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AUGIWorld

The Official Publication of Autodesk User Group International

November 2015

Exceptional Education: Options for Students and Trainers

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- Autodesk's Fusion 360 and Beyond
- The Digital Artist
- Parametric Constraints Primer



S PROJECT SOANE

A worldwide BIM crowdsourcing effort to virtually reconstruct Sir John Soane's treasured Bank of England.



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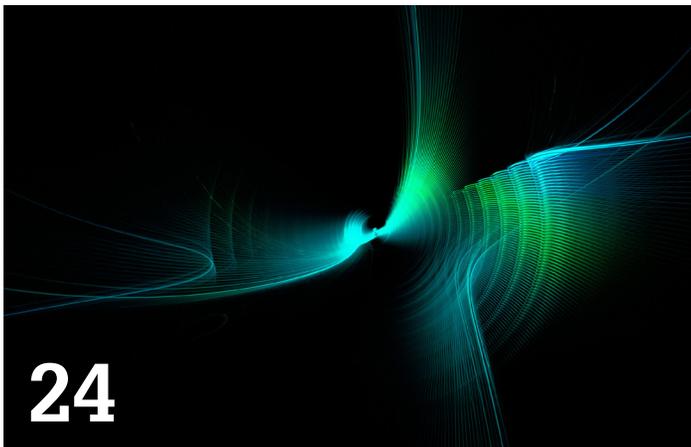
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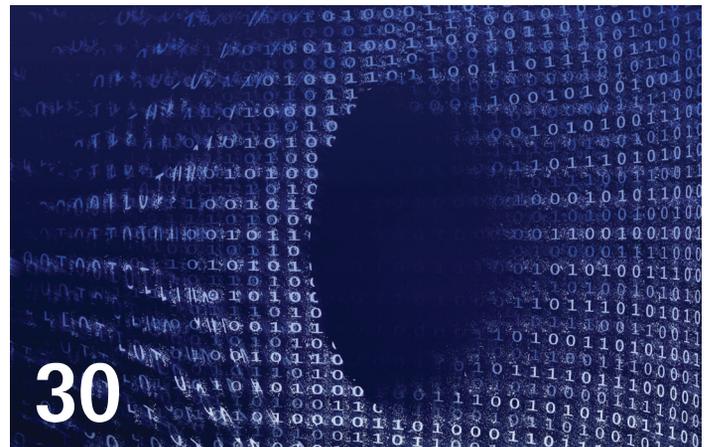


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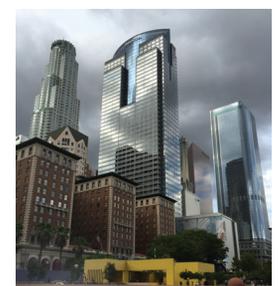


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 For more, please visit @cadbimmanager on Instagram

Letter from the President



ELECTION TIME

No, I'm not referring to the ever-increasing media coverage of the upcoming U.S. Presidential election. Rather, it is that time of year when AUGI holds elections for the Board of Directors. By the time you read this, we should have a good idea of who will be the candidates.

While it is too early in the process to give you a preview of the candidates, I wanted to write to you about the process.

We form a committee that searches for potential candidates and seeks nominations coming from the membership. This is a serious process that requires care and attention to the qualifications of the potential nominees. There are times where it feels like finding enough nominees will not happen and then the opposite occurs—we find a plethora of folks. (An aside: I cannot use the word “plethora” without thinking of *The Three Amigos*: “Would you say I have a plethora of piñatas?”)

Once the committee has a vetted slate of nominees they present the group to the board of directors for approval. I am proud that the board of directors has always handled this stage very responsibly.

The board of directors presents the candidates to you and then voting opens, typically at Autodesk University.

But the work for the committee is not done when they present the list of nominees to the board. The committee also makes sure that the forum for the candidates is active so that you may ask the candidates the questions that are important to you. Take advantage of the forum so you can get to know each candidate.

The committee also makes sure the voting system is populated and ready for the opening of the voting.

All of this work would be for naught without your involvement. Yes, you are the most crucial part of the process. It is your vote that makes all the difference. You tell AUGI which candidate you believe would be best to help take the organization forward. It is an important decision.

There are all sorts of reasons for voting for a specific candidate. The most important consideration, from my perspective, is that you should want someone you feel will professionally represent the organization to other professional organizations and companies. When someone acts professionally they have an ethic that makes them truly useful to the organization.

I hope that you appreciated this glimpse into the process leading up to the vote for the board of directors.

R. Robert Bell
AUGI President

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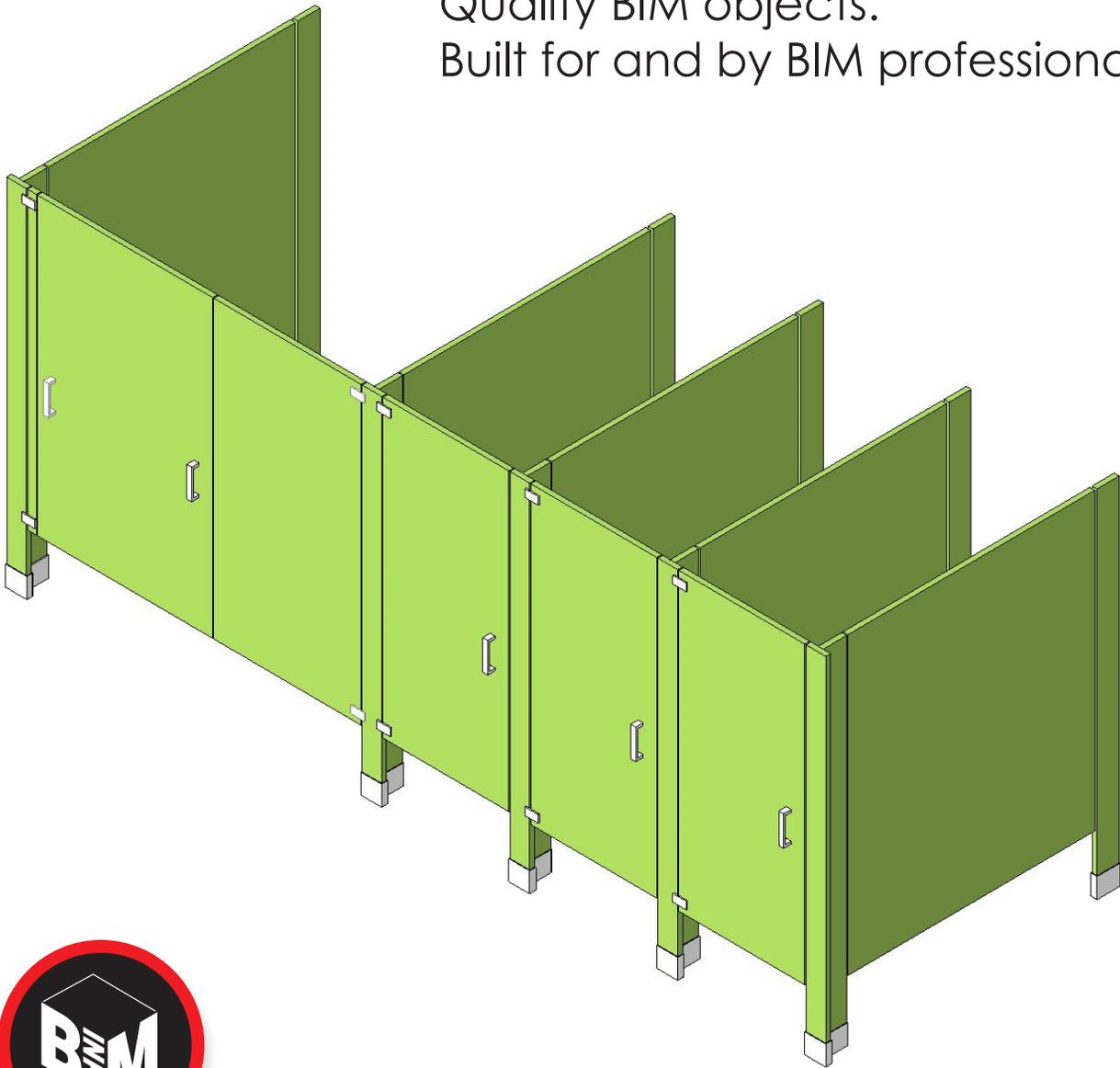
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Autodesk Design Academy Puts Education First



➔ **A**t this time last year, in this same column, I interviewed Don Carlson, Director of Autodesk Education. Since that time the expansion of Autodesk offerings to the educational arena has progressed. I returned to their team and interviewed Jaime Perkins, Senior Manager, Learning Content for Autodesk Education.

Mark: Jaime, thanks for taking some time with me. Last year we discussed the new offerings and I wanted to give our readers an update. For those who might not know, what is Autodesk Education?

Jaime: Technology is changing how people design and make things and Autodesk is creating the next generation of tools for the next generation of designers and engineers. Last year we announced free access to our 3D design software and creativity applications to schools, educators, and students around the globe, yet we don't just see our role in education as providers of software. We are helping to open doors for young talent, passionate educators, and academic institutions to connect to the tools, influencers, and opportunities to advance their skills, better their communities, and advance our industries.

Mark: What's new in the last year? What offerings are you providing for students, educators, and educational institutions?

Jaime: As an extension of our free software offering, in May we launched the Autodesk Design Academy for students and educators. The Design Academy helps students and educators unlock their creativity by granting free access to projects and courses that introduce students to new technologies and practices in 3D design.

Each Design Academy project asks students to use design thinking and software skills to make innovative designs that have an impact on people's lives.

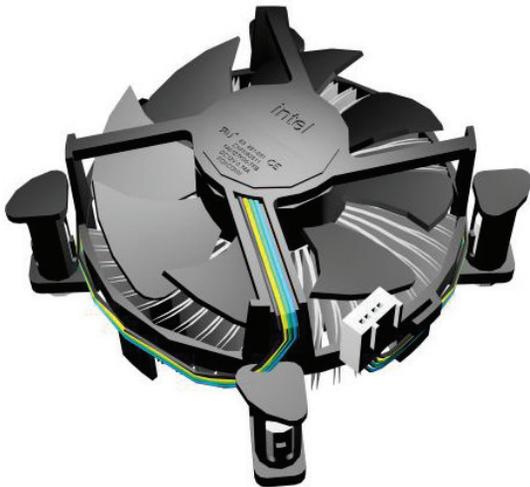
This June, we also made Design Academy available in iTunes U, the world's largest catalog of free education content. The Apple iTunes U platform is completely mobile across the iOS ecosystem, which supports a varied and diverse set of use scenarios to address online, hybrid, blended, and flip classroom models, as well as the diversity we see in teaching methods, devices, and environments in many countries.

Mark: You mentioned the announcement of free access to academic licenses. What software can a student tap into?

Jaime: Autodesk offers free access to all our software for students, educators, and educational institutions worldwide. Providing the next generation with tools and resources they can use for academic and career success supports Autodesk's vision to help people imagine, design, and create a better world. Providing free access to software helps strengthen design and engineering-related disciplines and helps students learn skills they will use in industry. We love seeing students use their talents to win design challenges, help the community, and ultimately land their dream job, and we are committed to helping them on this journey.

Mark: After reviewing last year's comments I came across this quote from Don... "Putting real-world tools into the hands of next gen talent so they can solve real-world design problems." Can you give us some examples of how students have used your tools?

Jaime: On Design Academy we have a Portfolios section where students can post their 3D design work, share the process they used in creating their designs, and follow their peers. We also launched a program called Design for Autodesk, where students create models in Fusion 360 and post them to the Fusion 360 gallery. To date, thousands of Fusion models have been submitted by students in the US and select European countries as part of the program. Students have created designs such as food processors, ejection seats, and prosthetic arms. On Design Academy we also publish success stories with examples of how students have used our software.



CPU COOLER

by Sangho Yun



AFFORDABLE PROSTHETIC ARM

by Jose Ortiz

Mark: What do you have that might help educators with the learning process for their students?

Jaime: Design Academy has more than 100 projects and courses that cover a wide range of industry fields using a variety of



COMPOUND HANGER

by Brenton Hilbig

Autodesk software. Every piece of curriculum is structured around project-based learning to teach students to use design thinking to solve real world challenges. All content is aligned to academic standards, authored by educators and designers, and comes with an instructor manual, student manual, datasets, and software tutorials to give educators everything they need to teach 3D design.

By teaching students skills like 3D modeling and 3D animation using professional Autodesk products, we are giving both students and educators a real advantage, creating a generation that's both college- and career-ready.

Mark: Thanks for your time, Jaime. Our readers in the education field and those who come in contact with students can help by pointing others to your Community and your offerings. Design Academy has almost 12,000 members and growing. It has curriculum, portfolios, product how-to videos, and an inspiration section. We appreciate your efforts to help students and teachers launch into design.



Mark Kiker has more than 25 years of hands-on experience with technology. He is fully versed in every area of management from deployment planning, installation, and configuration to training and strategic planning. As an internationally known speaker and writer, he is a returning speaker at Autodesk University since 1996. Mark is currently serving as Director of IT for SIATech, a non-profit public charter high school focused on dropout recovery. He maintains two blog sites, www.caddmanager.com and www.bimmanager.com.

The New and Improved Revit Hand: Ultimate Learning + Every Revit Tip, Trick, Technique & Workaround (Known or Unknown)





In this article, you will learn “how to learn” Autodesk® Revit® and pick up EVERY Revit Tip, Trick, Technique & Workaround (known and unknown)—including future ones. Yeah, I know what I just wrote and I am confident of the statement!

These tips will provide extremely valuable tools for working with Revit and even Dynamo; as well as for personal and professional growth with the hope that you become the best possible you!

HOW DO I LEARN REVIT?

While one answer is:

“If you are a professional and are asking this question you should consider a career outside of AEC.”

A better answer is:

“Start with the Tutorials provided directly inside of Revit. Start with the first one and do them all until you master them.”

If you read the rest of this article you will even find out how to find them, if that is now a question as well.

Got it?

- Do the tutorials!
- Do the tutorials to learn (or start to learn) Revit

Spoon-Feeding Enabler Alert:

<http://knowledge.autodesk.com/support/revit-products/getting-started>

Next, add to the self-learning (that is mandatory IMHO) classes from local schools, resellers, Autodesk directly (if you can swing the \$). One can use online videos, etc., and if you are really serious about wanting to learn Revit (or Dynamo) you can utilize the tips herein and get on it all (free and paid)!

OK, so you want or need Revit tips, tricks, and techniques, but how about Revit workarounds and workflows? Or are you simply looking for ways to produce your work (more) efficiently, or even correctly? Well, so do I... read on ;)

Since there is so much out there already, I am going to focus on ways to get tips, tricks, techniques, and workarounds that for some are obvious, yet are unused or under-used by far too many Revit users.

The best assets to get answers, tips, tricks, techniques, and workarounds:

- You and Your brain
- Your Computer (AKA: Others’ Archived Brains)
- Revit Mentor (AKA: Others’ Live brains)

TIP #1: SELF HELP: GET IT/GIVE IT

Do not ask someone before trying, re-trying, then re-trying differently yourself!

That is a rule for everyone who needs an answer to a question, whether in Revit or elsewhere.

This is not tongue in cheek; rather, this is perhaps the best way to learn. There is no magic wand out there—answers come from creative thinking and trying repeatedly, failing, and ultimately persevering.

- Approach obstacles as opportunities and you will better yourself and others.
- Give yourself a chance to figure it out; you can come up with the answer yourself most of the time and that is what life is all about.
- Take a new approach and lose preconceived notions of what you believe to be the possibilities.
- Look at the Properties dialogs. Your answer may be right in front of you.

Tip 1a

Create Answers Yourself (and grow your knowledge in meaningful, fulfilling ways). By following three simple concepts and eight potential steps, you will most assuredly either create or find the answers you are looking for.

Concept: Change Your Perspective

A. Get up, do 10 cleansing breaths, rethink, try again

- No hippie/zen joke here; this is great for your brain and outlook, at the very least!

B. Take a break, walk around, rethink, try again

- A few minute break can work to clear your head, allowing an answer to formulate, as well as giving you a good stretch.

C. Describe your issue to someone who knows nothing about it

- Ask one who knows nothing of the software or process that is giving you problems. Doing this will require you to explain it in a new way and that reframing will allow you to hear it anew and should open you up to a realization of the solution(s). (This works for me most of the time!)

Concept: F1

A. The F1/HELP button is your first line of defense. That said, the answer is not always there. But try this first!

Revit Architecture

Concept: Internet Search

Someone has most likely already had and solved an issue just like yours and the Internet will provide you with myriad answers. Don't forget to check different viewpoints!

A. Did someone say Google (*or any other good search engine*)? *And, no, I won't give you a link for those ;)*

- ✦ Describe your question specifically and briefly with the word 'Revit' in it.

B. RevitForum: <http://revitforum.org/>

C. AUGI Forums: <http://forums.augi.com/>

C. The Blogosphere

- ✦ There are so many Revit/BIM blogs out there your head may spin. Most all of us who write provide links to the blogs of others, so you can easily create a list that fills your needs.
- ✦ A good place to start: <http://c3consulting.com.au/links/bim-blogs.html>
 - ✦ Note that I have no professional attachment with these folks, I am just spreading some love.
 - ✦ Even though my blog is at the end of their list :-), it's a good start for you!

Now, the concepts above will get you the answer you need 99 percent (unscientifically reached figure) of the time. For the other 1 percent, move on to Tip 1b.

Tip 1b

Ask a Colleague or Expert

Ultimately, there are no bad questions; just be sure you have exhausted the concepts above so you don't appear as a lazy or incapable professional. To have tried to help yourself before asking others is actually a parameter that will help you as a person in many ways! The people you are asking are busy as well and initiative is usually rewarded, so let them know that you tried Help and the Internet, etc. before posing the issue to them. I can almost guarantee that you will be respected more and more.

Be a problem solver yourself, to whatever degree you can. Even though there are no bad questions, there ARE questions that are too numerous or repetitive. Most of these are so easy to figure out without involving others that you may create an unwanted reputation as a lazy professional. And as you may know, laziness is a good cure for long-term, gainful employment and professional advancement.

TIP #2: LEVERAGE SOCIAL MEDIA

LinkedIn, Twitter, Foursquare, YouTube, etc. are some of the sites that every Revit and BIM person needs to exploit. Why is social media a good tip? Because you can find people and solutions faster than you can say...

If you do not have an account for LinkedIn, Twitter, and Foursquare yet, you desperately need to get on board. If you have them, use them.

For instance, at Autodesk University the use of Swarm and/or Foursquare combined with Twitter has proven an overwhelmingly successful method for people from around the world to meet more easily (and more often) than ever before by simply checking into a location and engaging on Twitter, Instagram, etc. Folks became immediately visible to all of our digital (and real!) friends and followers, making meetings happen, a lot! Now with Periscope, who knows what fun will be shared... oh, and some learning, too.

This is of main importance at places like RTCEUR and at Autodesk University—not simply for the socializing aspects, but also for spontaneous working and brainstorming sessions that sprout up. This provides value well beyond the standard fare and many a Revit and BIM workflow will be shared and brought back to our individual corners of the world, helping beyond any of our expectations.

Tip 2a

Follow Leaders, Lead Followers

You can get a decent list of people to follow by hitting a few people's followers, like... mine: <https://twitter.com/#!/JayZallan/following> that should catapult you into their followers, etc. Then all you need do is interact.

The BIM Top 500 (<https://www.leaderboarded.com/b-i-m>) is a great place to find who you may want to follow, though take the list with a grain of salt as some people who are truly great do not rate at the top of the list as it only calculates one's "Klout" score, but it is useful.

Tip 2b

Post Only Good Content

You can get a lot of support by sharing some of your own expertise, but understand that with information overload always looming many people unfollow twit-spammers or over-posters and over-personal-posters. I suggest keeping it mostly on-point.

Here is a partial list of Revit and BIM folks on Twitter, to get a headstart (in no particular order ;)

@JayZallan	@revit3d	@djivey
@TroyGates	@brucegow	@revitall
@darren_roos	@mdradvies	@StewartGH1970
@marcellosgamb	@DynamoBIM	@kirklyncox
@davewlight	@Steve_Stafford	@CSIConstruction
@davidfano	@RevitFactCheck	@jrostar
@AYBABTM	@BIMandments	@davidkingham
@alnjxn	@MattRumbelow	@scottdavis
@becausewecan	@jobcaptain	@JWurcher
@PhilRead	@JasonGrantArch	@pauldohertyaia
@DesignReform	@SteveDeadman	@ElrondBurrell
@jvandezande	@ShaunF1969	@cjriddler
@seandburke	@bauskas	@BrianSkripac
@simonwhitbread	@GeorgeMokhtar	@apertedesign
@Revitspace	@MSIXVEO	@paulfaubin
@scottsh115	@ZachKron	@blads
@douvreit	@jeremytammik	@HarlanBrumm
@virtuarch	@ikeough	@LEEDing_Lady
@JonLanderos	@TanjaDzambaz	@masteringrevit
@KnowledgeSmart	@WesleyBenn	@randydeutsch
@projectvasari	@DesignByMany	@Twiceroadsfool
@AutodeskSupport	@RTCEUR	@BIMstore
@robincapper	@zoog	@caddhelp
@lukeyjohnson	@fedenegro	

Assorted tips from #BIMandments and elsewhere:

- ✦ If you find yourself doing a task repetitively, create a keyboard shortcut (if one does not exist). Then use it!
- ✦ Be proactive, not reactive
- ✦ Modeling screw threads in thy family will result in a sinful visit from a disrobed Justin Bieber
- ✦ Know a lot about creating families? Toss most of it when you start working on adaptive components and conceptual massing tools
- ✦ A shameless link sharing:
 - ✦ <http://bit.ly/x3PZyv>
 - ✦ <http://bit.ly/ywQ6a4>

You get the idea now... the Revit community is active, sharing, and

giving. Your job is to take advantage and join in so that new users can grow and you can get and give tips. Learning may be complex and take time and be frustrating at times, but I ask: what's better than becoming better?

OK, so now you know the process to become a Revit Master:

Try>Try Again>Try Again Differently>Bounce it Off 'Lay People'>Hunt Down the Digital Answer>Ask a Mentor.

You now have at your disposal not only how to learn Revit, but also EVERY Revit Tip, Trick, Technique & Workaround (known and unknown)—including future ones.



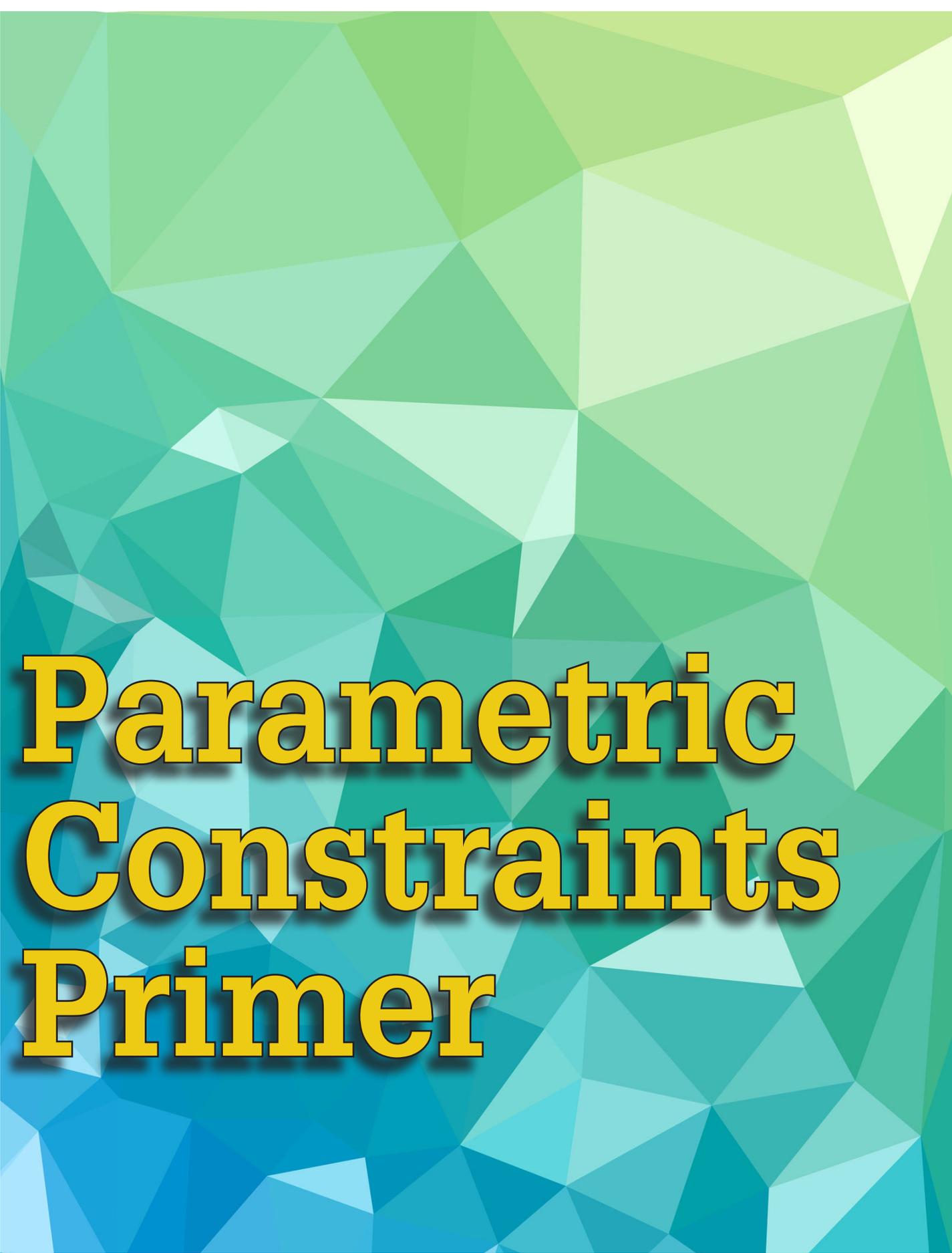
Architecture | Technology | Creativity These are Jay B. Zallan's professional passions: an intense and well experienced Virtual Design and Construction, BIM Leader, Designer, Artist and an AEC technologist

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

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

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

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



Parametric Constraints Primer

OVERVIEW

In a parametric drawing, you can add constraints to geometry to ensure that your design conforms to specified requirements. Parametric drawing can be defined as a technology that is used for designing with constraints. Constraints are defined as restrictions and associations that are applied to 2D geometry. There are two types of constraints: geometric and dimensional. Geometric constraints are used to control the relationships of objects in respect to one another. Dimensional constraints are used to control the distance, angle, radius, and length values of objects. A blue cursor icon will always display when you move your cursor over an object that has constraints applied to it. Constraints provide a way to enforce requirements when looking at different designs or when making changes in the design phase of a project. With constraints you can:

- Include formulas and equations within dimensional constraints.
- Maintain design requirements and specifications by constraining the geometry within a drawing.
- Instantly apply multiple geometric constraints to objects.
- Change the value of a variable to make design changes quickly.

It is important to note that you should first apply geometric constraints to determine the shape of a design and then apply dimensional constraints to determine the size of objects in a design.

Parametric constraints have a dedicated ribbon tab that groups the tools and their visibility controls in a logical arrangement. The Parametric Manager Palette allows tabular editing of names, values, and formulas once dimensional parameters are applied. This palette can be launched from the ribbon (see Figure 1).

Now that we have an understanding of constraints, we will look at geometric constraints followed by dimensional constraints, as well as some uses of constraints.

CONTROL PARAMETERS WITH THE PARAMETERS MANAGER

The Parameters Manager lists dimensional constraint parameters, reference parameters, and user variables that you can use to create, edit, and organize. You can easily create, modify, and delete parameters from the Parameters Manager. Within the Parameters Manager, you can:

- Click on the name of a dimensional constraint parameter to highlight the constraint in the drawing.
- Double-click a name or expression in order to edit it.
- Right-click and then click delete to remove a dimensional constraint parameter or user variable.
- Click a column heading to sort the list of parameters by name, expression, or value.

The Parameters Manager also allows you to define parameter groups in the Drawing Editor. A parameter group is basically a collection of named parameters. It contains a subset of all parameters defined for the current space, but the group can also be empty. Click the Filter icon to create a group, which displays a filter tree on the left vertical panel of the palette where you can show, hide, or expand the group filters. Drag and drop the parameters from the grid control into a parameter group. The Invert Filter check box displays all the parameters that do not belong in the group. You can filter the display of variables to do the following:

- All – displays all associative variables. No filter is applied.
- All Used in Expressions – displays all variables that contain expressions to evaluate a value and variables contained in expressions.
- Custom group filter – displays all parameters added in the defined parameter group.

In the Block Editor, the Parameters Manager displays a consolidated view of all parameters and user-defined properties for the block definition. The Parameters Manager palette includes a grid control with three columns (Name, Expression, Value) by default. You can add one or more additional columns

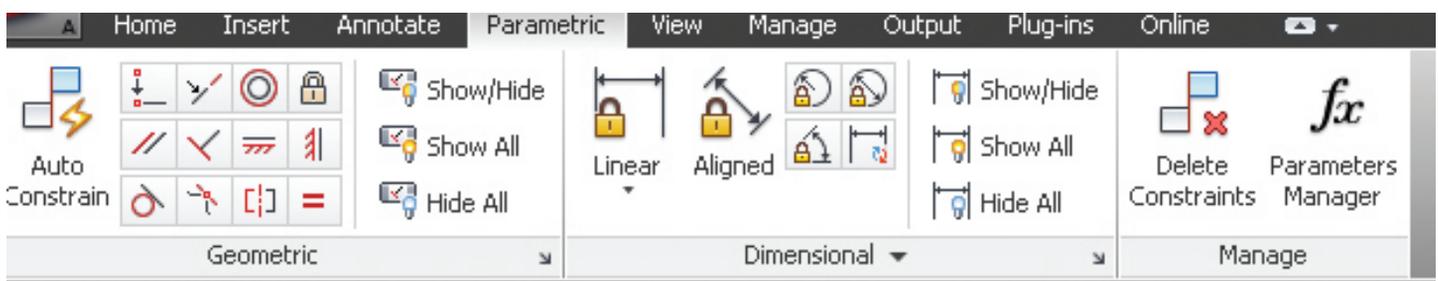


Figure 1: Parametric palette

AutoCAD Architecture 2016

(Type, Order, Show, or Description) using the shortcut menu. The Type column affects the formatting of the parameter in the Parameters Manager and Properties palette. It also affects the value of the parameter when the block is scaled. The Type cell for User parameters displays a drop-down list of the value types. The parameter can be sorted and set to Show or Hide in the Properties palette. The value of the parameter resets to 1 when you change the type from String to another type. Parameters can be renamed; equations and values can be entered or modified. Changes to a parameter name are immediately updated throughout the table and in the Block Editor. The parameters for the block definition are organized in the following categories:

- + Action Parameters
- + Dimensional Constraint Parameters
- + Reference Parameters
- + User Parameters
- + Attributes

You can only add user parameters to the table. When you delete any item from the table, the item is automatically deleted from the block definition.

GEOMETRIC CONSTRAINTS

Geometric constraints are used to determine the relationships between 2D geometric objects or points on objects relative to one another. When the constrained geometry is edited, the constraints are maintained. Therefore, you have a method of including design requirements in your drawing by using geometric constraints.

Geometric constraints contain controls for Coincident (with other object points), Fix (to an absolute location), Horizontal, Vertical, Concentric, Tangent, Parallel, Perpendicular, Colinear, Smooth (join splines), Equal, and Symmetric (matches characteristics about an axis) (see Figure 2). When these are added to the drawing, the first object that you select becomes the master and subsequent elections follow it.

When a constraint is applied, the selected object will automatically adjust to conform to the specified constraint and a gray constraint icon will display near the constrained object. A small, blue glyph displays with your cursor when you move it over an object that is constrained. Once a constraint has been applied, only changes to geometry that do not violate the constraints are permitted.

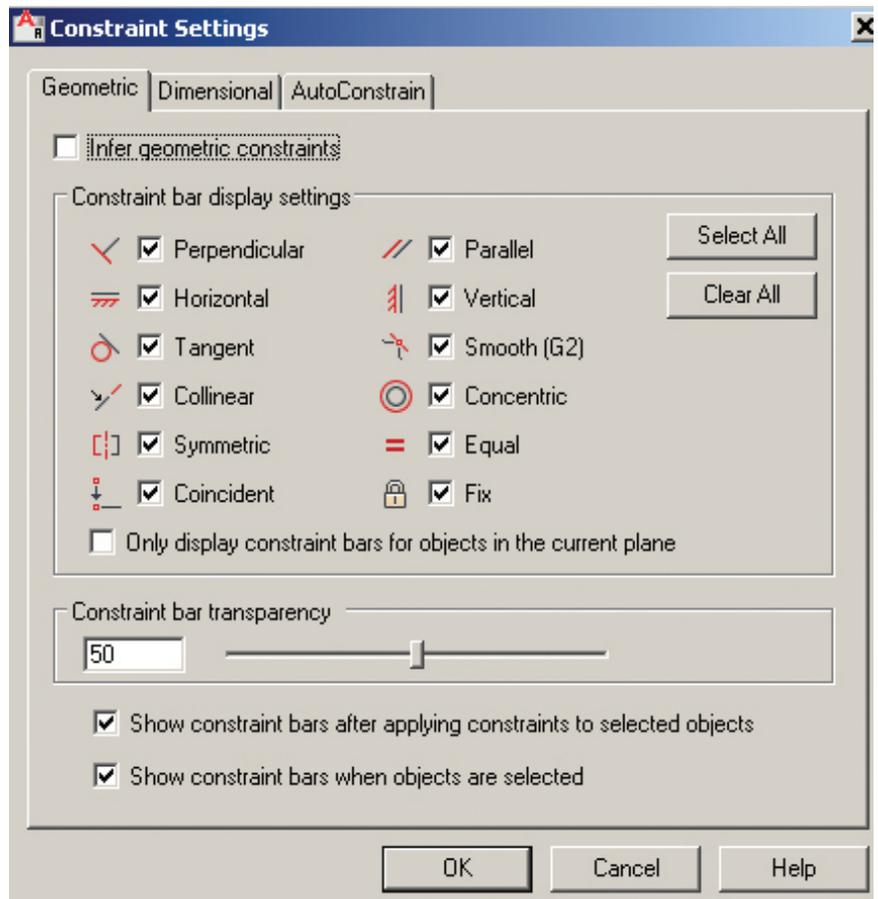


Figure 2: Geometric constraints

With some geometric constraints, you can specify constraint points on objects instead of selecting the objects. This is similar to object snaps; however, the locations are limited to center points, mid points, endpoints, and insertion points.

Multiple geometric constraints can be applied automatically and manually. If you want to apply all essential geometric constraints to a drawing automatically, you can use the `AUTOCONSTRAIN` command with the objects that you select.

Even though a geometric constraint cannot be modified, you can delete it and apply a different one. This option is available from the shortcut menu. You can also delete all constraints from a selection using the command `DELCONSTRAINT`.

DIMENSIONAL CONSTRAINTS

Dimensional constraints are used to control the proportions and size of a design. They can constrain distances between objects, sizes of arcs and circles, and angles between objects. If the value of a dimensional constraint is changed, all the constraints that are in the object are evaluated. The objects that are affected are automatically updated. You can also add constraints directly to segments within a polyline as if the objects were separate.

It is important to note that dimensional constraints are different from dimension objects. Dimensional constraints drive the angle or size of objects; however, dimensions are driven by objects. Dimensional constraints are used in the design phase of a drawing, whereas dimensions are usually created in the documentation phase.

Dimensional constraints can be created in the following forms: dynamic constraints and annotational constraints (see Figure 3). Dynamic constraints are ideal for normal parametric design and drawing tasks. They display a fixed dimension style, maintain the same size when zooming in or out, position textual information automatically, and do not display when the drawing is plotted.

When a dynamic dimensional constraint references one or more parameters, the prefix “fx:” is added to the name of the constraint. This prefix is displayed only in the drawing. Its purpose is to help you avoid accidentally overwriting parameters and formulas when the dimension name format is set to Value or Name, which suppresses the display of the parameters and formulas. Annotational constraints are more useful when you want dimensional constraints to change size when zooming in or out, display individually with layers, and display when the drawing is plotted.

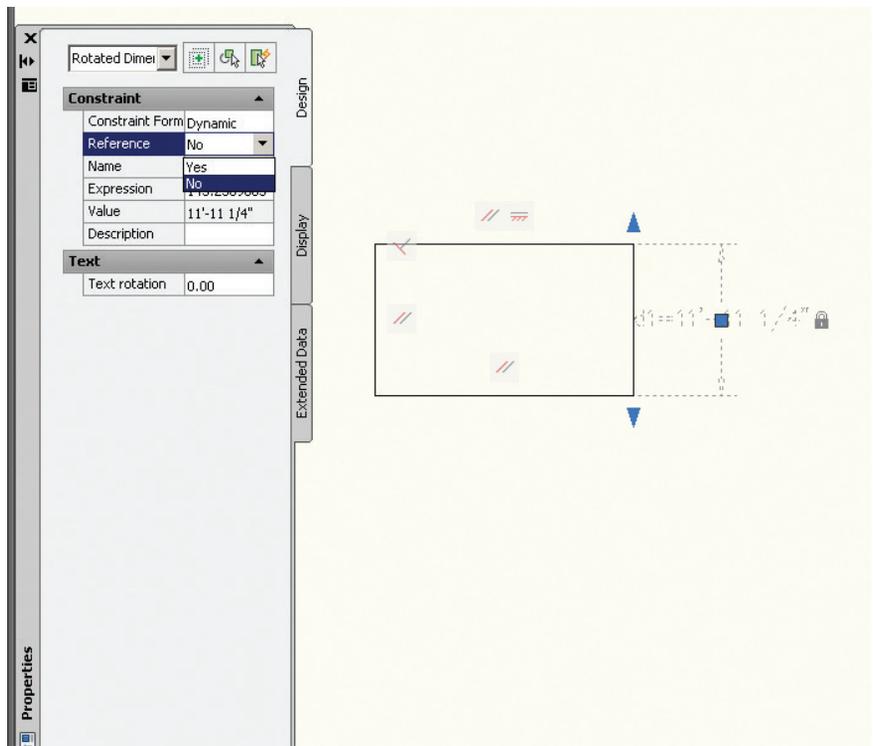


Figure 4: Reference constraints

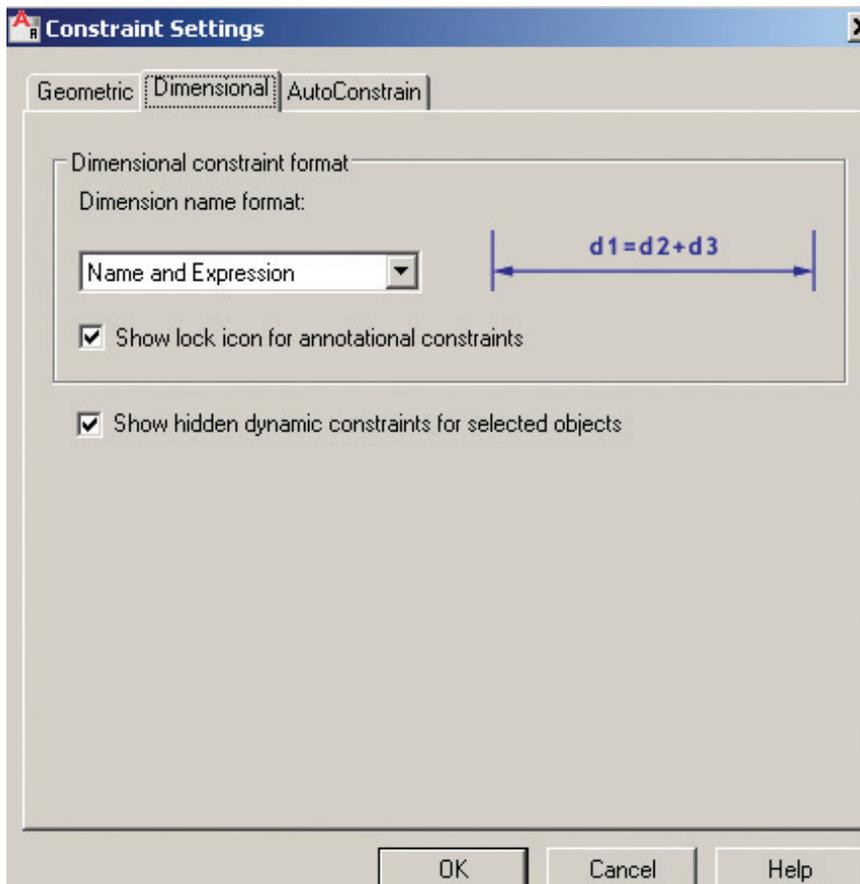


Figure 3: Dimensional constraints

There are also reference constraints, which are driven dimensional constraints and can be either dynamic or annotational. Reference constraints do not control the associated geometry, but instead report a measurement similar to a dimension object. This is a convenient way to display measurements that you would otherwise have to calculate. Textual information in reference constraints will always be shown in parentheses. The reference property can be set in the Properties palette to convert a dynamic or annotational constraint to a reference constraint (see Figure 4). However, you cannot change a reference constraint back to a dimensional constraint if this would overconstrain the geometry.

DESIGN WITH CONSTRAINTS

When you are creating or changing a design, a drawing will be in one of three states:

- Fully constrained – all relevant geometric and dimensional constraints are applied to the geometry. For a fully constrained set of objects, you will need to include at least one Fix constraint to lock the location of the geometry.
- Unconstrained – no constraints are applied to any geometry.

AutoCAD Architecture 2016

- Underconstrained – some constraints are applied to the geometry.

Please note that AutoCAD® Architecture prevents you from applying any constraints that result in an overconstrained condition.

For designing with constraints, there are two basic methods:

1. Work in an underconstrained drawing and make changes as you go.
2. Create and fully constrain a drawing first. In this way, you can control the design by relaxing and replacing geometric constraints and changing values in dimensional constraints.

Your choice of method will depend on your design practices. Both are equally effective depending on your needs.

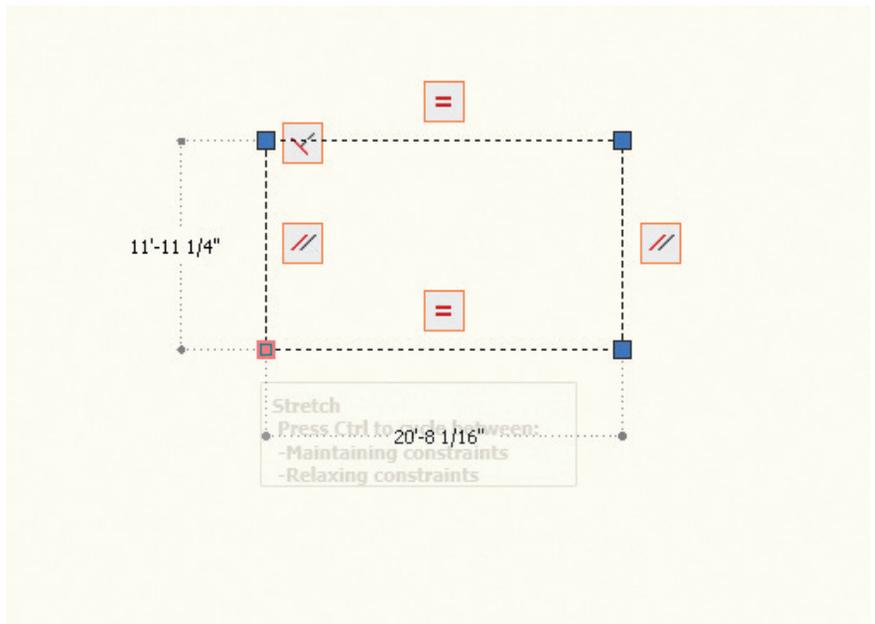


Figure 5: Relaxing constraints

USE CONSTRAINTS WITH BLOCKS AND XREFS

You can apply constraints between the following:

- An object within a block reference and an object within a drawing.
- An object within a block reference and an object within a different block reference (not within the same block reference).
- The insertion point of an xref and a block or an object, but not to any objects within xrefs.

When constraints are applied to block references, you can automatically select objects contained within the block. You do not need to press Ctrl for sub-object selection. Adding constraints to a block reference can many times cause it to rotate or move as a result.

When you apply constraints to dynamic blocks, the display of their dynamic grips is suppressed. You can still use the Properties palette to change the values in a dynamic block, but the constraints must first be removed from the dynamic block in order to redisplay the dynamic grips. Constraints can be used in block definitions, which results in creating dynamic blocks. You can control the shape and size of dynamic blocks directly from within the drawing.

REMOVE OR RELAX CONSTRAINTS

You can cancel the effects of constraints when you need to make design changes by using one of two methods:

3. Delete each of the constraints individually and then later apply new constraints. While the cursor hovers over a geometric constraint icon, you can use the Delete key or the shortcut menu to delete the constraint.
4. Relax the constraints temporarily on selected objects to allow you to make the changes. With a grip selected or when you specify options during an editing command, use the Ctrl key to alternate between relaxing constraints and maintaining constraints (see Figure 5).

Relaxed constraints are not maintained during editing. If possible, constraints are restored automatically when the editing process is complete. Constraints that are no longer valid are removed.

CONCLUSION

Parametric constraints have many design possibilities. They can be used to great lengths in AutoCAD Architecture when designing in 2D. How can parametric constraints work best for you? There's only one way to find out. Start using them today!



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

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Model Coordination Training

This month the topic for *AUGIWorld* is training. There are essentially three ways that people learn: visually, auditory, and the hands-on approach. Based on those three learning characteristics there are many ways to deliver the training as an instructor. My preferred method is hands-on during a real project—people tend to retain more of what they learn when they apply it directly to their project.

After the hands-on training I like to provide the client with a series of short topic-based videos that matches up with their workflow. This gives them a library of videos they can pull from to help them along when they hit a roadblock.

In this article I will take on the topic of model coordination. I have sat in on classes for this very topic at BIM workshops, AU, and RTC. Some instructors make it more confusing than it has to be.

I hope to simplify this process in a step-by-step tutorial. Unfortunately, if you are the type of person who learns best from hearing (auditory) then this may not work for you. But the visual and hands-on people should be all set!

THE POINTS

Revit has two points it works off of during model coordination—a project base point and a survey point. These can both be turned on from your visibility graphics.

Both the Survey point and the Project base point can be clipped or unclipped. It is important to understand that when you move these points they affect your project differently depending on whether the point has been clipped or not. Figure 2 shows the graphic of a project base point. The top image is a project base point that is clipped, and the bottom image is the project base point unclipped.

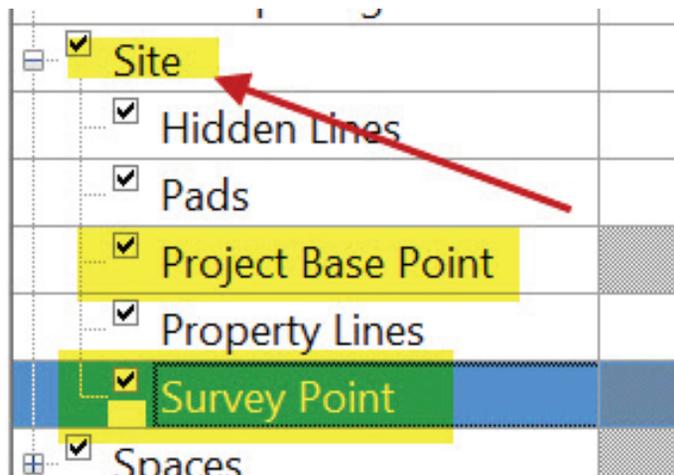


Figure 1: Project base point and survey point in Visibility Graphics

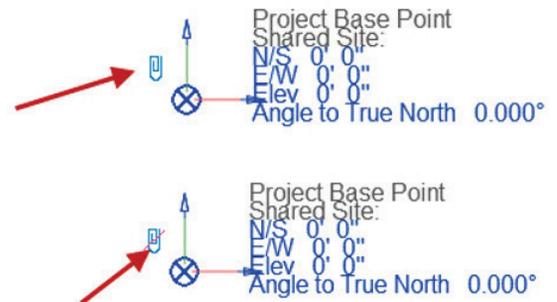


Figure 2: Project base point

THE COORDINATES

When you move a project base point that is clipped, your project coordinates will change as well. Figure 3 below shows a clipped project base point that has been moved two feet to the right (East). Moving a clipped project base point is the same as using the relocate project tool found in the Manage ribbon on the Settings panel.

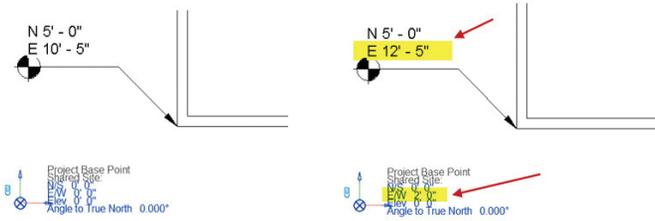


Figure 3: Moving a clipped project base point

Moving a project base point that is not clipped repositions the overall project coordinates, but not the coordinates of the model elements. Figure 4 shows that the spot coordinate does not change when the unclipped project base point is moved two feet to the right (east.).

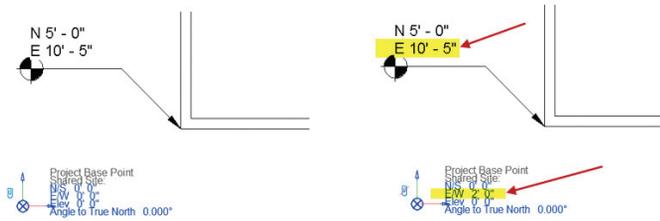


Figure 4: Moving an unclipped project base point

When you move a survey point that is clipped, you will see in Figure 5 that the survey reference point does not change, but the relative distance of model elements from the survey point do change.

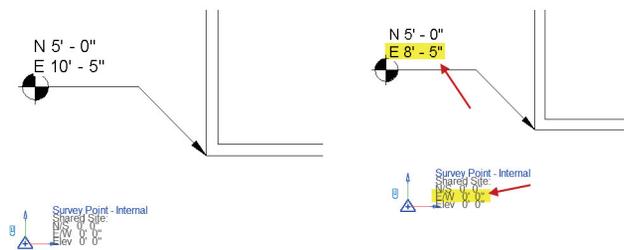


Figure 5: Moving a clipped survey point

When you move a survey point that is unclipped, you will see in Figure 6 that only the survey reference point changes, but the coordinates of model elements do not change.

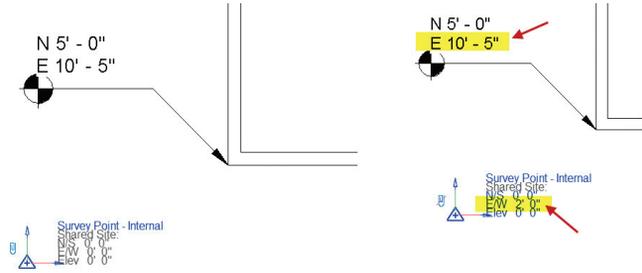


Figure 6: Moving an unclipped survey point

REVIT – REVIT FILE LINKING

Directly linking a Revit model into another Revit model is relatively straightforward. Make sure your survey point and your project base point are in the same location in both models and then link using origin to origin. Autodesk got it right when it made origin to origin the default in the 2016 release! Figure 7 is a basic example showing a Revit Structural model linked into a Revit Architectural model. Both models have the survey point and project base point in the same location.

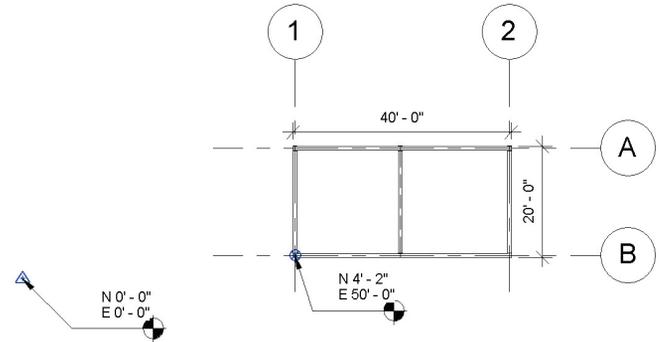


Figure 7: Revit to Revit link

REVIT – CAD FILE LINKING

Next we will look at linking a CAD (dwg) file into Revit for drawing coordination. Most often you may be provided with a Civil model showing the property and building location for your project, and coordination is needed in both directions. The Civil firm provides the Structural firm with a CAD (dwg) based site plan and the Structural firm may need to export their model into a CAD (dwg) format to the Civil firm.

Based on what we learned in the coordinate section of this article we can assume that the project base point is relative to the survey base point. Revit also refers to the survey point as a “shared site” point. Figure 8 shows a CAD file site plan with three buildings located on it. Every point in the AutoCAD file is relative to world

Revit Structure

coordinate system point $x=0, y=0$. In Revit our project base point is relative to the survey point or “shared site” point.

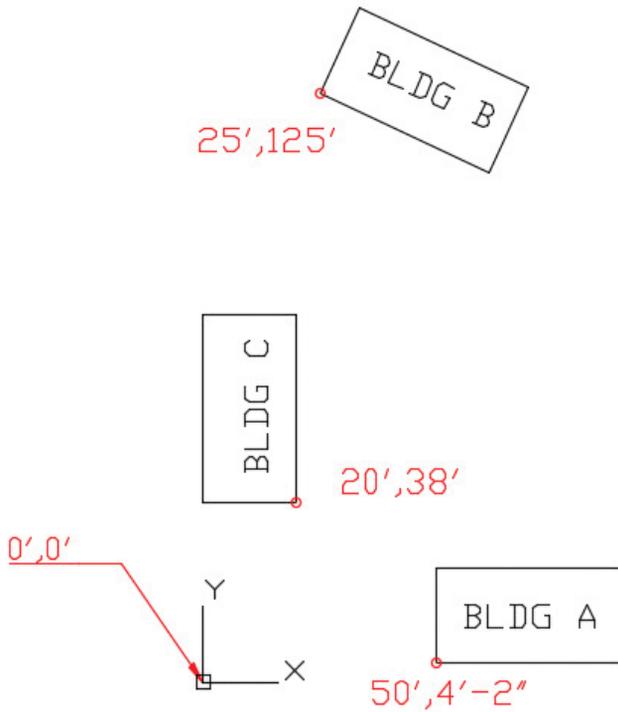


Figure 8: Base site plan from AutoCAD

When linking the Civil CAD (dwg) file into Revit, use the Auto-Shared Coordinates option. When you do this Revit will warn you that the files have different coordinate systems and that Revit will align AutoCAD’s world coordinate system with Revit’s shared coordinate system. The result is perfect—the CAD file is placed in the correct location inside of Revit.



Figure 9: Auto - Shared coordinates option

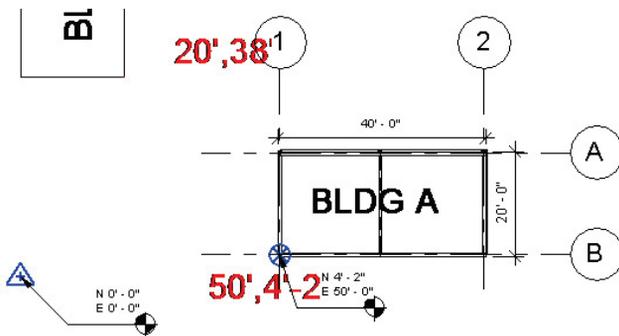


Figure 10: CAD result linked into Revit

When exporting the Revit model to a dwg format for use by the Civil firm, make sure you set your dwg export setting to use shared coordinates.

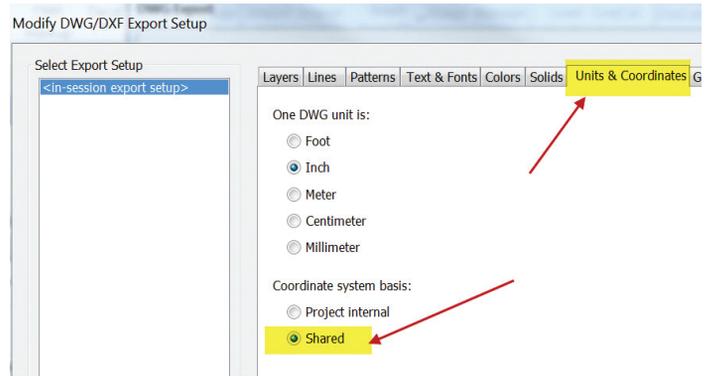


Figure 11: dwg export setting

When the Civil firm externally references the dwg file you provided from Revit it will land exactly on the site where it was intended to be placed.

SUMMARY

Learning is best retained when taken in small bites. There are so many other subtopics to cover with coordinates inside of Revit. The purpose of this article was to give you a clear understanding of the survey point and project base point inside of Revit and I am hopeful it did that. You should also be able to coordinate a building using different Revit models. And, finally, if you need to export or import the dwg file format, you should now have a successful workflow.

For those of you who are “audible” learners I would be happy to produce a video tutorial and email it directly. Just let me know.



Philip Russo began with AutoCAD version 2.5 in 1986. Through the years he has held positions in the CAD industry as CAD Draftsmen, CAD Manager, Sr, Applications Engineer, and is a Certified Autodesk Instructor. Lately Phil’s focus has been on the implementation of standard practices for the Revit platform. He currently holds the position of Corporate BIM Applications Manager at O’Brien & Gere Limited, an engineering firm located in Syracuse, New York. Phil can be reached at phil.russo@obg.com

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by Robert Green

HP's Z240 Workstations Bring Big Bandwidth

 Most CAD users don't really need multiprocessor workstations with 12 cores, but we do need workstation level RAM, storage and graphics power – a combination that simply isn't available in consumer PC's. Over the past three years HP has strived to create value based single processor workstations for CAD users with their Z200 series and this year's Z240 and Z240 SFF (small form factor) workstations take the concept to the next level. It isn't a stretch to say these workstations redefine what can be packed into a reasonably priced desktop workstation.

OPTIMIZING THROUGHPUT

Both Z240's pack a big punch where it matters in CAD environments: Processors, memory, solid state drives, and graphics power. By optimizing these components CAD users can deal with larger models and datasets much more quickly and reliably than with a lesser equipped consumer PC. Let's examine the highlights.

Processor. The Z240's single-processor architecture supports a variety of Intel® processors from the Core™ i5 up to the Xeon® E3 12xx v5 series quad-core¹ processors with clock rates from 3.2 to 3.7 GHz (Turbo boosted rates from 3.6 to 4.0 GHz, respectively). Since most CAD applications are lightly threaded (meaning they run primarily on a single core) the Z240's quad-core architecture emphasizes high processor clock rates rather than more cores. This speed vs cores tradeoff actually optimizes performance for CAD applications while keeping costs down.

RAM. System RAM is taking a big step up in the Z240 with the implementation of 2133MHz DDR4² ECC⁴ modules allowing up to 64GB installed in 4 sockets. This memory configuration makes CAD configurations from 16 to 64GB easy to implement – something that even the last generation of Intel processors couldn't do – while increasing the memory channel speed up to 30% over DDR3 memory modules.

PCIe Solid State Drives. The other huge news in the Z240 machines is the addition of a dedicated four channel M.2 expansion slot on the motherboard which can accommodate the newest HP Z Turbo Drive G2 NVMe solid state drive (SSD). This design change allows the Z240's to have up to 500 GB of bootable PCIe SSD storage on the main board while keeping a four channel PCIe expansion slot for another PCIe SSD drive or Thunderbolt™ interface available for expansion. The performance impact of the NVMe PCIe based SSD's can't be overstated for CAD applications as their transfer rates are roughly 4X higher than conventional SATA based SSD's.

Thunderbolt™. With the addition of an optional PCIe Thunderbolt 2 card⁵ both Z240's can support the industry standard high bandwidth Thunderbolt connections used with many portable drives, cameras and 3D scanners. Since Thunderbolt yields a theoretical transfer rate 4X that of USB 3.0 (20 Gb/s vs 5 Gb/s) any workflows that require frequent data transfer of point clouds, videos or field data from external devices can benefit substantially from this upgrade.

Drive Expansion. Both Z240's offer an integrated 6GB/sec SATA III controller supporting a variety of 2.5 and 3.5 inch form factor magnetic or solid state drives. The Z240 Tower



Both the Z240 Tower and Z240 SFF models have front accessible drive bays for expansion, an optional SD card reader, multiple USB 3.0/2.0 ports (one charging), and multiple monitor support in all configurations.

chassis contains 2 internal 3.5, 1 internal 2.5 and 2 external 5.25 half height drive bays to fit a variety of drives. The smaller Z240 SFF supports a single internal 3.5, single internal 2.5 and single external/internal 3.5 drive bays. Either machine can accommodate conventional SSD's and hard disks to allow for substantial additional storage³.

Graphics. Both Z240s support the latest graphics technologies, from 2D to High End 3D discrete professional graphics, from NVIDIA, AMD and Intel's P530 professional integrated graphics (depending on processor option selected) though some add in GPU cards may not fit in the smaller Z240 SFF chassis due to space or power supply constraints. Note: For users who do mainly 2D work - with little to no visualization - the on board Intel HD Graphics processor may be all you need.

OTHER CONSIDERATIONS

While the bandwidth stretching technologies mentioned above are the big news a few other features of the Z240 systems merit mention. Those include:

Operating System. Both workstations ship with either Windows 10 or Windows 7 preinstalled as selected by the user. No matter which OS is selected HP's suite of workstation utilities (like Performance Advisor) are included⁶.

Connections. The front and back of both models contain a variety of USB 2.0/3.0 connections (including one charging port) for external peripherals. The Z240 SFF's rear panel contains 3 DisplayPort outputs while the Z240 Tower has dual Display Ports and a single DVI output Intel Professional Graphics output (depending on processor selection) to multiple monitors.

Quiet, Cool and Easy to Maintain. With an optional dust filter, reconfigured internal components and 92% efficient power supplies the Z240's require lower fan speeds to maintain thermal performance resulting in a very quiet operation. As with all HP Z Workstations the tool free chassis and

components make any required maintenance easier to perform – two features IT departments will appreciate.

WRAPPING UP

The new HP Z240 Workstations simply provide big workstation features in a compact, economical package that will support all but the most power hungry CAD users. If your company is considering new CAD workstations the Z240 series machines are definitely worth a look.

ABOUT HP

HP helps you stay ahead of the curve with professional desktop and mobile workstations designed for large and complex datasets, dispersed teams, and tight deadlines. HP Z Workstations, built for Pros with Intel® Inside®, deliver the innovation, high performance, expandability, and extreme reliability you need to deliver your 3D CAD projects in less time. To learn how to configure a HP Z Workstation, visit the HP and Autodesk page at www.hp.com/go/autodesk. Start saving now!

ABOUT ROBERT GREEN

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



1. Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.
2. Each processor supports up to 2 channels of DDR4 memory. To realize full performance at least 1 DIMM must be inserted into each channel. Actual memory speeds dependent on processor capability.
3. For hard drives, 1 GB = 1 billion bytes. 1 TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) of disk space is reserved for the system recovery software.
4. Intel® Xeon® E3 and Intel Pentium processors can support either ECC or non-ECC memory. Intel® Core™ i5/i7 processors only support non-ECC memory.
5. Thunderbolt™ 2 is available via an optional add-in card. Thunderbolt cable and Thunderbolt device (sold separately) must be compatible with Windows. To determine whether your device is Thunderbolt Certified for Windows, see <https://thunderbolttechnology.net/products>
6. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.microsoft.com>.

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The Digital Artist

It could be argued the greatest advances in the 21st century may be with computers. Generations are now born that have never known life without a computer. It's said we've entered the start of a new era. As history has proved, it is art that lasts through the ages and today's art is more digital than ever.

3ds Max® users could be described as some of the most elite artists of this century using perhaps the most sophisticated computer software an artist can use. They are the da Vincis, the van Goghs, the Rembrandts. They are the sculptors, the painters, the architects, and engineers of this era and their work will last much longer than they will themselves.

But with art some might say it's important to always remember the fundamentals. So this article covers some of those fundamental elements we use while we all try to make our mark on history. Some of those elements include lines, shapes, spaces, and colors.

LINES

We'll begin with lines. They control viewpoints and edges. They can shade (as in a cross hatch) or can be a shadow. The line itself can create a shape or change it and because of that it's important to remember we aren't confined to solids or shapes in 3ds Max, but we can use the power of simple lines to completely change or generate very complex or interesting scenes. Take the rendered box in Figure 1 for example. The first box, with white lines, can be described as lines that identify the contour of a simple cubed object with straight, sharp edges. The second box would have to be described differently, though the lines are in the same exact locations as shown with the first object. But the quality of the

line is considerably different, which alters the overall form of the object itself. For the third example the same box was fractured using quick-slice in 3ds Max, the resulting lines (or edges) were extracted and thickened, then finally smoothed to create a much more interesting object.



Figure 1

SHAPES

Shapes are simply a result of connecting the ends of lines to form a closed contour. An interesting side note is that 3ds Max defies traditional art because shapes in 3ds Max can be three-dimensional. With the ability to create two- or three-dimensional shapes we can create interesting objects in a very short amount of time. Take the object in Figure 2, for example. By simply defining the contour from the axis at the center of a chess piece and using the lathe modifier, we are able to construct a queen chess piece in just a few seconds. It's interesting to also consider that even empty space defines a shape and that shapes in general define every three-dimensional object in the universe. By understanding them, we can construct, or deconstruct, very complex scenes. See Figure 3 for an example of a few basic shapes used with 3ds Max tools such as bend, twist, array, and extrude to create such objects.

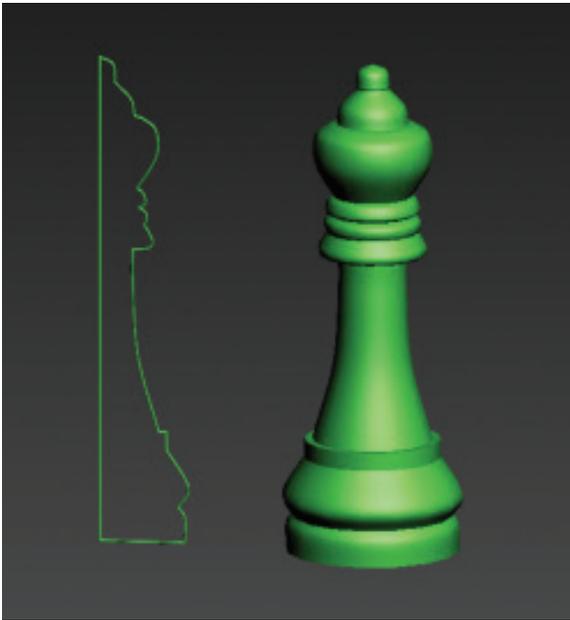


Figure 2



Figure 4

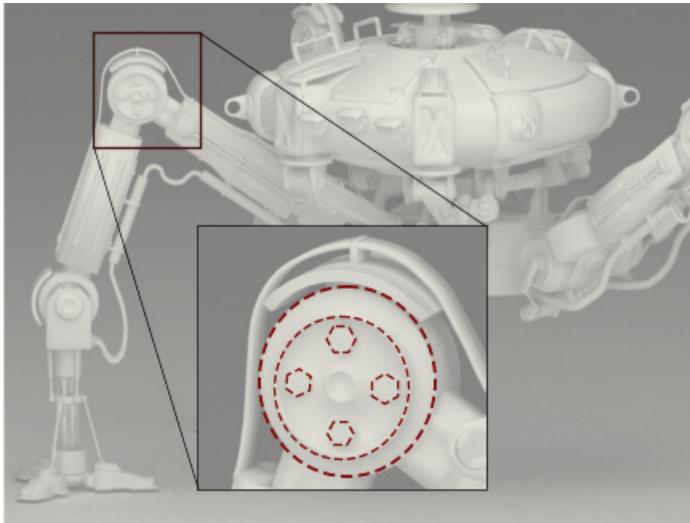


Figure 3

SPACE

Space can be described in different ways such as overlapping or separation, between, around or above and below an object, or distance above and below a specific plane. Space can also have a variety of effects on one's scene such as objects shrinking or having less detail as they appear further from a viewer, cool-temperature colors as objects fade into the distance, and darker colors and better contrast as they are closer. The illusion of space is what 3ds Max is entirely constructed on, using very complex formulas to create 2D shapes on screen that represent 3D objects in space. It's all a bit confusing considering 2D space can be described as an illusion representing 3D space, but in Figure 4 you'll find an example of using such space, a V-Ray camera, and 3ds Max to create an effect that makes some objects appear further from the object in focus.

COLORS

In a typical color wheel you'll find colors that mix red, orange, yellow, green, blue, indigo, and violet. Colors can be dark (shaded, with black), or light (tinted, with white). They can be cool, warm, or neutral. Mountains of data have been produced about colors—those that complement or contrast one another, or how to construct proper themes I won't be discussing much. I would, however, like to recommend assigning favorite colors and colors themes to a custom toolbar using the macro recorder.

First, create a custom toolbar and button. Next, record a macro. To record a macro, simply select the MAXScript menu and choose Macro Recorder. Next, select an object and alter the color to your preference. When completed, select MAXScript again, and click on Macro Recorder once more. This will disable it. Then open the MAXScript Listener and highlight the portion of the macro that changed your object's color. It should look similar to "\$wirecolor = color 64 104 164". Simply drag and drop the highlighted text onto the toolbar button you had created. Save the toolbar so that any time you want to change the color of an object to your specific preference, simply select your object then press that button.



Brian Chapman is a veteran Autodesk zealot, 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.



Find the Time for Training

This month's theme is "Education and Training," which in our industry is an ongoing effort, or at least it should be. Let's get real about our future. Whether you're new to this industry or an experienced professional, time is passing quicker than it ever has. Between events with family, friends, and volunteering, and keeping up with our personal technology, which seems to be evolving weekly, our lives are pretty full. Are you keeping up at work? Are you trying to get ahead?

You may not be concerned with spending extra time learning about products you already use every day because:

1. You already know how to use it
2. You don't have time

In both cases, you're probably wrong. With some exceptions, most people do not know as much about their software as they think they do, nor are they working as hard or as long as they think they are.

KNOWLEDGE

When it comes to knowing the software, most users get by with the basics—just what is needed to get the job done. Over the years I have worked with a lot of people that use Microsoft Office, AutoCAD® or Autodesk® Revit® on a daily basis and have done so for years, but when I have asked about how to perform a specific task, they commonly don't know the answer. How many times have you had a conversation with a coworker or an industry peer and described something you did with a software product such as AutoCAD that you both use and you find that the person wasn't aware the software could do that?

Many users work in their software today the same way they have for the last 5 to 10 years. Why is that? The software has definitely changed, so why hasn't the user?

This often leads to the "I don't have time to learn new software."

TIME

In the current economy it's likely that many people truly are working a full 40 hours a week and some even more, but during your working hours are you constantly working? While at work, how much of your time is spent checking your Facebook, Twitter, or personal email accounts? What if that time were spent looking up resources on blogs, YouTube videos, or even in the help files that are included in your software?

Depending on your company, if your boss were to see you on Twitter or Facebook or on your personal Gmail you may get a warning about your workload, but if they were to see you watching a YouTube video about your software or reading a blog or help file they're likely to be more understanding—especially if you explain that you're trying to solve an error or productivity issue. This also shows your interest in improving your work product. Learning new features or tools or figuring out how to increase productivity with the tools you have does require an investment of your time.

When it comes to the "not having enough time" response, the reality is that we all have the same amount of time. How we spend it is based on our priorities, or "What is important to me?"

IMPORTANCE

What are the reasons that education and training should be important you?

- + Keeping up with industry trends
- + Learning about existing features in your daily software (items that you don't currently use but would benefit from)
- + Learning how to use new features in the updates/upgrades you receive
- + Learning about new or different products than what you currently use
- + Getting certified in a software product
- + Preparing to change industries/jobs

Clearly there are some reasons that education and training are important, but how do we go about it?

“Learn something new. Try something different. Convince yourself that you have no limits.”

– Brian Tracy, professional speaker, author, success expert

MAKE IT HAPPEN

The reality is that education and training requirements and preferences are not the same for all users and include variations in access and learning styles. Fortunately, the industry addresses this by offering a diverse selection of training resources.

When many people think of education and training, they think of companies providing access to local reseller classes, in-house seminars, or industry events such as the annual Autodesk University (AU) event in Las Vegas. Most people still love the live events because it is not only a chance to get out of the office, but it is also a chance to ask questions and network. This is one of the biggest draws for Autodesk University.

Unfortunately, as many users and CAD managers will tell you, this seems to be harder and harder to come by. Why is this? Many companies think that classes are expensive, they lose an employee's or multiple employees' billable hours during the training timeframe, plus they are paying the employee salaries. Classes and events are often looked at as a huge expense, because companies are not sure if the knowledge gained will cover the costs. Depending on who you speak with you will get answers both ways. The value of live classes will depend on a variety of factors including:

- Is the trainer knowledgeable and a good instructor?
- Is the material being covered truly applicable to what the employee does or will be doing?
- Is the employee vested in learning or is this just a day out of the office?

LIVE TRAINING

Live product or task-specific classes given by experienced trainers can be very beneficial when timed properly. Companies shouldn't send users to training now for software that will be installed next year or in three months. For instance, if there is a plan to do a major product update or software change out, it would be best to get the software installed side-by-side with the existing software or have it done while users are out of the office in the actual training. This way, when the users return they can start putting their knowledge to work right away. Large companies may require staged upgrades by group or department. Maybe a hybrid approach will work better, where select users get sent to training and then come back and work through the transition with the rest of the staff. Obviously in this case the selection of the user(s) is critical.

One popular live option for users, which is potentially cost effective for companies, is to send selected individuals to Autodesk University (AU). With the variety of classes and topics covered, attendees can customize their schedules to whatever their companies or departments need. The cost to send an individual to AU with flights, conference cost, hotel, and expenses will be around \$3,500 (this depends on the cost of flights and what are allowed expenses). This covers four days of what is basically custom training, as well as an opportunity to see where the industry is headed.

If there is a need for a more focused product training, local resellers may be the best bet. Resellers typically offer a variety of fundamental, intermediate, and advanced courses on nearly every Autodesk product.

Users who may want a more scheduled routine and instructor-led training have another option in Autodesk Authorized Training Centers (ATCs). With sites worldwide, the ATC network meets the needs of design professionals with flexible schedules and custom training for all levels of expertise and Autodesk products. See the link below to find an ATC near you.

<http://www.autodesk.com/training-and-certification/authorized-training-centers>

Because of the social interaction aspect of live classes and events these will always be popular among users. For companies, if planned properly these events will be an investment rather than just an expense.

So what can you do if these classes or events are not an option? There are multiple inexpensive options and even more that are actually free. For an individual creating his or her own education and training plan these will likely be the first “go to” options.

VIRTUAL TRAINING

Virtual training encompasses anything that is not live, in-person training. Web-based training courses and DVD video courses are examples of virtual training. Web-based training can be done live or at a time and place that is most convenient to the learner.

There are numerous options for virtual training that range from free to a few hundred dollars. If you are planning on staying in this industry consider any costs as an investment in your future. Below are a couple I have used.

Lynda.com (\$19-\$35 per month)

Lynda.com has all kinds of classes (not just for our industry) but there are multiple classes on AutoCAD, AutoCAD LT, Revit, Inventor, and so on.

<http://www.lynda.com/search?q=AUTOCAD>

<http://www.lynda.com/search?q=REVIT>

Infinite Skills.com (\$21-\$25 per month)

Like Lynda.com, Infinite Skills offers online courses, but also offers DVDs on a variety of topics. As of my last visit there were

AutoCAD

DVDs on AutoCAD basics through advanced as well as multiple versions of Revit and Inventor.

<http://www.infiniteskills.com/>

FREE TRAINING

Autodesk itself also has free resources for your education and training program. Check out Autodesk University online and the online “Learn your Way” database.

<http://au.autodesk.com/au-online/overview>

<http://www.autodesk.com/education/learn-and-teach/learn>

Full-blown formal product training courses may not be required by all users, especially long-time Autodesk software users. Tips and tricks, in-depth command “how to” lessons, and customization topics may fit the bill. For these users other educational learning options include YouTube, webinars—live and pre-recorded, publications, and blogs.

There are hundreds of YouTubers and bloggers who create content for your benefit that are free to read and watch. Although there is a mix of quality, there is no shortage of content. You can find nearly any topic you are looking for with a quick web search.

For everything from short tips and tricks to complete walk-throughs of commands and features, YouTube has a huge collection of end user and professional trainer videos.

Below are some sample searches for AutoCAD, Revit, and Inventor:

https://www.youtube.com/results?search_query=AutoCAD

https://www.youtube.com/results?search_query=REVIT

https://www.youtube.com/results?search_query=INVENTOR

Below are a few popular blogs (there are sooo many more):

<http://lynn.blogs.com/>

<http://cadablog.blogspot.com/>

<http://www.ellenfinkelstein.com/acadblog/>

<http://thecadgeek.com/about/>

Of course, there is also AUGI. AUGI creates a monthly magazine, *AUGIWorld*, that you’re reading now. There is an archive of these articles in the Library on augi.com. A quick search may find an article, written by a fellow user, which covers what you need.

<https://www.augi.com/augiworld>

<https://www.augi.com/library>

A new offering by AUGI is webinars. These webinars are presented by expert end users and Autodesk presenters. The live webinars are free to attend for all registered users, including non-paid membership levels. Recorded webinars are available to professional level members. I encourage you to check out this new feature at the link below to see what may be useful for you.

<https://www.augi.com/training/webinars>

Every year AUGI teams up with Autodesk for Autodesk University (AU) in Las Vegas. Through this relationship AUGI has compiled a large amount of AU content from previous years. This material covers Autodesk applications, workflow processes, software customization, CADD and BIM management, and Tips and Tricks. The course material can be found here:

<http://forums.augi.com/forumdisplay.php?1413-Conferences>

I hope that you find some of these resources useful as you build your own personal education and training plan. If you know of additional resources your fellow users would benefit from that are not mentioned here, drop me an email at walt@functionsense.com and I will get them posted in a future article or through AUGI’s social network.

When considering whether or not to create an education and training plan, think about the following.

- ✦ Your future growth and development
- ✦ Constantly changing technology requires constant learning
- ✦ Don’t get complacent
- ✦ Don’t be labeled as an old timer
- ✦ Don’t be that person who says, “But this is how we’ve always done it.”
- ✦ Don’t resist change—change opens new learning experiences.
- ✦ Keep reading books, magazines, blogs, and help files.
- ✦ Set learning goals
- ✦ Get certified: <http://www.autodesk.com/training-and-certification/certification>
- ✦ Join a local user group

If you are planning on attending Autodesk University this year and have not yet registered, be sure to use the “AUGITRK” code for a chance to get one of 150 free AUGI premier memberships. And if you are going, let me know—I would like to meet you in person to hear about the struggles and successes in your personal education and training process.



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

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Autodesk's Fusion 360 ... and Beyond

In September 2015, Autodesk finally brought back Simulation to its 360 platform by adding it directly to Fusion 360. This was not a surprise as the company had, as far back as November 2014, stated that they would do so and offer it for a price increase as Fusion 360 Ultimate. Users that bought in early have felt a bit beguiled as they have paid for something that they did not receive; however, it is back and the company just offered early subscribers another year for free. Fair enough.

FUSION 360 ULTIMATE

Fusion 360 Ultimate is a collection of CAD-related tools that are completely integrated into the Fusion 360 environment. These include:

- Solid Modeling
- Surface Modeling
- Rendering
- Animation
- CAM
- **Finally** Simulation
- *We're only missing one more thing...*

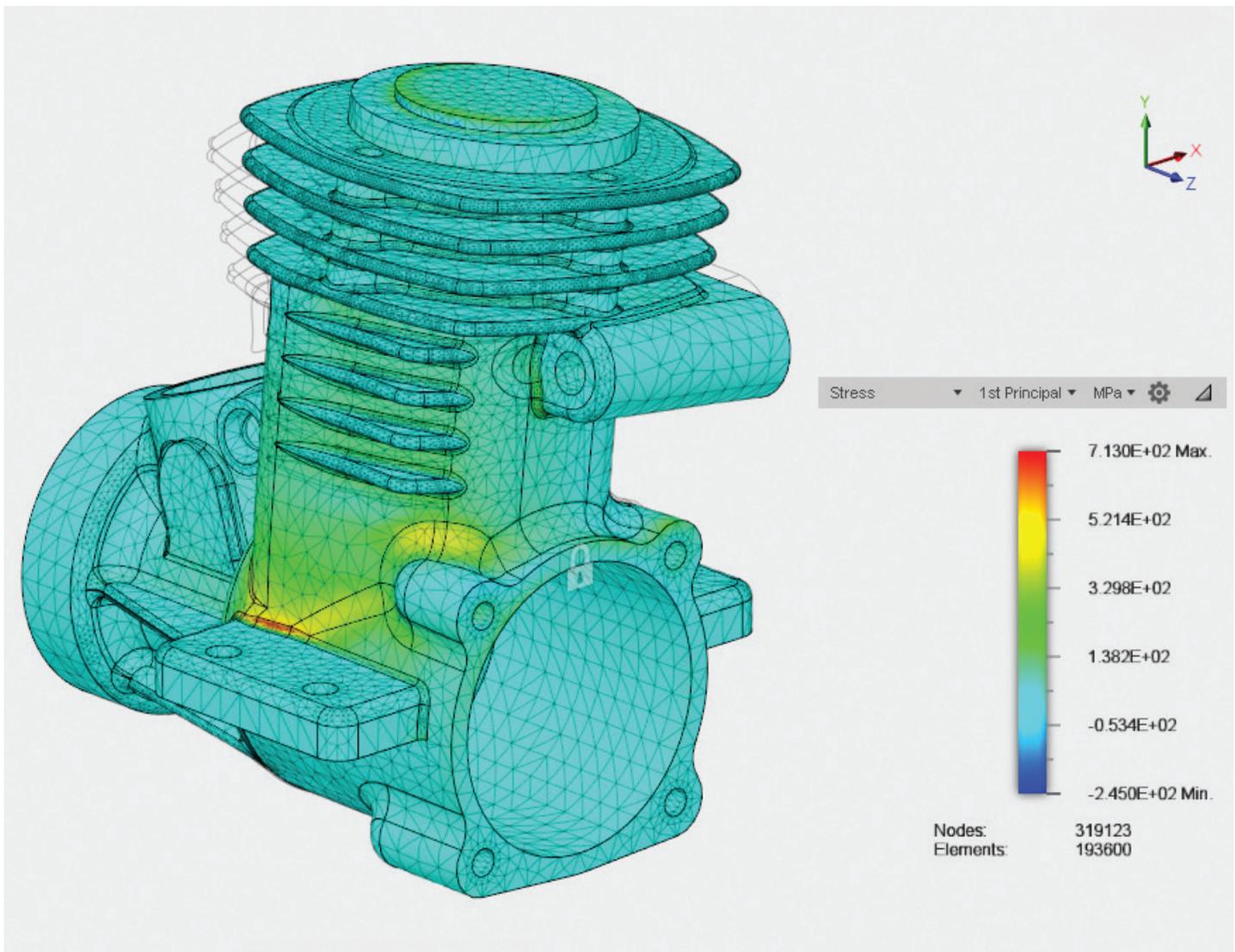


Figure 1: First principle stress contour plot

Sheet Metal – and that is the last item missing in the Ultimate roadmap. In fact, when you review what Autodesk stated that it would do, while behind a tad bit, they have completed most items on the list. More importantly, Autodesk seems to be trying to complete the list and move forward.

Sometimes companies make statements about exciting plans for their product to be competitive and drive user adoption. When things go awry, they employ the “Don’t ask, Don’t tell” strategy, and simply move on without regard for their prior statements. The Fusion 360 team has impressed me by first being open to their plans, and secondly, actually trying to complete them. For a list of some of those plans, check out D&M’s Fusion 360 Ultimate promotion article. (<https://designandmotion.net/autodesk/autodesk-fusion-360/so-i-have-fusion-360-now-what/>).

How does this affect me? Since most readers here will already have Autodesk software of some form, you might wonder how all this benefits you and your team. The reality is this:

Autodesk keeps extending the Fusion 360 Ultimate promotion, which gives users the opportunity to purchase the entire package for only \$300 USD annually.

- ✦ Solid modeling teams can get Simulation and FEA (including support) for \$300 per year.
- ✦ Non-solid modeling teams get their own capability to create and import any 3D model they desire into most any professional CAD software, as the need may arise, for only \$300 per year.

The promotion locks the price permanently.

While Simulation is currently limited to static stress and natural frequencies, the team has been willing to state that they are working to provide transient and non-linear capabilities along with cloud solving.

Now, on to the important stuff, the recent update.

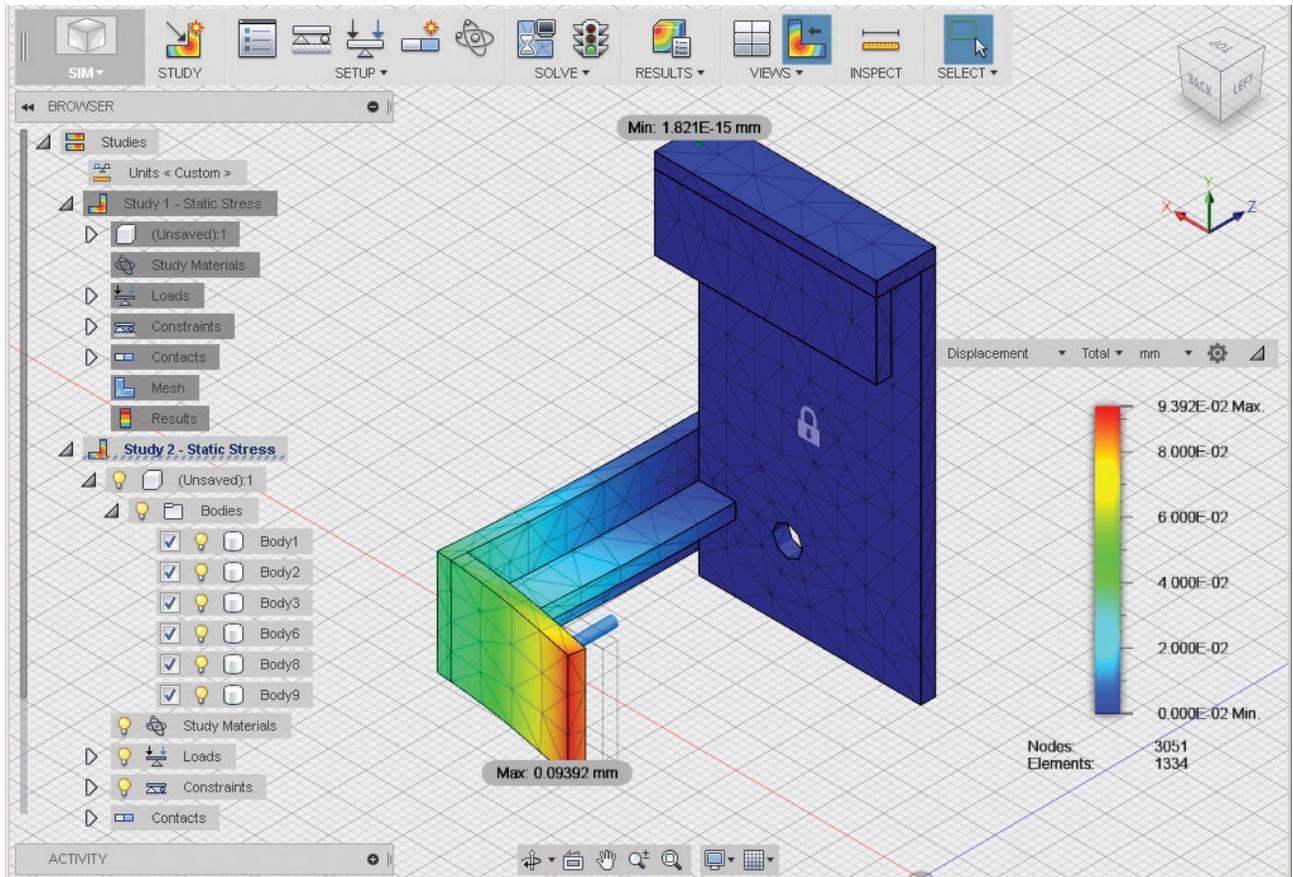
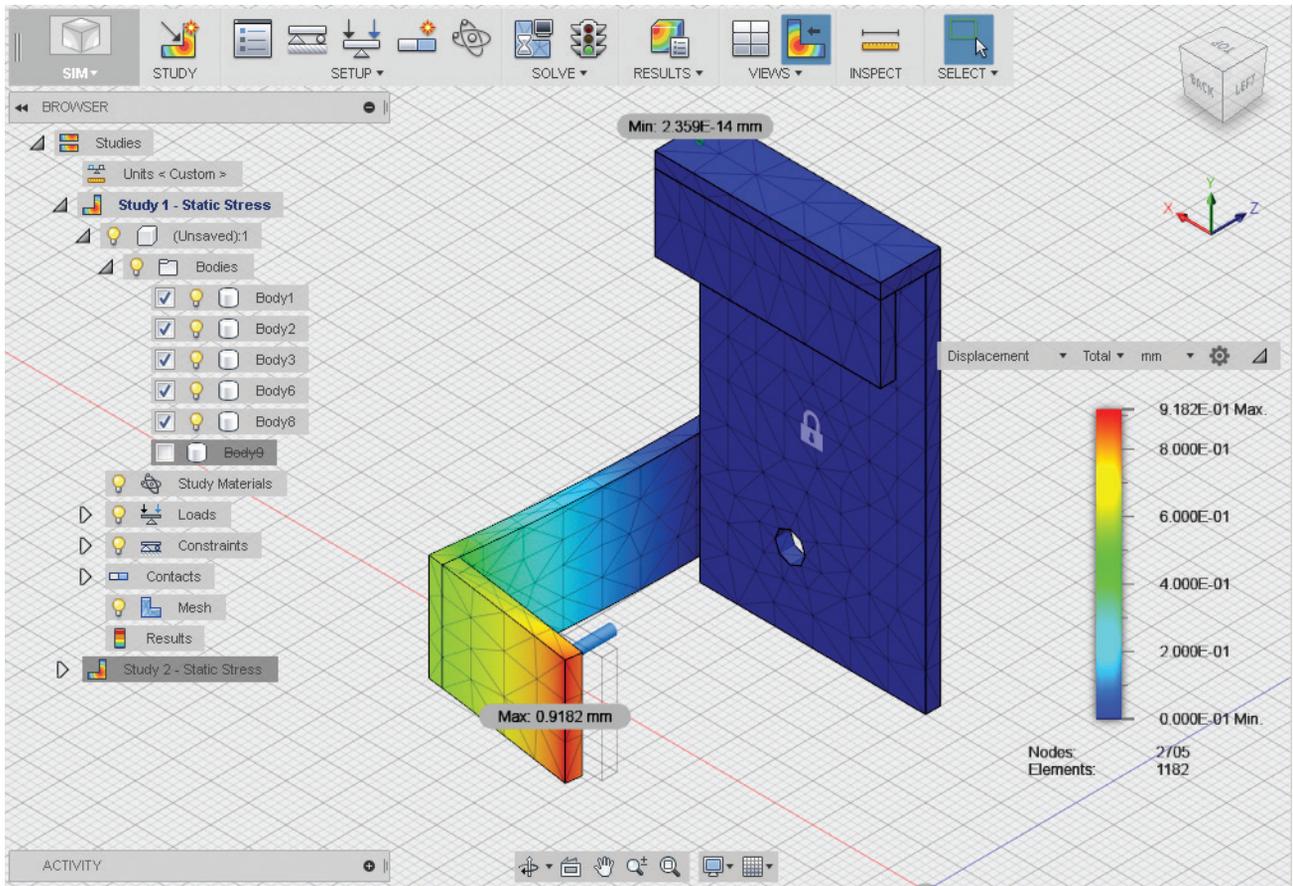


Figure 2: Separate studies within Simulation

INTEGRATED SIMULATION

Fusion 360 Ultimate now includes Linear Static and Modal Analyses. Simulation has its own tab, similar to the other components in Fusion 360. The simulation model and results from various studies, regardless of complexity, remain embedded within the single Fusion design file. Much of this technology was present in one of my favorite emerging platforms, SIM 360, which worked alongside Fusion in the past. They are all together again finally, in a single space, and with a complete architecture overhaul.

The integration includes automatic contact generation, which generates contacts based on the model components proximity, as per the default contact option. This is acceptable for now, but I would like to see the system look to the assembly joints and use those to determine appropriate contacts. An example of this would be a sliding contact created where there are mating cylinders with a cylindrical joint applied.

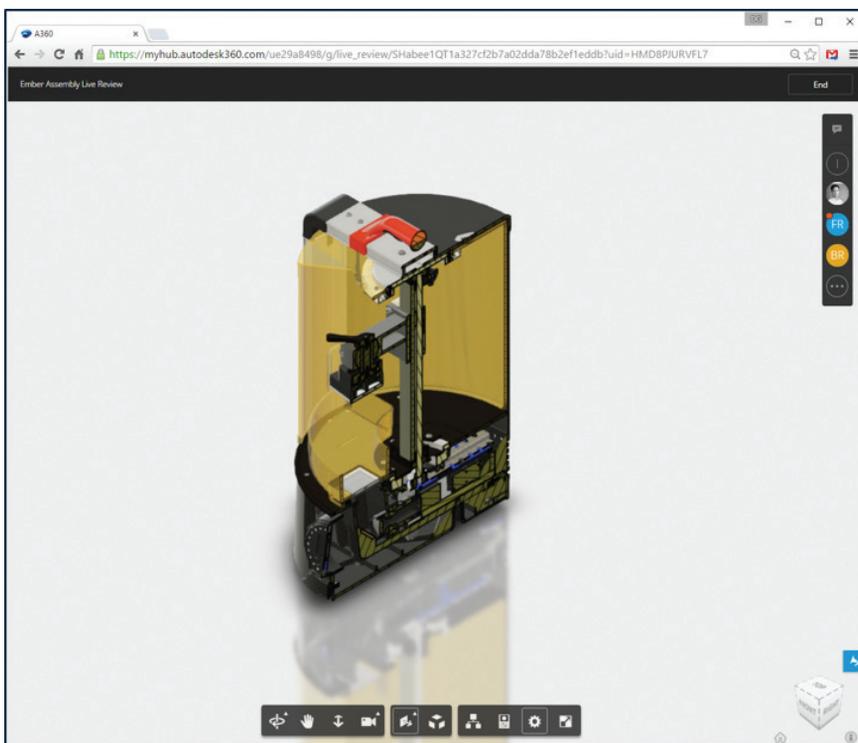


Figure 4: Fusion 360's real-time live design review

INTEGRATED DRAWING IMPROVEMENTS

- Parts lists now include balloon alignment, and part renumbering is rightly distributed back to the Bill of Materials (BOM).
- Drawing centerlines and hole centers update dynamically as the model changes.

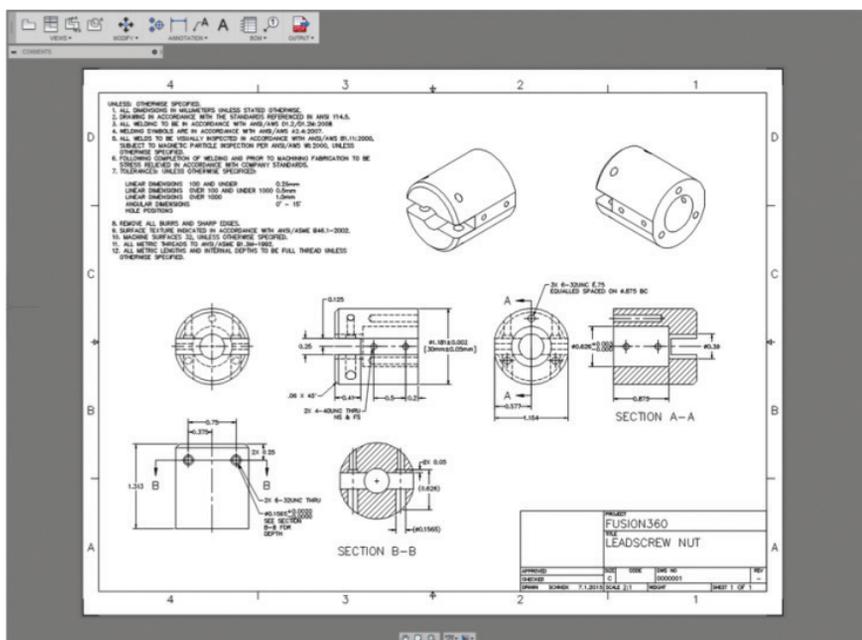


Figure 3: Fusion 360's improved drawing capabilities

ACCESSIBILITY WITH AUTODESK 360 INTEGRATION

Fusion 360 models are stored in the A360 cloud, Autodesk's cloud storage and collaboration space. The A360 and Fusion 360 teams have been working together to improve their cloud space and functionality. I think that recent changes are beginning to add value for subscribers, and that certain enhancements in A360 are a wonderful fit for Fusion customers.

Fusion Simulation Results – Simulation results will be visible and interactive for invited team members. Controls are available to review the results of studies for each file version, without needing anything beyond the web shell.

Restricted Invitee Viewing – A360 now offers Read-Write and Read-Only access to data stored on the cloud, which is a critical improvement. Fusion team members can now invite non-team individuals to review the model through the web shell, but not have any access to the actual model.

Real-time multi-user design review – Fusion 360 offers a portal that permits team members and invitees to view the model simultaneously, and chatting and driving the model view as desired. This is a great addition and is available from the web shell or directly within Fusion 360.

A360 has implemented numerous UI changes, and Autodesk hopes these will make the space data-centric and more usable for teams than in the past.

Fusion 360

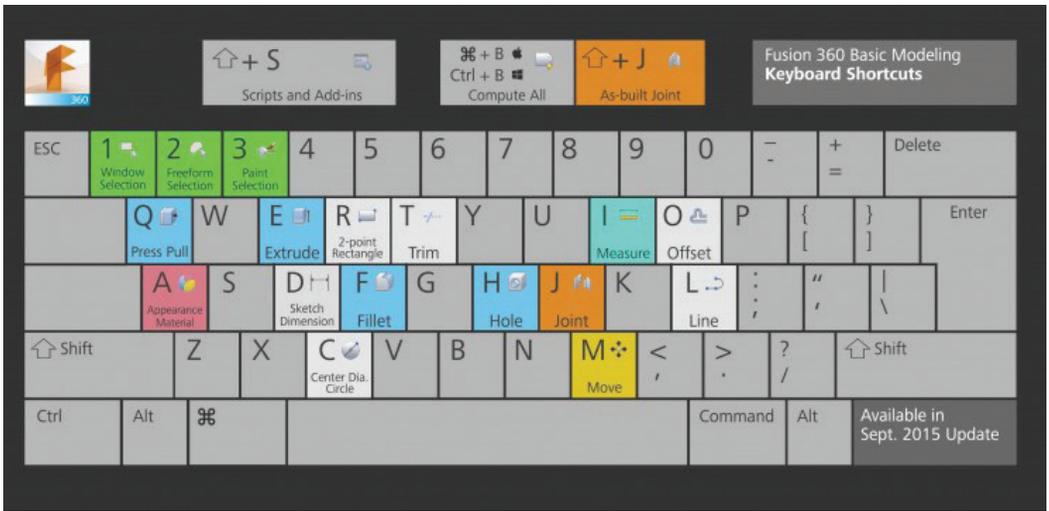


Figure 5: Keyboard shortcuts

KEYBOARD SHORTCUTS

Following along with the numerous user requests and the Fusion team's apparent desire to fulfill these, Fusion 360 now employs keyboard shortcuts. Tips and training materials for Simulation are available online, and the team has stated that command searching will be available, but I have not seen this yet.

COMING SOON...

The Fusion team has not been very reserved about their plans to bring back all of SIM 360's capabilities and more. Included in their plans are thermal and transient studies as mentioned before, but the company is also trying to bring non-linear solutions to the 'Fusion' table for the first time. Add to that the cloud solving capabilities, which as I understand it, are already waiting and planned for the end of 2015. The reality is that the infrastructure needed has already been in place for other services such as Inventor Optimization, Sim 360, Simulation 360, and Simulation Flex.

Will they turn on the Nastran solvers for Fusion 360 Ultimate? I think they should. Why? Because I'm not only a world renowned engineering technology writer, I'm also a customer.

Humor aside, the fact is that Nastran brings with it a significant level of trust and validation. If Autodesk wants to market Fusion 360's simulation platform as a way to bring validation tools to those who need lower priced (and capable) software, they may very well need a bit more for their customer's clientele. The Fusion 360 team is likely not too concerned about this though, as Fusion 360 continues to be leveraged as a capable tool for start-ups, noting that professionals will likely prefer to use Inventor's features.

The team has also noted that they intend to build on drawing capabilities and simulation as time passes. Branching-merging PDM workflows will hopefully be part of the next major discussion on Fusion's upgrades as A360's data management possibili-

ties expand. If I had to name the big ticket items I'd want to see in the next year, these would be on the list:

- More "oomph" for drawings
- Better UI in terms of model parameters
- Sheet Metal
- And my ongoing #1 Fusion request of all time: Feature dynamic relationships. That's where holes, for example, move with their respective shaft counterparts. You move the shaft for some reason, I bet the hole (and bearings) it mates with will have to move, too.

Fusion 360 improvements continue to impress me. While I need a bit more power and comfort in the design process, the Fusion 360 team continues to bring more value to the design and collaboration table.

To learn more about Fusion 360, check out the Fusion 360 Facebook page.



John Evans is the Managing Director and Technical Specialist at Design & Motion, an international R&D firm, helping customers with product design, manufacturability, and validation. He is a US Air Force veteran and has over 20 years of design, manufacturing, and fabrication experience in aerospace and industrial machinery, and holds various industry certifications including Autodesk Inventor Professional. John is a devout fan of simulation technologies, material sciences, and continues to pursue his education in aeronautical and mechanical engineering. John's role at Design & Motion includes technical research and journalism related to engineering software from around the world, with published articles in various design related journals and magazines, as well as the company website. John speaks Japanese and English, loves aircraft, loves his wife and 2 boys, and would rather be on a 1000 yard rifle range right now. You can reach him at john@designandmotion.net



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Seven Strategies for Choosing the Right Training Program



How do companies choose where to train their employees in Autodesk® Revit® or AutoCAD® Civil 3D®? Is all courseware the same? Should the cost of the class be the deciding factor? Should students simply show up, or do they need any preparation before they attend? And what can they expect to happen after the class?

Following is an interview with Matt Miyamoto and Sash Kazeminejad, two instructors from Ideate, Inc., an Autodesk Developer Network member for more than 20 years and Autodesk Platinum Value Added Reseller, to understand the whole training process from the instructors' point of view. Miyamoto is a licensed Civil Engineer in the state of Hawaii. Before he became an instructor with Ideate seven years ago, he logged nearly a decade of experi-

ence in residential and commercial site development; water, drainage, and sewage systems, and harbor and roadway improvements.

Miyamoto described some recent changes he's observed in AEC students who typically attend his classes. "At first, when everyone was adopting Revit for Architecture and Civil 3D, our classes were packed with students who were unsure about the value of the new software. They had been doing things differently for much of their careers. But we notice that the latest round of students, often directly out of school, are quite open to learning new processes, theories, and styles," he said. "Success depends on having an open mind, and I think the AEC industry really understands that now. Our students realize that there will be change ahead, change that is perhaps uncomfortable, but it will be for the better."

That open mind is critical, given where the focus of training might develop in the next few years. "Collaboration is probably the number one thing you'll hear about in the near future," said Miyamoto. "During the last several years, everyone got up to speed in learning how to create their own 3D model. Now, people will need to create 3D models that display well together with models from other departments. You'll have civil engineering models, building models, and structural models. The way I envision a meeting in the future, I will be able to see a model of my building, as well as a model of the pipes that will go in the building, as well the river landscape in which that building will be situated. For something as sophisticated and complex as this kind of collaboration, training will be absolutely key. Not only training in how to work within Revit or AutoCAD Civil CD, but more customized training for a company's employees, such as training in that company's standards and specific needs. We spend a lot of time thinking about how the most effective training for that scenario will look."

Like Miyamoto, Kazeminejad spends most of his waking hours thinking about how to become a better instructor and offer a better training program. In fact, Kazeminejad was recently selected as the top North American Autodesk Training Center (ATC) instructor for 2015. Since he became an Autodesk Certified Instructor in 2014, more than 200 students submitted evaluations attesting to his enthusiasm, expertise, and effectiveness. His performance quality gave him top North American rating among the 635 active Autodesk-certified instructors. "We've gone through this Revit and Civil 3D training ourselves," said Kazeminejad. "We've been where our students are now, so we can relate to their experience, and we can help companies to think of certain criteria as they search for the best training."

Miyamoto added, "I remember everything about my own initial AutoCAD Civil 3D training experience. It was five days of more information than anyone could process, then the instructor gave us a phone number and a 'See ya later.' That learning model is flawed, in that it is not enough. You cannot drink from a fire hose; the learning process happens a little at a time. Topics and concepts should be broken down into smaller pieces that students can understand and integrate, and then the instructor should build on those pieces."

"My goal is not to put a book on your desk and walk away," Miyamoto added. "My goal is to engage you and then teach you principles and techniques that will help make your job easier and your approach more efficient."

Between them, Kazeminejad and Miyamoto created a practical, applicable list of strategies to consider and elements to look for while choosing the right trainer for employees who need to learn.

1. **Identify that there is a need for training.** Was there a recent change in your industry? Are clients beginning to ask for certain deliverables that you unfamiliar with? Did several new employees just join your company, or are you the new employee, fresh out of school?
2. **Identify your specific training need.** Make an internal assessment so you can easily explain to management and potential training companies exactly what you're looking for. Maybe seven employees need training on everything that architects can do in Revit, or maybe only one person needs that training and the rest of the crew needs to get updated on office standards.
3. **Carefully examined the website of the reseller/trainer you are considering.** Examine not only the courseware, but also the training team members' credentials. Where are they coming from, what professions? You'll want, ideally, instructors who have worked in your profession and in the industry versus trainers who simply know how to operate the software.
4. **Explore the training program itself.** The training program should be clearly and comprehensively explained on the company's website. The training should be suited to your real-world needs of reducing time-to-market, increasing productivity, and maintaining quality standards. The courses should qualify for Professional Development Hours (PDHs) either under AIA or ACEC guidelines. But don't just stop there. Suppose you examine five or six training companies and narrow that group down to three. That's when it's time to pick up the phone and call each reseller to have a discussion about the topics that they list on their website. You can actually speak to one of the instructors about the depth of topic coverage in their class.
 Good instructors look forward to speaking with you because listening to your requirements helps them to keep their curriculum current and relevant. After a fact-finding discussion, they may even be able to identify a different course that works better for you or your company. It's possible that you, your group, or your employee will benefit from custom training more than from a standard two- or three-day class, because they are past a certain level but not yet up to the next level. Choose instructors who appear to be passionate about the material and are driven to succeed in teaching.
5. **Before class starts, the training company should reach out to the students.** Students do not benefit from walking into a class without preparation. Ideally the training company will say, "Here is the outline of what we are to cover. Be on time, and bring your questions with you to class." Expectations should be set ahead of time so that the students have some idea of what they're going to be studying.

AutoCAD Civil 3D

Meanwhile, students should also know what they want to get out of the class. As a student, arriving with a goal or an outcome in mind will help you to know, during the class, when you've hit your milestone. You should be able to communicate your goal with the instructor during the first day of class. Just as the instructor's responsibility is to tell you what's going to be covered, you are responsible for saying, "By the way, I really want to know how to add notes and annotations to my slide," or "We need to know how to design a road by the end of this class."

6. **Blended learning should be part of the curriculum.** After the standard, in-person, two-to-three day classes, the blended learning methodology is to follow up with numerous resources such as reading material, self-paced video, and other forms of eLearning. Blended learning is a hot new development in training; in fact it was discussed at last year's Autodesk University ATC Summit. Several companies are developing their own blended learning resources; Ideate's package, for example, includes 90 days of support (via phone and e-mail) with experts who have real-world knowledge, plus access to self-paced video tutorials through "CADLearning Portal" so students can remind themselves of what they learned, build on what they were taught, and stay current on any Autodesk software updates.

"We want our students to continue to be able to apply their newfound skills, even if they don't have a project waiting for them back at work," said Ideate Training Manager, Jennifer Anderson. "Blended learning continues the support and reinforcement of their lessons." Students can practice exercises that are focused on their own scenario, such as interiors.

If the Autodesk software is updated, students can learn about the updated software as part of their training package. "We are passionate about keeping our client current in their products," said Kazeminejad. "We want to maximize return on your investment in our training service. There's never just a one-off between us and our students." In addition, Ideate has a policy in which a student can come back and retake a class within a year. "We hear from students that it's a lot easier the second time around," said Miyamoto. "The things they didn't get the first time around are suddenly easy for them and that's well worth the investment of their time."

7. **Customized learning should be an automatic part of the trainer's offerings.** Customized learning is curriculum assessment and development to fit your company's specific needs, and whether held at an Autodesk Training Center or at your company, your group learns in a private environment. "More and more of our customers are requesting this service, especially companies using AutoCAD Civil 3D," Miyamoto said. "Often they determine the need for this group learning after they have brought all their newcomers up to speed with the standard classroom experience." If a company wants its group to take a certain focus geared toward their profession, they can take a class just for that, such as Revit Architecture for Interior Designs. Or they can simply fine-tune their skills, bringing a mixed-level group of skillsets to a single higher level.

"We also do consulting as a follow-on to customized learning," Miyamoto continued. "Suppose you take a three-day class and then hit the ground running on a huge project in your office. An instructor can visit your site and lead your group through those initial software hurdles that present themselves on this project. We offer this to reinforce the value of our instructional offerings as a whole."

Kazeminejad added, "I'm a huge believer that continuing education and face-to-face training are valuable in every sense. Videos are very helpful and can offer a robust training experience without expensive travel costs, it's true. But that face-to-face relationship, in my opinion, is more important. Questions will arise in a class that the instructor can answer immediately—you can't get that from a video. You will also receive immediate feedback from an instructor as to how you are doing.

"When we teach, we make sure to always give you the theory behind why you are pushing certain buttons, and that's a benefit from the face time with your trainer. Once you have the theory, you'll be better able to remember the process. Best of all, you can lay all your questions and concerns right out on the table. Being able to relate to a live instructor is a big motivator to be a good student. Regardless of your skill set, you'll always come away with something new."

"Don't settle for the first company that comes up on an Internet search page, concluded Miyamoto. "Look for Autodesk Certified Instructors (ACI) at least. At Ideate, we have learned, during our ACI training, to incorporate aural, visual, and kinesthetic learning styles, and we break topics into small, repeatable cycles that build upon each other. That's because our CEO, Bob Palioca, has made it our mission to overwhelmingly delight our customers. Our students are an important part of our customer community, and we think constantly about how to improve their experience."



Matt Miyamoto



Sash Kazeminejad

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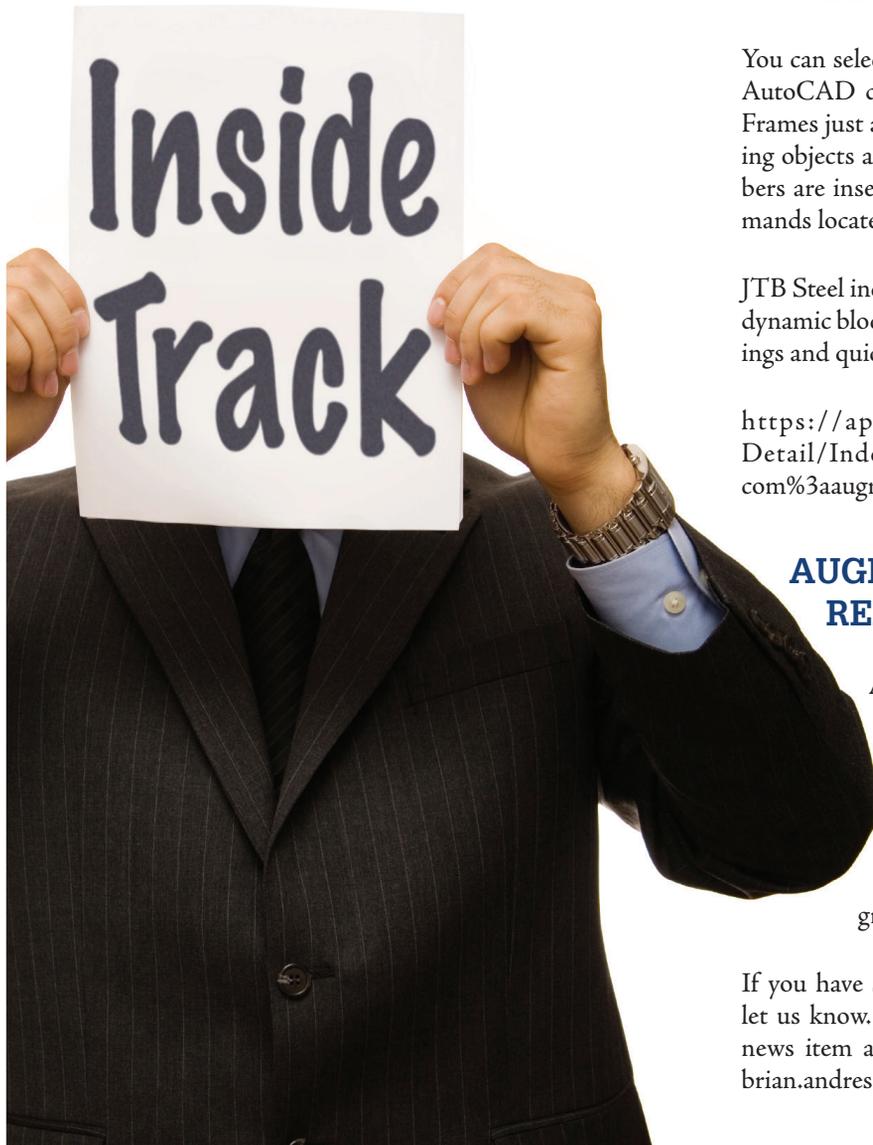


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