



AUGIWorld

The Official Publication of Autodesk User Group International

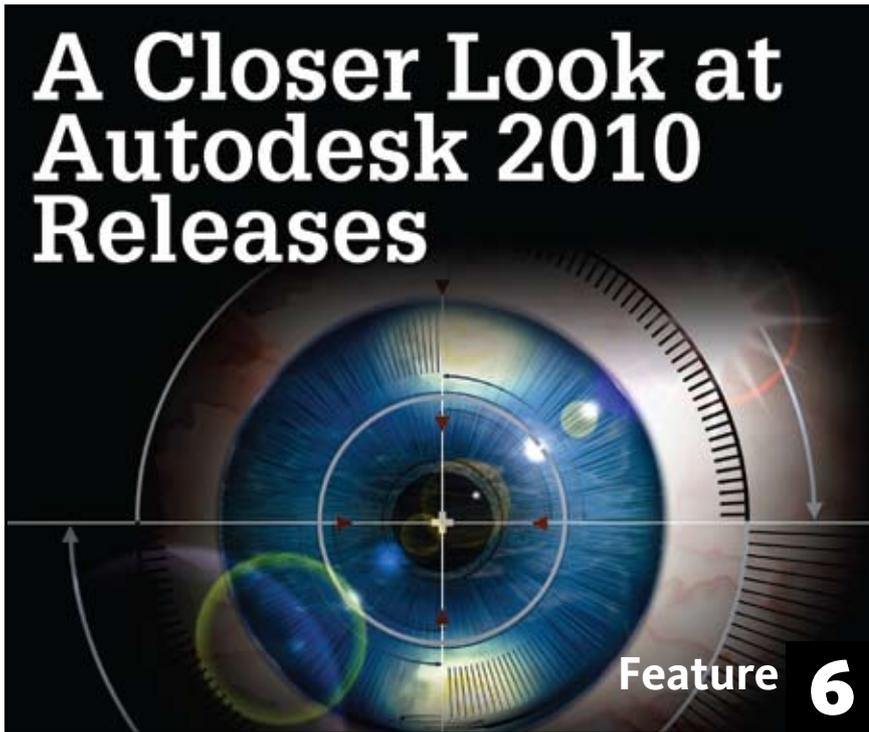
A Closer Look at Autodesk 2010 Releases



Plus...

- *CAD Manager – Cost Cutter*
- *A Lesson in Constraint Fundamentals*

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AUGIWorld

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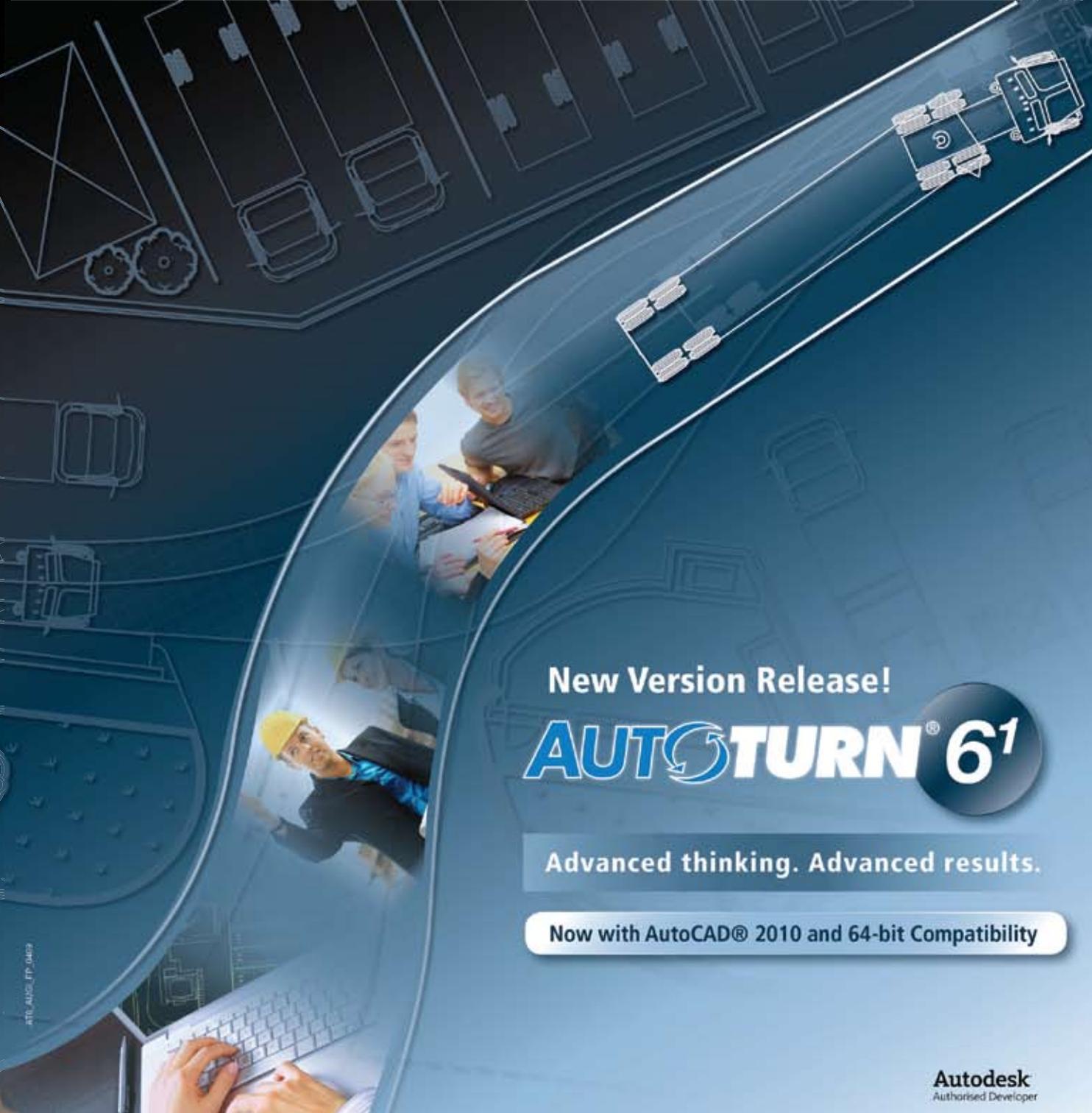
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The CAD Manager



CAD Manager – Cost Cutter

In this kind of economy and the global impact it has made, CAD managers must think about how to save their companies money. Saving money for your firm is one part of your job that you can never stop thinking about. You need to keep within budget, reduce outlays, and keep a lid on spending.

I didn't know if I wanted to start with this topic by telling you about how to save money or start by telling you that your main focus is to invigorate those who generate revenue for the firm. I do not want you to think that saving money is your eternal top priority. It is important, but you should never let it be your only focus.

Your overarching focus should be to empower your users to know more, use the software better, create content quicker, avoid potholes in the process, and get the job out the door before it is due. This is your main trajectory. This should be what drives your thinking, your efforts, and your budget.

But there are times when you have to think in an expanded manner about saving money. So what can you do? How can you save? Here are a few areas that can bring some good returns.

Postpone whatever is not absolutely demanded

Most budgets are developed with a lot of breathing room. Mine includes a lot of "wish list" items that I will purchase if my firm is doing well. When times are good, these items are added to my available list of tools. Adding these items will benefit everyone and they are often the one item that has been desired by many for most of the past year.

But when times are tough, you need to scale back. The first items to go are these wish list items. These items should be defined in your mind, but may not be flagged on your budget. They are the ones you wish you could purchase, but you are



waiting until you have enough room in the spending plan to cushion the decision. Well, that cushion is most likely gone now. These days, every firm that I come into contact with is trying to find ways to save a few bucks. You need to help out with this process inside your firm.

This discussion is pointed toward postponing the purchase of those items that can be postponed. There are several items that cannot be postponed. Failing hardware and faulty software are among them. If your users have outstripped their existing hardware or software, then upgrading it may not be an option. You may have to divert monies from one area to another to cover this need.

Defining "needs" as opposed to "wants" is sometimes difficult. Keep in mind that everyone frames their "wants" as "needs." It may be difficult to sift through the perspectives of others as they explain how much they NEED that software purchase or hardware upgrade. Ask yourself what will be gained from the purchase. Will it solve a real problem? Will the new software fix a legitimate issue? These questions will need some hard thought as you try to separate the real issues from the ones that are overblown.

I typically ask these questions to narrow my thought process.

- What will we gain from the purchase?
- Is there something else we can purchase that will get the job done cheaper?
- What will be fixed by the purchase?
- What will happen if we do not purchase what someone "needs"?
- Who will be impacted by postponing the purchase?

Look for hard facts and not opinions. Facts overrule opinions. There may not be any factual information on some purchases and you will have to make the wisest decision you have based on what you know.

Rethink everything you spend

When you do make a purchase, think long and hard about what you are buying. Think in the long term. Think about where you can get the most bang for the buck. Think about where you can make the largest impact on the most people and projects for the least amount of money.

It may be time to act differently than you have in the past. Is it time to go on subscription services for software or maybe to get off subscription? Subscribed maintenance, or whatever the vendor may

call it, allows you to be stable from a financial perspective because you know what the cost will be over the next few years. But in times like these, you may need to drop some of the subscriptions that you have and adopt a “pay as you go” plan. Paying for upgrades at the time of need is sometimes harder to justify when times are tough and reducing your subscriptions may cause future troubles when you really do need the upgrade and have to go begging for money.

Maybe you should see what is out there in the Open Source world. This may not impact your CAD dollars, but it will make some things easier on the wallet than dropping big money on proprietary software. Or maybe you should think about upgrading your existing hardware rather than replacing it. Adding RAM can squeeze a little more out of aging equipment.

Do your homework on upgrades. Be ready to defend your purchases because they will be challenged. You need information, test results, input from others, hard facts, and valid opinions to make the case for a purchase. Act as if it were your own money. Would you buy the product you are asking your firm to buy if it came out of your pocket? It does come out of the same revenue stream that pays your salary, so in a way it is your money. In today's economy, saving money saves jobs.

Renegotiate every contract you have

Now is the time to revisit every recurring cost. Write down everything in your budget that is paid on an annual or monthly basis. Include software, hardware, support, consulting, and anything for which you are invoiced from the same provider every month or year.

What you are going to do is call each one of them and ask for a reduction in price. But first, do some prep work. Find out what you have and make sure that it is a current list. Find out how many licenses of software you own and how many are actually being used. If you have under-purchased and actually have more installed than you own, then call them right now and buy those extra seats. Always stay within your license count. If you have an overage, then make a note of it and see what the impact would be if you reduced the annual support of those licenses. You may have to repurchase from scratch if you let them expire. Some developers allow licenses to be set aside and renewed in the future as part of an upgrade. It will usually cost you something if you let them lapse, but it may be a needed thing to do in the short term.

Stay close to the money people inside your firm. Get a history of the account processing before you contact the vendor. Are the bills being paid on time? Do the vendors have any outstanding invoices? Nothing kills your hopes of a good negotiation more than having them tell you that the bill has not been paid for three months. Having a good standing with the vendor and being paid up, with a history of good payments, gives you leverage. You can appeal to the fact that you are a good customer and deserve a discount.

Speaking of invoices... are you reviewing every invoice? Sometimes the accounting department is disconnected from your discussions and does not know what the payments are for. Your company may be paying for something that you did not agree to. Always check invoices from time to time to make sure that costs have not crept in that you did not approve.

Know their business. You need to do a little research on the companies with which you will be dealing. Check out the press releases on their websites. See how the business climate is for them and their product. If it is a new product that they are trying to get into the market, they may be willing to deal. If it is an older product whose time may be passing, they may be willing to deal. If they have just been bought out by a competitor, they may be willing to talk. Anything that you can find that will reflect their need for a sale will help you in your process.

Okay, now we are ready to take action. Take that list and start calling to renegotiate your agreements. You can take several stances when you do this.

Play hard ball

Go in armed with your facts and perspectives and play it hard. Ask them to discount something or there is a strong possibility that you will have to take your business elsewhere. Do this only if there is somewhere else to take your business. Do not state that if they do nothing you will actually make a move. Just get them concerned that you might. If you threaten to move unless they give you some form of price break and then they do not, you will have to move or eat your words. This will make it impossible to ever play it hard with them again if you end up staying with them. They will know that you were bluffing. So don't do this unless you seriously have another contender in the running for your business. Never lie to a vendor – it isn't moral, professional, or a good practice. Play it hard, but keep it honest.

Play nice guy in need

You could play it nice to see what they can do for you. You will not get as good a discount as you might from playing it hard, but you may not be comfortable with playing it hard. Playing nice does not have to be soft. You could plead your case without begging or groveling. Keep it along the same lines as playing hard, but couch it in terms of your need to save money or you might have to cut something and you would not want to cut back on their contract. There is never any harm in asking them to do better. I typically do not give them a hard figure that I am looking for. For example, I don't say “cut it by \$10,000.” I simply ask them to do better on the price. Remind them of your loyalty and love for their product. Remind them that you have been doing business with them for a long time. Keep it friendly.

Appeal to their soft spots

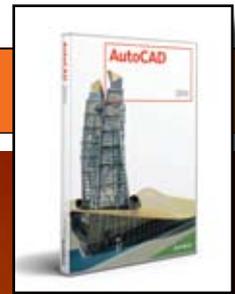
Find the spots where they are weak or where they are trying to get strong. This is not an aggressive stance. It is one that appeals directly to their needs. They may need to sell one version of software. Or they may be nearing the end of their sales cycle. They may have bundled discounts when you buy multiple products. They may have a new product that they are trying to get into the market. They may be willing to partner with your firm to get some feedback or prime the pump of industry penetration. Do your homework and you will uncover one of these areas that you can use to help get a better deal.

Conclusion

So when you are looking to save a few dollars, euro, or deutschmarks, keep some of these items in mind. By looking into what you have, what you need, and what the vendors are offering, you will find ways to reduce your outlay, improve your financial position, and generate a favorable standing from your firm.



Mark W. Kiker is president of the AUGI Board of Directors. He is a National CAD Standards Project Team Member and team member of the National BIM Standard. Mark is general editor of BLAUGI and also publishes caddmanager.com, the CADD Manager's journal, as well as the caddmanager.com blog. He is a returning faculty member at Autodesk University. He is currently chief information officer for HMC Architects in Ontario, California, USA.



AutoCAD 2010: A New Twist on Design

Hear Ye, Hear Ye... all gather around. In March, Autodesk released the newest version of AutoCAD®. If this sounds familiar, it is for good reason. For the past five years, Autodesk has been releasing new versions of its software in March. This event has become more predictable than the groundhog's indication of an early spring.

Let's look back at the last couple of releases. AutoCAD 2008 introduced new ways of working with annotation in drawings and AutoCAD 2009 brought a new user interface, 3D navigation enhancements, the Action Recorder, and much more.

With so many useful features and enhancements in the previous two releases, what could Autodesk find to pack into another new release? AutoCAD 2010 does not implement anything new like using brain waves to command translation, but it does further refine 2D drafting and implements 3D mesh modeling. (I was hoping for the brain waves to command translation, though!).

User interface tweaks

For the most part, AutoCAD 2010 looks just like it did after the massive user interface overhaul that came with AutoCAD 2009. If you still have not come to terms with the ribbon in AutoCAD 2009, you will be happy to know the AutoCAD Classic workspace is still available.

One of the tweaks to the user interface that you will encounter is the menu browser. Formerly, this feature was accessible by

clicking the Application button, but it has been replaced with the application menu, which is more in line with the one found in Microsoft Office 2007. From the application menu, you can quickly access recently or currently opened drawings as well as search for a command that you might have trouble locating on the ribbon. Figure 1 shows the new application menu and the AutoCAD 2010 user interface.

Contextual ribbon tabs were introduced in the last release, but were limited to a select number of commands. AutoCAD 2010 expands the use of contextual tabs to include certain commands and whenever an object in the drawing window is selected. Figure 1 shows the External References contextual tab displayed on the ribbon, but not active. In addition to the new application menu and contextual

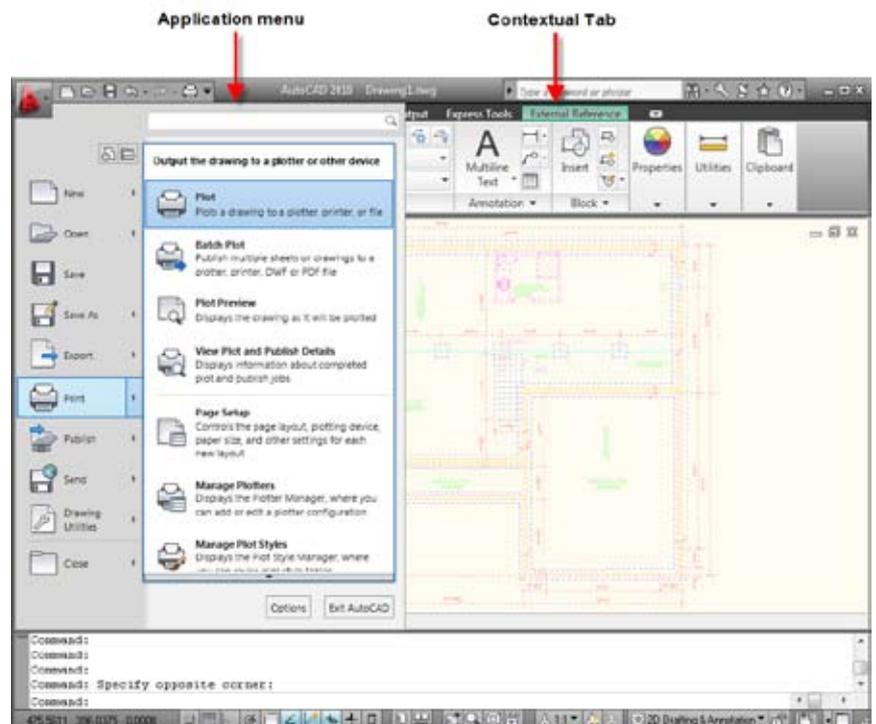


Figure 1: New application menu and the AutoCAD 2010 user interface.

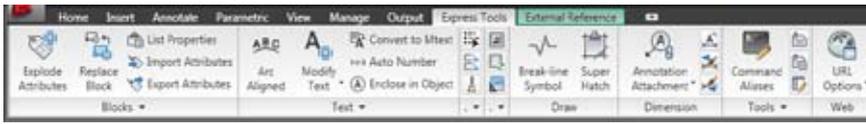


Figure 2: Express Tools ribbon tab.

tabs, the ribbon itself has received some minor tweaks of its own. Many of these are in the placement and grouping of commands, designed to improve workflow and discoverability.

The ribbon has also seen a new Express Tools ribbon tab (see Figure 2) that contains, what else, the Express Tools. Now, you will no longer need to display toolbars or the menu bar if you want to access the Express Tools when you are using the ribbon.

Parametrics to the rescue

Have you ever seen Autodesk Inventor® in action and wished that AutoCAD had the ability to do parametric drawing? Perhaps you are not even sure what parametric drawing is. My guess is that once you find out what parametric drawings are, you'll likely wonder how you worked without them all these years. Parametric drawing is the ability to add constraints to geometry in a drawing and then make the geometry react or behave in a specific way.

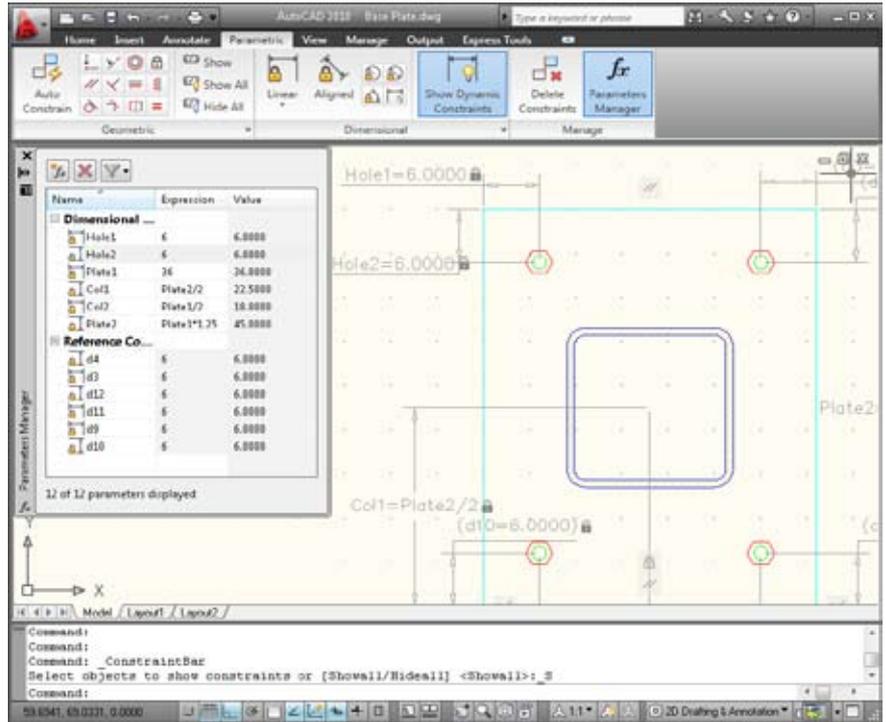


Figure 3: Geometric and dimensional constraints.

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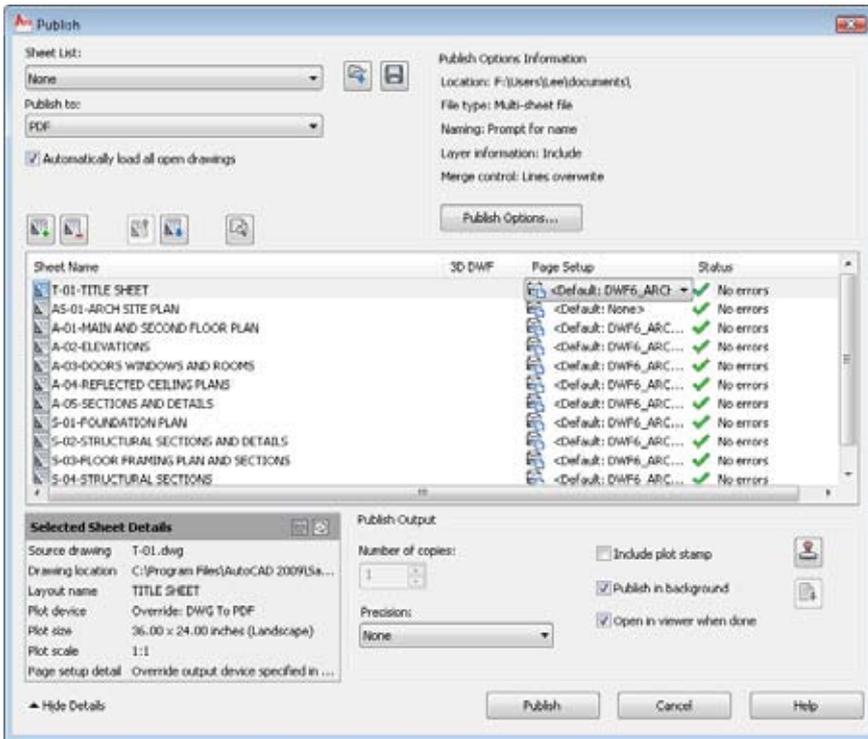


Figure 4: Enhanced Publish dialog box.

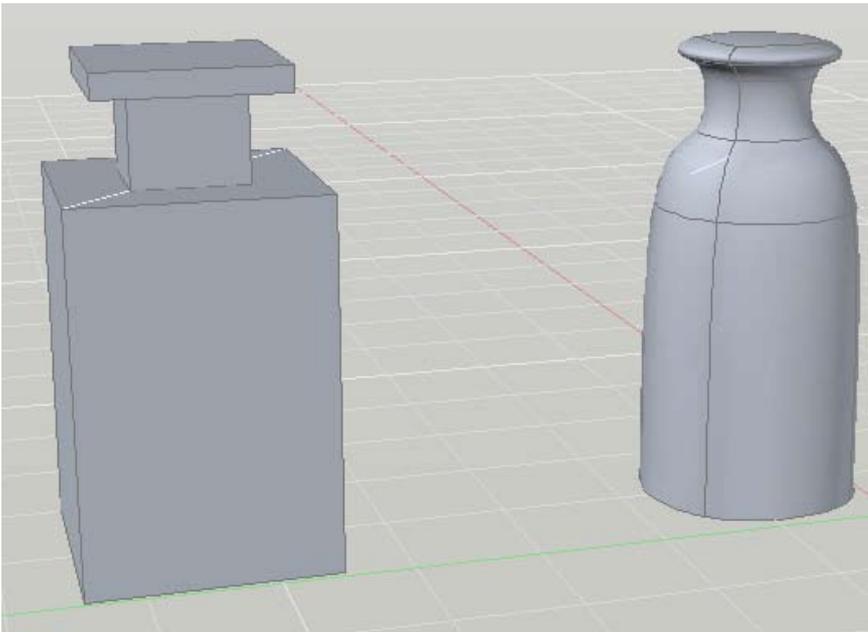


Figure 5: Transform a square, harsh model to something smooth and organic looking.

ment. There are two types of constraints you can use: geometric and dimensional. You can also force geometry to remain perpendicular or parallel to each other, along with many other types of constraints that can be applied to geometry in a drawing. Dimensional constraints can be used to drive dimensional values of the geometry in your drawing and can also be used to annotate your design.

PDFs, your way

Producing a PDF file from AutoCAD was always left up to Adobe or a third-party utility until several releases ago when a dedicated plotting device to output a drawing to a PDF file was introduced. This early PDF plotting device had some limitations such as producing single sheet files unless you used sheet sets and no way to retain layer information. Well that has changed with AutoCAD 2010. You can now use the PUBLISH command and the Publish

**AutoCAD 2010
takes a
huge step
forward by
introducing many
new features
that allow you
to transform
your models into
organic looking
objects.**

dialog box (see Figure 4) to output multi-sheet PDF files and decide whether or not layer information should be retained.

Why the focus on layer information, you might wonder. Well, you can now attach a PDF file to your drawing as an underlay just like you can with DWF and DGN files. To attach a PDF file to your drawing, you can use the new ATTACH command, which allows you to attach a drawing or one of the other external reference file types. You can clip, control the display of layers, and adjust the display of a PDF underlay just like you would a DWF or DGN underlay. The new CLIP, ULAYERS, and ADJUST commands can be used with xrefs, underlays, and raster images attached to your drawing to help simplify workflow.

Going organic and printing in 3D

3D modeling in AutoCAD is nothing new—it has been around since Release 13 as part of the product and as an add-on prior to that. What has changed over the years, however, is the functionality offered. AutoCAD 2010 takes a huge step forward by introducing many new features that allow you to transform your models into organic-looking objects. You can convert 3D solids into meshes and then apply smoothing to them (see Figure 5), or you can create new mesh primitives from scratch before smoothing them. Meshes can be smoothed and creased, and the faces of a mesh object can be split.

Along with being able to model new organic-looking objects, you can also modify 3D objects much easier and print a 3D model using a 3D printing service or printer. When modifying a 3D model, you can now select sub-objects such as faces and vertices with the new sub-object selection filter. In addition to that, a new Gizmo and command are available for scaling in 3D and there have been some modifications to the 3D move and rotate Gizmos as well.

Other drafting enhancements

In addition to some of the major features introduced in AutoCAD 2010, you will also find many small yet exciting changes that can increase your productivity. The following is an overview of some of the smaller changes you might find useful.

Autodesk Seek integration – Autodesk Seek allows you to search an online database of design-related content and insert it into your drawing.

Spline to polyline – The PEDIT command now allows you to convert a spline to a polyline object.

Reverse direction – The REVERSE command allows you to reverse the order of points and vertices on objects such as lines and polylines. Great for fixing the orientation of linetypes that contain text.

Rotate viewport – The VPROTATEASOC system variable controls whether you can rotate a viewport on a layout without needing to rotate the objects in model space.

Initial setup – Initial Setup allows you to do some basic customization of your AutoCAD drafting environment. It allows you to specify the discipline that best describes your work, which, in turn, is used to help locate information on Autodesk Seek and related partner products on the Autodesk.com website. Other customization opportunities in Initial Setup include the ability to select which task-based tools you want displayed for easy access and which drawing template you want to use for new drawings.

Measure geometry – The new MEASUREGEOM command combines the functionality of the DIST and AREA commands among other functionality, into a new and improved command that offers many enhancements including visual feedback over its legacy counterparts.

Customization files and CUI Editor – Customization (CUI) files are now CUIx

files, which contain all the elements of a CUI file and any bitmap files that are referenced by the commands in the CUI file. The Customize User Interface (CUI) Editor has been enhanced to make it easier to customize Quick Access toolbars (QAT) and define which ribbon tab should be displayed when the conditions for a contextual tab state are met. Additionally, if you have any dashboard panels that you created with AutoCAD 2008, they can now be migrated to ribbon panels.

AutoCAD LT 2010 enhancements – In addition to many of the new features and enhancements, excluding parametric drawing and organic modeling, the following enhancements are available.

- Use the ALIGN command to align objects in 2D and 3D.
- Manage and edit block attributes with the BATTMAN (Block Manager), EATTEDIT (Enhanced Attribute Editor), and ATTSYNC (Attribute Synchronize) commands.
- Edit xrefs using the REFEDIT (Reference Editor) command.

Compatibility with previous releases – Compatibility is always a concern when upgrading to a new release of AutoCAD. AutoCAD 2010 introduces a new drawing file format and is not binary-compatible with AutoCAD 2009 and other previous releases. You will need to use the SAVEAS command to save your new drawings to an older format when exchanging drawings with a client who is using an older release. In addition, any add-ons that were written with ObjectARX need to be recompiled.

Conclusion

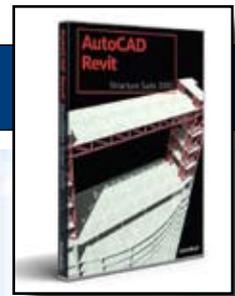
AutoCAD 2010 offers a variety of new enhancements that you will find useful whether you work in 2D or 3D. Features such as improved PDF output and the ability to attach a PDF file as an underlay can greatly improve the ability to collaborate with users who are using a different CAD program or when working on a government project, for example.

For those who use AutoCAD not only for documenting a design, but also visualizing a design, the new organic modeling feature allows you to create more modern and natural-looking models. AutoCAD 2010 offers many new features and productivity enhancements over previous releases. To get a better understanding of just how AutoCAD 2010 can help you become more productive, download the trial version from <http://www.autodesk.com/autocad> or contact your local Autodesk reseller.



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For those who use AutoCAD not only for documenting a design, but also visualizing a design, the new organic modeling feature allows you to create more modern and natural-looking models.



Revit Structure 2010: A New Look and a Lot More

Autodesk® Revit® Structure 2010 has probably been the most anticipated release of Revit Structure to date. A lot of exciting new features and enhancements make this version a “must have.” If you don’t know Revit Structure yet, then this is certainly a version you will want. The software’s new help feature will assist you while you learn the application. This help feature can be turned off when you think you know it all, and turned back on when you realize you don’t know everything.

A new user interface (UI)

For the first time in Revit’s history, Autodesk redesigned the UI. This application now uses the Ribbon technology. When I first looked at this new interface I had second thoughts, but after only a week of use, it makes complete sense why Autodesk took this route.

Gone are the toolbars, menu, and design bars—the ribbon takes its place. It is organized into task-based tabs and panels organized into typical workflows. This all allows for a single access point for all the tools.

Most of the modifiers come up in a contextual tab that only appears when you

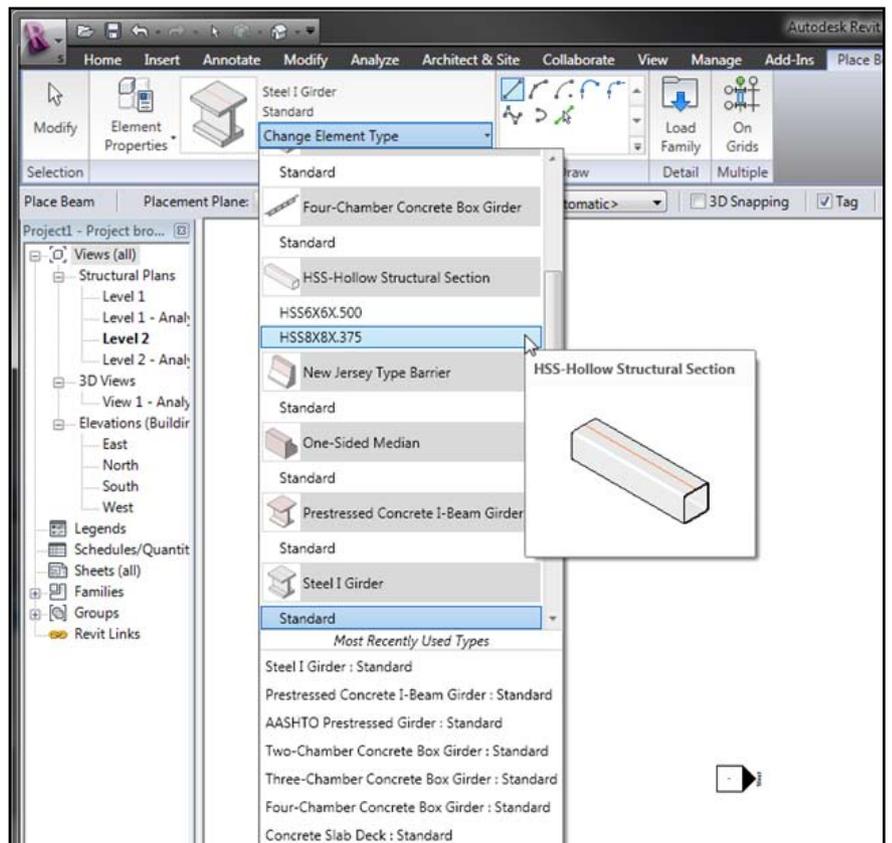


Figure 1: The new ribbon look for Autodesk Revit Structure 2010

select an element or a tool. In Figure 1, for example, I am adding a beam; note the task ribbon tab that appears.

Notice that there have been changes to Change Element Type (formerly the Type Selector). Now you can see a preview of each family; hover longer and you get a larger image of it. Listed below each element are the types for that element.

What was once the file pulldown has been rebuilt and is now the Application Menu located in the upper left-hand corner of the application where the purple R is.

A new InfoCenter has been added to let users have a wealth of information at their fingertips.

New learning tools have been added to aid in the transition from Revit Structure 2009 to 2010. Tooltips, for example, are a learning tool that users will find very helpful. This enhanced feature works when you hover over a command in the ribbon with your cursor. A quick description will appear, but wait a bit longer and a full explanation of the tool appears. In some cases, a picture or graphic will emerge to further explain. If you need more info about a given tool, you need only hit F1 while the tooltip is showing and the help menu will open to that very topic.

The info bar has been cleaned up and placed in the title bar of the application.

Finally, the spell checker has been replaced with an improved version. Some of the improvements include setting your language for the main dictionary and creating custom dictionaries.

There is a new ribbon tab for Dedicated Analysis Tools. Grouping all the analysis tools together and organized by task such as creating a consistent analytical model, checking for required supports, adding boundary conditions, or even adding structural loads.

It should be noted that Revit Structure 2010 does not have a switch back to “classic” interface option.

Conceptual design environment

Now on to some of the more exciting new features. Conceptual Design Environment, in my opinion, will be a favorite of many users. Users can explore early design concepts before creating more detailed BIM models.

What exactly is Conceptual Design Environment? Glad you asked! It is a type of family editor that provides sophisticated modeling tools and techniques for designers to create new massing families. These design concepts contain intelligent model data, which eliminates the need

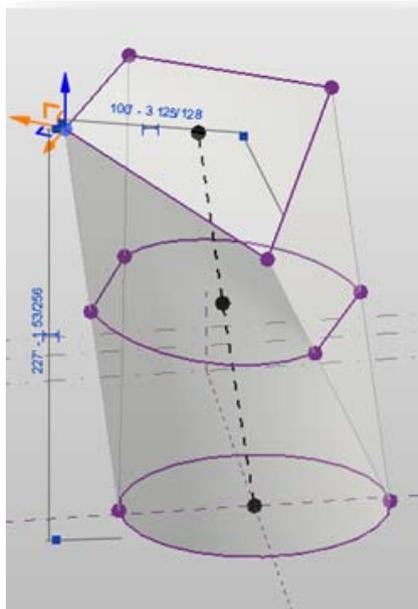


Figure 2: A new conceptual design example.

to recreate a design whenever a change needs to occur.

The new environment contains new features such as:

- Flexible geometric form-making and manipulation tools.
- Enhanced drawing environment that allows drawing directly on surfaces and reference planes.
- Tools to divide surfaces, apply patterns, and create flexible parametric components.
- Integrated workflow with the Revit project environment.

Form making is now easy. Just draw your shape, click a button, and your shape is made. Some 3D forms that can be made are sweeps, extrusions, and lofts. You can

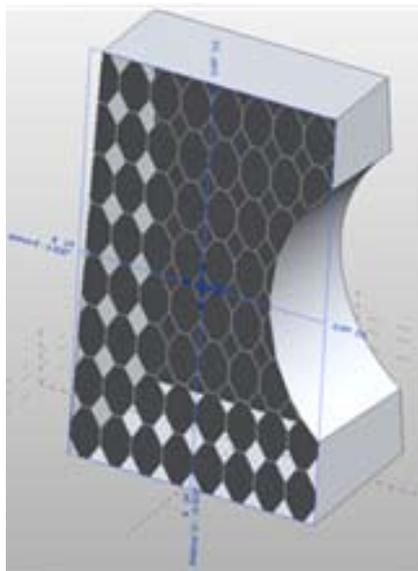


Figure 3: Panelization of a surface.

directly manipulate points, edges, and faces in 3D as well.

Surfaces now can be divided and pattern complex surfaces and add building detail that can be later panelized (see Figure 3). You even can define nodes in your surfaces.

Making forms is a snap now with the sketching enhancements. As you draw, automatic workplane detection occurs so you don't need to always fuss with finding what workplane from which to draw. So in 3D, you can work more effectively with reference planes and automatic workplane detection.

A lot of exciting new features and enhancements make this version a “must have.”

You can use splines with points to manipulate surfaces that are NURB-like.

The new X-ray mode allows you to modify points along surfaces in a environment that incorporates control and visualization.

Of all these, my favorite is a new Gizmo-like modeling modifier tool best resembling the Gizmo in Autodesk 3ds Max® and AutoCAD®.

Columns enhancements

Slanted columns, a long-awaited feature enhancement, are finally in Revit Structure 2010. Slanted columns (inclined, raked, or slanted) have to be drawn in an elevation, section type views, or even 3D views. After drawing them into place, just click them and either use the element modifiers or the element properties to fine-tune or change the slope. Endpoint-driven and angle-driven controls are available.

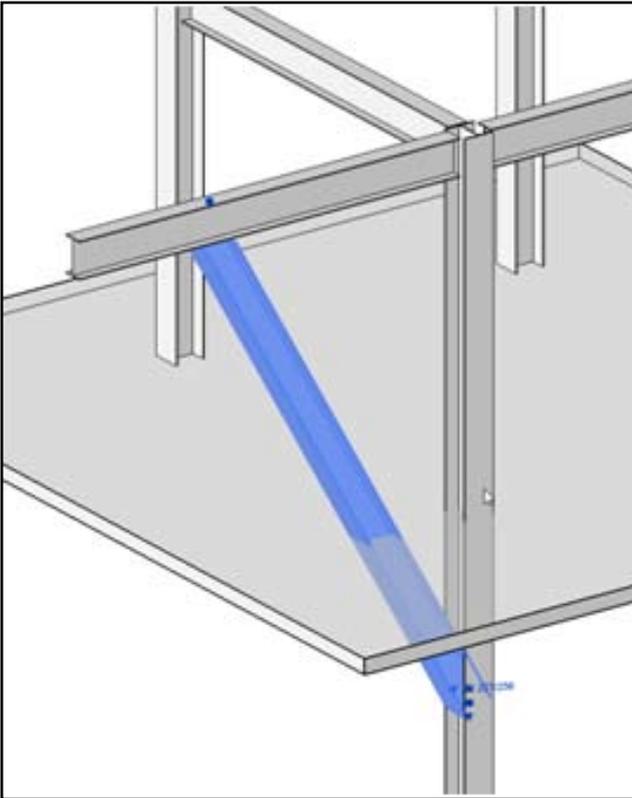


Figure 4: True slanted columns!

Columns now are cut back and set back when beams are adjusted using the Beam/Column Join Editor. But it seems you cannot adjust the columns directly with the editor.

Column Location Mark enhancement is now a schedule property. A label category parameter can be used in schedules and tags.

loads, and load combinations. You will also be able to view tabular and graphic results. This, however, requires you to have the Autodesk® Robot™ Structural Analysis Professional 2010 software in addition to Revit Structure 2010.

The new Bridge Modeling extensions, first introduced to Revit Structure 2009



Subscription holders

New extensions for Revit Structure 2010 are available and Conceptual Form Analysis is one of them. Forms created using the new Conceptual Design tool can be opened directly in this Revit Extension and then you can define support conditions, structural

customers with an Autodesk Subscription, have been enhanced further in 2010.

These extensions allow you to model parametric bridge structures such as abutment, road decks, piers, and bridge railings. You can now import road alignment from civil engineers using LandXML files.

Steel Connection Modeling extension allows subscription holders to model typical 3D steel connections. You will be able to define components for beam to column end plate connections, column base connections and the extension will then automatically create the connection using 3D components (see Figure 5).

Performance

Improvements to Revit Structure 2010 give the ability to design larger, more complex objects without the need to break up the model. In addition, the software now takes advantage of all the RAM on your computer. This is great news for all you 64-bit computer owners. Yes, that's right, Revit Structure 2010 is now a native 64-bit edition for Windows XP Professional 64 bit or Windows Vista 64 bit (Business, Home Premium, Ultimate editions). At last Revit Structure 2010 can move beyond the 4GB limit of 32-bit computers.

Conclusion

I hope you enjoyed a look into the new features of Revit Structure 2010. Some new features and a lot of work lead to a nice looking and greatly functional application to get those magnificent ideals designed, analyzed, and documented—all in one application.



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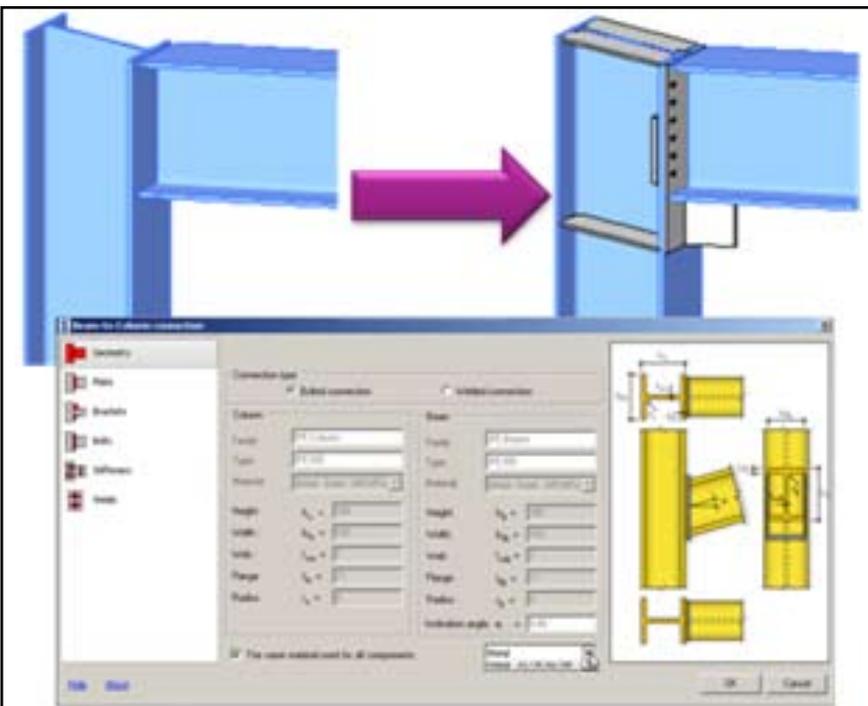


Figure 5: Steel detailing connections possible for Autodesk Subscription customers.

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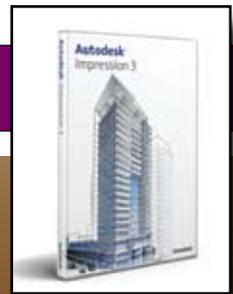
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What's New in Impression 3



What time is it?

It's spring time again. Flowers will soon be budding, birds are headed north, and Autodesk is releasing new versions of its software. Impression is among those products that have been enhanced. It is now into its third release, which for me is difficult to believe. I remember when it was a little bit of code that could be found at the Autodesk Labs website. There, it was allowed to cut its teeth and turn into something that has proven to be worthwhile.

Of course, Impression has changed a lot since its first version. One of the fundamental changes was in its availability—from retail software to free download! That's right; Impression is a free download for those that are on Autodesk Subscription. (Yeah, there's always a catch.) Many people are on subscription now and are already using Impression. If you aren't, then go download it now. I'll wait until you get back.

What did Autodesk do?

The last version of the software, Impression 2, was a great update to the original.

Does Impression 3 follow suit? While Impression 3 doesn't add as many new items as the previous update, it does add several new abilities to current functions and commands. It seems that the approach taken was to make Impression work better with what it had. Autodesk didn't bog us down with new bells and whistles. Impression

3 features enhancements to gradients, blocks, style controls, layers, style libraries, and color books, just to name a few.

Adaptive gradients

Impression users know that you can fill an object with a gradient fill. There have long been two choices for two different types of gradient fills, linear and radial. Now we have a third choice, adaptive gradient fill. Adaptive gradient fills create a gradient fill that follows the outline of the filled shape. By contrast, the other two gradient fill types disregard the outline of the shape. This is a great addition that provides more fill style creations.

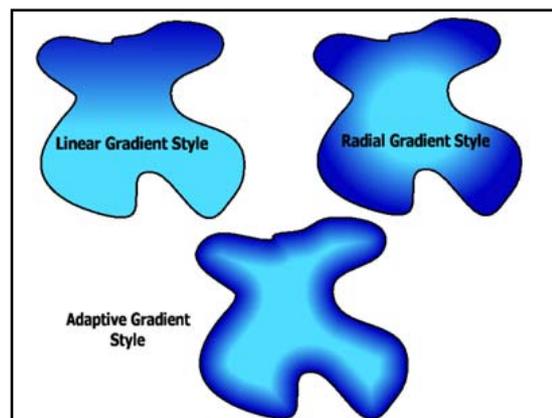


Figure 1: This is an example of the three types of gradient fills available in Impression 3. The new Adaptive Style follows the outline of the object.

Block improvements

Impression uses blocks similarly to the way AutoCAD® and other Autodesk products use them. They allow users

to recreate detailed objects very quickly. They also help to standardize visual representations in drawings. Impression 3 has improved upon the way we use blocks. Many of the improvements allow us to easily identify and manipulate them.

Block identification

Impression drawings will often use several different blocks. Sometimes a quick revision is needed...real quick. The good news is that the object created was a block and was used in several key places. Now the client wants the green trees (a block) to be replaced with red trees. You could delete each block, one at a time, or use the block substitution tool. Okay, you did that. Then the same client wanted... well, you get the idea.

After several block substitutions, you need to know which block instance was which when it was put in. Now Impression 3 can tell you what's what. Move the cursor over any block and hover. While hovering, a tool tip will appear that identifies the block for you. An icon will also appear in your cross hairs that will identify the type of block. The icon will tell you that the block is a standard block, a substituted block, or a multiblock. This enhancement makes interacting with blocks much easier.

Create block from selection

The purpose of some of the enhancements will be obvious as soon as I tell you the name of them. Create Block from Selection is one of those new features. You could create a block from a selection in Impression before, but you had to jump through several hoops to do it. Now, simply select the objects you want in your block and then right-click. A menu will open up and one of the options is "Create Block From Selection." Very handy! Before, you had open the block pallet, select your object, and then click the create block from selection icon, and so on. Much easier now!

More global style controls

Impression 2 gave us the ability to "globally" resize a style. In Impression 3, we can now globally control the rotation of a style and globally control the color (see Figure 2).

We could do these things before by changing the style settings, but now these two tasks can be done rather quickly. The global rotation and color controls work in the same manner as the global resize tool. Go to the style editor and move your cursor over the properties flyout arrow to open the flyout panel. Click the setting you want to change to open the con-

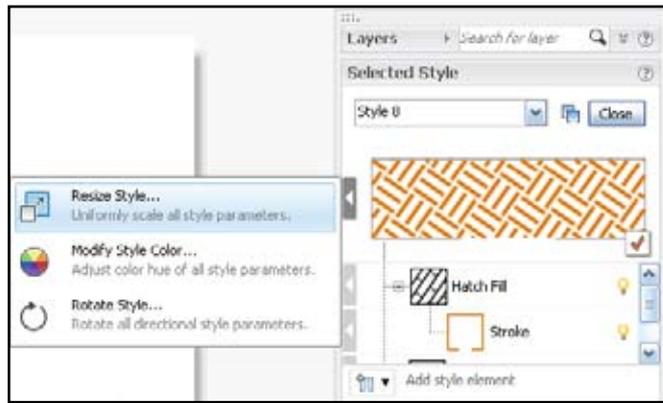


Figure 2: Globally change a style's color and its hatch rotation with a few clicks.

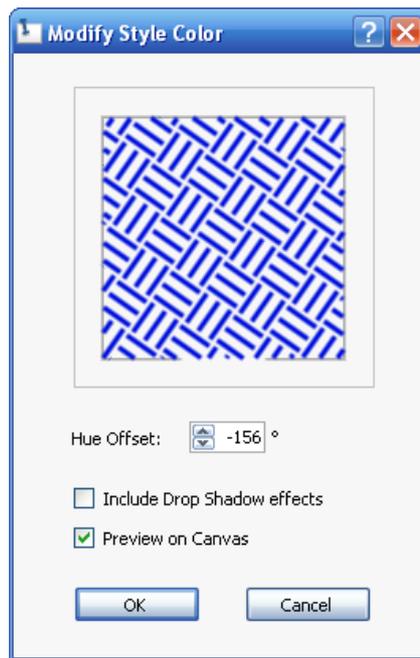


Figure 3: Click the text HUE OFFSET to use as a slider bar to change the color of the style.

trols. All three controls look and work similarly. Click and drag the style control left or right to change the setting with a slider bar interface. It is very quick and easy to change these settings (see Figure 3).

Layer enhancements

Impression is just like AutoCAD in that it uses layers to manage the visual styles of its objects. Impression 3 has added several new features to its layer controls and interface. Before, Impression would start a new file and it would not include any layers. The problem with this is that you can't do anything in Impression without a layer. You had to make one. Impression 3 creates a new layer (called Layer 1 with Style 1 applied to it) when a new drawing is made. This saves a few steps when starting a new drawing.

Layer tools

These new layer tools will be very familiar to AutoCAD users. In fact, the icons used for them were borrowed from AutoCAD.

In AutoCAD, you can isolate a layer, make it current, turn it off, or "un"isolate the layer. Now, you can do these things in Impression 3.

AutoCAD users will instantly know how to use these new tools. Select an object, go to the layer pallet, click the Layer Tools button, and then click the tool you want to use. They essentially work the same as they do in AutoCAD. The layer of the object you selected can be made current, turned off, or isolated. You can only use the "un" isolate tool if there are layers that are isolated, just like in AutoCAD. When using the isolate layer option, if you haven't preselected an object, select your object(s) then either press enter to accept or right click to open a window for more options. This new window gives you the chance to cancel your layer isolation task (see Figure 4).

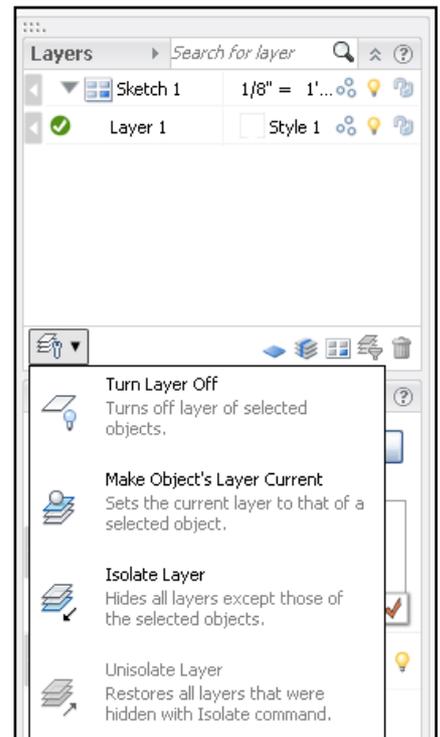
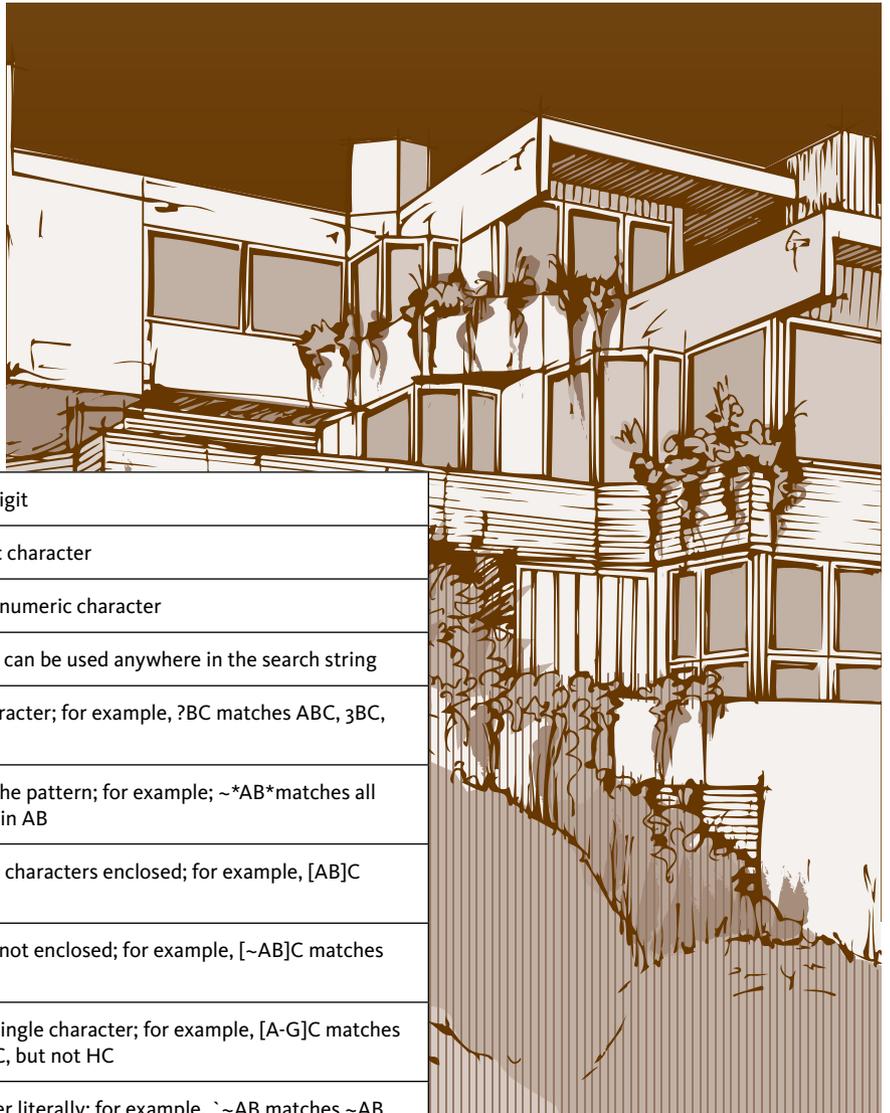


Figure 4: New layer tools are similar to AutoCAD tools. Impression 3 will help you to work with layers better.

Layer filters

Layers are essential to organizing your drawings' visual styles. The more you have, the more you can do. Sometimes there are too many to handle. Impression 3 has added Layer Filters. To filter your layers, select the layers you want to keep and press the Filter Selected Layers button. The button looks like the filter icon in AutoCAD. There is a second way to filter layers. In the layer pallet, click the Search box. As you start typing in layer names, you should notice other layers disappearing. Here is a list of wild-card characters that the layer search will understand.



# (pound)	Matches any numeric digit
@ (at)	Matches any alphabetic character
. (period)	Matches any non-alphanumeric character
* (asterisk)	Matches any string and can be used anywhere in the search string
? (question mark)	Matches any single character; for example, ?BC matches ABC, 3BC, and so on
~ (tilde)	Matches anything but the pattern; for example, ~*AB* matches all strings that don't contain AB
[]	Matches any one of the characters enclosed; for example, [AB]C matches AC and BC
[~]	Matches any character not enclosed; for example, [~AB]C matches XC but not AC
[-]	Specifies a range for a single character; for example, [A-G]C matches AC, BC, and so on to GC, but not HC
` (reverse quote)	Reads the next character literally; for example, `~AB matches ~AB

To “unfilter” the layers, click the icon that says “Click here to show all layers.”

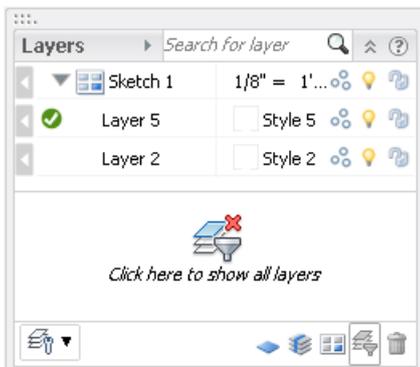


Figure 5: The Layer Pallet after the layers have been filtered.

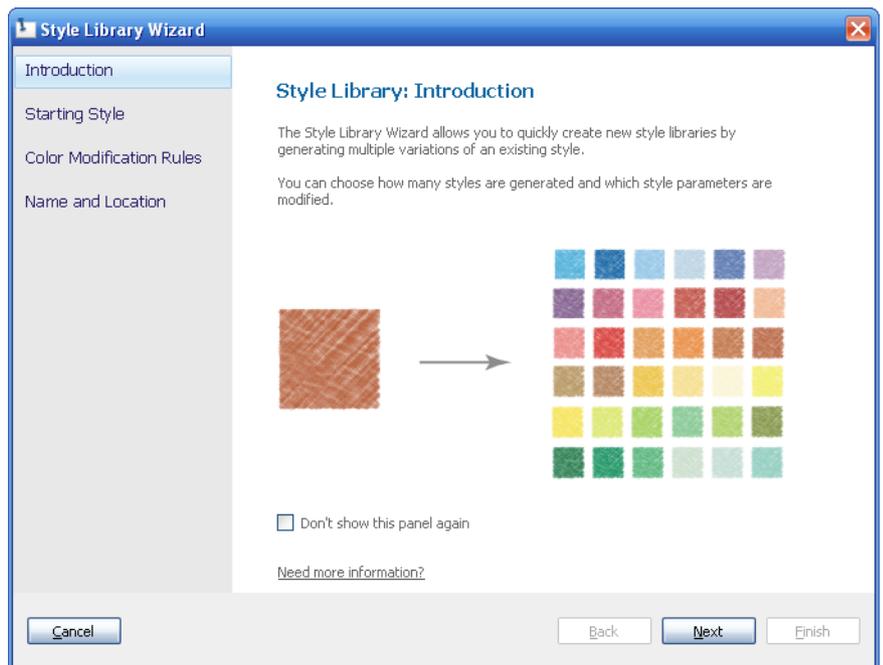


Figure 6: The first panel when using the Create Style Library Wizard.

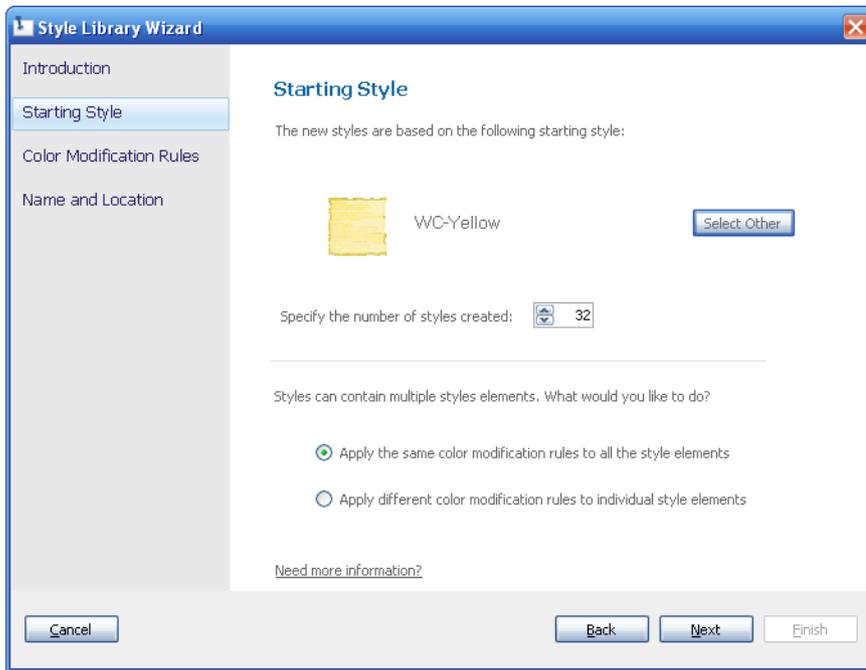


Figure 7: Select the starting style and the basic rules to apply to it.

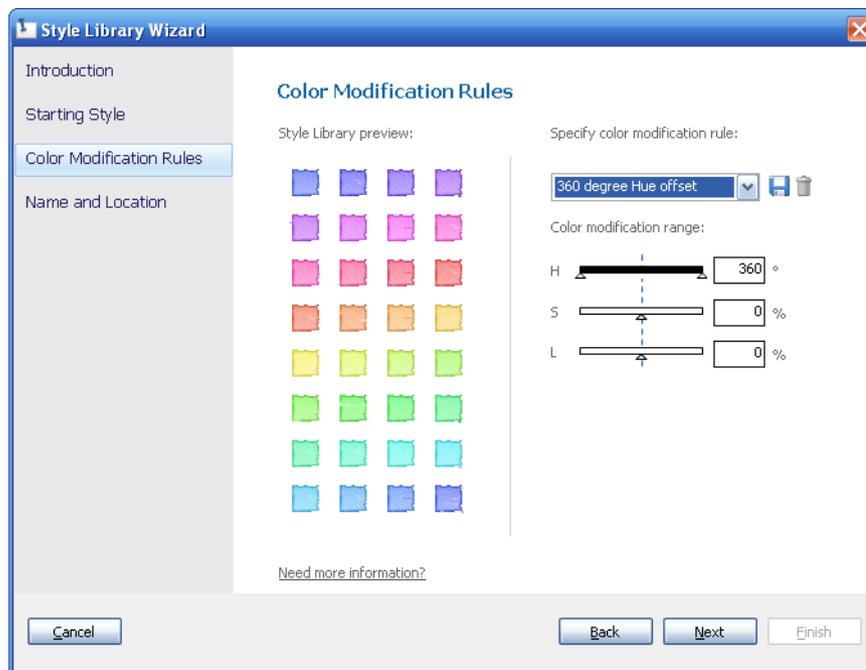


Figure 8: Change the way the color is altered with the slider bars. You will get a preview of what your new styles will look like. Don't like them? Change a setting.

Style library wizard

Creating style libraries is difficult in Impression. You essentially have to create each style one at a time and add them, one at a time. Impression 3 has added a new Style Library Wizard to help speed up this process. You begin by creating a style or importing an existing one. Click the "Create Library from Style Selection" icon in the style pallet (see Figure 6).

Follow the on-screen instructions. You begin with the starting style, specify the

number of new styles to create, choose the type of color modifications to apply, and then determine the color modification rules to use (see Figure 7).

There are a few predefined rules to choose from, but there are also settings that will change the hue, saturation, and luminosity levels for the new colors. Each new style will have the same stroke, fill, and other effects as the original style. It creates the same style, over and over again, but with a different color applied to it each

Impression is now much more intuitive and easier to use. The new features that have been added to it allow users to create drawings more quickly and efficiently than before.

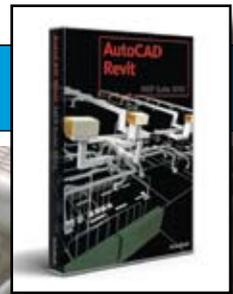
time. This tool can allow you to quickly create several similar styles to be used in your drawings (see Figure 8).

Conclusion

Impression is now in its third version. Each new release has improved on the one before it. Impression is now much more intuitive and easier to use. The new features that have been added to it allow users to create drawings more quickly and efficiently than before. New layers tools that are nearly identical to those in AutoCAD have been added, giving users greater flexibility when drawing and more efficient tools. The block enhancements help to streamline their use as do the new global style controls. Working with Impression has been made more efficient with this third release.



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Get Ready for Revit MEP 2010

New Ribbon

Probably the first and most obvious change in Autodesk® Revit® MEP 2010 is the new Ribbon. The ribbon features a streamlined user interface. It spans the top of the application window and replaces the menus, toolbars, and design bar.

The ribbon organizes tools into a collection of tabs, which represent workflows such as creation, annotation, or collaboration. Each tab contains a series of panels, which are groupings of tools used to accomplish some part of the workflow.

Users can set up ribbon panels in the order they choose. They can even “tear

them off” to increase drawing space. The Ribbon supports dual-monitor workspace. Autodesk Revit MEP remembers where you placed them during the last session.

The ribbon does take some getting used to. I have found myself clicking on tabs in an attempt to find the tool that I was looking for. The ribbon is contextual in that

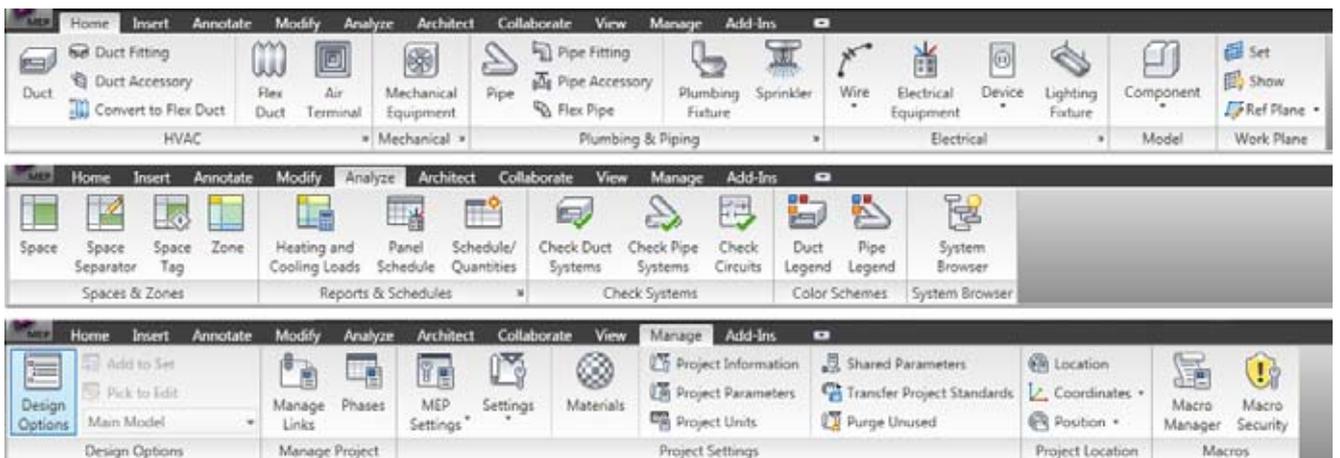
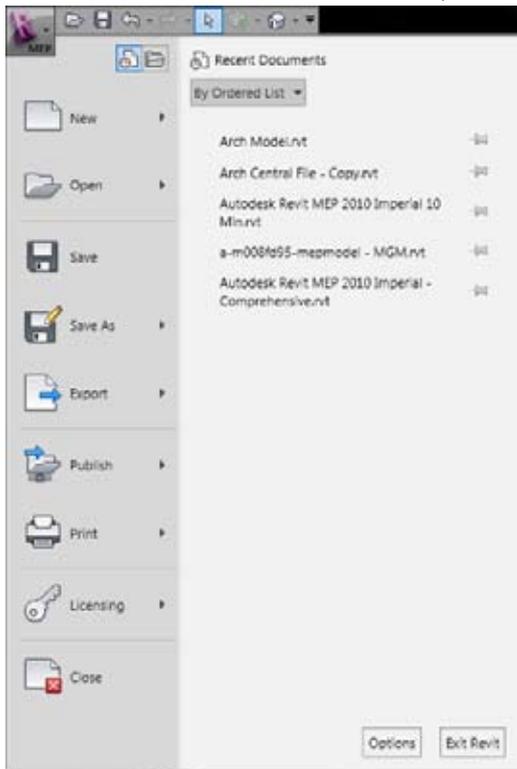


Figure 1: The new Ribbon showing the Home tab, Analyze tab, and the Manage tab.



Application menu

In the upper-left corner of the Autodesk Revit MEP display, users will find the new Application Menu (or the big “R”), which provides easier access to all project operations such as save, print, export, and publish. This new menu properly organizes these operations and makes Autodesk Revit MEP consistent with other Autodesk applications, making it easier to find the needed tools.

Buttons at the top of the Application Menu provide quick access to recent or currently opened projects or views and the ability to sort your recent documents list by access date, size, type, and ordered list (see Figure 2).

Adjacent to the big “R” is the Quick Access Toolbar, which gives users quick access to the most-used commands. The right-click menu includes options that enable users to easily remove tools from the toolbar, add separators between tools, and display the Quick Access toolbar above or below

Figure 2: Most file operations can be found under the Big “R.”

it will automatically change according to what tool you are using or which Revit MEP item is selected.

Change is always hard and you might be asking, “Why this change?” It appears Autodesk is trying to give all Autodesk products that implement the ribbon a common look and feel. Users coming from AutoCAD applications will see familiarity with this common thread between the Autodesk products.

the ribbon.

In addition to the right-click menu, the Quick Access toolbar includes a flyout menu, which displays a list of common tools that users can select to include in the Quick Access Toolbar. From here, users can also choose to display the Quick Access toolbar below the ribbon.

Users can add any tool they want to the Quick Access Toolbar simply by right click-

ing on the icon in the ribbon interface and choosing “Add to Quick Access Toolbar.”

Spaces enhancements

Spaces have been enhanced in two major areas. First, the ability to create spaces has been improved with the addition of the Place Space Automatically tool. This will allow users to place all the spaces for the entire model with a single click. This is a huge time saver for creating spaces.

The second enhancement to spaces is found in the properties. The properties have been improved to give us the ability to further define the space type. The space type has been expanded to include energy analysis settings. These include the ability to specify an occupancy schedule, lighting schedule, and power schedule. These schedules will dictate usage percentage factors. If the proposed building will be primarily used between the hours of 8:00 and 5:00, these can be specified and taken into account in analysis (see Figure 3).

Native heating and cooling load engine

Revit MEP 2010 has removed the IES loads analysis tool and replaced it with its own native heating and cooling load engine. The new engine will allow users to create simple, standard, or detailed load reports. Users will also be able to examine the analytical surfaces of the model inside the heating and cooling loads tool to verify that all surfaces are being calculated correctly. This lets users examine analytical surfaces to ensure that interior and exterior surfaces are correctly identified. Each

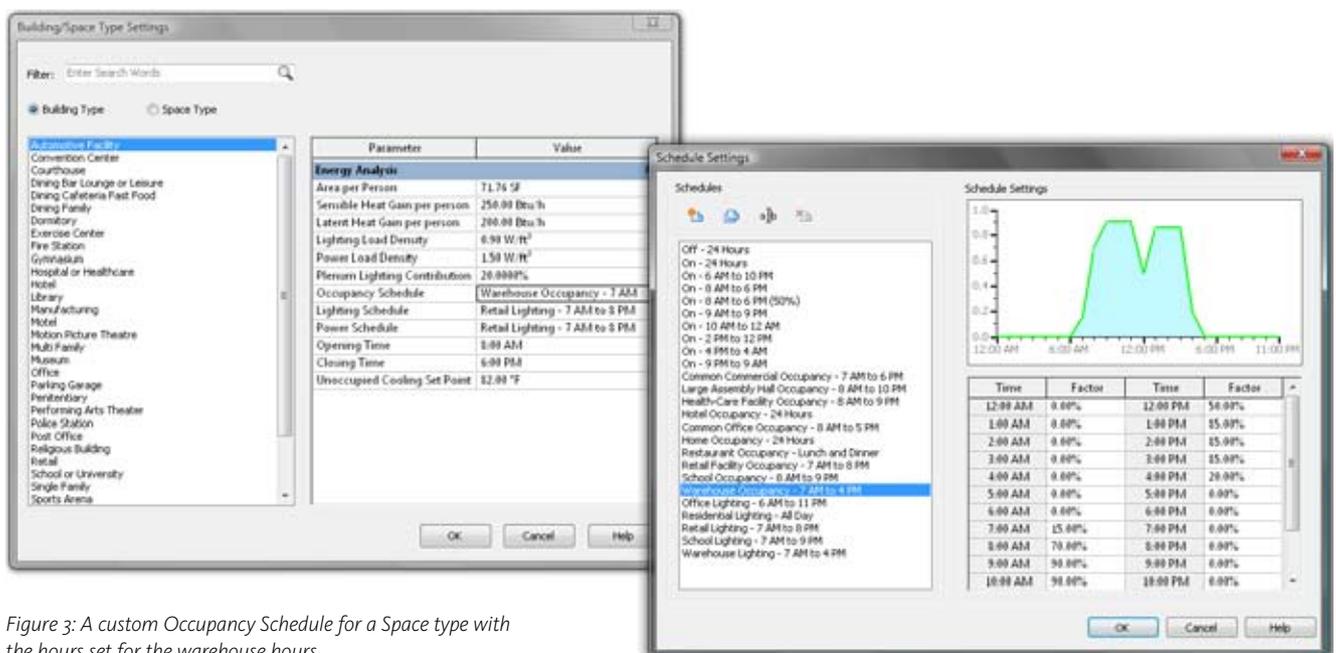


Figure 3: A custom Occupancy Schedule for a Space type with the hours set for the warehouse hours.

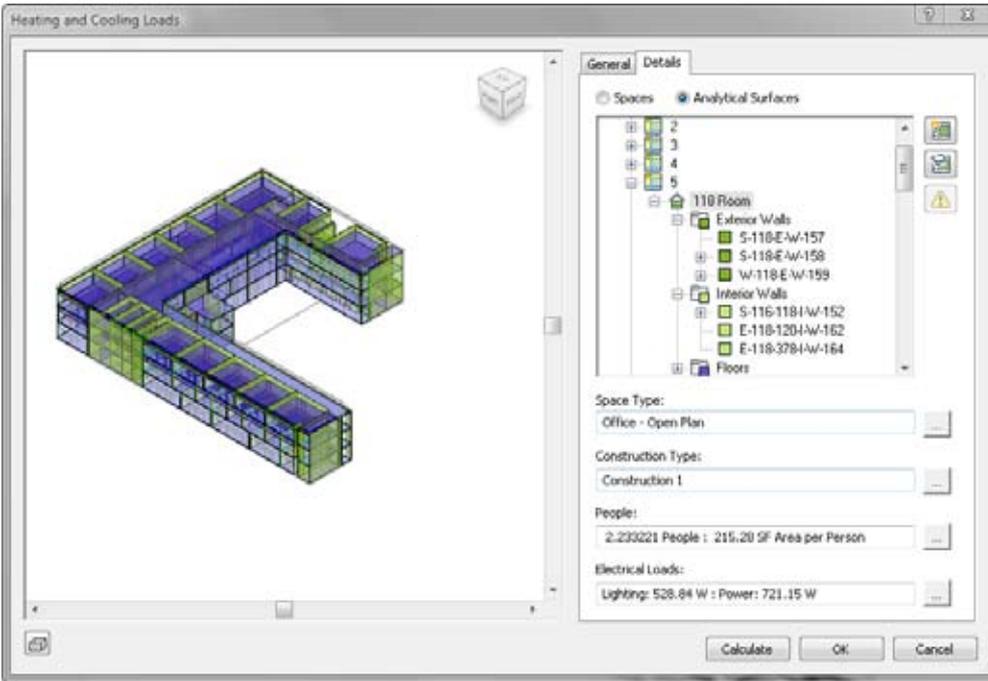


Figure 4: The exterior and interior walls are detected by the analytical surfaces inside the heating and cooling loads tool.

surface is color coded according to surface type. A warning icon will be indicated if Revit MEP detects a problem with the spaces. Possible solutions can be viewed to correct warnings. These additions will allow users to be confident about the basis of the calculations (see Figure 4).

This same set of tools is available if the model needs to export to a gbXML file for analysis to be run in a third-party program. The new and improved gbXML export tool now shows the analytical model and the gbXML settings that specify the parameter values used by third-party software applications when calculating energy use.

Additional weather data

Additional weather data has been added to the program and can be selected and

modified in the project information settings. This allows users to specify not only the location of the project, but also the weather data for that location. Users can either use the default data from the particular city that has been selected or modify the dry bulb, wet bulb, or mean daily range. This information will be carried on to the heating and cooling loads analysis or to the gbXML export (see Figure 5).

Enhanced multidiscipline collaboration

Revit MEP 2010 is improved with the addition of more than 300 ASHRAE duct fittings and ASME pipe fittings. This will give users the ability to use the appropriate fittings that were previously unavailable.

Users can now import building components from Autodesk Inventor® or other

mechanical applications that create Autodesk Exchange (ADSK) files. The exported Inventor file is intelligent. Parametric data is preserved. Connectors are intact. Geometry can be enhanced with additional connectors in Autodesk Revit MEP.

Integration with Autodesk Seek has been enhanced by being able to publish or search for content from inside the application. Users can publish content to Autodesk Seek from the Application Menu. Users can search for content in Autodesk Seek from the Insert tab on the ribbon.

Platform enhancements

Many additions have been made to the Revit platform and Revit MEP takes advantage of all of them. Let's begin by introducing the new conceptual design modeling tools. This is a new environment that gives users the tools to develop conceptual mass models that can be converted into building components once loaded into a project file. These tools will allow users to subdivide or panelize the conceptual masses to begin to see constructability of the form.

A nice new feature for new users will be the enhanced tooltips. The tooltips appear when the cursor rolls over a ribbon icon button. The tooltips are multileveled in that more information about the tool is displayed the longer the cursor is left over the icon. New users can quickly understand the purpose of the commands and how to use them with these enhanced tooltips. These tooltips can be modified in the Revit MEP options by setting the Tooltip Assistance options to None, Minimal, Normal, or High (see Figure 6).

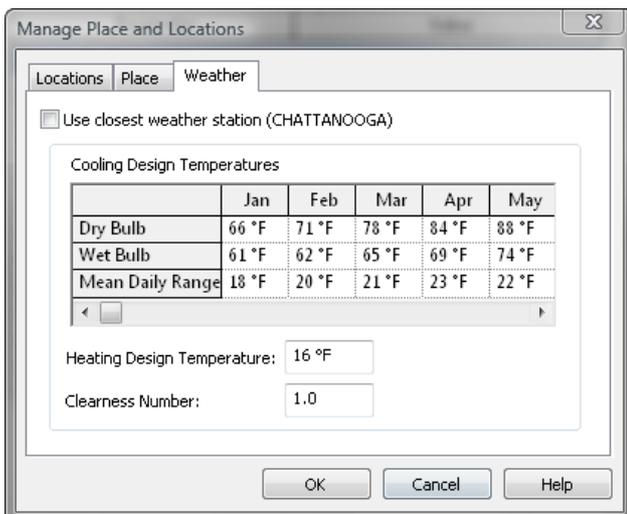


Figure 5: The weather data for Chattanooga, Tennessee.



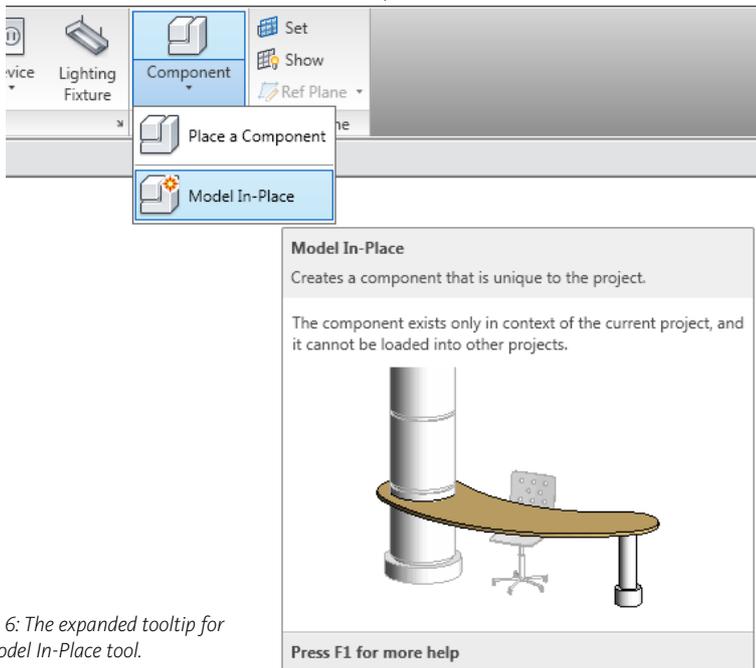


Figure 6: The expanded tooltip for the Model In-Place tool.

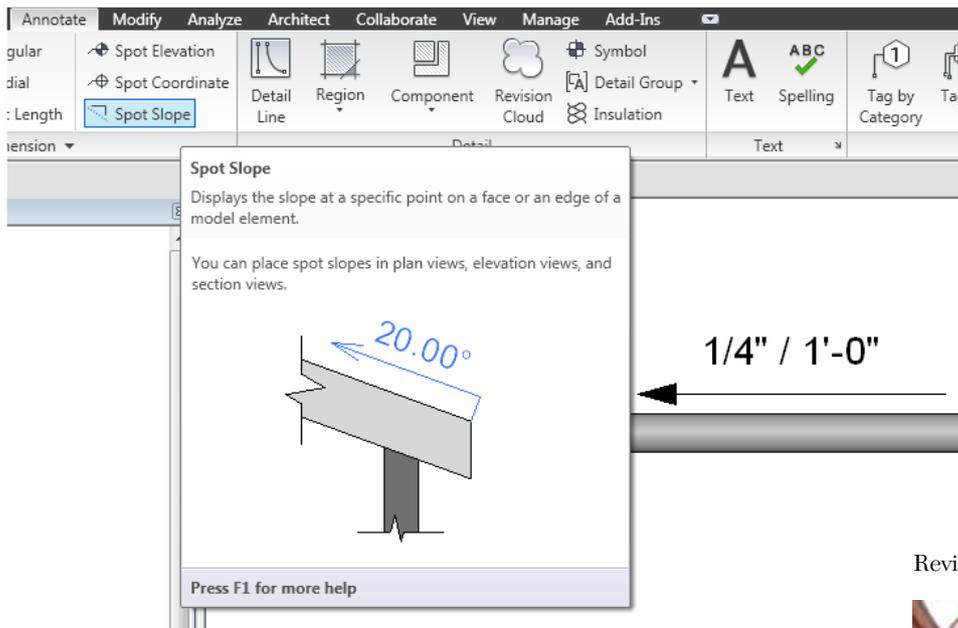


Figure 7: A sanitary pipe with the indicated slope being called out by the new spot slope tool.

The Revit 2010 platform is native 32-bit or 64-bit compatible. The program ships with one installer that will automatically detect your operating system and install the appropriate version. Native 64-bit support will give users the ability to design larger, more complex models without breaking them up. It will allow for improved performance and stability in memory-intensive tasks such as printing, model upgrade, and import/export of large models. This allows users to take advantage of all of RAM on a computer, rather than being limited to 4GB of RAM, which is a limit of 32-bit computing.

Sheet or project revisions have been improved by now allowing the current revision and the current revision description

to be included in a drawing list schedule. Now, users can list the status of the revision on something other than the revision schedule on the titleblocks.

A new type of permanent hide is available by right clicking in a view. Users can now hide by filter in addition to the hide by element and hide by category. This will allow users to create filters and quickly hide the elements that are associated with the filter.

A couple of nice new features are available when working with Worksets. First, in the Open dialog, if a Central File is selected, users can check a new check box to Create a New Local Copy. This will eliminate the need for users to open the Central File to create new local copies.

The second nice feature when working

with worksets is the ability to set the default worksets to open. For example, if you only want to open the Mechanical workset, you can set that as your default and Revit MEP will remember to always open the Mechanical workset until you change the default setting.

A new spot slope annotation tool is available in the Revit 2010 product line. This tool allows users to annotate elements that slope. This will be a nice tool to use on sloped pipes. It calls out the slope and supplies a slope arrow (see Figure 7).

A halftone/underlay settings dialog is located in the list of settings. This allows users to control the darkness of underlay views in a view and will apply halftones to all underlays in the project.

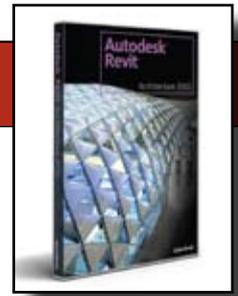
Summary

Revit MEP 2010 is loaded with new features. In addition to the ones I've discussed in this article, there is one more that cannot go unmentioned. Probably the most important new feature is the notable performance gains for updating network flow, adding elements and connecting to networks, and design manipulation.

I have found a massive improvement in working and manipulating pipes. Pipe accessories now attach correctly and rarely do you have to rotate the accessory or manually break the pipe to add the accessory. Out of all the new features, I believe this will be the most applauded. I hope this gives you a sense of some of the new powerful features in Revit MEP 2010.



Mike Massey has more than 15 years of experience as an architect working on various project types. Currently, Mike is Vice President of Architectural Design Solutions for ALACAD, where he assists firms in assessing, planning, and implementing new technology. His knowledge and enthusiasm for AutoCAD products runs deep as a user of AutoCAD since Release 9 and AutoCAD Architecture since its debut. He has developed a deep appreciation for Revit, as he assists firms in implementing and using all the Revit products. Mike is a contributing author for Autodesk Official Training Courseware and a frequent speaker at Autodesk University. For more of Mike's tips, see his blog at <http://knowingwhatyoudontknow.blogspot.com>



All Done Up in Ribbons

A Look at the new Revit Interface

Editor's note:

Ever since architectural design made the transition from pen, paper, and ink to computers, paper, and ink (you never really believed the hype about the “paperless office,” did you?) the one constant in the design workplace has been change. Software tools evolve rapidly, and work processes evolve with them. Companies and individuals need to review and adjust methods regularly. “Am I doing this right?” and “Can I do this better?” have become part of your toolkit, like it or not. Those who do not keep up are left behind, and we all know what happens to slow gazelles.

Not all software changes are useful or worthwhile (Vista, anyone?) and “planned obsolescence” can prove as fatal to software providers as it has proved for automobile manufacturers. Autodesk, to the company's credit, leads from the front by involving users in discussions about their products and relying on extensive beta testing before release.

This year sees the Revit platform adopting the Ribbon interface, in the cause of an integrated look and feel across all Autodesk applications. That desire for congruity alone does not justify change that will certainly confuse existing users. In this column we examine the new-look Revit Architecture to see if the interface changes actually promote efficiency.

—Chris Fox, AUGI Revit Editor

Order from the menu, or a la carte?

The first Revit window that opens in a standard installation, Recent Files, has changed appearance. It's horizontally organized now. You can open previous project of family files by picking thumbnail icons

or file names, as before. There is a link to Autodesk's Web Library.

The first differences to note: no menus visible, only two toolbars and the Ribbon. The red R icon at the upper left of the screen opens the application menu. This takes the place of the former File menu,

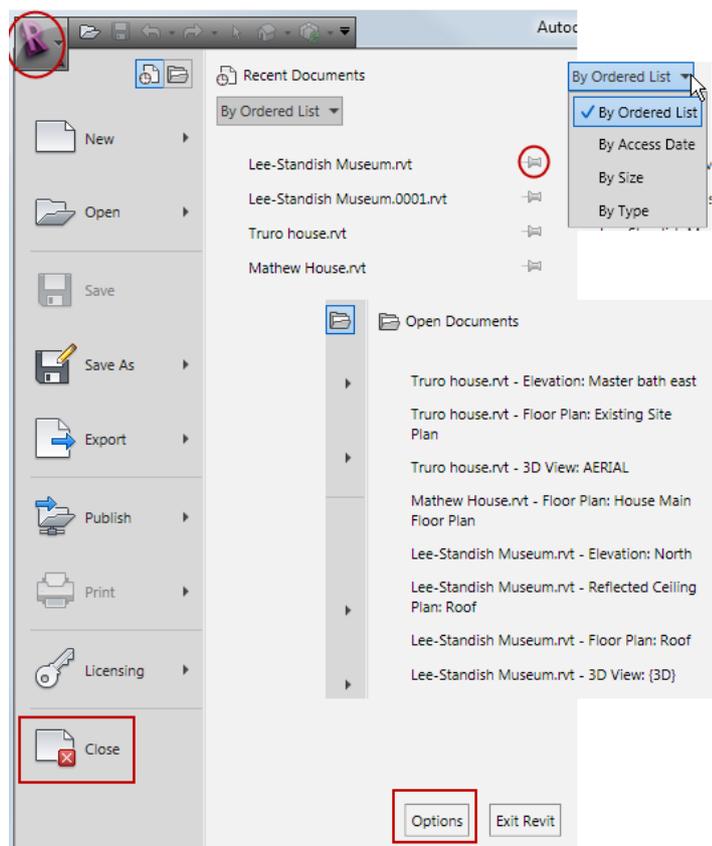


Figure 1: The application menu showing various configuration options.

and is the only menu you will use.

At the bottom of the menu on the left is Close. This is the only way to close a file other than closing all windows. At the bottom right is Options.

Personally, having worked as a production drafter and designer for years, I am glad to see cascading menus depart; I hated having to slow down my cursor speed or make three picks to reach a tool, especially as monitors reached sufficient size. Actions you perform dozens of times a day, if they can be made even a second faster, not only save considerable hours over the course of a project, but keep the working rhythm lively. You know what I mean—once you know where a tool is, you want to find it without looking, like cymbals in a drum kit, or sockets in a ratchet set.

You can toggle the right pane list from Recent Documents to Open Documents, which allows you to use the application menu to switch views in open files without having to open the View tab. You can sort Recent Documents by Date, Size, and Type. You can pin documents to the list, so they do not disappear if you work in many files.

With the list options, I'd call the application menu an improvement over the old file menu.

Raising the bars

Speaking of clicking tool icons by reflex, Revit's exposed toolbars have departed except for the Quick Access Toolbar at the upper left and the InfoCenter at the upper right of the screen. The Quick Access Toolbar holds common tools: Open, Save, Undo, Redo, Modify, 3D View, and Synchronize with Central. You can turn on File>New, and you can add tools from the ribbon to the Quick Access Toolbar with a right-click option. You can relocate the QA toolbar below the ribbon rather than at the top of the screen.

You will use the QA Toolbar, because this is the only place Undo and Redo appear. It's also the fastest way to open the default 3D view or make a perspective, and the fastest way to save. If you make New visible, beware that it sits next to Open, and you may find yourself wasting time opening empty files rather than searching inventory.

Modify appears on the QA Toolbar so you can always reach it. As I'll explain later, Modify is not always where you expect it on the ribbon (see Figure 2).

The InfoCenter, upper right of the screen, is a search and connection tool. A search field will show results in local installation help files and also online. The Communication Center radar icon is on this

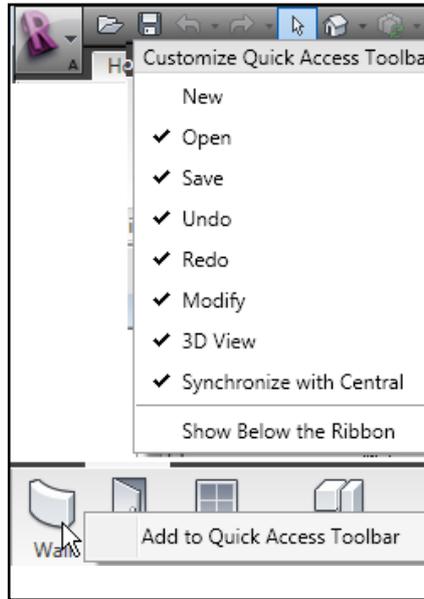


Figure 2: The Quick Access Toolbar; this image has been condensed.

toolbar, and does not spout annoying bubbles. The help icon at the right side holds a drop-down list. Two listings will help if you are spooked by the interface changes: User Interface Overview and Where is My Command? Who says Autodesk programmers don't have a sense of humor?

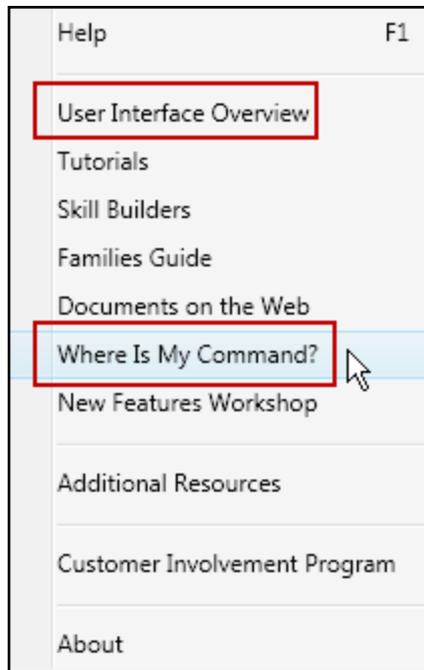


Figure 3: InfoCenter and Help

The Quick Access toolbar suffices; some place on the top of the interface has to hold the constant items. I don't like New and Open sitting next to one another, and I'd like to have Close exposed, but I can understand why the programmers did not do that first time out.

Less is more

Once you're inside a project file, other changes become apparent: no Design Bar, no rows of toolbars. The drawing screen is correspondingly wider, and optionally taller, than before.

The Ribbon holds eight tabs. Each tab is divided into panels of grouped tools. The titles of all are visible all the time. You can minimize the ribbon tabs in two stages, if you want to give yourself more vertical screen space for the drawing area. In essence, the design bar is now horizontal.

The big deal with the ribbon is the simplified arrangement of tools and the heightened graphics. No tool duplicates, and very few show when not in use. Wall appears in one place only, as does Reference Plane. There are no editing tools at all: Move, Copy, Rotate, and all the others do not occupy the screen unless items are selected. Tools on the Modify tab are all for changing model geometry and graphic display.

Tool icons are all bigger and more colorful, and Tooltip assistance has been markedly enhanced. Hold your cursor over a

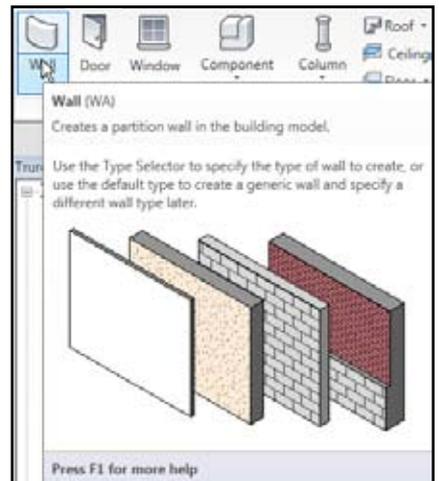


Figure 4: Tooltips

tool icon, and you may be surprised at the cascading graphics. Once you decide you don't need all the pictures, you can tone down Tooltip Assistance in the Options dialog. Remember, that's on the application menu now.

You will clearly not use all the ribbon tabs to the same degree, and you cannot reorder them, to push Collaborate, say, or Massing & Site, to the far right. If you have a very small screen, the ribbon display will truncate to icons only.

Context is all

So, how do you copy something if there is no Copy tool? This is where the ribbon actually works a little differently from the old design bar.

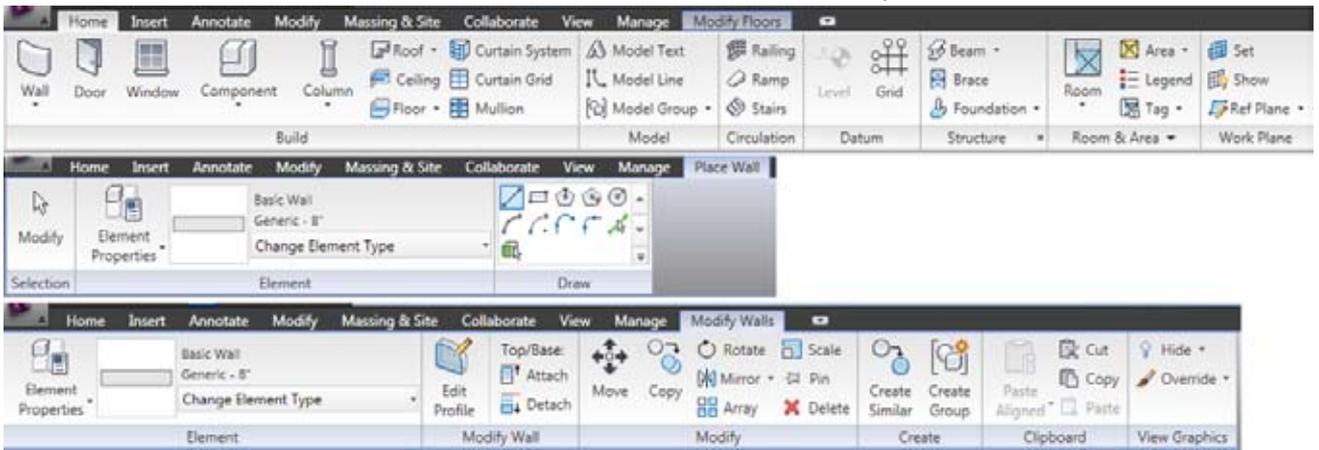


Figure 5: The Home Tab and two Wall context tabs.

Any time you start a placement tool—Wall, for example—a context tab opens with controls, options, and tools. The Options Bar also activates. The context tab holds the Type Selector, Draw options, and the Element Properties button. This button is split; you can open Instance or Type Properties directly. Modify sits to the left of action context tabs.

Whenever you select items, another context tab appears. This tab holds editing options: Move, Copy, Rotate, Mirror, Scale, Pin, and Delete. The Type Selector and Element Properties choices appear when applicable, and Modify tools specific to the element (Edit Profile and Attach for walls, for example). Create Similar and Group are in a Create panel, Cut and Clipboard Copy appear in a Clipboard panel, and there is a panel for graphic overrides. Selection context tabs do not have Modify present, which is why it also appears on the Quick Access menu.

You can switch to other tabs while context tabs are open. You do not have to finish a floor sketch, for example, to load in a family or change views, but you cannot start placing walls with an unfinished sketch.

We don't have space for a tab-by-tab review, but I'll mention that the View tab contains the most tool buttons; here you control graphics, create views, set up sheets and switch windows. Switch Windows is a tool I would put on the Quick Access Toolbar right away: too many clicks otherwise to reach something one uses constantly (see Figure 4).

Finally, an interface you can customize

One slick feature of the ribbon: you can undock individual panels so they function as floating toolbars. You can locate them outside the Revit window; same with the Project Browser and dialog boxes. I finally could afford dual monitors last year (and

paid for them before the crash!), so I'm looking forward to spreading Revit out a little and keeping exposed the tools I want out in the open.

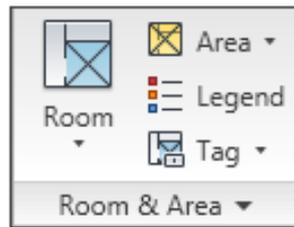


Figure 6: The Room @ Area panel, undocked.

Check out the vids, kids

Don't take my word for this. If you do not have Revit 2010 installed somewhere in your office, take a look at the new interface in action.

Autodesk has posted an official video about the new interface at http://adt_blog.typepad.com/between_the_walls/2009/03/autodesk-architectural-products-user-interface-video-tours.html

or http://www.youtube.com/watch?v=afQOYjQ_peY.

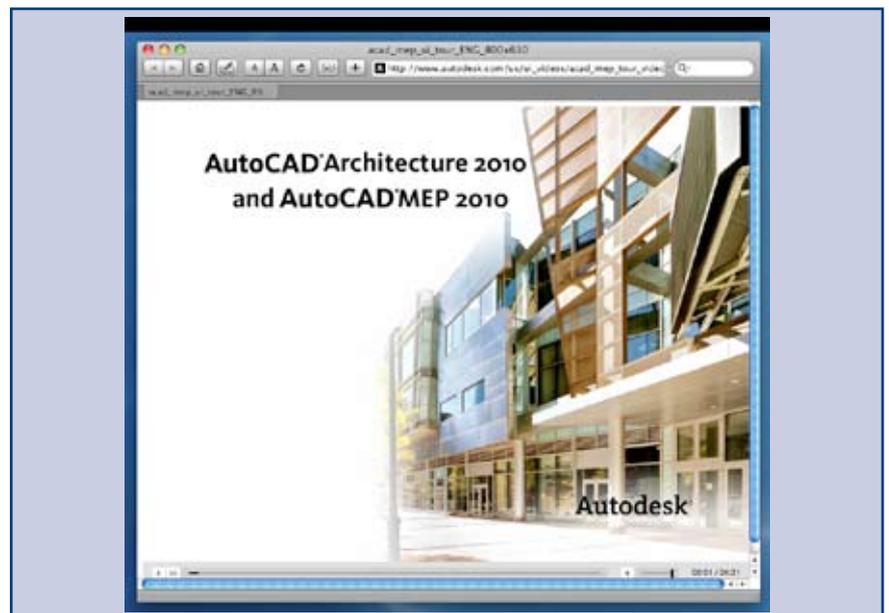
David Cohn, an independent Revit blogger, has posted a review video of the new interface: <http://revit-up.blogspot.com>.

By the time this article is published, other reviews will undoubtedly be available.



Chris Fox is the Revit editor for AUGIWorld, and has written numerous articles on Revit Architecture, Revit Structure and Revit MEP. He has written Autodesk Official Training

*Courseware for Revit Architecture and Revit Structure. His book *Introducing and Implementing Revit Architecture 2009* is published by Autodesk Press. Chris records instruction videos on Revit for CADLearning. Chris recently moved from the US to Australia, and leads training classes in Revit through corporate, university and technical school contacts there. You can reach him at chris.fox@archimagecad.com.*



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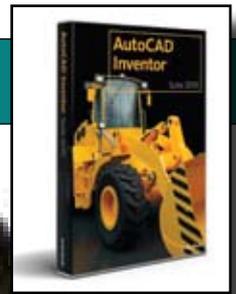
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The 700 Pound Gorilla



King Kong it's not, but Autodesk has finally polished up the new "King" in the 3D modeling world. As some lament the death of Mechanical Desktop, many more have seen Inventor grow up and become the successor to a legend in the mechanical design world. With all the new features that have been added to the latest release, we should be able to wait patiently for the next hundred pounds.

There are so many enhancements to Autodesk Inventor® 2010 that I could probably fill the entire issue. As a result, I'm choosing what I consider to be the "cream of the crop" features needed for the average user to achieve even greater productivity.

The ribbon

Like most Autodesk products for 2010, the user interface has been retooled and now sports the Ribbon. The Classic UI has been retained and the ribbon may be swapped out by accessing the toggle in Tools > Application Options > Colors. While the ribbon may seem daunting,

don't ignore it in favor of the Classic UI as the ribbon will be needed as new features are added to Inventor. But for now, you have the choice of using the Ribbon or the Classic UI.

New features workshop

The very first step to make after you have installed Inventor 2010 should be to Help

> New Features Workshop. New Features Workshop may be accessed by picking the dropdown menu from Help.

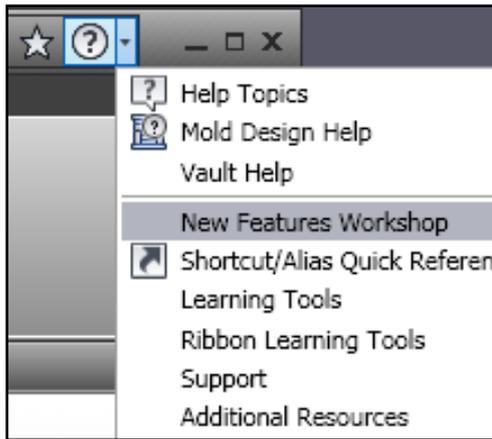


Figure 1: Accessing Help

Take the time to go through EVERY segment of the Workshop. In this Help segment, new features are grouped for your ease in locating items that are of significance to your workflow.

With Desktop Content Center, administration will be a breeze and Content Center speed will be improved, with lower memory requirements.

Assembly enhancements

My eyes were drawn to the new enhancements for productive assembly design. Topping the list of enhancements are new and expanded productivity tools, enhanced pattern capability, enhanced constraint highlighting, and Shrinkwrap.

The productivity tools that have been added or improved for 2010 include the ability to rename browser nodes using one of three naming schemes. Components within the browser may be renamed by filename, part number, or the default name.

Add Part and Add Sub Assembly permit creation of parts and subassemblies within an assembly file using a streamlined workflow.

Save and Replace saves a copy and replaces the current component with the saved copy. Ground and Root Component selects a component within an assembly and moves and grounds the component at the assembly origin.

Component Derive allows substitution of a component with a derived version. Place At Component Origin allows placement of a new component at the selected component's origin.

For those who have difficulty understanding and managing assembly constraints, there's the option to display component names with the constraints in the model browser. This option is available in Application Options > Assembly.

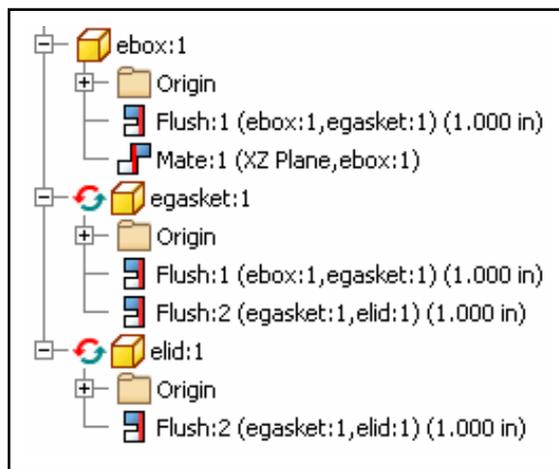


Figure 2: Constraint relationships

Degree of Freedom Analysis displays a dialog that lists the number of translational and rotational degrees of freedom for all of the occurrences in the active assembly.

For those dealing with Level of Detail Substitutes, you now have the ability to update or create substitutes on the fly within an assembly.

Other goodies included in Inventor 2010 assemblies are the ability to pattern an existing component pattern, enhanced constraint highlighting, a new axial mate icon within the model browser, assembly browser restructuring, user-defined browser folders, and the ability to shrinkwrap an assembly.

Bills of materials

There are several enhancements to the Bills of Materials in Inventor 2010. We're now able to edit in the Bill of Materials dialog box with a workflow similar to Microsoft Excel. In addition you can now open any file from within the Bill of Materials dialog.

New is the opportunity to customize the Bill of Materials columns to suit your needs. This customization may now be exported to an external XML file that may be imported into other assemblies. Thumbnails and highlighting between the BOM dialogue and the model browser are also supported.

AEC Exchange

AEC Exchange functionality has been expanded in this new version. Previous versions allowed conversion to AutoCAD DWG files. Autodesk Inventor 2010 provides exporting in the new .ADSK format utilized by other Autodesk software—Autodesk Revit and Autodesk Revit MEP at this point.

You are now able to export building components, check your design against Revit standards, create connections and a user coordinate system in your translated components, produce and manage shrinkwrap substitutes for smaller file size, and create component properties on the fly. All of this is supported by an AEC Exchange browser.

Content Center

If you are a stand-alone user, and you don't want to have the memory overhead of ADMS on your system, then Desktop Content Center is for you.

With Desktop Content Center, administration will be a breeze and Content Center speed will be improved, with lower memory requirements. All libraries will be saved and accessed on your local disk, with no need to connect to the server. This is of great benefit for those with laptops who need to travel away from the office.

Content Center configuration is aided by the use of a number of new tools. You may review all the libraries available in the library storage location. Sorting of listed libraries by the names and properties are now available. To add a new library to your current configuration, you merely need to check the boxes of the libraries that you wish to use in the current configuration. You may also transfer libraries between the Desktop Content location and your Vault server by using the Library Transfer Guide.

For those users wishing to change the materials within library content, the Material Guide will do just that. Once library content has been moved to a read/write library, you may use the Guide to easily add

materials to existing families. All selected members of a family that are altered will be created as copies of existing families.

In previous versions of Inventor we have been able to place Content Center components as custom parts. In 2010, we can place custom Content Center components as standard parts.

All Content Center components can now be refreshed and updated to new members upon placement, or you may update them manually. New browser icons for Content Center components distinguish between standard Inventor parts and Content Center members.

Translators!

Previously available from the Autodesk Labs website, we now have the ability to translate Catia version 5 model and assembly files directly to Inventor parts and assemblies. Not forgotten are new translators for UGS, Solid Works, and other Parasolids-based parts and assemblies as well as Pro/E Wildfire parts and assemblies. A JT translator is also included in the package.

An exciting new addition to Inventor 2010 is the ability to open an Autodesk Alias .wire file, and have the Alias file be associative within Inventor. As changes are made to the original Alias file, the linked file may be updated from within Inventor.

Drawing enhancements

Dual dimensioning is now available in Hole, Chamfer, Bend, and Punch notes. Dimensions may be edited immediately upon placement rather than use the old RMB edit technique.

View geometry may now be projected into a sketch that is associated with a view. The projected geometry remains associated to the parent view geometry.

Dimensions may now be applied to spline points and minimum/maximum XY values. Dimensioning may be accomplished using either ordinate or general dimension types.

Additional symbols have been added into the list of symbols for feature control frames. Now, a simple check mark controls which symbols will be available.

Feature Control Frames are now aligned with the symbol box above the datum. Optionally, you may also position the datum box on the leader side. You may install the ESKD support add-in, which will create an ESKD Annotate tab in the Ribbon.

For those users who employ a large number of symbols in their drawings, we now have a way to manage the chaos. Inventor 2010 supports user-defined symbol folders within individual files and templates. This will allow organization of symbols of similar type.

For those users who employ a large number of symbols in their drawings, we now have a way to manage the chaos

Parts and more parts

One of the biggest news flashes for Inventor 2010 is in the area of parts. Inventor now supports multi-body parts. In the past, only sheet metal supported multi-body parts in the form of the folded and unfolded versions of a single part.

Multi-body parts greatly enhance top-down design in that we can create multiple solid bodies within a single part file and use the Combine command to join, cut, or intersect the bodies into one part (shades of Mechanical Desktop!) Other normal modeling commands such as Split or Derive may also be used. Multi-body parts allow easy plastic part design and enhance the Tooling add-in for the creation of molds and fixtures.

The Derive command may now be used on a part file that already contains a solid. This workflow allows for Boolean operations within a single part file. Because of multi-body integration, bodies may be moved within an individual part file by free drag or specified offset value along an origin axis.

Another new aspect of Inventor 2010 parts is the ability to create plastic features within a part file. This ability was previewed in last year's Autodesk Labs release of Inventor Plastics.

For lofts, the addition of a context menu greatly improves the performance and ease of use. The context menu allows selection on the fly of such things as Edge Chain, Section Selection, Rails, and Centerline selection, eliminating the need to return to the dialog box each time you change the selection type.

iFeature enhancements include the ability to create an iFeature from an existing iPart. During the creation process, a table-driven iFeature may be created by selecting the included features from the model or the browser. You may also include iFeatures within an iPart table.

iFeature custom properties may be made available within a consuming part file. When you insert the iFeature into a part file, custom iFeature properties will be added to the custom property tab of the part.

Sketching

Improvements in sketching include the use of sketch blocks, use of arcs in a 3D sketch, addition of the Apply option in the scale command, removal of the Bowtie option in splines (now available in the root context menu), and a new command - Silhouette Curve.

The Silhouette Curve command is available within a 3D sketch. This command permits the creation of a natural 3D parting line around the outside boundary of a surface, along the direction vector. This silhouette curve may be used to create a boundary patch surface, or to use the Split command along with the new Split Solid Option to create two separate bodies.

Styles

Users may now modify the unit types for Material Properties. Supported are most Metric and English unit type standards. When changing unit formats, the current values are converted and displayed in the selected metric for English unit format. Weight, Volume, and Pressure unit formats are available.

Put it in the Vault

Unfortunately, time and space in this issue make it impossible to cover every single new feature in this mammoth release. However, I must mention that we now have multiple options and versions in Autodesk Vault. While the standard Vault remains on the DVD, we now have options for purchasing intermediate steps in the Vault family. Options include Vault Workgroup with revision control and Vault Manufacturing, (formerly ProductStream). Contact your reseller for more information on the differences between these products.



Dennis Jeffrey is an Autodesk Inventor Certified Expert and Autodesk Implementation Certified Expert. He is the founder of Tekni Consulting LLC, a firm specializing in Autodesk Manufacturing Solutions implementation, training and consulting. Dennis has been using Autodesk Mechanical 3D Products since 1987. He is the author of Creative Design With Mechanical Desktop™ and Creative Design With Autodesk Inventor, with a new co-authored book, Mastering Autodesk Inventor 2009 now available at Sybex.com. Dennis is a moderator for the AUGI manufacturing forums as well as an AUGI Wish List reviewer and columnist. He can be contacted at djeffrey@teknigroup.com.

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A Lesson in Constraint Fundamentals

When creating a new part with Autodesk Inventor®, a sketch pad opens. This is where you lay out the outline of your geometry that you will need to extrude, rotate, sweep, etc., to create the first feature of your solid model. If you are accustomed to working with AutoCAD®, you will need to adjust your thinking cap a bit. You start by drawing or sketching what you need for your design. Then add constraints and dimensions after the geometry has been drawn or sketched.

Constraints—what, why, and how

A constraint is a control that is needed to constrain the geometry. Got it? NO? A constraint is how geometry is related to other geometry within your sketch. Better? I hope so. Geometry related to other geometry... think about that for a minute. Well, parallel, perpendicular, concentric, linear — isn't that how a line is related or constrained to another line? Concentric, as with two circles, or a circle and an arc?

A fully constrained sketch means that there are no “floating” geometry entities. I'll define floating with this example: if I were to grab an end point, center point, or part of the geometry (line or circle), I could pull it or stretch and drop in a new location. Nothing will change on its own later in my design. I'm sure most of us have been working on a design, and then it suddenly changes and we have no idea why. Just a sudden click on something and the geometry changes. If you fully constrain your sketch, and all sketches, then that magically changing part tends not to happen with inadvertent mouse clicks later on.

I start at the origin (X, Y, Z are all 0), and create my first line, used for a center point for a circle or arc. From there, I continue rough drawing the rest of my geometry. Some constraints are being applied as I continue my sketching. You will see an icon pop up with your cursor as you create your lines, circles, and arcs. Those are some basic constraints, such as perpendicular,

parallel, tangent, concentric, and end points that are coincident. There may be another constraint or two also applied. You will have to apply others as needed to fully constrain the sketch, which we will discuss in further detail. See Figure 1 for the icons in the constraint tool bar.

I have completed my rough sketch (it is rough as there are no dimensions, and not all the geometry is constrained). See Figure 2. See the line with the arrow pointing to it? That is the line I am constructing—it is being constrained parallel to the bottom line.

Hint: If you need the new line to be parallel or perpendicular to a specific line, start your new line, then momentarily hover your cursor above the line to which you want your new line to be parallel or perpendicular. The corresponding constraint will show above the line.

The first line you create, if horizontal or vertical, will automatically have an assigned constraint. I will describe later how to show constraints and how to remove unwanted constraints (see Figure 3).

Warning: Be careful how you create your lines. When you are placing lines at angles, you might get angled lines that could be created parallel or tangent to other angled lines already on your sketch. What I do is exaggerate what the angle is, then assign a dimension to correct the angle that I need.

Once you have finished your sketch, the next operation is to lock the point at the origin. If you look in the lower right corner, there is a message that determines how many dimensions are needed to fully constrain the sketch (see Figure 4). I continue adding dimensions or



Figure 1: Constraint Toolbar

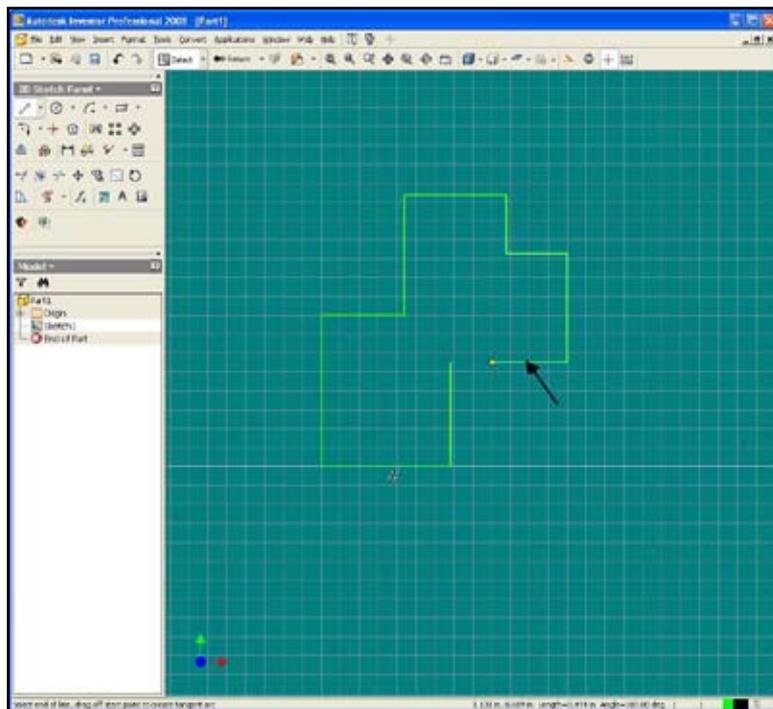


Figure 2

constraints as needed to fully constrain my sketch, and looking in the lower right corner, the number of dimensions continues to decrease to 0.

As you add a dimension, the number decreases by one. Adding constraints may decrease the number by more than one. As soon as I locked the point at the origin, the number went from 12 to 10.

The first line I sketched was a vertical line from the origin. That line and the point at the origin turned black—those are shown as constrained. When a drawing is fully constrained, all the geometry is black. Before placing dimensions, I try to apply all my constraints first. If I need two lines that are in-line with each other, I use the “co-linear” constraint.

If I need two lines to be of the same length, I might use the “equal” constraint.

An alternative to the equals: when dimensioning the second line, you can select the dimension from the first line. That will also make the two lines equal.

When placing points or circles in your sketch, you may need them to be vertical or horizontal to each other; I use those constraints. You could also use a vertical and horizontal dimension to locate each point, as well. I normally use constraints and use fewer dimensions, to keep my sketch less cluttered.

If I need to adjust the features later, it is easy to remove or delete constraints, then add a different dimension as needed. Dimensions are like constraints in that they both determine the variance of one piece of geometry to the other. If you try to place a constraint that has already been set, you get an error message (see Figure 5).

Just select “cancel” and continue. A fully constrained drawing might look like Figure 6. That has dimensions and I have shown all constraints. Also, in the lower right-

hand corner, the message is “Fully Constrained” and all the geometry is black.

Hopefully, you now have a good basic understanding of constraints. There will be a time when you need to delete one and change to a different constraint, or you need to add a dimension to redefine how that feature is needed.

I prefer to use Show Constraint for a single piece of geometry. Refer to Figure 1—next to the “constraints” icon is the “Show Constraints” icon. Select the Show Constraints icon, then select the piece of geometry for which you need to modify the constraint. A Constraint Bar pops up, with all the constraints that are associated to it. Right-click, select Done, click on the constraint you need to delete, and then press the delete key. That piece of geometry should turn green, which means it needs

to be constrained. Change to what you need, and it should turn black. Congratulations! Your drawing is now fully constrained again.

Follow up

Constraining geometry is adding relationships between the different parts of geometry in your sketch—similar to adding dimensions. In some cases, you can reduce the number of dimensions needed, thus “unchuttering” your sketch while still maintaining design intention.

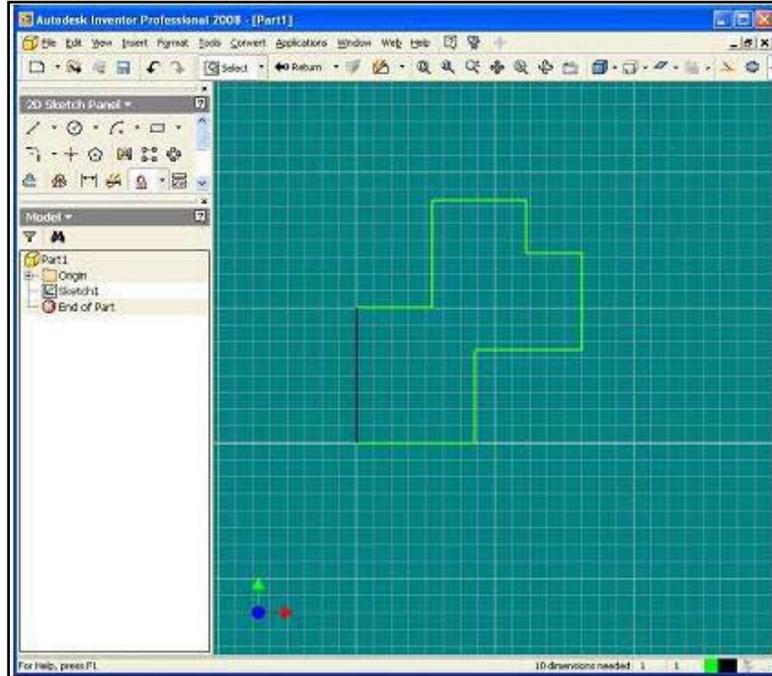


Figure 3: Locking Point



Figure 4: Dimensions or Constraints Needed



Figure 5: Constraint Error

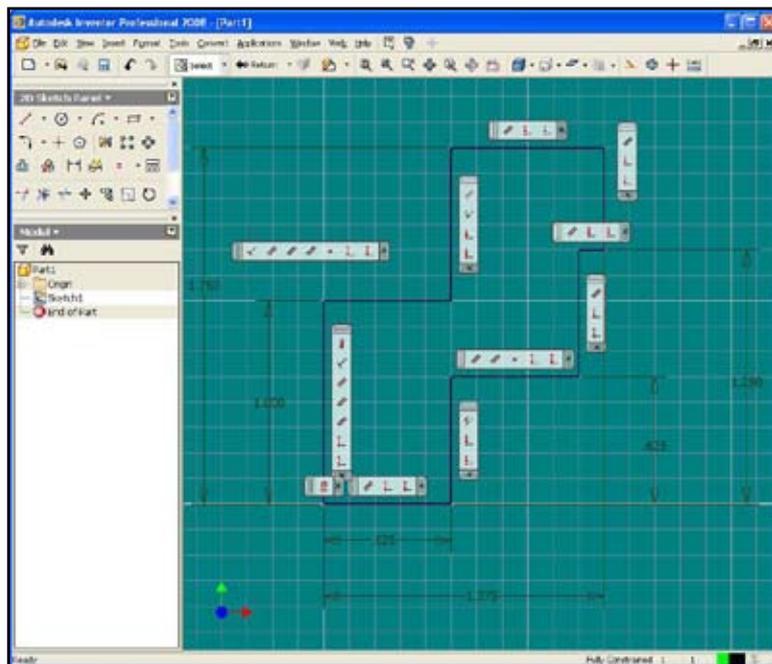


Figure 6



David Keener is a Design Engineer for SMT Industries in

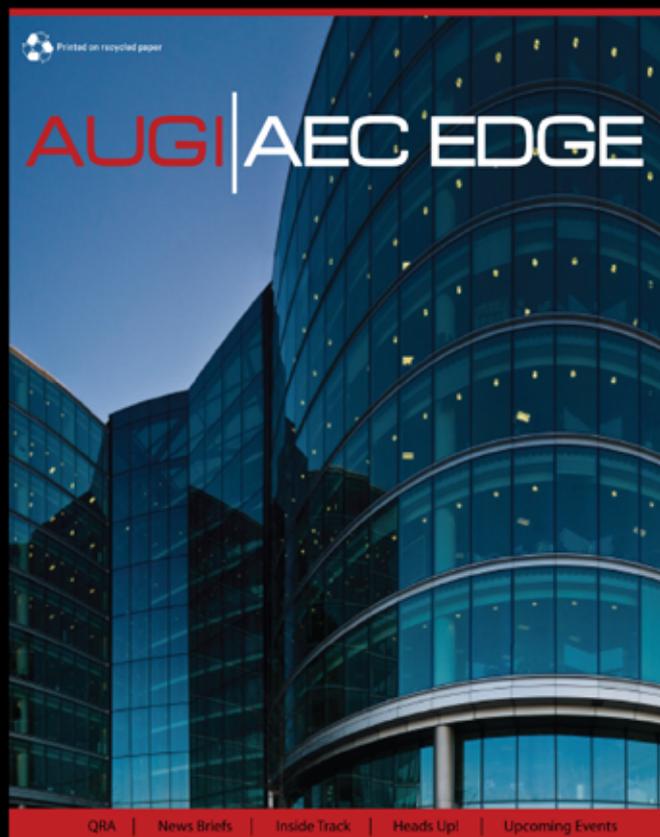
Sidney, Ohio, and also an Adjunct Professor at Edison Community College in Piqua, Ohio. He has been using AutoCAD for more than a decade and Autodesk Inventor for more than two years. He can be reached at d_keener@smtind.com.

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