in 2016. It uses an example set to create, name, crop views, and more.

**Revit Excel Link** is yet another flavor of tools to push and pull information between Revit and Excel.

**Dim Text Update** allows users to override multiple dimensions at once.

**LinkFixer** makes updates and relinking (even a folder's worth worth) a breeze.



U.S. CAD, headquartered in Newport Beach, California, is another extremely prolific producer of applications for Revit. For what the company quantifies as “low cost,” you can enjoy the use of seven packages of tools.

The **BIM Manager** tool set includes the following tools.

- Import/Export
- Multi Type Editor
- Folder – This tool opens Windows Explorer to the current file's location
- BIM Query – Uses Excel to pull edit and push BIM data
- Project Cleanup

The **Analysis** tool set includes the following tools.

- Room Lighting – Not what you hoped for; just calculates room volume
- Insertion, Thickness
- Swing Direction
- Update

The **Annotate** tool set includes the following tools.

- Material Legend
- Legend by Category – Create custom legends by element
- Renumber
- Align – Align text to elements

The **Select** tool set includes the following tools.

- Filter – Apply filters to selection sets
- Select – Rules-based selection tool

The **Modify** tool set includes the following tools.

- Draw Bounding Box
- Edit Grid Name
- Room to Floor
- Multi Join
- Create Assembly
- Create Assembly View

The **View** tool set includes the following tools.

- View depth Override – Change element colors based off distance to viewing plane
- View/Sheet Manager
- Align Viewport on Sheet
- Crop region
- Toggle – Switch on and off visibility by category for a whole project
- Resize Section Box
- Room Views – Generate 3D room views
- Zoom To

The **Content Admin Kit** tool set includes the following tools.

- Update Category
- Execute Calculated Parameters
- Update Calculated Parameters
- Manage Calculated Parameters
- Parameter Manager
- Shared Parameter Manager

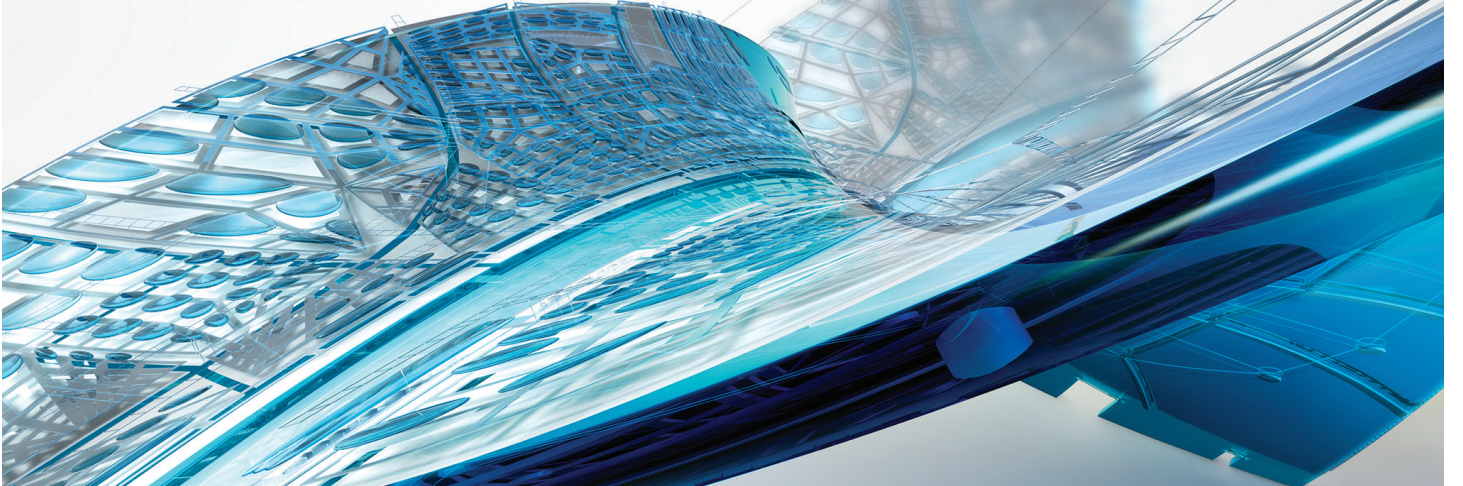
For more about USCAD applications go to [uscad.com](http://uscad.com).

As I said last year, keep users in mind. Don't overwhelm them with ribbon tabs. Remember, there are no guarantees that these tools will work with other tools you have. You may have to wait for resellers to react to new versions, leaving you in the lurch between product release and application update every year. It is difficult to take just the tools you want and leave the ones you don't. Resellers have done a consistent job of delivering their tools in large packages. Much like cable TV services, you will have to buy the Home Shopping Network whether you want it or not in order to get SportsCenter.



*Todd Shackelford is the BIM Manager for Alvine and Associates, the president of the BIM Board of Omaha, a University of Nebraska instructor and a frequent speaker at Autodesk University. He authors two Blogs; CAD Shack and The Lazy Drafter. A Revit 2013 Certified Expert. Todd looks for his missing socks when not otherwise committed. Tweet Todd @ShackelfordTodd or email Todd at [tshackelford@alvine.com](mailto:tshackelford@alvine.com)*

# Moving Day: Are You Ready for this Transition?



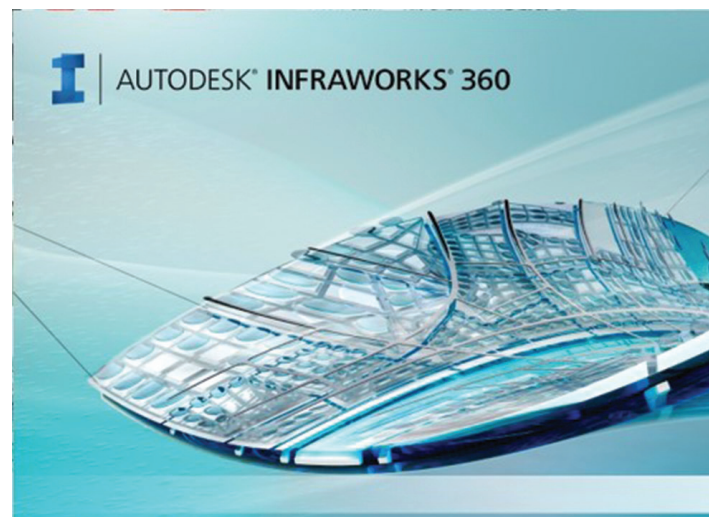
Remember years back when cell phone technology was already commercial, but still in its infancy. I heard first-hand discussions among my father and his friends about how new technologies were evolving faster than expected and the difficulty of keeping up with them. From having a clear understanding of what, when, and how to jump onto the train of new products/devices to using them logically and efficiently in our lives, it seems that we are always facing learning challenges. It's like a never-ending cycle of supply and demand.

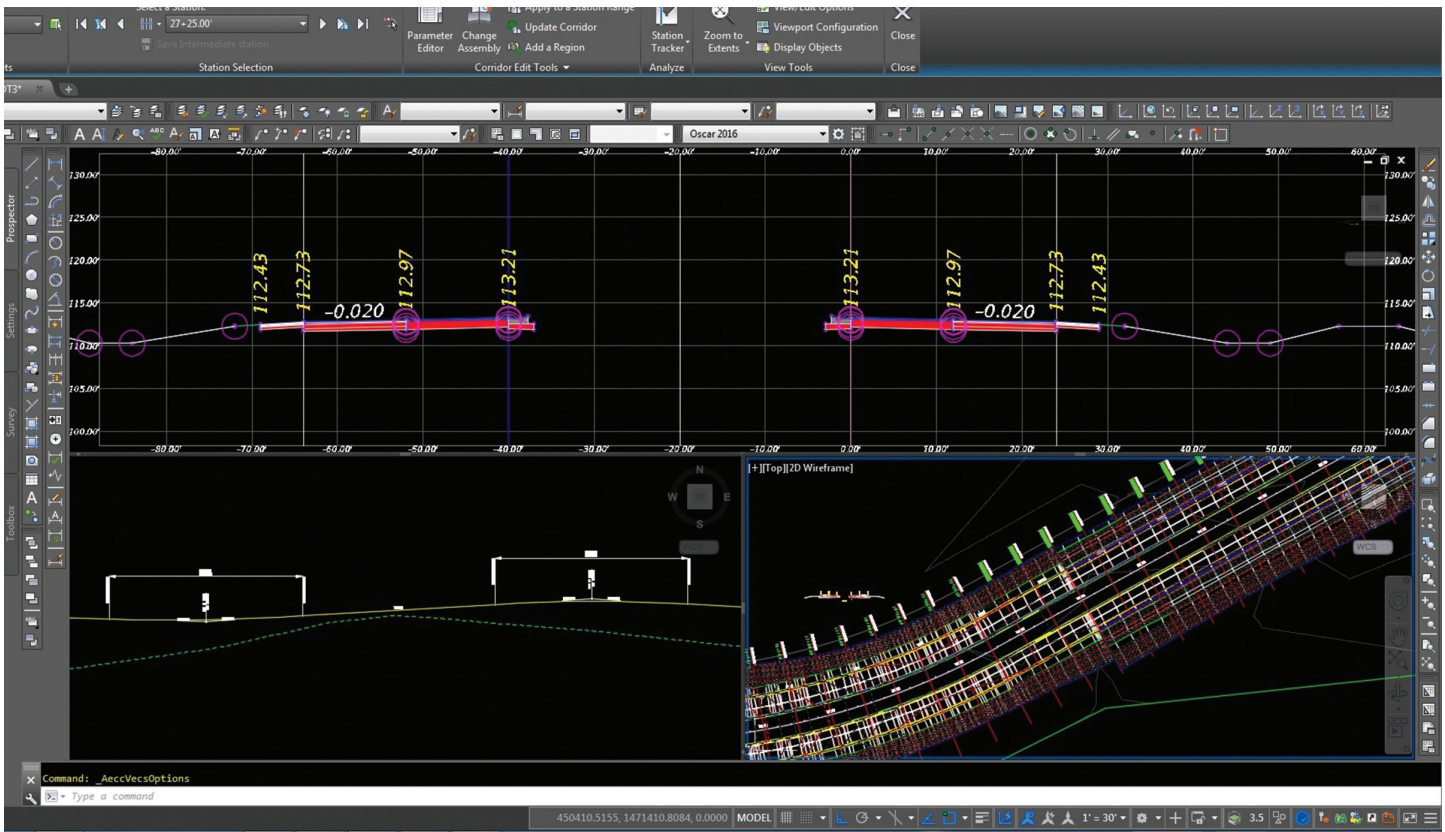
So what does this mean for our demanding infrastructure industry—whether you are an architect, a surveyor, an engineer, a technician, or even more complex, a company that provide services in some of these fields or perhaps all?

The last few years have seen a rapid and consistent growth in the number of products available, assisting with our daily routines (preliminary conceptual work, design tasks, or project documentation), but leaving us to ponder what tools to use and how to apply them efficiently and proactively.

By definition, implementation is the action that follows any preliminary thinking in order for something to happen. After you make the decision to either switch to a new platform or to acquire a new set of tools for developing work, there are important elements that you must take into consideration for successful application of the newly invested programs.

When researching Autodesk's Infrastructure Design Suite packages and Infracore 360, you must first consider the requirements for running these programs efficiently—meaning the hardware configuration to optimize your current workstation for CAD/BIM applications. This process includes asking fundamental questions such as: Will I be using visualization tools? Modeling complex structures? Rendering 3D models? Creating high-quality images from designs? Performing drainage and structural analysis? Creating traffic simulations? Keep in mind that these answers and the many others that are specific to your needs have a huge impact on the hardware required for efficient workflows.





From the comfort of my desk chair as I'm writing this article, it is impossible for me to determine all the uses you will have for CAD applications, as only imagination and creativity sets the limit of what you can accomplish. But I will share what I have found to work decently for a good optimization of Autodesk's Civil 3D, InRoads 360, Storm and Sanitary Analysis, and 3ds Max.

AutoCAD® Civil 3D® runs mainly on a single processor core and you will want to make an investment in the fastest processor with the highest cache you can afford. A quad core Intel-Xeon E3-1505Mv5 (8MB cache, up to 3.70 GHz) will fit the bill for this component. In order for this new processor to perform at its best, you need sufficient RAM. I strongly recommend acquiring as much as your budget allows, but at a minimum no less than 32 GB (16+16 DDR4). Since InRoads 360 and Civil 3D corridor models are usually large files, it only makes sense to complete your new processor and RAM with enough SSD to run your OS and software applications, supplementing with a conventional hard drive for extra storage (500 GB SSD plus 1TB HDD is a decent set up).

Last but not least, you will need to select a graphics processor unit (GPU). With so many options and many of them above the quadruple digit mark (\$,\$\$\$), this decision can be complicated. I have found that the NVIDIA Quadro 4000M (4GB) or higher performs well. There are also heated debates regarding gaming video cards, NVIDIA GeForce, and AMD's Radeon, to name a few, but we'll save that discussion for another time.

Another factor to consider in moving to the Autodesk world of possibilities is the actual commitment from management to the

change. It has been proven true many times that this includes not only saying yes to buying new computers and purchasing new software, but understanding the transition needed to make your work more efficient, resulting in a return on investment that is quantifiable in a timely manner.

I would advise management to consider these questions: Does my company do survey work, environmental work, land development, transportation design, traffic analysis, hydrology/hydraulics? Do my projects include some degree of architectural design? Do we include landscaping design? Do we have a need for video presentations? To simplify, what is it that you want to accomplish by using Autodesk products? Determining the key components of your daily workload will tremendously help the chances for success in implementing the new platforms, finding the right team members, and selecting the optimal programs for purchase and training.

In summary, a general implementation approach to Autodesk platforms, specifically Civil 3D and InRoads 360, should consider the following:

- Hardware specifications: have the precise equipment to take advantage of the applications, tools, and workflows that the software offers for different needs within your projects.
- Management buy-in: ensure that management knows and understands the difference between modeling and CAD; modeling is a tool for design and engineering applications, not just another drafting tool.

# Implementation



- Handling resistance to change: identify internally the staff members who typically refuse to accept new technologies and prefer to stay with old platforms (e.g., “This has worked well for the last 10/20/30 years or so, why do I need to change it?”); engage them intelligently and patiently.
- The learning curve: define your firm’s scope, identifying the needs that will be met by Civil 3D and InRoads 360. Find the right team members, assign proper resources for training purposes, define logical timeframes and milestones within your current project workload, and allow for the creation of proper workflows and templates standardization based on clients’ preferences and/or requirements.
- Selection and designation of a BIM CAD manager: fill this position with a manager who has decision-making authority for the benefit of the organization, who can assign autonomy

and responsibilities for CAD standards, and allows the freedom to determine the right processes to be implemented based on the current needs of projects/clients.

Only you can set the limits of what can be accomplished with Autodesk programs, from preliminary design to final project documentation. The selection of the right tools and the right team will determine success in performance and quality deliverables, but only if you encourage your organization to accept new challenges and equip them for changes.

Good luck with your move!



Oscar Castaneda is a Transportation Design Engineer at Infrastructure Engineers Inc. out of its Orlando office in Florida. With more than 10 years of experience in the industry, Oscar is a practicing Designer (EI), and recently he has spent his time leading Infrastructure Engineers’ transition into Civil 3D and InRoads 360 with their current design workload, making the most from Autodesk’s Suite Packages, and attempting to break barriers between Bentley and Autodesk products users. Oscar can be reached for questions/comments: [ocastaneda@go-iei.com](mailto:ocastaneda@go-iei.com).

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# Implementing CAD Standards in ACA

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

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

- File / Folder Names
- Drawing Title Block Names
- Layer Names, Colors, Linetypes
- Dimension Styles
- Text Fonts and Sizes

- Drafting Symbols
- ....and many more

## DRAWING TITLE BLOCK NAMES STANDARD

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

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

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



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

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

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

## CREATING LAYER STANDARDS

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

- ♦ **Discipline Designator** – This is an alphabetic-character field that designates the discipline that is associated with that layer. The list I use is the same as the one I described previously. A second optional letter can be used to further define the discipline character.
- ♦ **Major Group** – This is a four-letter alphabetic-character field that designates the major building system to which the layer applies. For example, wall, door, glaz, etc.
- ♦ **Minor Groups** (can be 1 or 2) – This is an optional four-character field that further defines a major group. For example, A-GLAZ-INTR for interior glass.

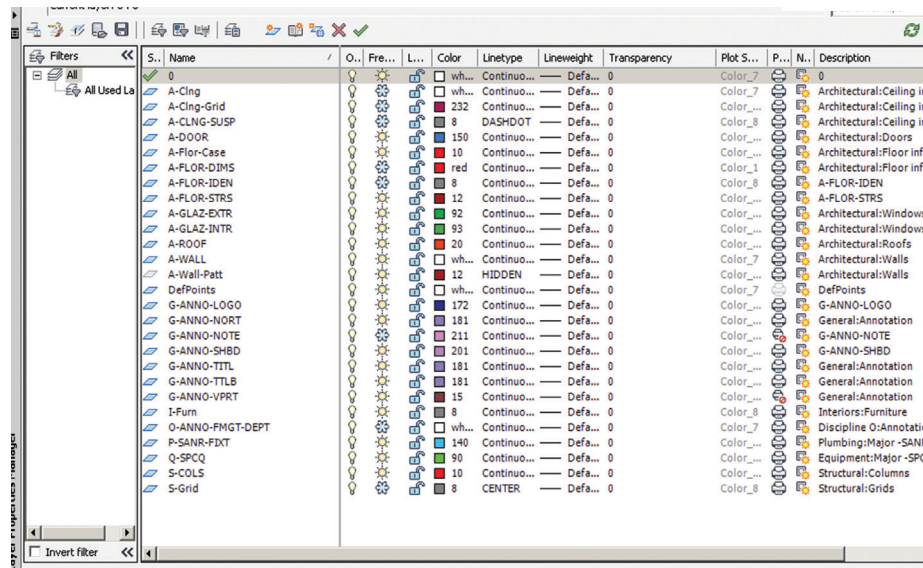


Figure 1: Layer standards

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

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

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

## CREATING A CAD STANDARD FILE

Once you have created your standards, let's look at how to create and implement CAD standards files in ACA using the Manage tab of the ribbon. To begin implementing CAD standards in ACA, you must first create a CAD standards file. To do this, begin by opening a new drawing. Next, you need to establish the desired settings

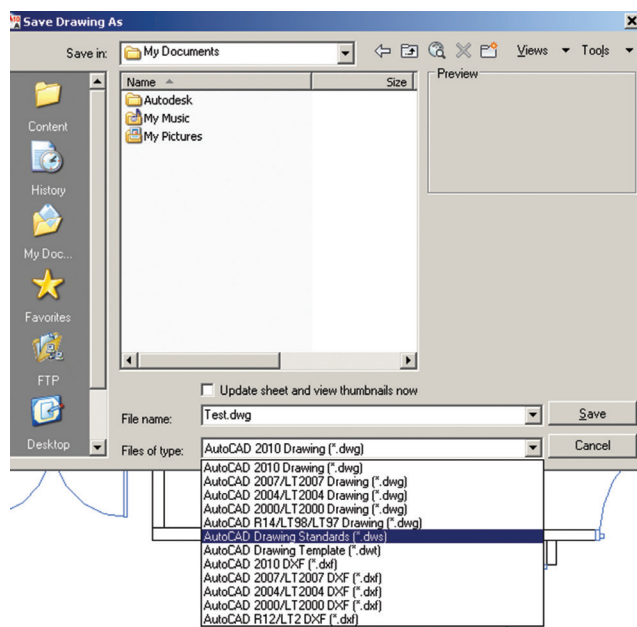


Figure 2: Saving drawing standards file

for layers, linetypes, text styles and dimstyles. You may also have your standard Title Block included in this drawing. Finally, you must save it as a drawing standards file by changing the file type to \*.dws (see Figure 2). You can do this for each type of drawing you will be creating—for example, architectural, electrical, mechanical, etc. You can also contain everything within one drawing.

## CONFIGURING CAD STANDARDS

Now that you've created your CAD standards file, you can associate that file with any drawing you are working on. Users should be required to do this prior to beginning any

# AutoCAD Architecture 2017

new drawing to maintain consistency throughout all drawings. Under the Manage tab on the ribbon, go to the CAD Standards panel and select Configure (see Figure 3). A dialog box will open showing two tabs: Standards and Plug-ins. Select the Standards tab. Here you will find displayed any information regarding the standards files associated with the current drawing, once they have been added.

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

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

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

The Settings dialog box under Configure Standards gives you additional settings for your standards (see Figure 4). You can choose to Automatically Fix Non-Standard Properties. When this item is checked, all the properties of the objects with identical names will change to match the settings in the preferred file.

You can also choose to Show Ignored Problems. When this is checked, it will show previously ignored problems when you perform subsequent standards checking. The login name of the person who previously checked it as Ignored will be shown in the Check Standards dialog along with the problem associated with the item. There are a few notification settings you can choose from as well, including the ability to Display Alert Upon Standards Violation. Feel free to play with these settings and see what works best for you and your employees.

## CHECKING CAD STANDARDS

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

The Problem area of the dialog box displays a description of a non-standard object found in the current drawing. The Replace With area of the dialog box lists possible replacements for the current standards violation. These replacements are the settings from the standard file you created and inserted into the new drawing. If there is a recommended fix available, it will be preceded by a checkmark. If there is not a recommended fix available, no items will be highlighted in the Replace With list. The Preview of Changes area of the dialog box indicates the specific properties of the non-standard object that will be changed if the fix that is currently selected in the Replace With list is applied. You may also choose to check the box Mark This Problem As Ignored. When

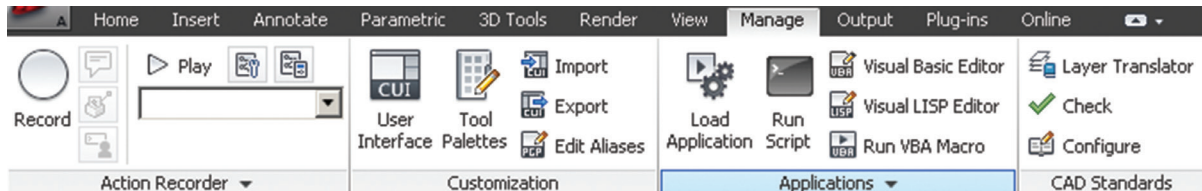


Figure 3: Manage tab

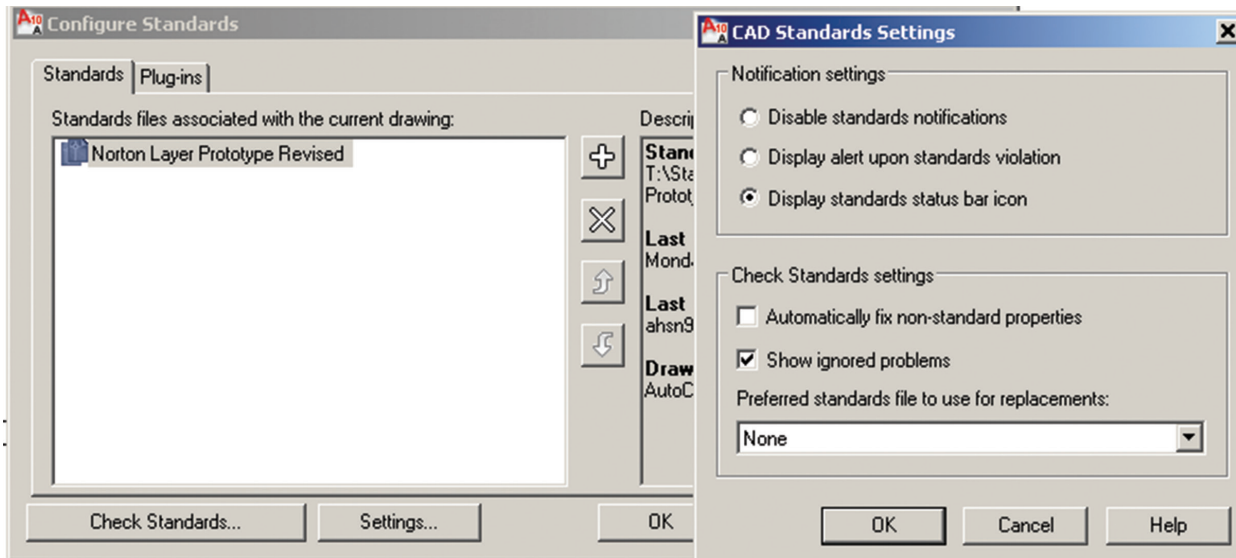


Figure 4: Dialog box with settings

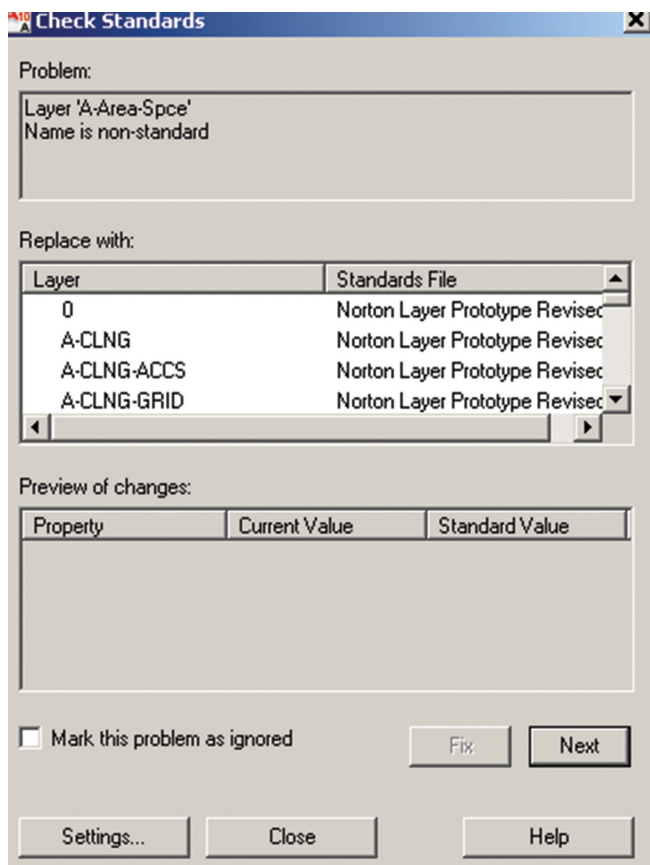


Figure 5: Check Standards dialog box

you do this, the login name of the user will be recorded with the fact that the problem has been ignored.

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

## THE LAYER TRANSLATOR

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

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

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

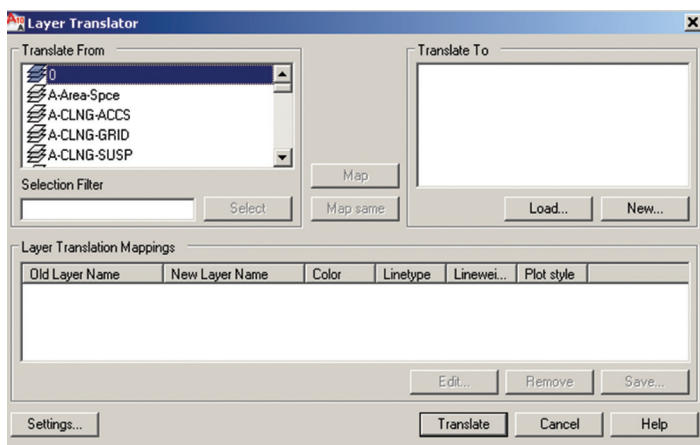


Figure 6: Layer translator

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

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

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

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



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# Silence Is Silver, Communication Is Golden

**T**he construction industry (more than any other industry) involves many players with different experiences, personalities, and skill sets... which is great! But there's a flip side—how do you ensure consistency of cost, schedule, quality, and even safety with so many colors and flavors? How do you maximize productivity across various trades, various projects, and various countries even? Contrary to a production line in a manufacturing plant, which produces similar products over and over again in a controlled environment, a building project is most often unique in terms of design, location, and people involved.

Getting alignment across the entire team becomes the #1 priority for BIM managers, using 3D models as communication tools to quickly illustrate the intricacies and complexities of a given project.

And that's the key: communication. Disclose, share, inform, publicize, suggest, announce. I know what you are thinking—this sounds like more emails... Absolutely not! The tools are out there, and they can do amazing stuff! Let's discuss a few examples.

## BUILDING AN INTEGRATED 3D MODEL

The 3D model (or what is mostly used nowadays for coordination as a collection of 3D files) is already a step up from 2D design documents simply by adding another dimension. 4D, 5D, 6D all the way to 8D models build upon the same concept to add time, cost, and lifecycle management all the way to accident prevention data, pulling the type of information conveyed in multiple different directions.

The added features open new avenues to specific types of analysis. But how about this: instead of continually trying to add more dimensions to a complex tool, why not focus on spreading out its use to the wider audience and integrating the model more consciously into our daily work processes?

The idea is to improve the number of people interacting with the model on a regular basis instead of relying on a few experts focusing on very specific dimensions to digest the information contained in the black box that is the 3D model. In practice, this would mean identifying the most common work processes and aggregating them into the model.

The point is to leverage work produced by team members to enrich the 3D model with information from outside the modeling and 3D coordination process. Examples include tagging the model with RFI (request for information) data, publishing submittal information, linking the model to document repositories, tracking design releases, or even using it as a notification tool.

## INTEGRATING RFI DATA WITH THE 3D MODEL

On the construction side, one of the most common tasks for a project engineer is managing RFIs. A formal question is sent to the designers and once the answer is received, it gets distributed to the rest of the construction team, including affected subcontractors. Multiple parties can be affected by an RFI response and it is imperative they analyze the constructability, the cost, and the schedule impacts associated with the response.

On very large projects (\$500M+) this often means having to track and manage thousands of RFIs. Moreover, field personnel need to be made aware of the design changes through the RFI process. This commonly means the RFIs need to get tagged on the design documents, generally by a dedicated resource.

But what about adding another dimension to that process: publishing and managing RFIs through a 3D environment? This would mean fewer items falling through the cracks and better communication on their status, leveraging the 3D information to better illustrate the issue and track in real time the updates to the individual models as RFI responses get coordinated. This can be done two ways: manually, using that dedicated resource; or automatically, using the metadata from the 3D environment.

Guess which one is faster, cheaper, and less prone to mistakes?

To automate the process, the easiest way is to use Navisworks DataTools, with a little added discipline on the project engineer's side and a few added fields of metadata in the model. Each piece of the model would have a property filled with a very specific value. That value would be replicated by the project engineer in the RFI and will serve as the link between RFI and model.

The key is to use a predetermined Work and Location Breakdown (WLB) code that is unique to any group of items in a specific location for a specific trade. Basically, break down your coordination model by area and by trade and assign (i.e., have the model author add) the associated code to the model pieces. The granularity of the breakdown will drive how precise the results will be, but will take more time to input. You can structure the code whichever way you want, as long as both the code in the model and in the RFI are the same.

With the groundwork laid out, simply configure your Navisworks DataTools to fetch the RFI information (from your RFI database, spreadsheet, text file...) and link the WLB code from the model to the RFI. For help on the DataTools configuration, the Autodesk Navisworks team created a great article in 2011 that I still use to this day<sup>1</sup>.

The last step involves color coding the model pieces based on the RFI status using the Appearance Profiler: all closed items are green and are ready for construction; any item that has an open RFI associated with it is colored red and should not be built until the RFI is answered.

It always looks better with a little color!

<sup>1</sup><http://beyonddesign.typepad.com/posts/2011/09/datatools-links.html>

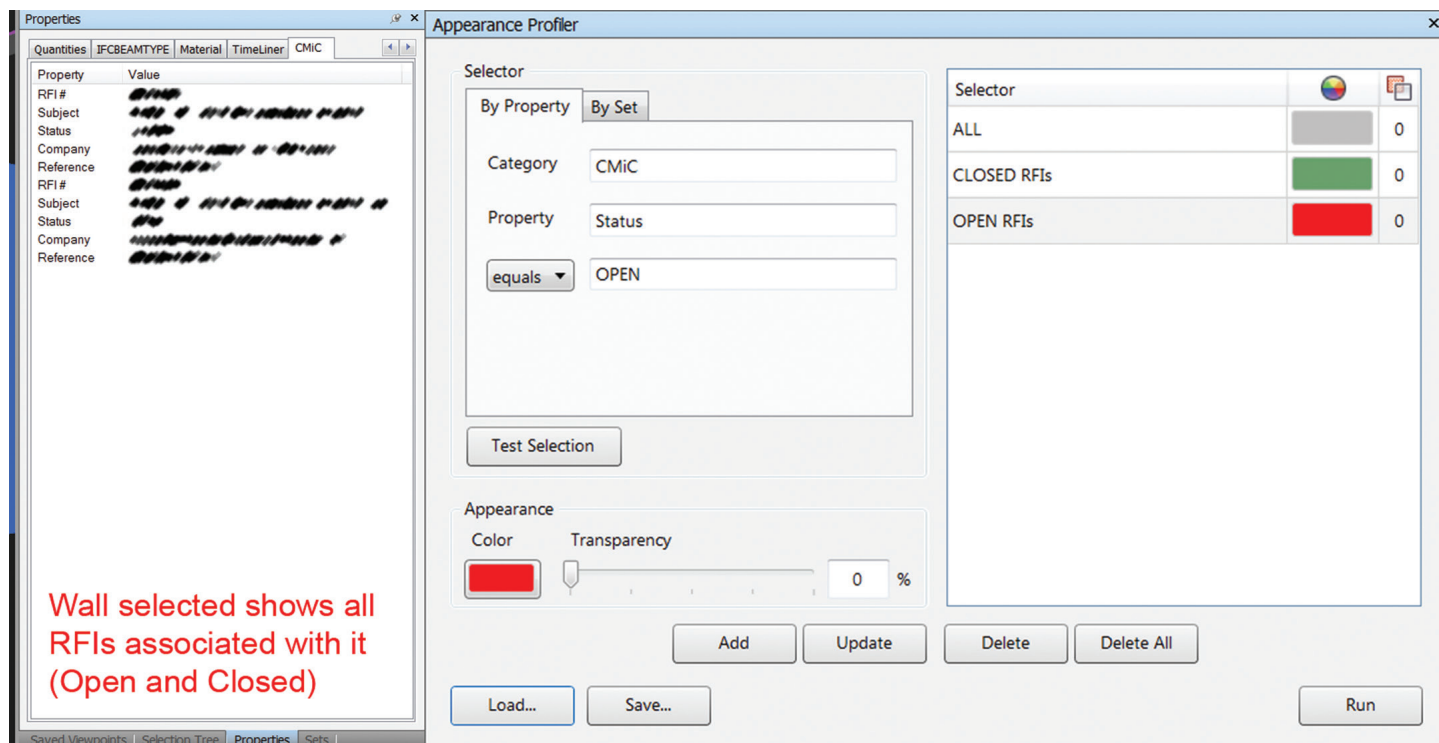


Figure 1: Connection with the RFI database is leveraged to color code pieces based on construction status using the appearance profiler—be careful of the order in which you apply the colors (Navisworks works from top to bottom).

# Navisworks Manage 2016

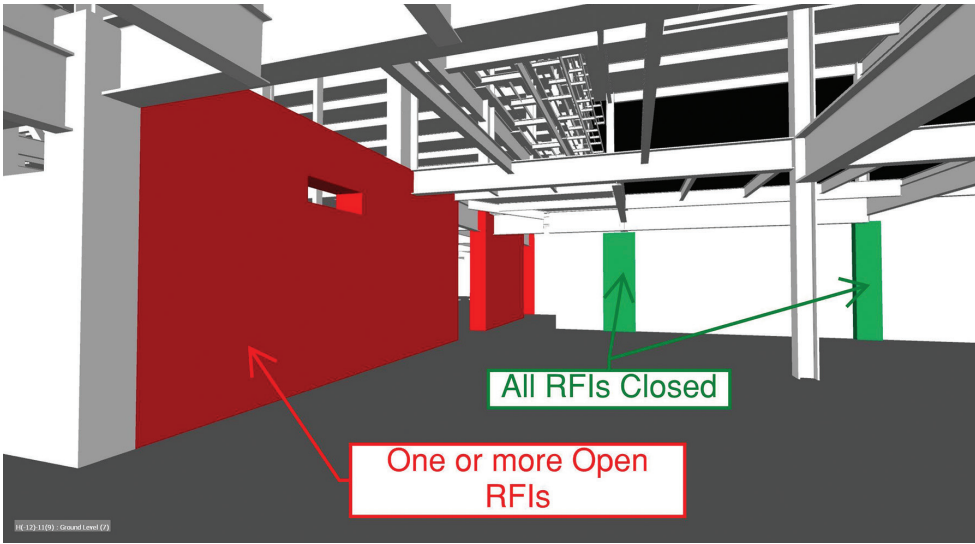


Figure 2: Color code the model by RFI status for a specific trade (concrete) to get a clear picture of what issues remain before the walls and columns are poured.

The result is searchable model properties that include RFI information (in this case RFI number, title, status, company or trade affected, and date closed) and a color-coded 3D model that shows what can be built in green, and what cannot in red. For easier viewing, specific viewpoints were saved for each trade (in this case, concrete).

Some of you might point out that equipment sets in BIM 360™ Field could achieve the same things, and you would be right. But this would mean having to change the RFI process for companies that are already using specific software to tie the cost and schedule impacts of an RFI to their cost control system. (DataTools solution shouldn't impact any existing processes.)

## AUTOMATING SCHEDULE LINKS FOR 4D ANIMATIONS

The same principles can be applied to the schedule where the same Work and Location Breakdown (WLB) code can be added to a custom property in your scheduling software. Depending on what schedule is used for the animation, the code's granularity can be adjusted to show less detail and match the schedule activity in question.

For example, if your master schedule shows an activity for pouring all the walls on a specific level, your code in your model should be adjusted to match the level of granularity in the schedule, meaning all walls on the same level in the model would have a property with the same WLB code.

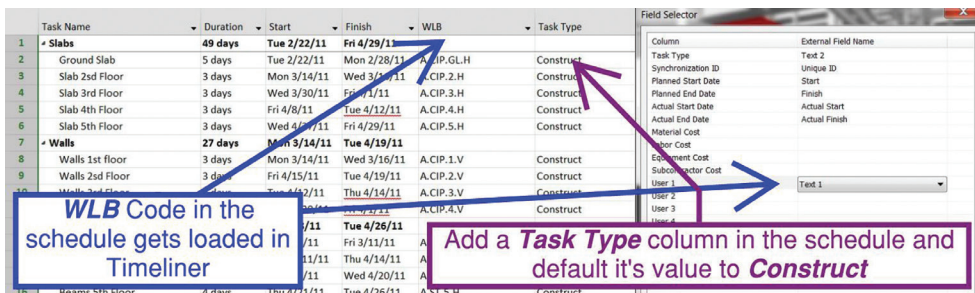


Figure 3: Link your schedule (left hand side) to the model in "Timeliner" (right hand side) by importing the custom WLB and Task Type fields.

You can then import or link the schedule in Navisworks "Timeliner" and use the "Field Selector" to import your WLB code.

Tip: Make sure you have a "Task Type" column in your schedule with a default value set to "Construct" (by default; this will save you time when you refresh the schedule).

Once you have synchronized your schedule, use the auto-attach feature with a rule that links the WLB code from the schedule to the same WLB codes in the model pieces. After a few minutes of linking process, admire the results in the Simulation tab. Viola! ...a fully automated 4D animation!

No more manual linking of tasks!

## INTEGRATING THE INTEGRATIONS

Independently, the last two examples already provide the team with more visible ways to interact with RFI and schedule data produced on a regular basis (with no additional effort).

NO! I would rather look at lengthy spreadsheet or a CPM schedule instead of colored elements in the 3D model... (said no one ever).

The visualization capabilities of the 3D model are used to convert the "1D" information into a clear, visible result that reduces misinformation and confusion, thus improving intelligent communication.

But what if we combined both examples? What if instead of a color-coded model on one side and an animated model on the other, we combined both to produce a color-coded 4D animation? Used together, these two methods can be even more valuable; not only helping identify issues, but also prioritizing them.

By combining the color-coded model with the schedule animation, teams can focus on solving upcoming issues when needed, as opposed to spending time and resources working on non-immediate concerns.

In practice, this requires a few aesthetic modifications to the 4D animation to make sure the color coding is only driven by the metadata and not the schedule status. By setting all statuses to display Model Appearance Color in the Timeliner, Configuration tab, you ensure that the only colors to look out for during the playback of the animation are for RFI issues.

Name	Start Appearance	End Appearance	Early Appearance	Late Appearance	Simulation Start Appearance
Construct	Model Appearance	Model Appearance	None	None	None
Demolish	Model Appearance	Hide	None	None	Model Appearance
Temporary	Model Appearance	Hide	None	None	None

Figure 4: Configure Navisworks Timeliner to only show RFI status colors during playback.

Once you have configured Timeliner, it's time to play back the animation and admire the results: as the 4D animation displays the objects according to the schedule, the items that are ready to be built are either white or green; the ones that are not appear in red.

So what have we learned, boys and girls?

The result is an easy-to-use and view, color-coded animation showing the status of RFIs and prioritizing them to follow construction. Instead of having to shift through a spreadsheet and matching the various design or construction-related questions being asked, the entire team can focus on the ones that matter. Moreover, on the back end this does not take any extra work and as long as the RFI and information in the model is entered in a disciplined fashion, this automatically refreshes to always show the latest and greatest information. Communication and sharing of information is improved, more reliable, and easier to analyze.

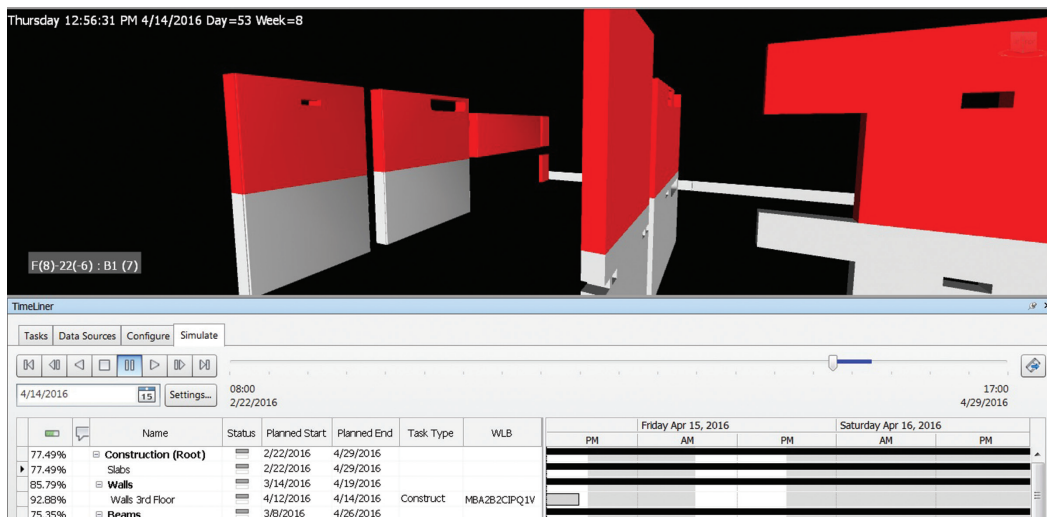


Figure 5: Color-coded items appear during the 4D animation to indicate if they are ready to be built or should be held off until issues are resolved.



Jean Goyat is a BIM Engineer at DPR Construction. With a solid educational background including a Master's degree from the Ecole Centrale de Lille in France and a master's in construction engineering from the University of Texas at Austin, Jean applies his knowledge of BIM products (AutoCAD, Civil 3D and Revit certified professional) to improve construction technology usage on large technical projects in California. Passionate about innovation in construction, Jean is constantly pushing the boundaries of technology implementation and integration into work processes to foster better communication and collaboration between project actors. Currently focusing on a large hospital project in Palo Alto, he is known by his team as the BIMja.



Kaushal Diwan leads DPR Construction's National Innovation Group, fostering the culture of "ever forward" and challenging the status quo by pushing the limits of change. Kaushal also leads DPR's corporate BIM training program and supports project teams across the nation. His 10 years of experience in the industry consists of BIM implementation and cost estimation for technically complex healthcare, higher education, life science, advanced technology, and commercial building projects. He is actively involved in national and local BIM groups and has also been a popular speaker at Autodesk University, local colleges and universities, and within the Sacramento Architecture, Engineering and Construction (AEC) Community.



**W**hether you are a CAD drafter, CAD designer, or CAD manager I bet it's safe to say you have heard the words, "You have to follow the company standards!" What if there were an easy way to help guide you along—a way to help you get comfortable with a new release of software or comply to a new set of rules that have been put in place? The CAD Standards Manager in AutoCAD® has been around since Release 9, but in my experience is rarely used. Take note of these tips as we dig deep into the Standards Manager and illustrate how you can implement this important tool to help you standardize your drawings and designs, making it easy to create a uniform standardized product for your organization.

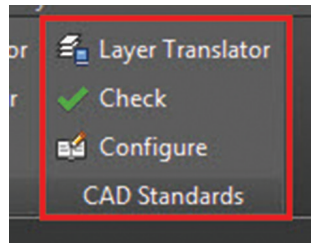


Figure 1: CAD Standards panel

On the Manage tab of the ribbon there is a panel named CAD Standards as shown in Figure 1.

### CREATING THE STANDARDS TEMPLATE

On the CAD Standards panel you will find the Layer Translator, Check, and Configure options. We are going to review each option as we begin our implementation of CAD standards.

The first thing we need to do is set up a standards template or templates (you do not have to have all in one file). By setting up

the template you will be able to check and apply the standards provided in the template to your non-compliant drawings or convert drawings provided by others to your company standards. Within the template we will define text styles, layers, dimension styles, and linetypes that are commonly used in all drawings. To begin we are simply going to start a new drawing and add our standards to that file then save that file to a standards file as shown in Figure 2.

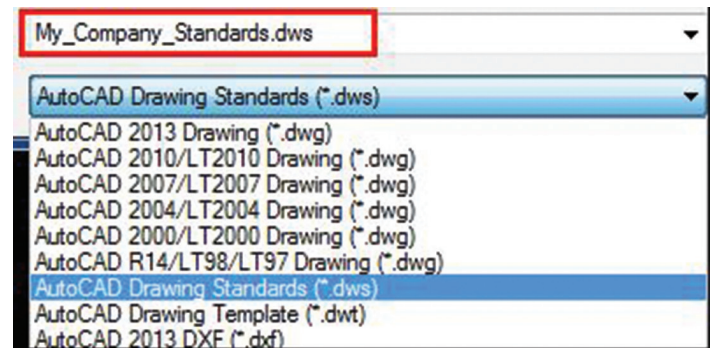


Figure 2: Saving to a standards file

### STANDARD TEXT STYLES

Start by opening up a new drawing and adding layers, text styles, a dimension style, and a few linetypes, giving each the properties you use for your company standard. Save that file to a secure location on your network where you can find it—this would typically be a CAD Standards folder where you may place your CAD Standards Manual. For this example we will save the file as My\_Company\_Standard.dws



We are going to start with text styles. Have you ever opened up a drawing and you have a large number of text styles, names of fonts, and text sizes and you have no idea where they came from? And to make it worse they cannot be purged due to an object, linetype, or some random AutoCAD feature that is holding on to them. This is where the CAD Standards Manager comes to the rescue.

Figure 3 shows a drawing received from a client in which the fonts do not conform to our company standard. We have several imported from Microstation and others we are not sure what they are referencing. This operator has gone rogue! Good CAD practice tells us that we need to clean those up to our company standard.

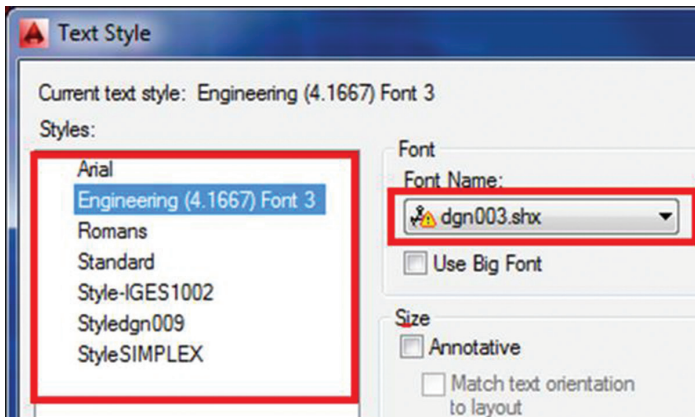


Figure 3: Problem fonts

Let's load up our template file (.dws), which includes the fonts we want to use. On the Manage tab of the ribbon navigate to the CAD Standards panel, then select Configure as shown in Figure 4.

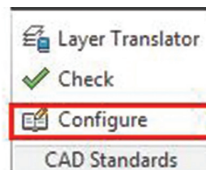


Figure 4: Configure on the CAD Standards panel

After selecting configure, hit the "+" sign and add the My\_Company\_Standards.dws to the window. The file will be loaded into the CAD Standards Manager and ready for checking against the current drawing you have open.

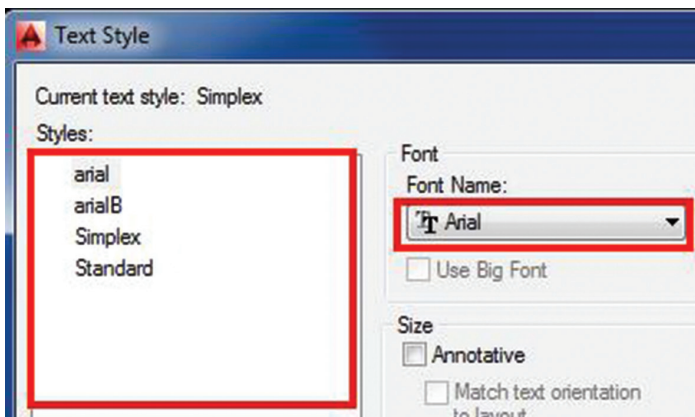


Figure 5: Our standard text styles

Figure 5 shows the text styles that we created in our company standards file that we are going to use for comparison.

## KEEPING CONTROL WITH PLUG-INS

There are two tabs in the CAD Standards window: Standards and Plug-Ins (see Figure 6). Once the file has been loaded into the drawing, navigate from the Standards tab to the Plug-ins tab and uncheck all but the text styles. Now we are ready to run our check and change those fonts. Select Check Standards and you will have several steps to review and/or complete.

1. The problem font. The Standards Manager will display the font name and the problem.
2. What font you would like to replace that with? Remember you are reading from the template file you created. If you have additional fonts you would like to use simply add that to your template file prior to creating the standards file.
3. The Standards Manager will give you a preview of the changes. Take a look to make sure this is what you need and/or want for your particular design or drawing.
4. Lastly, select fix then close the Standards Manager.

This is a great way to eliminate unwanted text within your drawing file. You also have the ability to change the settings and also mark this as ignored. If you are a CAD Manager you may want to ignore one font for some particular reason and/or client request, overriding your current standard. For Dimensions Styles follow the same procedure as with text to check with your company CAD standards.

Text Styles are just one of the plug-ins that are available with the CAD Standards Manager. The standard checking process uses standards plug-ins, which are applications used to check for specific properties of that topic. Layers, dimension styles, linetypes, and text styles are each checked against the plug-ins you select.

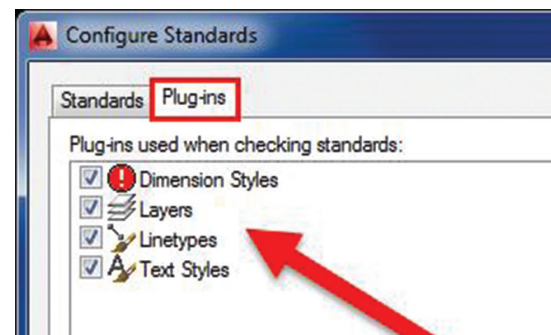


Figure 6: The Plug-ins tab

You can specify which plug-ins to use when checking a drawing for standards violations by checking the box as shown in Figure 6.

## THE LAYER TRANSLATOR

The Layer Translator is not part of the Plug-ins, but a separate button itself. Our company hired a new intern who decided to draw up an access road detail (Figure 8) without consulting the CAD staff on standards. As a CAD Manager when I see all colors "white" and different colors for similar features (i.e., dimensions) it typically means there were some errors in layer control and some objects may even be on layer 0. The Layer Translator is one way to ensure these properties are corrected and quickly.

# AutoCAD 2017

From Autodesk Help, "...if you receive a drawing from a company that does not follow your company's layer standards; you can convert the drawing's layer names and properties to your company's standards. You can map layers in the drawing you are currently working on to different layers in another drawing or standards file, and then convert the current layers using those mappings. If the drawings contain layers of the same name, the Layer Translator can automatically change the properties of the current layers to match those in the other layers."

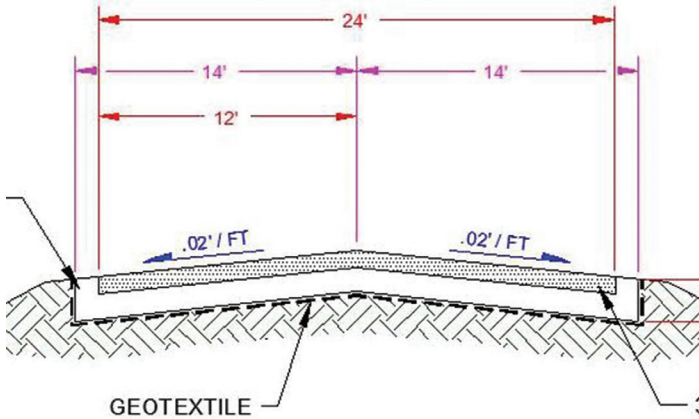


Figure 7: CAD detail violations

Let's take a look at the ribbon and list the standard violations individually, then we will use the layer translator to correct (i.e. translate). I have selected the geotextile line on the map included in Figure 7 and highlighted the three violations in Figure 8 below



Figure 8: The standards violations

- As a CAD Manager I noticed three violations within our file.
1. Incorrect Layer Name. (Our standard is to have a prefix of two letters.)
  2. Color set to "white" and not to "Bylayer." (Bylayer is our standard.)

3. Linetype set independently of the layer. (Bylayer is our standard.)

To solve this problem I opened up one of our company standard detail drawings and checked all the properties and verified it was completed correctly and, more importantly, to our standard. I then saved the CAD file as an AutoCAD Standards file named MY\_COMPANY\_DETAIL.dws. We are saving this to a standards file, which will give us the ability to use again to check other details against our standard.

Next open up the detail drawing the intern created. Move over on the ribbon > Manager tab and this time select Layer Translator (refer to Figure 1). The Layer Translator window will pop up. Select the load button and browse to the standards file that you created. This can be the company detail that you named MY\_COMPANY\_DETAIL.dws. Notice in Figure 9 how your current open drawing layers are shown on the left (Translate From) and your company standard layers on the right (Translate To). We are now ready to check our layer translate settings by selecting the settings button in the lower left portion of the window.

The settings button will control what we want forced onto each layer. This is important as in some instances you may not want one of these items selected.

For more information about the settings on the Layer Translator Settings, see Autodesk Help.

We now are going to map our layers and begin the translation process. There are several steps we need to follow as shown in Figure 10.

1. The Translate From section. Take your time and look at the names and properties of the layer you are translating from and verify this is correct.
2. The Translate To or the target layer. This is the new layer you want in your drawing.
3. Layer translator mappings. In this area you can see the setting that will be converted after the translation is complete.
4. Translate. The button to initiate the translator.

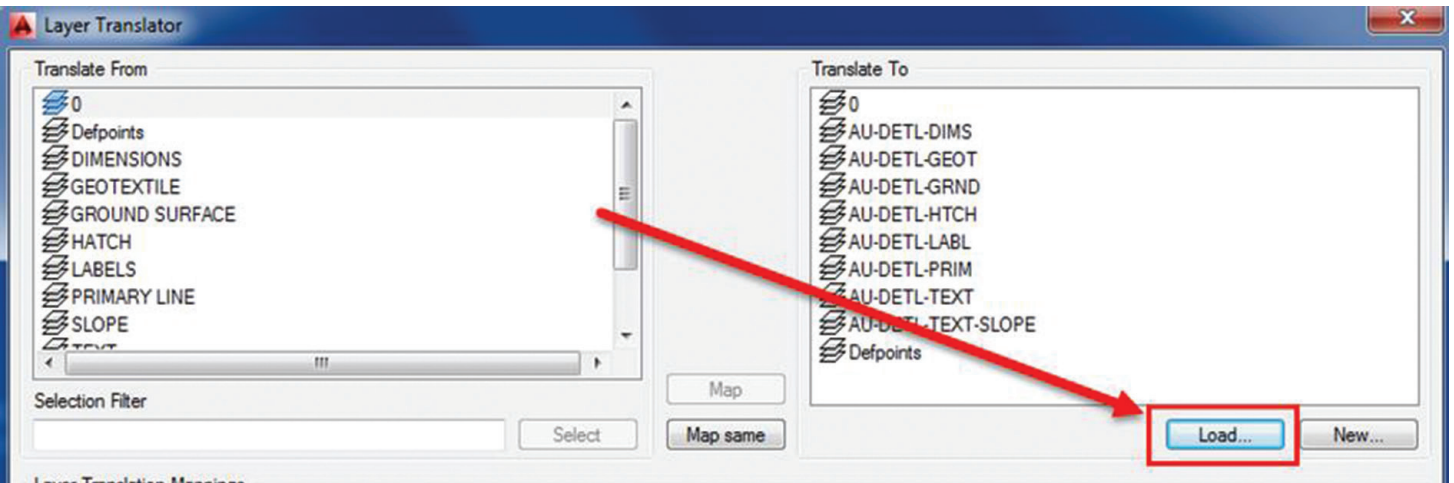


Figure 9: Layer Translate dialog box

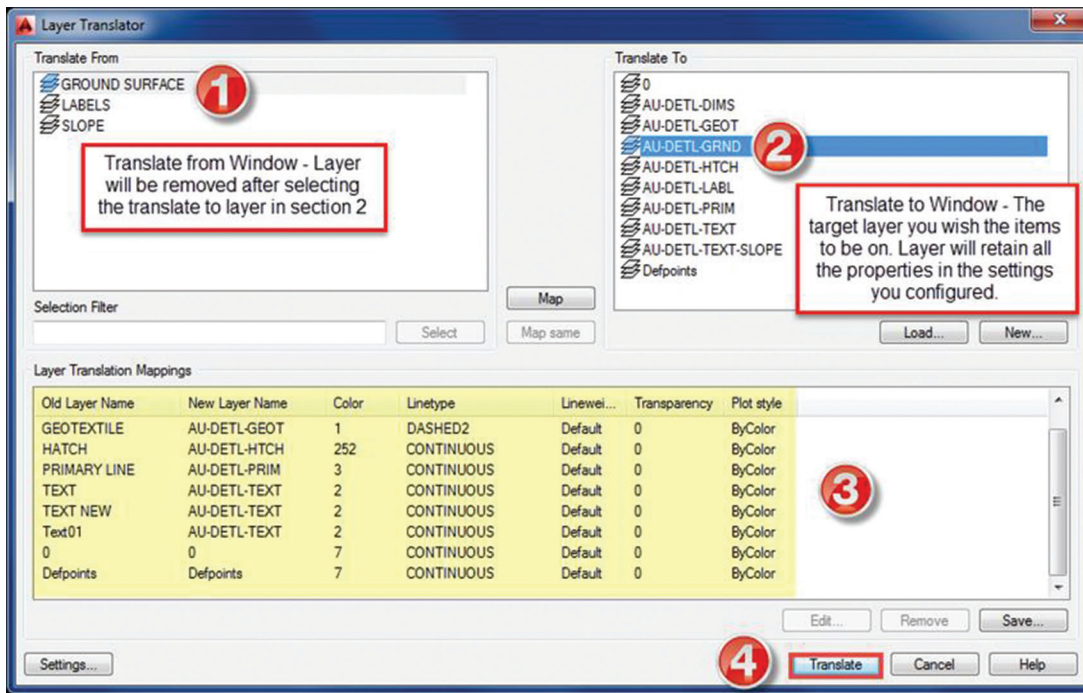


Figure 10: The translating process

Follow the sequence and when complete hit the Translate button in the lower right of the window. Don't worry if you make a mistake—you have the opportunity to save the mapping file and start over.

Your original detail will be changed according to the translations you mapped.

## DON'T FORGET THE VARIABLES

Typically, after I check a file for standards I remove the file from the CAD Standards Manager in a way similar to when I added the file. Go to the CAD Standards Manager panel and select Configure, then select the .dws file you loaded and select the “X” to unload the file.

Of course, you can keep it in there if you want to police all of your files, but depending on your system variable settings you may get a warning that the standards file is missing. There is a system variable named STANDARDVIOLATION, which can either be set to 0, 1, or 2. This variable specifies whether a user is notified of standards violations in the current drawing when a nonstandard object is created or modified. Definitions of each are shown below.

- |   |   |
|---|---|
| 0 | Notification is turned off  |
| 1 | An alert is displayed when a standards violation occurs in the drawing  |
| 2 | An icon is displayed in the status bar tray when you open a file associated with a standards file and when you create or modify nonstandard objects |

You can set this variable in your ACADDOC.LSP or ACAD.LSP to 0 and the operator will not know if you have a standards file loaded. Otherwise, leave the default setting and the user will get a warning if the file cannot be located within the support file search path.

There are many housekeeping items that you can take care of in AutoCAD by using the CAD Standards Manager. Take that survey file, fix the text styles, map the layers, and make it comply with your standard. This tool is awesome for everyone. From the new user to the seasoned veteran, the value of using CAD Standards tools will be proven—especially to CAD Managers like me. With a


little work up front, you can save yourself a lot of time and keep things consistent between design drawings, making you more efficient and productive on your current project task.

HINT: Notice how I preface the layer names for AU in the detail? With a little luck, by courtesy of my friends at Autodesk, you may just see me teaching a class on how to use this important tool at Autodesk University 2016! As I mentioned in the article, the CAD Standards Manager can help you check, correct, and maintain standards within your company. Learn and explore with this tool and see how you can change the way you work to become more productive each and every day you use AutoCAD.



Sam Lucido is a CAD Services Manager with Haley and Aldrich, Inc. He has over 25 years of experience involving design, user support, and customization. Sam is professionally certified in AutoCAD, an Expert Elite Member, and recently completed his 4th year speaking at Autodesk University. He uses his vast knowledge about AutoCAD to help provide support to engineering and design teams with monthly tip sheets and online training. You can find him at CADProTips.com and he can also be reached at lucido1373@gmail.com

# Civil 3D and Third-Party Apps

 Shortly after the debut of AutoCAD® in the early 1980s, we were provided with a programming language that could control AutoCAD. AutoLISP programs have been at the right hand of every AutoCAD Power User. They have helped us complete drawings with tight deadlines faster by streamlining tedious workflows or completely automating various tasks in the software.

For many years, and even still today, we can use LISP routines found in the depths of the Internet that will assist our basic AutoCAD workflows. However, in progressing forward, other software products including AutoCAD vertical products such as Civil 3D® have changed greatly to the point where AutoLISP has become limited in its capabilities. Civil 3D in particular became primarily accessible only to higher level programming languages such as VBA and .NET. These changes have made it more difficult to find custom code to automate tedious workflows. The Autodesk App Store helps to close that gap.

So how can we leverage 3rd Party Apps in Civil 3D? And where can we find them? This article looks at some of the optional add-ons for Civil 3D and the Autodesk App Store.

## AUTODESK APP STORE

The Autodesk App Store debuted in late 2012 aligning with the rest of the software industry. Nearly every large software developer has created an online store—an easy stop for users to find add-ons that can assist them in their tasks. It makes perfect sense for Autodesk to do the same and assist in centralizing a location for software add-ins. You can find the app store at <https://apps.autodesk.com>.

### Product Stores

Revit
AutoCAD
Maya
Inventor
Fusion 360
3ds Max
Alias
AutoCAD Architecture
AutoCAD Civil 3D
AutoCAD Electrical
AutoCAD Mechanical
AutoCAD MEP
AutoCAD Plant 3D
AutoCAD eescad
Inventor Publisher
Navisworks
Simulation
Vault
Autodesk Advance Steel

**Apps for Many Products** – The App Store provides a portal for many different Autodesk products and may not be limited to the list shown below in the future. Clicking on one of these links will take you directly to apps that work within that specified software. The AutoCAD and Civil 3D sides of the store are two that contain the most apps.

**Instant Satisfaction** – The App Store makes it simple to find the tool you need and to get it installed quickly so that you can focus on your deadline. Apps found on the store are all held to a similar package format and review by Autodesk, an MSI file that installs to an Autodesk directory setup for apps, a ribbon CUIx button or tab, and a help document. Most of the apps you find on the store can all be installed in a matter of minutes and are relatively easy to use and implement on a project.

**Purchasing** – When purchasing apps on the App Store, it's important to be aware of a few items:

- ♦ **Autodesk Account** – You must have an Autodesk Account set up and be signed in to make a purchase. With that being said, it's also important to note that any apps purchased with that account stay with the account. Therefore, company procurement personnel will find it beneficial if the apps are purchased using an Autodesk Account tied to the company versus the individual. This way apps can stay with the company.
- ♦ **Pop Up Blockers** – Be aware that upon selecting the Buy Now button, a second page will appear to complete the purchase. If nothing appears, it's likely being blocked by a pop up.
- ♦ **Payments** – Payment methods are selected by the app developer and are either PayPal or BlueSnap and offer a secure method of accepting payments with major credit cards.

**App Reviews** – One of the biggest benefits of the App Store is the ability for users to rate and comment on apps. I am usually reluctant to purchase something when I am unclear of what it could actually do for me, so these reviews can help tremendously. Seeing an app with 5 stars and many great comments has drawn my attention countless times to see if it's something that would benefit my workflows.

**Connect and Easily Contact Developers** – The App Store can also assist in helping you find a developer who might be able to write that small program you had in mind. When you are on an App's page, the right side under the Buy Now button lists out the app information as well as the developer information. Feel free to send an email and ask the developer any questions you might have.

## THIRD-PARTY APP SPOTLIGHT – RED TRANSIT CONSULTANTS, LLC

Now that we know where to find the apps, let's take a look at a few examples of Civil 3D Apps that can increase your productivity. For all of the examples here, you can find the apps on the Autodesk App Store by searching for the name. More information and videos of the apps in action are available on the App Store.



**Red Transit**  
CONSULTANTS, LLC

**Slope Across Pipes** – Tired of modifying pipe elevations by clicking on each pipe and going to pipe properties? This app provides tools for quickly modifying pipe elevations and slopes. The app supports modification of elevations by centerline, crown, or invert while offering a command for single pipes and a command for handling multiple pipes at once.

★★★★★ **The biggest move forward in Pipe Networks!!!**

The Pipe Slope Single command allows for quickly setting the elevations and slope of a single pipe. The command allows for selecting pipes/structures in plan view or pipes/structures in profile view and offers two modes, by slope and by elevations. With mode by slope, select the pipe in plan or profile view by the desired end of the pipe to modify the invert and apply a slope holding the selected end and invert of the pipe. With mode by elevations, select a pipe in plan or profile view by a desired end and the app will prompt for elevations for either end of the pipe and set the slope based on those elevations. The command also provides the ability to select another pipe and inherit its elevation to be used in the modified pipe.

The Pipe Slope Multiple command allows for quickly setting the slope of a number of pipes within a common pipe network and applying pipe drop across each structure. The command allows for selecting pipes/structures in plan view or pipes/structures in profile view and offers two modes, by slope and by elevations. When selecting parts in profile view, the command also provides the ability to extract the selected point elevation from the profile to apply to the pipe network. For both modes, the command does not care if the upstream or downstream end is selected, nor does it care if the start and end points of the pipes are in the same configuration throughout.

```
Command:
RTCL_PIPESLOPEMULTIPLE
Select Mode [Slope/Elevations/seTtings] <Slope>: E
Select start structure or pipe:
Select end structure or pipe:
Total pipe length in run: 902.2934
Enter start Invert elevation [Pipe] <89.6>:
89.6 entered for start Invert elevation...
Enter end Invert elevation [Pipe] <87.94>:
87.94 entered for end Invert elevation...
Enter pipe drop across structures [0] <0>:
6 pipe slopes updated to -0.184% and 6 structures adjusted to pipe inverts...
```

**Pipe Network Productivity Tools** – This set of tools was initially built upon the Slope Across Pipes app, and includes it within. The app offers 14+ tools for various tedious tasks dealing with Civil 3D Pipe Networks.

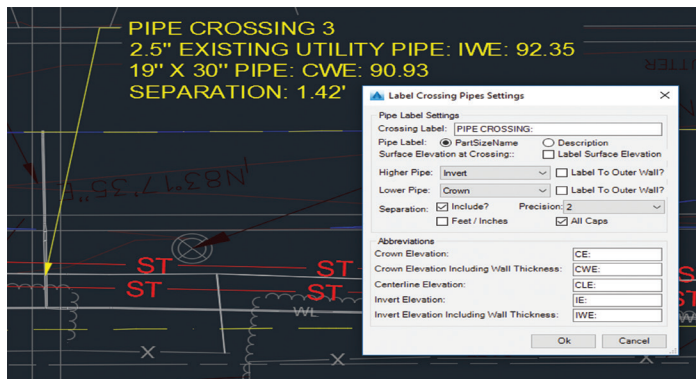
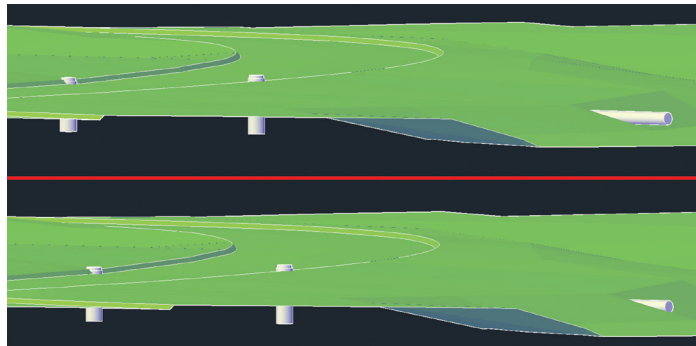
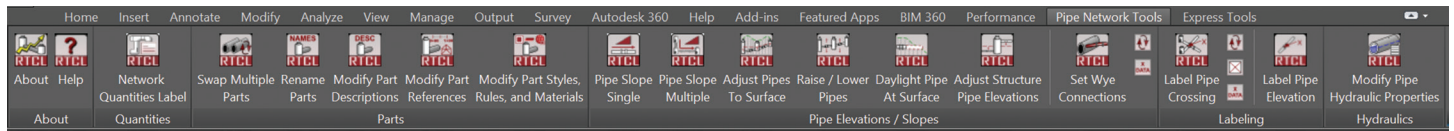
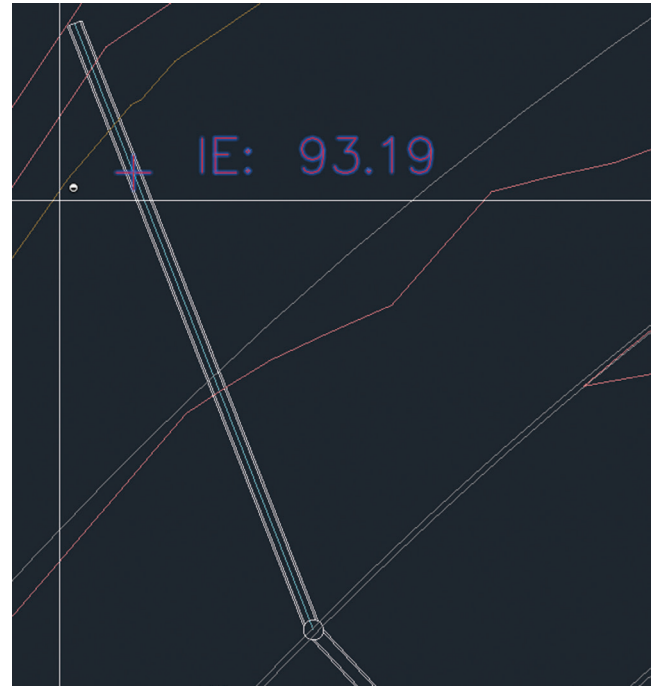
# AutoCAD Civil 3D 2017

★★★★★ Great time saving app

Many of the commands offer three selection methods to obtain your collection of parts to modify: Network – All Pipes and Structures; Multiple – Randomly choose pipes and structures as desired; Path – Select a start manhole/pipe and end manhole/pipe and it will collect all pipes and structures in between. Additionally, these commands offer the ability to filter that selection by the PartSizeName, making it incredibly simple to select all parts of a specific size within a network.

With the above selection process, you can use the follow commands to ease the design process with Pipe Networks:

- + Swap Multiple Parts
- + Rename Parts
- + Modify Part Descriptions
- + Modify Part References (Alignments and Surfaces)
- + Modify Pipe Hydraulic Properties
- + Modify Pipe Elevations with Slope Across Pipes, or adjust the pipes to a specific distance above/below a surface



Additional tools offered in the app are:

**Daylight Pipe to Surface** – easily and automatically adjust a pipe end to the point where daylight on a surface based on its current elevations and slope.

**Wye Connections** with dynamic update button

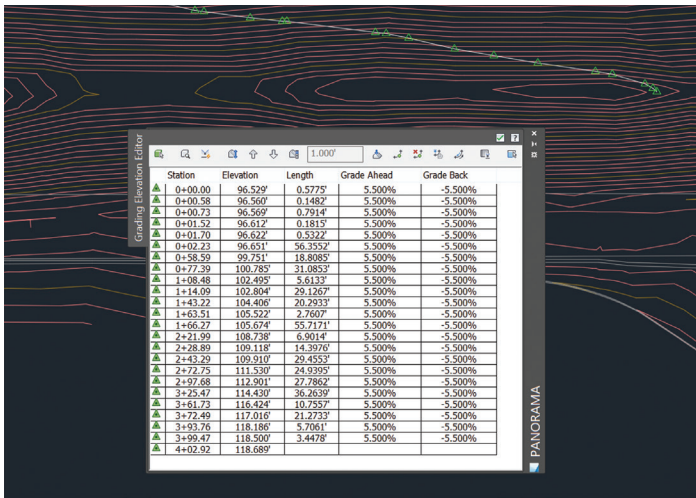
**Label Pipe Crossing** with dynamic update button

**Label Pipe Elevation** – computing the elevation of a pipe at any point along it.

**Grade Slope Along Surface** – The Civil 3D waterdrop tool can be very helpful by drawing a 3D polyline across a surface in the direction that water would flow, but have you ever needed to plot a 3D polyline following the exact slope/grade across a surface? Perhaps you're trying to grade in an access road into a pond and it needs to be no steeper than 8 percent, or you need to grade in a diversion berm on the side of a landfill that needs to have a grade no steeper than 2 percent. This app can help you with that task.

★★★★★ Time Saver!!!

Simply by choosing a start location and the grade/slope you desire to plot, this tool will utilize the triangles in the surface and calculate where the exact grade entered crosses the triangle (if possible), and then add the necessary points to a 3D polyline, and move on to the next neighboring triangle. The app repeats the process until a solution can no longer be found, resulting in a 3D polyline that follows your surface at the exact horizontal and vertical positioning that meets the desired grade/slope.



★★★★★ Great App!

This app allows you to export surface spot elevation labels, contour labels, and slope labels to a text file. Then you can import the text file and recreate the labels on another surface. The app also maintains drag state positions for spot elevations, all types of contour labels, and both one point and two-point slope labels, while also maintaining any style settings and marker style settings.

## CONCLUSION

If you've already been purchasing/downloading apps from the App Store – thank you! If you have not looked into purchasing apps from the App Store, hopefully this article will encourage you to take a look. There are some great ideas/tools out there that can assist in your daily workflows.

If you have any ideas or suggestions on my existing apps or if you have new app ideas that you'd like to see implemented, feel free to send over an email. I'd love to hear from you!

**Import/Export Surface Analysis** – Do you perform frequent surface analyses? Do you ever wish you could create more standardized analyses settings? Import/Export Surface Analysis can assist in doing this.

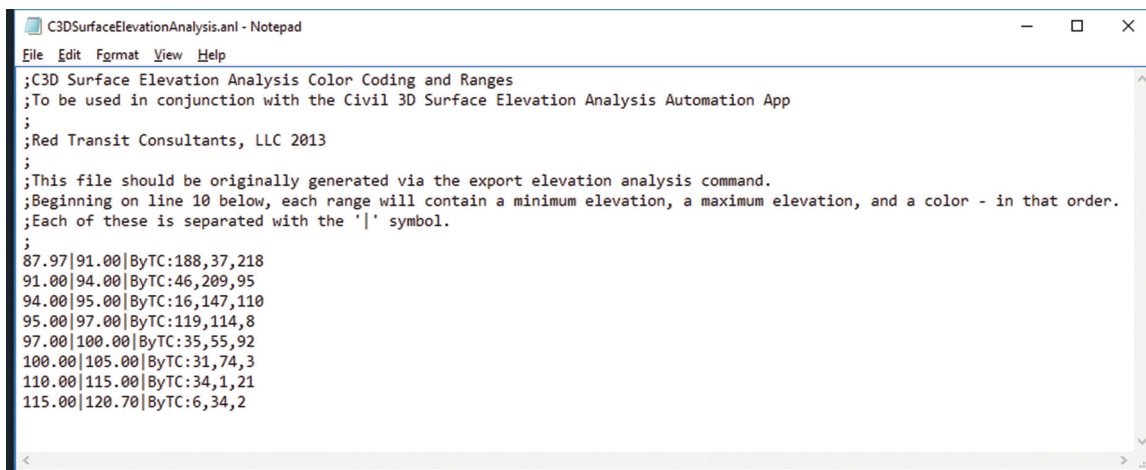
★★★★★ Helps to stop duplicate tasks

The app allows you to save the applied analysis settings to an exported ANL file (basically a text file) and allows for reimporting the file and applying to another surface as opposed to clicking on the colors/linetypes/lineweights for each range in an analysis. Additionally, the app is smart enough to tell you if the current surface style is capable of displaying the type of analysis you are attempting to apply. It has the ability to search your drawing for a surface style that is capable of displaying the analysis and/or modify the current surface style to the correct settings for displaying the analysis. The app will also handle true colors.

**Import/Export Surface Labels** – Prior to Civil 3D 2016, you were not able to modify a surface label's reference surface. The software now allows for this, but it still does not solve the issue of labeling a surface in the same manner as another. Perhaps you are labeling a final surface and a subsurface—both surfaces exist in separate drawing files.



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# Third-Party Options



**I** can't imagine Autodesk would have been so successful without giving users the ability to work within their software to develop their own tools and applications. They had the foresight to essentially give users the ability to create "apps" before many ever considered the concept. It started with small additions to their software such as giving us the ability to run AutoLISP through the AutoCAD command line, providing VB support, until eventually they massed micro-nation-sized populations of employees to mold their applications so users can use create almost anything we want. In the end, organizations and people across the world have used that ability to develop their own tools that benefit thousands of people around the globe. In this article, I'd like to present a few of those tools, and with luck, you'll find a third-party application you might find useful, or one that will spark an idea for you to create your own. First though, I'd like to mention Autodesk's new forum for third-party application development.

## THE FORGE

If you've not heard of the Forge yet, you will. For the next year or two you'll be hearing Autodesk talk about it. Somewhere in the armies of Autodesk employees are teams of people dedicated to providing a complete solution, or "platform" for developers to work with their cloud services, APIs, and SDKs to take part in "the future of making things." I promise this won't be the last time you hear that term. In fact, I read an article somewhere where it's already abbreviated ("TFMT"). Autodesk isn't all talk, though. Despite the buzzwords, acronyms, and promises, Autodesk has invested \$100 million into

the project (as listed on their website <http://forge.autodesk.com>). Expect to see 3ds Max® content generated, shared, modified, and manipulated in ways you might not have imagined before. Now, let's talk about a few smaller steps for mankind that might help right now.

## AUTOMODELLER PRO BY CODE-ARTISTS

Automodeller Pro started from a much lighter program and grew to be an incredibly powerful product. I describe it as a real-time, multi-threaded geometry painter that gives users the power to populate massive and impressive scenes in a matter of seconds. Users can texture their geometry with a group of meshes to create very high resolution and interesting content. All we have to do is select a source to paint with and a target. With a variety of options, we can generate complex scenes like that shown in Figure 1 in just a few minutes. A few of the many options for painting geometry are listed below.

1. Entire Object – Choose to paint source object over your entire object.
2. Face – Limit painting mesh objects to a single face.
3. Only Borders – Excludes the faces, allowing users to generate complex and interesting frames.
4. All but Borders – Useful to coincide with custom columns, pilasters, or whatever can be imagined.
5. Offsets – Control randomization and offsets of painted mesh to ensure a unique look every time.



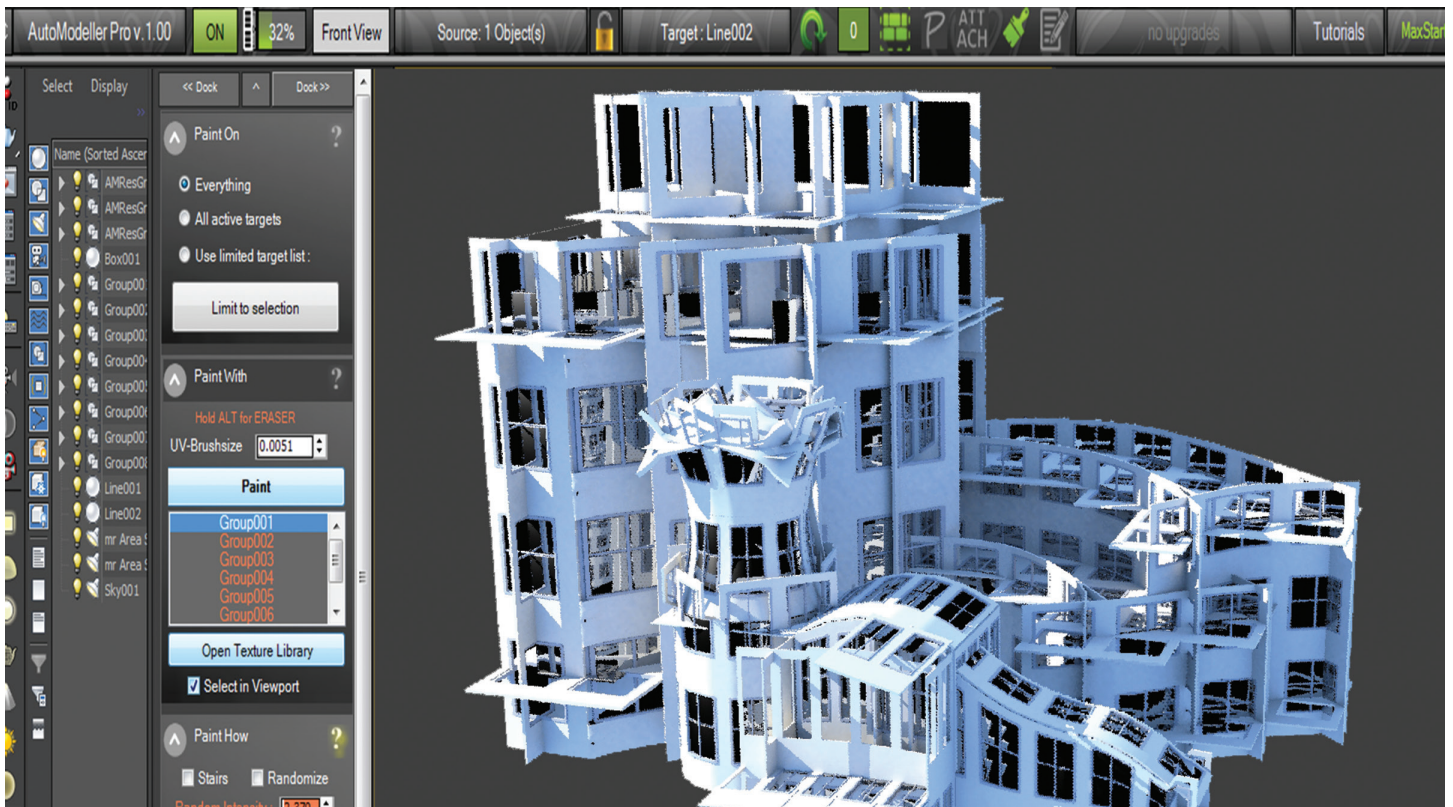


Figure 1: Automodeller Pro example

## DEBRIS MAKER BY AARON DABELOW

If you're an expert, Aaron Dabelow might be a person you'd go to if you had a question about 3ds Max. His experience in production with 3D and visual effects, combined with the ability to program, makes his tool "Debris Maker" effectively one of the most useful tools I've found. Debris Maker is a procedural geometry generation tool to help populate scenes with debris common in many environments. The tool includes:

1. Bricks – Choose from three different brick styles and auto stack them to form a wall or place them one brick at a time.
2. Corrugated Metal – Create sheets of metal with crease control and option to add holes.
3. Crystals – Grow clusters of crystals with options to smooth or sharpen edges.
4. Gemstones – Determine irregularity, facets, and chamfer edges to create gemstones.
5. Grass – Choose switch, indian, yard, wheat, or bulrush with options including height, bend, and more.
6. Gravel – Generate gravel or stones.
7. Leaves – Define resolution, crease amount,

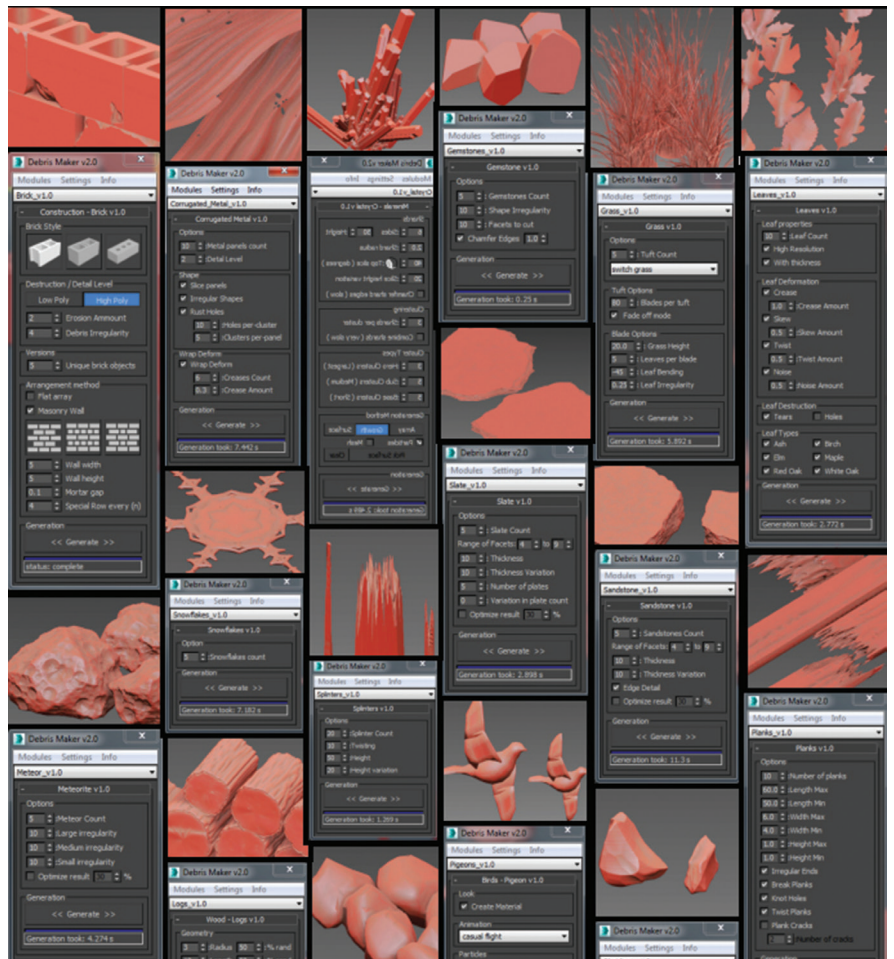


Figure 2: Debris Maker examples

# 3ds Max 2017

skew, twist and types including ash, elm, oak, birch, maple, and white oak.

8. Logs – Generate stacked or unstacked logs with radius, length, deformation control, and more.

9. Meteorite – Select count, irregularity value, and optimization.

10. Obsidian – Control count, chip amount, banding amount, and optimization to generate the stones.

11. Pigeons – Automatic generation of animated pigeons with casual or fast flight using the particle flow system.

12. Planks – Options to break, add knots, twist, cracks, and more.

13. Riverstone – Add pit amount and size, banding, and more.

14. Sandstone – Choose count, thickness, thickness variation, and edge detail.

15. Shrapnel – Options to choose noise scale, count, and panel resolution.

16. Slate – Similar to sandstone with sharper edges.

17. Snowflake – Only option is to define the amount of flakes wanted.

18. Splinters – Splintered branches with twist, height, variation, and count options.

19. Twigs – Generate branch and twigs with options such as twisting, warping, branching, and more.

## LUCID BY EPHERE

Lucid is a deep-integrated complete physics system using the power of Nvidia graphics card (required) to generate physics simulations quickly. There's nearly no limit to what Lucid can simulate. Some of the basic simulations are shown in in Figure 3.

1. Water – I'd argue that water is probably the most important object a physics software should simulate, and Lucid handles it well.

2. Foam – Foam's unique structure is difficult to simulate. Lucid makes it simple.

3. Rope – Working with splines and nurbs, Lucid's curve physics helps create believable rope, chain, or cylindrical object physics easily.

4. Softbodies – Lucid simulates softbody interaction such as a sponge, Jello, and more, quickly.

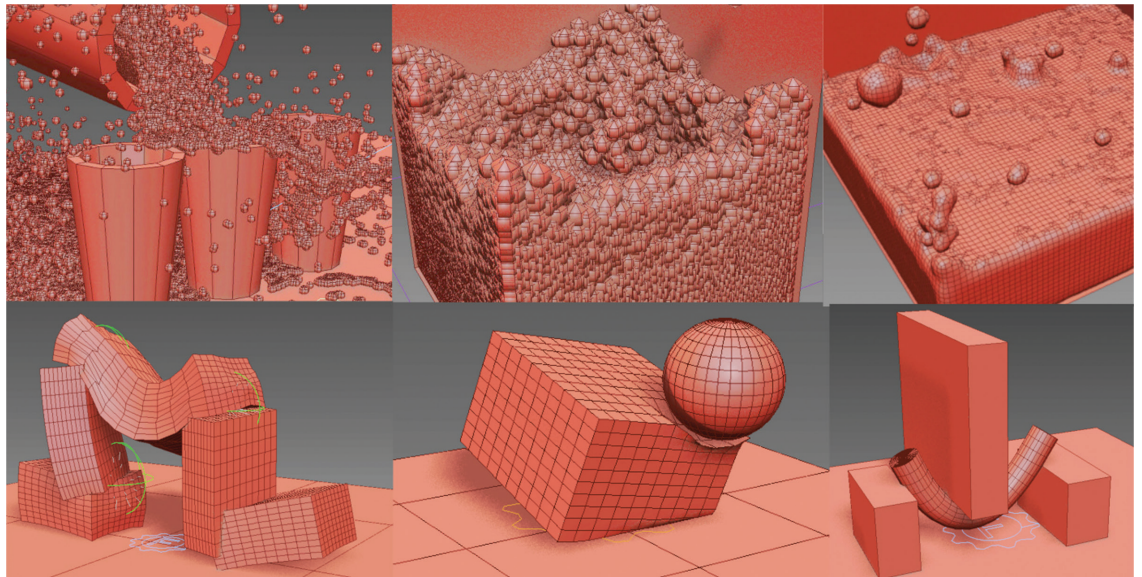


Figure 3: Lucid examples

5. Denting – Using a plastic creep parameter, Lucid can create believable dents in rigid bodies.

6. Bending – Flexing and bending of objects with persistent deformation.

7. Rain – Puddle and rain drop simulations made easy.

8. Cloth Tearing – A personal favorite. Stress-based tearing of Lucid cloth.

9. Magma – When a substance thicker than water is required, magma is a great substitution.

10. Gas – The ability to mimic gas by altering some of the fluid parameters shows how Lucid can be used in creative ways.

The list goes on, but if you're like me you'll find Lucid a great alternative for your scene development and simulations.

## CONCLUSION

The ability to manipulate Autodesk software is perhaps its greatest attribute, and Autodesk is doubling down on the services it provides to do just that. Look forward to finding great new third-party applications to help with your own production and workflow. If you happen to be a developer, I'll look forward to using them myself.



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

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### IDEATE EXPLORER 2017

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



The Ideate Explorer for Autodesk® Revit® tool gives you an easy, intuitive, and profound way to search, filter, quantify, and select elements in a Revit model. When having the ability to tie up interrelationships between 100,000+ building elements can make or break your workday, you need one simple, powerful Revit add-on to help you explore and manage your Revit building information model.

Ideate Explorer for Revit from Ideate, Inc. empowers you to:

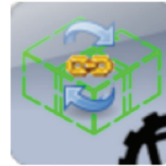
- Discover that you have 101 instances of the same DWG embedded and yet invisible in your Revit file
- Clean-up rogue line styles
- Organize and review your items by workset, phase, or level
- Easily browse, find, and edit instances of revisions, grids, reference planes, color fills, annotation, and other items not covered within the project browser
- Make a selection set based on parameter values
- View and filter Sheets, Views, Schedules, and Legends without disrupting the Project Browser setup

Ideate Explorer is essential to quality control. Audit your Revit models and keep them trouble-free.

Note: This comes as a Trial download, but does provide a full-functioning version of the software. After the trial expires, the software can be used in Demo mode, which only gives access to information about the current selection set.

### SCOPE BOX SYNCHRONIZER

<http://bit.ly/1soX3Mj>



The application is able to import all or selected Scope Boxes from a linked Autodesk® Revit® project into your project, as well as checking if yours and the linked Scope Boxes are the same. If they are different, you're able to synchronize your Scope Boxes to match those in the linked project.

This is similar to the built-in Copy/Monitor functionality, but for Scope Boxes.

### mOculus.io

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



mOculus.io brings Maya Viewport 2.0 content to your Oculus Rift. Attached to a normal Maya StereoCamera, the Oculus Rift can be used to see from its view. The positional and rotational tracking from the Oculus Rift is mapped to your Maya StereoCamera as live input.

Leave the 2D screen and immerse right into your current Maya scene with the stereoscopic Viewport 2.0 VR in your Oculus Rift. The intuitive way of working directly in VR helps with modeling, texturing, lighting, shading, and animation.

You can use the software for presentations, previs, set design, animation, camera work including live stereoscopic camera adjustments, and recording.

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

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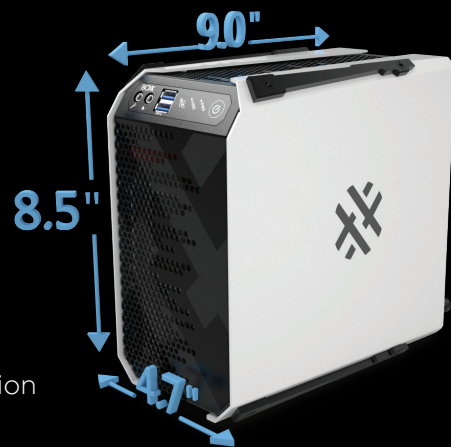
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