

Jan/Feb 2007



AUGIWorld

The Official Publication of Autodesk User Group International

What Are You Worth?

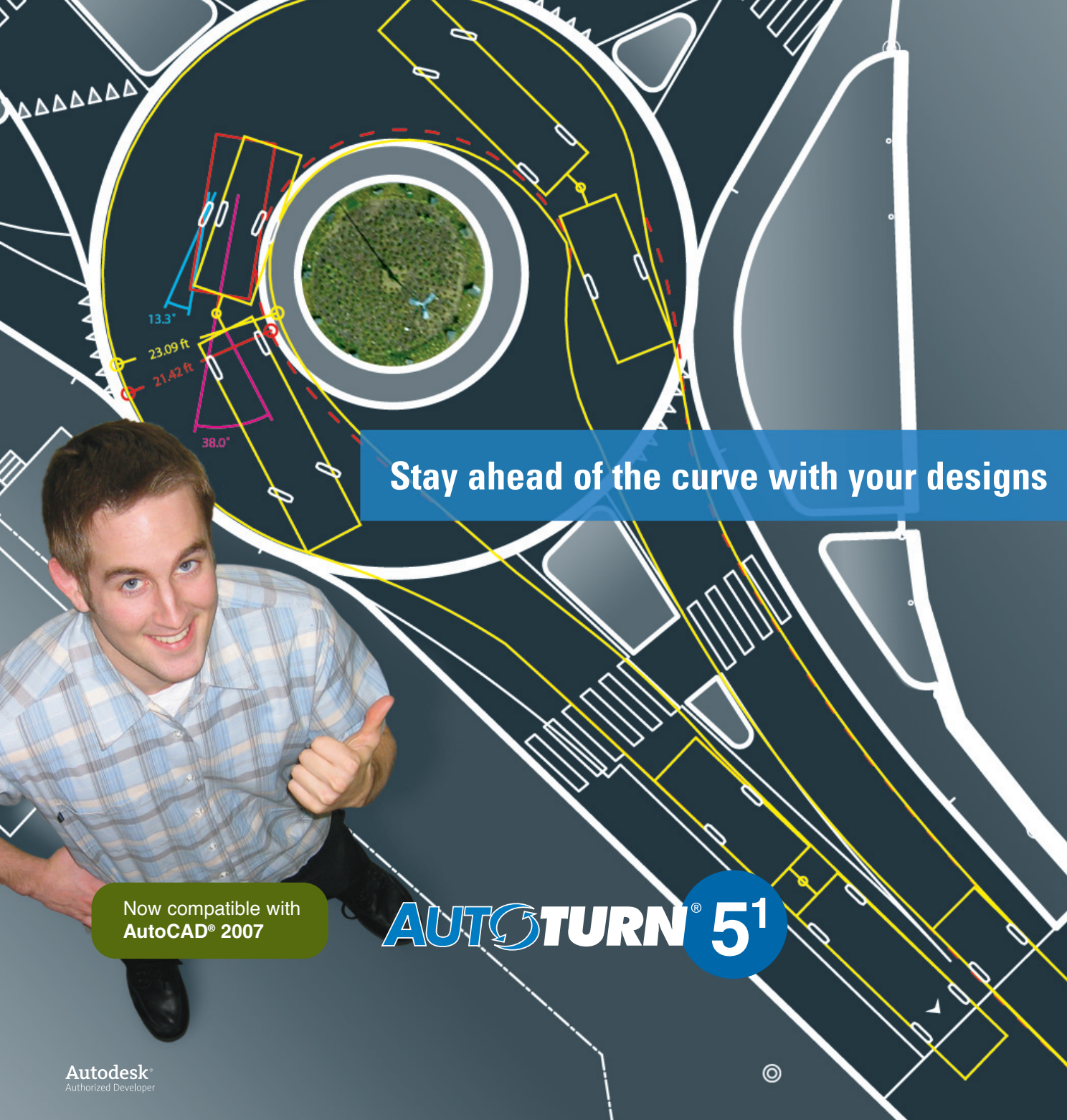
The Results
Of The 2006
CAD Salary
Survey



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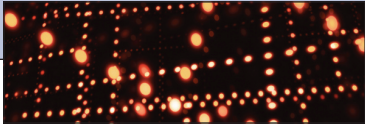
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Publications Mail Agreement # 40733013
Return Undeliverable Canadian Addresses to
Station A
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You Deserve a Raise!

I have given and gotten some very good raises and some very small raises in my career. The small raises are sometimes based on thin margins of profitability at my firm or just an overall economic slowdown. The good raises are most often not based on overwhelming firm profitability or a booming economy. Instead, good raises are based on employees' ability and effectiveness in their profession and their perceived value to the firm. Let's discuss the methods you may use to move an average raise to above average and a good raise to a great one.

Prepping for a great raise

Getting that big raise does not just happen by going into your boss's office and asking for it. You need to be doing many things all year long before you walk in and ask for that raise.

Don't be average. Don't expect to get a good raise if you are doing a lackluster job. The biggest thing you can do to make a large raise possible is to do a fantastic job in your role with the company. Doing the best you can do at all times is the first step toward financial rewards. No one is going to pour out dollars on an average worker. You need to do the best you can do.

Do more than expected. You need to be doing more than what is expected of you. You need to go beyond the job description. If you fulfill the job description, but do not often exceed it, then you are doing what was expected of you when you hired and, thus, would be earning whatever they paid you when you first got the job. Moving to higher levels of income requires you to take on more responsibility and duties. If you are going beyond the basics, then you are poised to get more than the basic raise.

You need to build your brand. Let others know what you have been doing all year. My last column (Nov/Dec *AUGI-World*) talked about not falling into invisibility. Take heed: invisible CAD Managers

do not get great raises. Go back and review what was in that column and put it into practice. Become visible. Keep track of accomplishments and share them year round. Don't brag, just inform.

Ask what it takes to get a good raise. I suggest asking what it takes to move ahead in the firm. Talk to your boss and find out what he or she thinks you should be doing to move ahead. Are you meeting the boss's expectations for your current position? Is there room for advancement above you?

Now you have spent a major amount of time prepping for the process of getting that hefty raise. Let's talk about the process of discussing it with your boss. But first, do your homework.

1. Know what you are worth. This issue of *AUGIWorld* is dedicated to just that. Comparing salaries and getting input from real-world employees as to what their firms are doing, how much they are paid, and what they can expect in the future. You may need to adjust the numbers a little based on your location or industry or title, but the survey gives you a good ballpark number to think about. Are you making less than that? Then use the data to back up your value. Are you making more? Then use the data to justify that you have been worth more than the average and still command greater levels of compensation. Ask HR or your boss what the salary ranges are for your position. They just might tell you. Some will share that info and some won't.

2. Have a long-term perspective. Don't expect to jump up two or three salary levels in one shot. If you are drastically underpaid, then plan for multiple strong raises to get you to the level you deserve. Sometimes it is a long process to get to the upper levels of your range.

3. Update your resume. No, you are not going to look for another job (at least not yet). But the process of updating your resume will remind you of your value, experience, training, breadth, and education. You

won't share this during the process, but it sure helps to think things through.

4. Create a list of accomplishments. Make them quantifiable and measurement based. Something like... Increased productivity 25 percent by creating department tool palette. Be ready to defend everything on your list. Think what you will say if your boss says, "So what?"

5. Know your odds going in. You should have a good idea of your odds of getting the raise before you start the conversation. It may just be a gut feeling. You could also ask around or look at historical info about raises at your company. If you really think it is a long shot, then decide if it is worth the trouble.

The best time to ask

When the company is in a good financial position. Did they just make target on the stock returns to investors? Did they just land a large project? This may be a good time to catch them in a giving mood.

When you are greatly needed. If the company is in great need of your talents, they will not be willing to have you dissatisfied or thinking of leaving the firm. This can be construed as blackmail by some, so be careful.

When you have just had a major success. Did you just sink a 30-foot putt to win the British Open? Did you just kick the winning goal to capture World Cup? Well, maybe not that great, but did you just successfully rescue a project? Did you just complete an upgrade to your software? Now is the time to ask for a jump in pay.

At your annual review. Most of us have an annual review, so don't overestimate the natural flow of asking for a little more than the boss has been thinking about. It is a normal conversation to pursue or negotiate a higher salary.

Set aside a time with the boss. Whatever the circumstance, be sure to make an appointment. Don't just walk into the boss's

office and make a demand. You do not want to be interrupted when you are on a roll.

What to talk about

You most likely will be nervous when approaching someone to ask for a raise. That is natural. Everyone is nervous—even your boss, who doesn't want to lose a good worker or make any mistakes either. Just keep in mind that there is no harm in asking. I believe it shows initiative and assertiveness and most bosses look for those qualities in their team members.

Obviously, talk about your accomplishments—past, present, and future. Discuss how you have helped the firm in the past and what you are doing now. This will reinforce your value and the talents you have already brought to the company. Then mention specific projects that you are going to work on soon. It will remind them of the need they have for your services.

Talk about what you deserve to earn, not what you need to earn. Your employer most likely will not be moved by your need to pay for that new house or car. They will be moved when you mention what you think you are worth and back it up with data. Focus on what you deserve to be paid and how you have added value to the department or project. Keep it in tune with company goals and how you have helped achieve them.

Talk about your dedication to the firm and your teammates. The boss will want to know that you are not just leveraging your talents at the expense of the firm. You need to keep the long-term career goals in mind and not sacrifice your integrity for a few more shillings, kroner, yen, or dollars.

What not to talk about

Don't discuss what will happen if you do not get the raise you are hoping for. No ultimatums. Do not even come close to saying that you will leave the firm if they do not respond (even if that is what you have in mind). If you draw a line in the sand, they will think you are challenging their authority and will respond negatively.

Don't talk about your long-range plans. If this is the first step in a long line of asking for raises, don't tell them. Management does not want to know that you will not be totally satisfied with what they might offer.

Don't talk about an exact figure. You may not agree with this, but I do not think it wise to tell others an amount for my value. What if I am too low? Then they would not give me more. What if I am too high? They might have a good laugh, but not be motivated to give me a raise. You could dis-

Compensation Options

Don't get trapped into thinking that your take-home pay is the only thing that defines your value and enhances your life. There are many ways for your company to reward your efforts. If the budget is too tight for your supervisor to bump your salary any higher, then look for some of these.

- Bonuses may be easier on some companies, so ask if you can develop a system where you challenge and push yourself with the commitment from the company to reward you for achieving various goals.
- Does your firm offer car allowances? Do you travel a lot between offices? Maybe they would consider a car allowance.
- Consider non-cash perks, such as flextime, work-at-home days, better office, or more vacation time.
- Ask for career-development items such as new assignments, training, more education benefits, professional development or conference attendance money (for Autodesk University 2007, for example).
- Request a job title change to better position yourself for promotions and raises in the future.

cuss general figures or ranges, but I would discourage putting a quantity to the raise. You should discuss how much below the average salary scale you feel you are, if that is true, but not about how much more you want. I have used terms such as "I deserve more" "My value is greater" and "I think you can do better" to spur them on.

Don't beg, whine, complain, or get angry. Do not let this conversation degrade into a complaint fest. Keep it top notch, professional, and focused on the positive.

Accepting what they offer

Offer 1 – No raise at all

If they offer nothing, then you can start wondering about your value to the firm. You may need to start looking for another job. Graciously accept their decision, then decide what to do next.

Option 1: Continue the conversation. It is not necessarily over, based on the initial response. Gauge the response and if you think there is room to negotiate, move ahead. Keep talking. Maybe ask for some other benefit (see Compensation Options).

Option 2: Ask what behaviors specifically cause them not to be motivated to give you a raise. Ask what you can do to improve your odds. Stay put. Work harder. Ask again later.

Option 3: Start looking for another job. Don't tell anyone, just start looking. If you do decide to look for another position, keep up your efforts at providing top-quality work until you leave. You want to leave on a good note.

Offer 2 – the average raise

If the offer is average, accept it or ask them to do better. Any raise is most likely a good thing. You will be making more money. You could ask what it would take to get the big raise you desire and work harder. Or you could ask them why they are not responding with more. They may rethink the issue or provide valid reasons for limiting the offer.

Offer 3 – the great raise

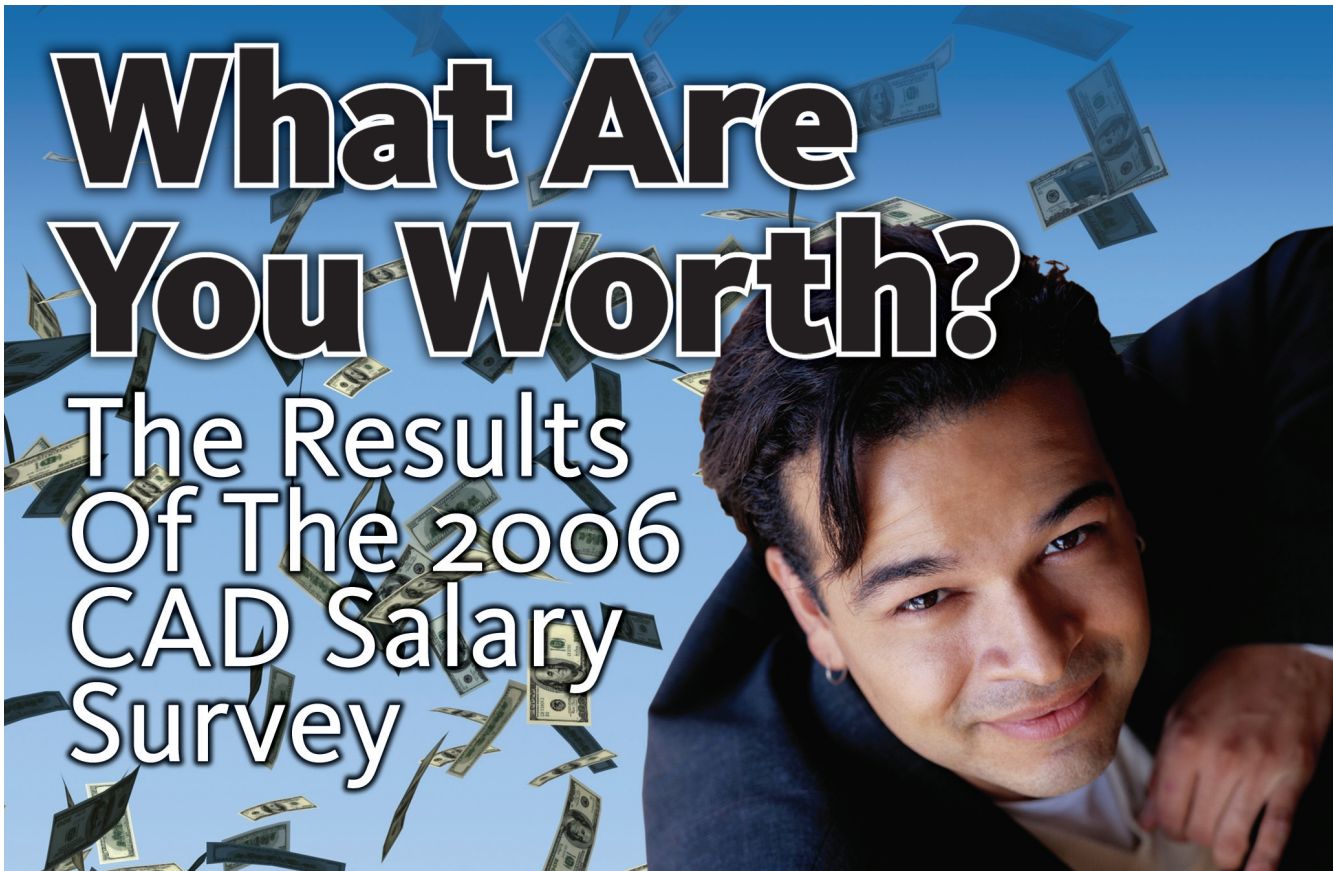
If it is a great raise, then rejoice, take your spouse out to dinner and get moving on proving the return on the investment that the company has made in you. They have now taken your salary to a new level and you need to raise the bar on your efforts to increase the firm's progress. Thank them profusely and redouble your efforts to make them sure they made the right decision.

Whatever the response from your firm, make sure you thank them. Even if they gave you nothing, thank them for listening. Be polite. Be professional.

Getting the big raise is based most heavily on what you have done and what you can do for the company. Keep reminding your boss of your value and keep seeking ways to increase that value.



Mark W. Kiker is a member of the AUGI Board of Directors. He is the General Editor of BLAUGI and also publishes *caddmanager.com*, the *CADD Managers Journal*, and the *caddmanager.com* blog. He is currently Director of Technology for HMC Architects in Ontario, California, and can be reached at mark.kiker@augi.com



Our annual survey of AUGI members brought a record number of responses. In this article, we show the average salary for each job title and the top ten fields, broken down by geographic region.

In October 2006, we asked all AUGI Members to take just a couple minutes of their time to contribute information to our fifth annual CAD Salary Survey. I'd like to extend a big "Thank You" to all those who took part. This year we reached the highest level of participation ever!

While response has increased 30% from 2005, I'd like to point out that that's barely over 8 percent of the total membership. So, please, keep an eye out for the survey next October and take part. The more information we take in, the more information we can give back to you, a point I hope I've managed to drive home the past two years.

You might notice that the *AUGIWorld* report on the 2006 Salary Survey looks a little different from previous years. We've stirred things up a bit; adding a dash of experience, a pinch of education factors, a heaping spoonful of industry, and a few bars of graph! (Rest assured, my data is better than my jokes.)

I do hope you took the opportunity to browse the more detailed results posted to the AUGI.com website after the 2005

survey. While I will tell you here a little bit about the exciting changes in this article and how you are comparing with last year, I will also inform you about the information available for download from AUGI.com.

Earnings have increased an average of nearly 5 percent and over 85 percent of respondents rate their job as "Secure" or "Very Secure." International participation has jumped 7 percent this year, so check out the countries whose members have provided enough responses to secure a spot here in the pages of *AUGIWorld*! Women now make up nearly 16 percent of design professionals. While they report earning 11.2 percent less than men with similar experience and education, that is an improvement over the 12.6 percent difference reported last year. As the trend continues, with women earning more college degrees than men, we can expect this variance to shrink steadily in the future.

Would you like to know which fields and job functions pay the most? Which industries have been giving the largest salary increases? Which disciplines have a significant

number approaching retirement age? Which jobs you can find more women occupying? Which fields offer the best benefits and return the highest levels of job satisfaction?

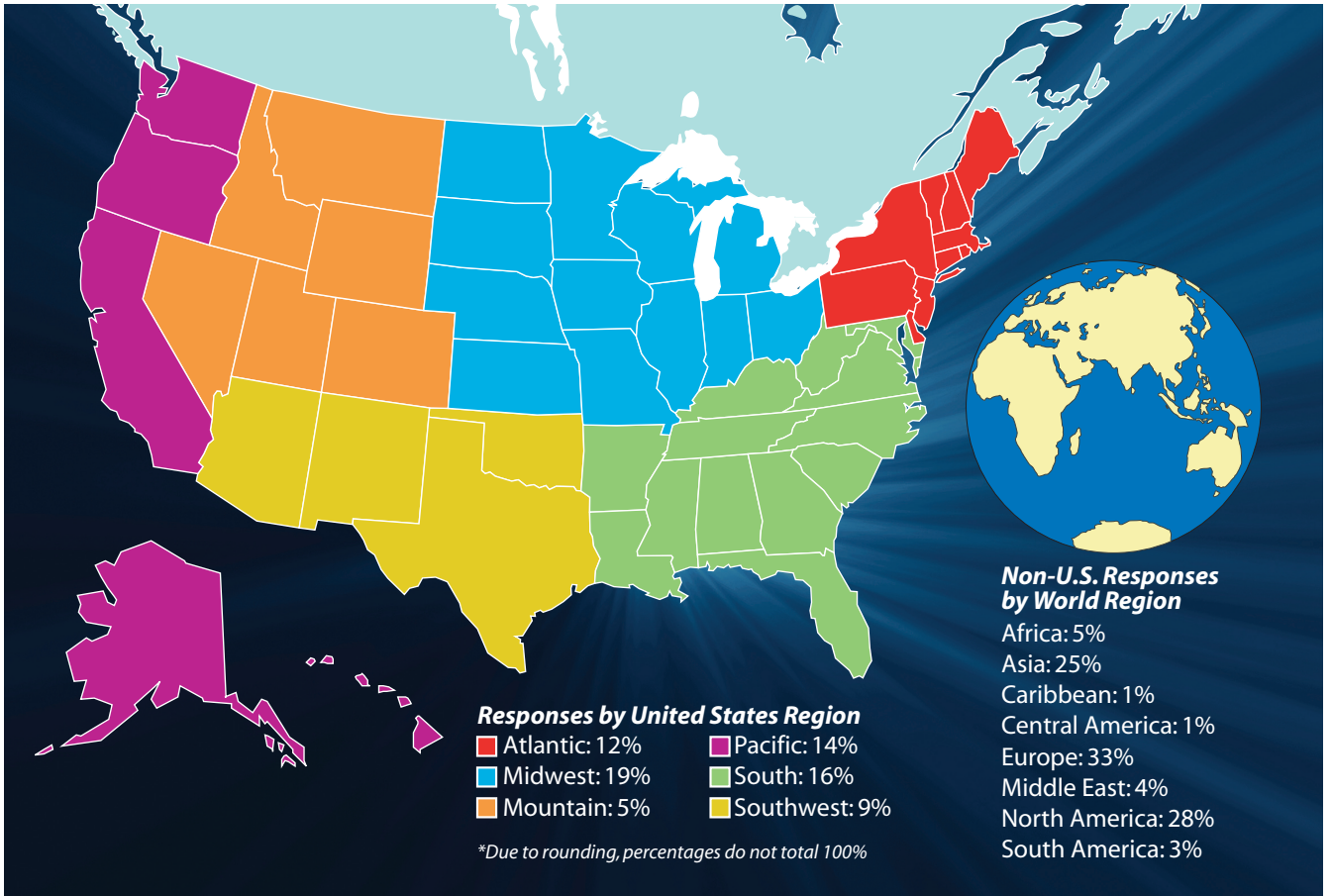
Well, if you do, then you'd better head over to the AUGI website, where I'll be putting the remainder of this year's data.

I'd like to thank you again for contributing to this valuable resource. Your peers appreciate having facts on what other CAD technicians are actually earning today. Everyone should have the comfort of knowing that they are being fairly compensated by their employer.

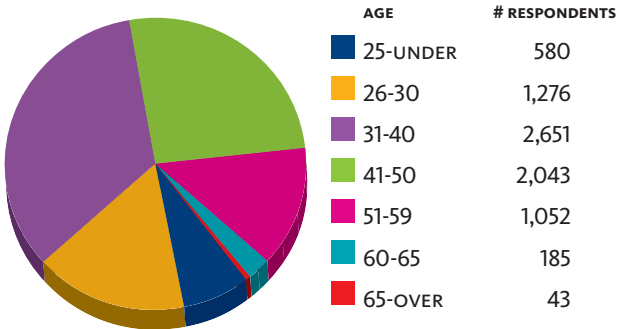
Check out the FAQ document posted with the online survey results, and if you have some additional suggestions for improvement, please feel free to contact me at salariesurvey@augi.com. Every year we evaluate the survey and tweak some options based on member input.



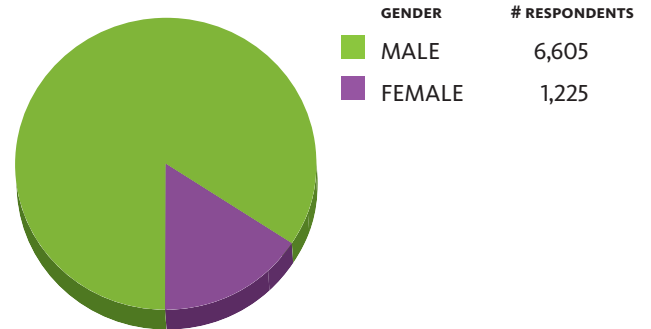
Melanie Perry is facilities-management CADD coordinator working for BJC Healthcare. In her spare time, she is president of the Gateway AUG and a freelance writer. She can be reached at mistressofthedorkness@gmail.com.



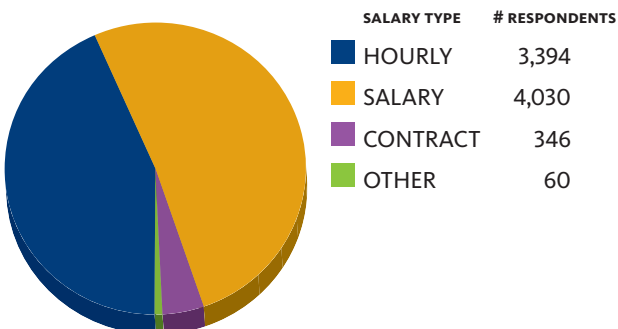
Employee Age



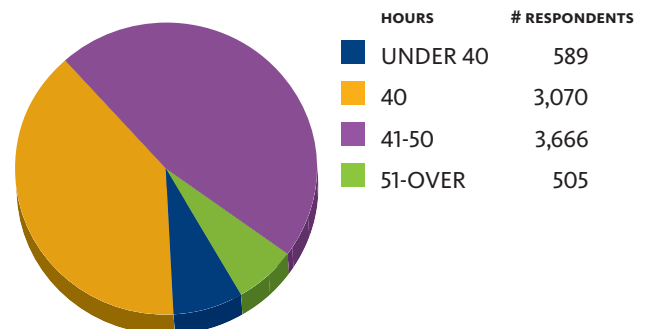
Employee Gender



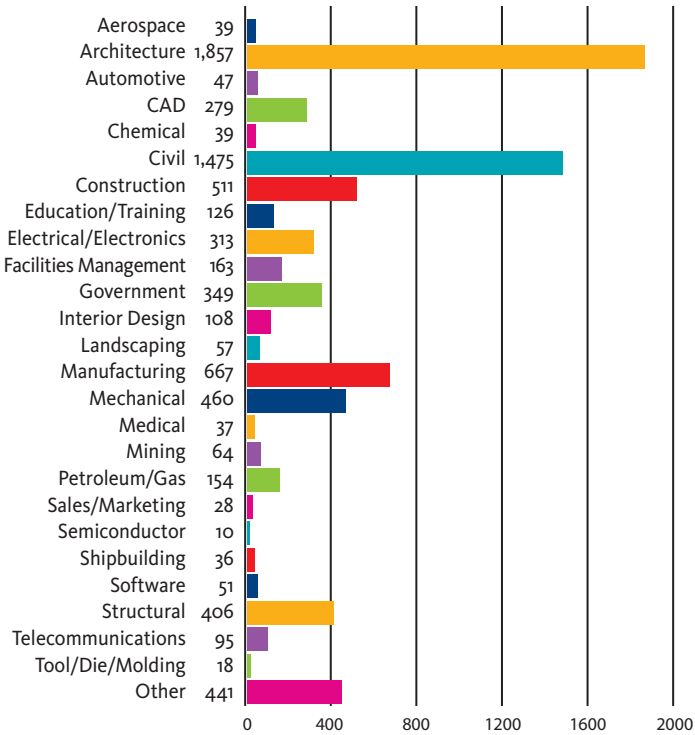
Compensation



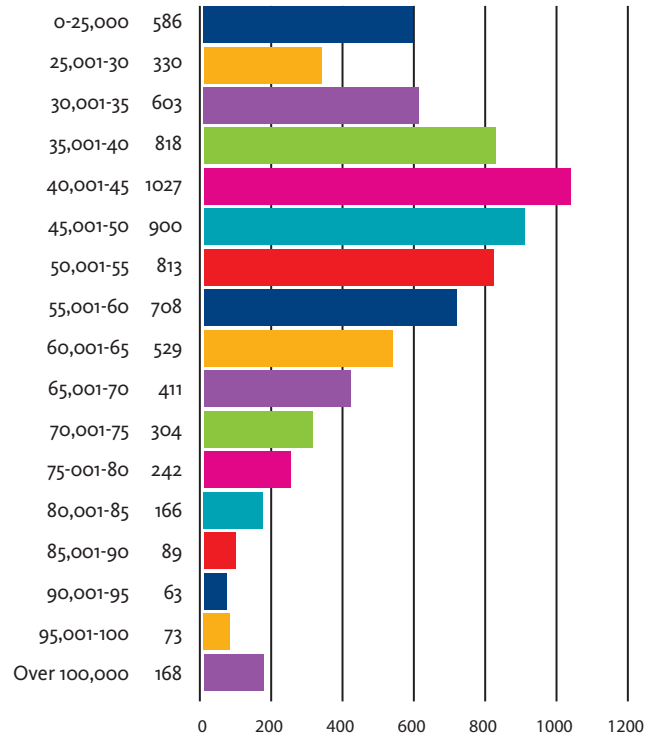
Hours Worked Per Week



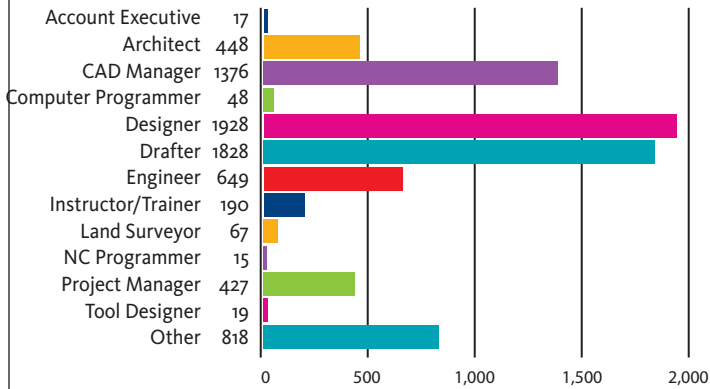
Field/Industry



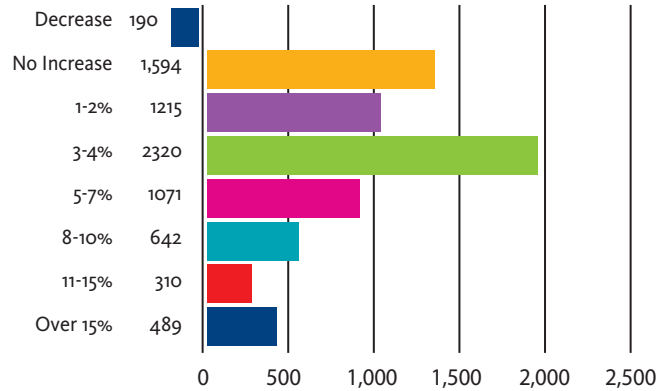
Annual Compensation in 2006



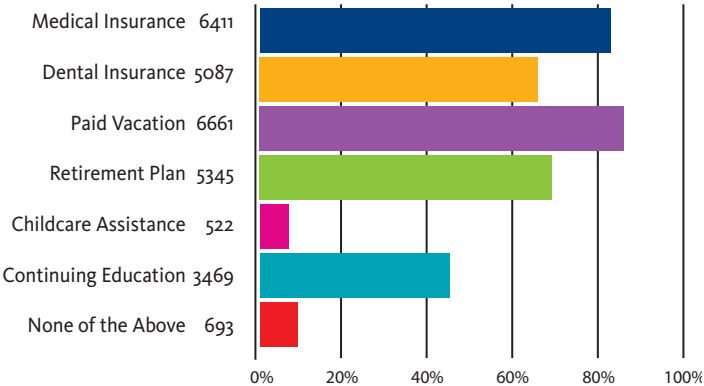
Job Title/Function



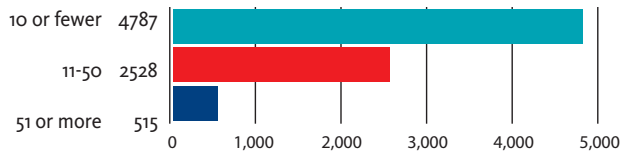
Salary Increase in Last 12 Months



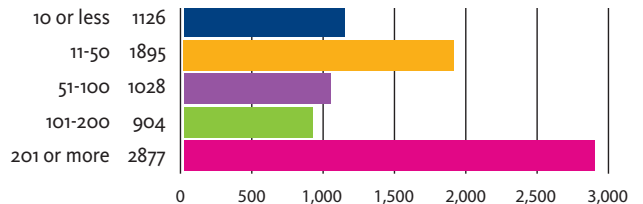
Employee Benefits



How Big Is Your Department



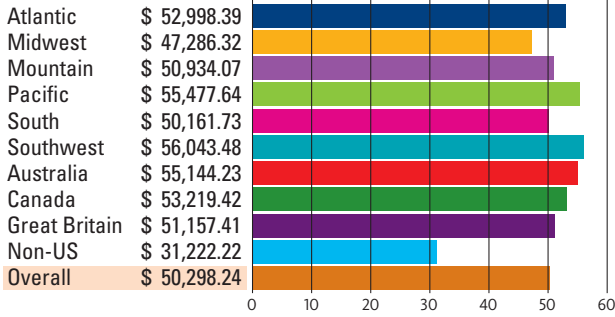
How Big Is Your Company



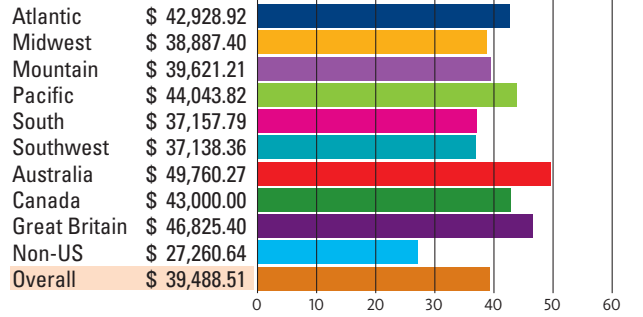
AVERAGE SALARY BY JOB TITLE/REGION

Survey respondents were asked to provide their salary data in U.S. dollars. They were given access to an online currency translator to assist them in this effort.

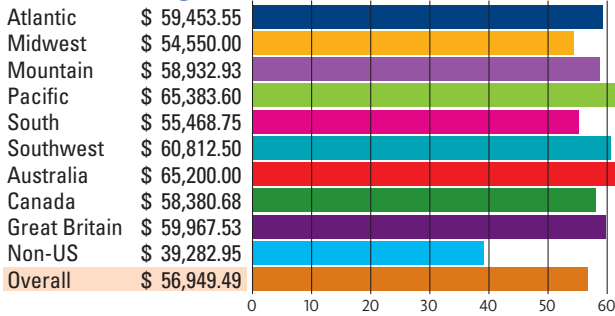
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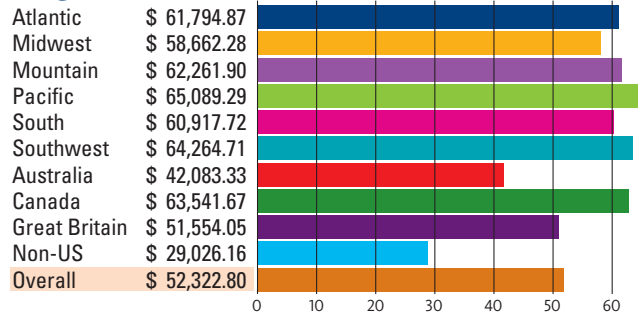
Drafter



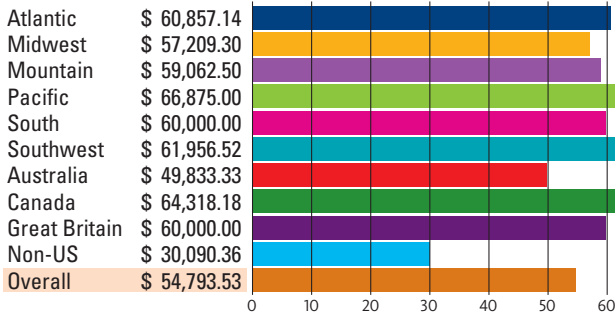
CAD Manager



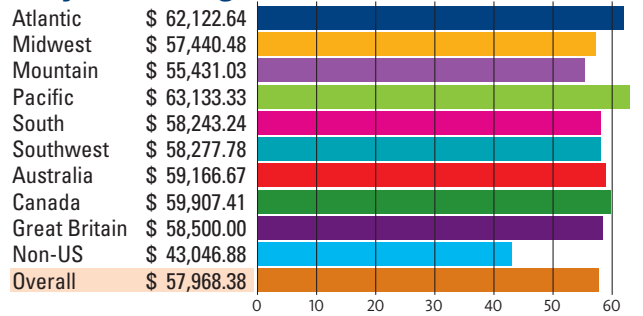
Engineer



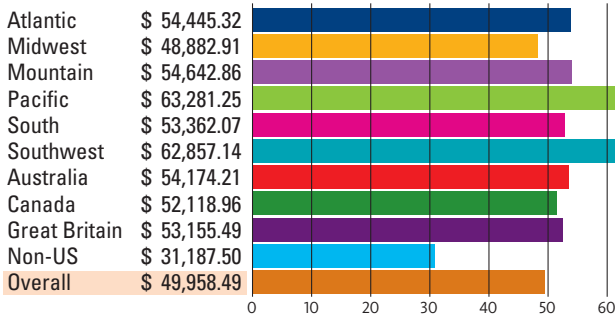
Architect



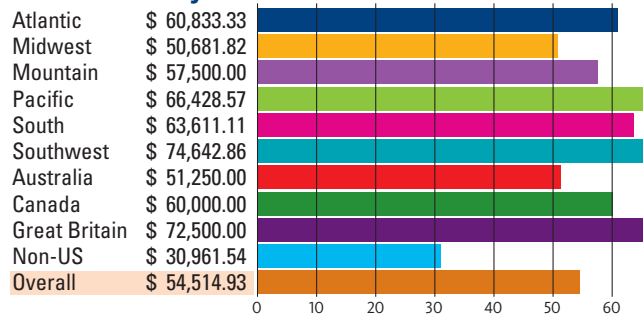
Project Manager



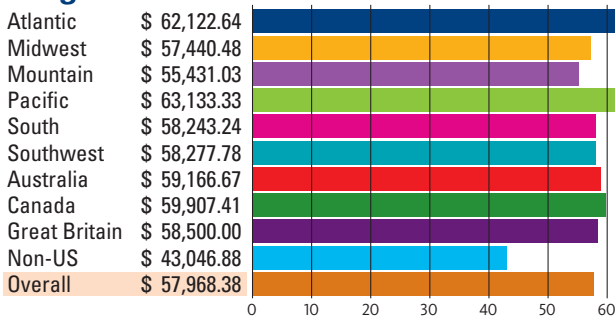
Trainer/Educator



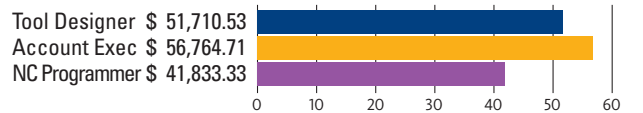
Land Surveyor



Programmer



Miscellaneous Job Titles



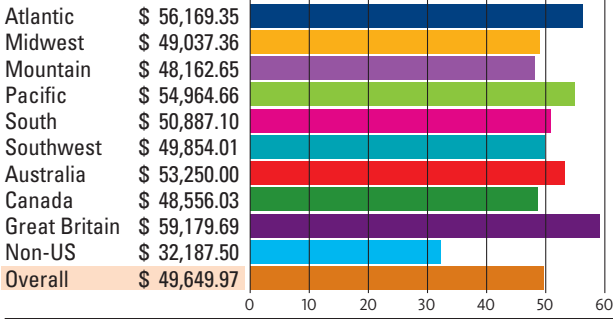
Not Enough Response for Regional Breakdowns

Additional information is available at augi.com/surveys.

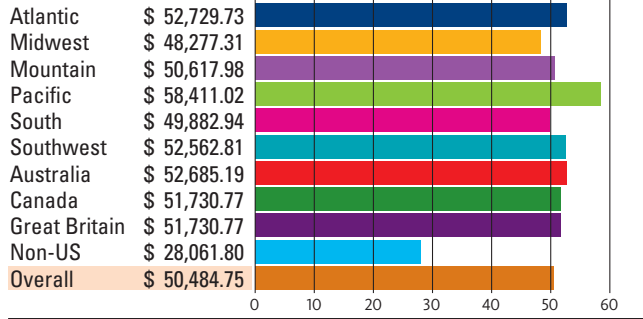
AVERAGE SALARY BY INDUSTRY/REGION

This information pertains only to the top 10 disciplines.

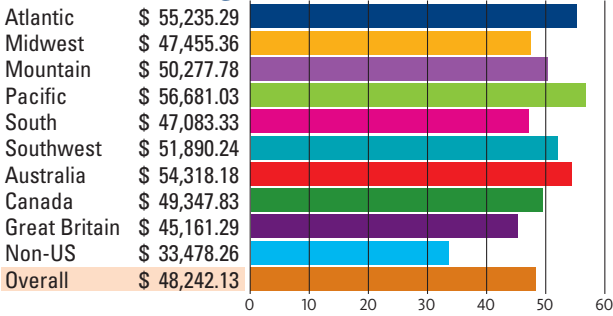
Architecture



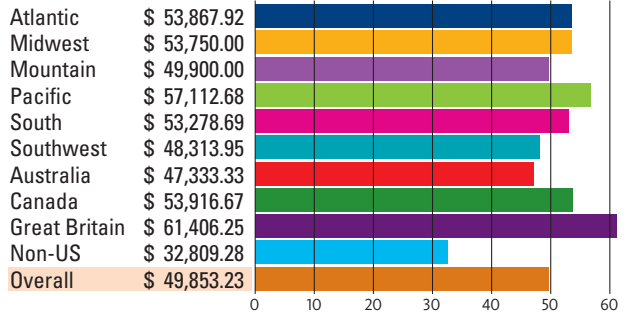
Civil/GIS



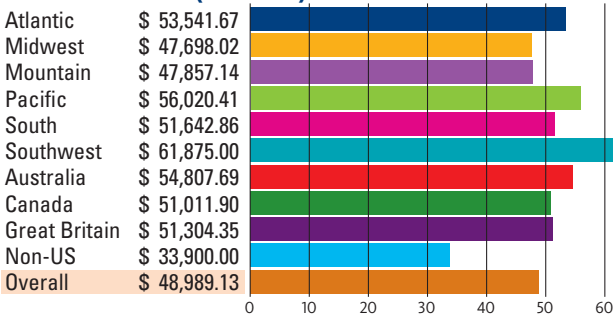
Manufacturing



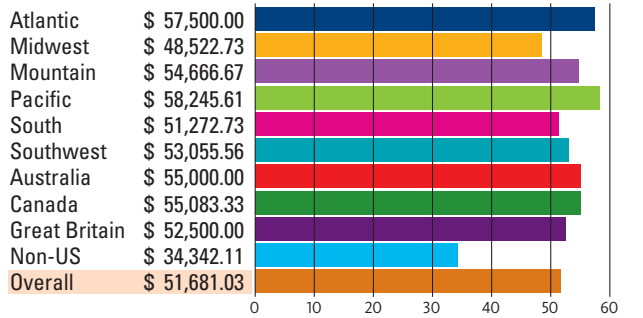
Construction



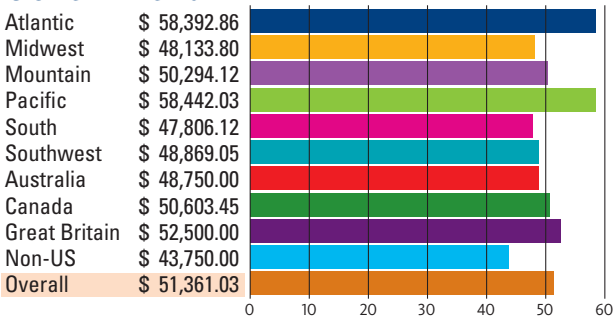
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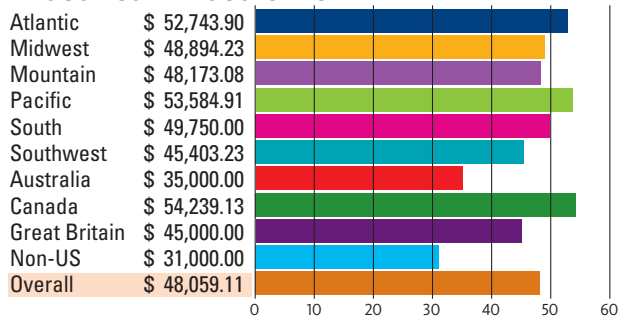
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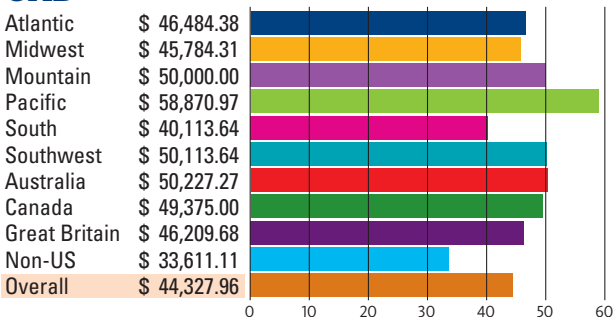
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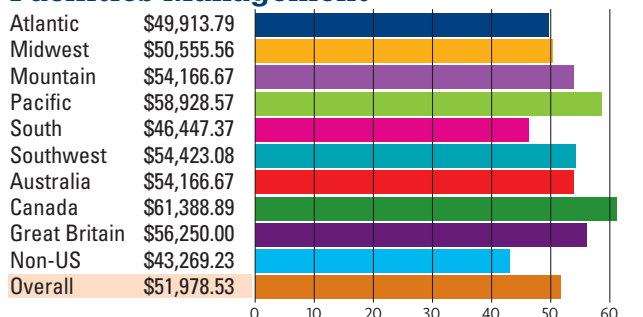
Electrical/Electronic



CAD

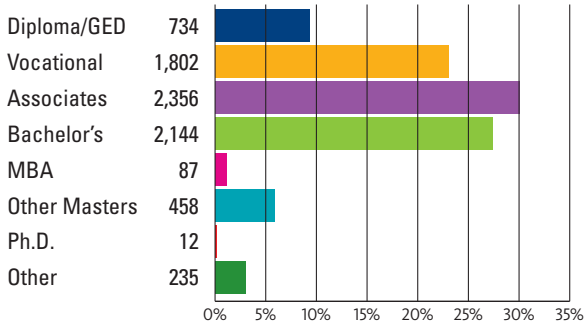


Facilities Management

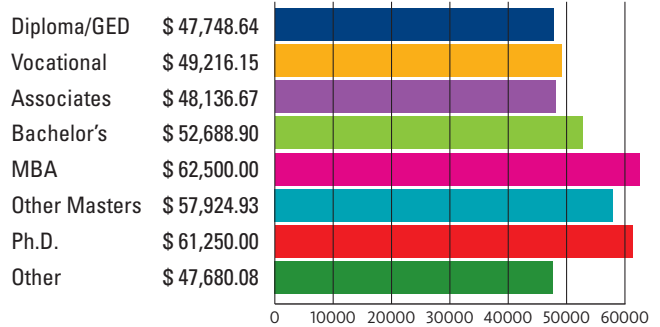


AVERAGE SALARY BY MAJOR FACTORS

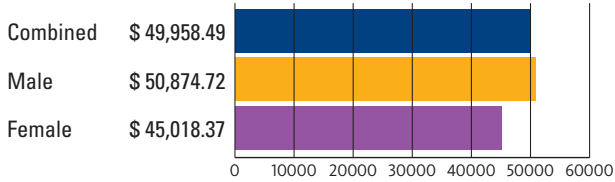
Education Level/Degree Attained



Average Pay By Education Level

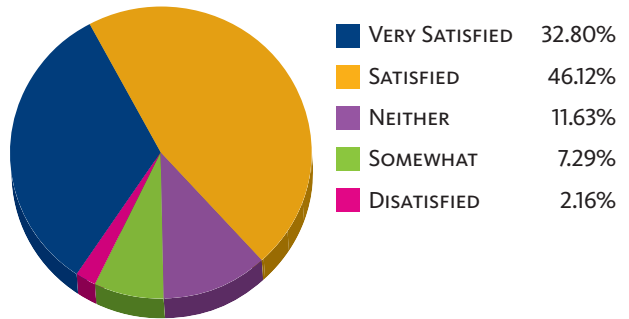


Average Pay Per Gender

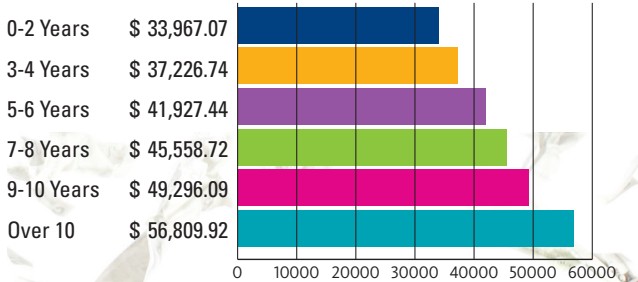


This is an 11.5% difference, a slight improvement over the 12.6% difference in 2005.

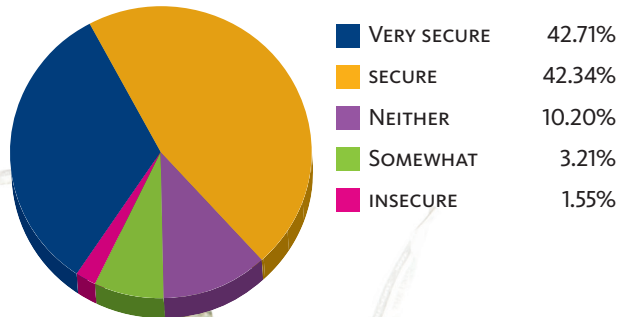
Feelings of Job Satisfaction



Average Pay By Years of Experience



Feelings of Job Security



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Sign on the Hidden Line

Linework Display Controls in Revit

Editor's Note:

This is being written before the turn of the year into 2007. Anticipation is starting to build over the upcoming Autodesk® Revit® Building Release 10, and there is much curiosity about the new Revit Systems 2. Revit continues to expand its user base worldwide—the question posed by slow adopters is changing from “Why should I?” to “How do I?” Reasons for delaying a good look at the Revit platform are getting weaker by the month.

—Chris Fox, AUGI Revit Editor

Linework in Revit

One of the big issues for drafters and designers who move to the Revit platform is controlling the display of objects and lines. Savvy drafters will quickly find the line styles and lineweight dialogs under the Settings menu, but those settings alone will not be enough for complete control. Without layers to manipulate, you need to understand the role of object properties and view controls. It's hard to overstate the importance of understanding view properties and visibility controls per view.

The standard view control dialogs, object properties dialogs, and settings dialogs contain most of what you need in order to make Revit display your project the way you want. Other tools and controls help you tweak your display.

Plan views

Walls in plan views display according to a complex interaction between the properties of the walls and the views. Walls in Revit Building 9.1 display a gray fill pattern bound by thick lines when the view is set to Coarse Detail Level and the walls are cut in the view. This gray pattern is defined in the wall type properties as the Coarse Scale Fill Pattern. If the wall is a complex type, line patterns representing interior structure will display at Medium and Fine levels of detail. These patterns correspond to materials definitions applied to the wall structure. The wrap, or precedence of one pattern over another at openings and wall ends, is set in the wall properties.

The Cut Plane height from the floor plan level is defined in the View Range section of the View Properties and determines whether wall lines are cut or projected. The Visibility Graphics dialog controls the thickness of the boundary lines in coordination with line type and thickness settings. The phase properties of the wall, phase of the view, and phase filter applied to the view also affect display of the wall lines and fill pattern. That's nearly a dozen controls in five dialogs you may have to search to specify the appearance you want for a given wall segment.

Once you have found your way around the properties of the object and views you need to adjust, further manipulation of line appearance will bring other tools into play. The Wall Join tool allows you to cycle through wrapping options at the complicated wall intersections that always seem to crop up. The Linework control on the Toolbar specifies linetype overrides per element per view. You can also sketch Detail (drafted) lines and fill patterns on any view when the controls for a modeled object just won't do what you need.

One common issue in residential design is showing the outline of the roof in the floor plan of the level below the roof. How do you accomplish this without tracing lines that are disassociated from the actual roof?

First, you can make any level of your model visible in any plan view by use of the Underlay property of the plan view you are in currently. Make the Roof level of your model the underlay for the level below, where you wish to display the roof outline. Use the Visibility dialog to clear the display of the roof surface pattern and set the roof display to the Hidden or Overhead line-

type. If there are ridges or hips/valleys in the roof, use the Linework tool set to Invisible lines to remove those from the view. If you move a wall, the roof outline will follow the changes without further intervention.

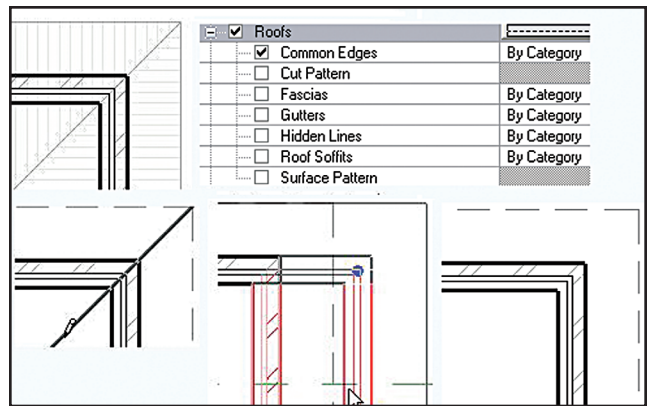


Figure 1 – Left to Right, Top to Bottom: Roof shown as underlay, surface pattern cleared, Overhead and Invisible linework applied, a wall stretched, the roof outline adjusts.

Elevations

Revit's elevation views are 3D in that they have depth that can be defined by the user. The far clip plane of the view can be active or not, and, when active, is easy to adjust. Plan views have a clip plane and a depth plane, with elements between the two planes displayed in a line style called Beyond. Elevations lack this additional display characteristic. Can elevations indicate depth somehow? This is a popular question at implementation workshops.

A control that needs a little digging to find is the silhouette override, in the Advanced Model Graphics section of View Properties (also found by clicking the Shadow On/Off control on the View Control Bar at the bottom of the drawing area).

By checking Override Silhouettes, as shown in Figure 2, you can apply a line style to object edges in an elevation. Set silhouettes to Wide Lines and use the Linework control set to Beyond on building, door, and window edges that are a certain distance from the elevation plane, and your elevation will soon give an indication of depth. If desired, create

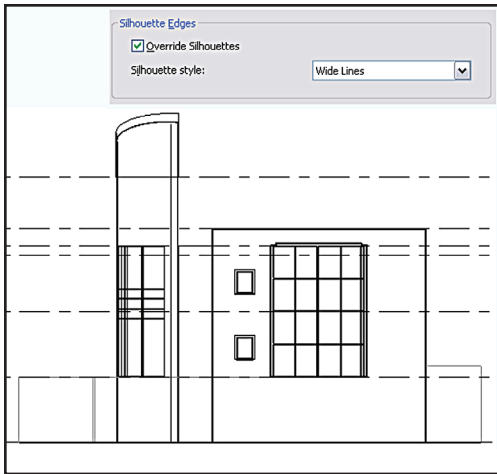


Figure 2 – The Silhouette Override in Advanced Model Graphics, and an Elevation with three linestyles to indicate depth.

a new halftone linetype for elements even farther away.

Another requested change to default elevation involves the display of topo surfaces. When a topo surface has been created to show sloping terrain, certain display standards do not show the cut pattern of earth below the ground line and do represent the ground line in elevation with a heavy line. The Visibility Graphics dialog does not provide a way to turn off the section display of the cut pattern. The Site Settings dialog, found on the Settings menu, has an area for

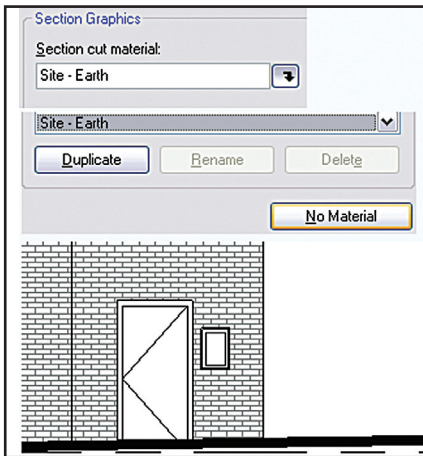


Figure 3 – Use the Site Settings dialog along with the Visibility Graphics controls to remove the earth pattern from a toposurface in elevation views.

Section Graphics that allows you to specify a pattern (or no pattern) for a cut toposurface. Then use the Visibility Graphics dialog to override the default line weight for the Cut Line Style of the toposurface and you can adjust the appearance of the ground line as you wish in elevations.

If you need to see earth in section views of the same toposurface, you will have to create filled patterns (hatches). Personally, having done that for years with AutoCAD®, I consider this the lesser of two evils to creating a masking blank filled pattern in all elevations. It would be good if Revit could devise a by-view control of the cut pattern of toposurfaces.

Dig for the display

Understanding Revit's mechanisms for control of linework in plan, elevation, and section views is crucial for effective, quick creation of

views that look the way you like. Not all the controls are contained in the View Properties dialog or the Visibility Graphics. Keep looking around and you may be surprised at what you find!



Chris Fox is the Revit editor for AUGIWorld, and has written numerous articles on Revit Building and now Revit Systems. Chris recently moved from the US to Australia, where he leads training classes in AutoCAD and Revit through corporate, collegiate, and technical school contacts. Contact him at lcfox@archimagecad.com.

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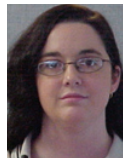
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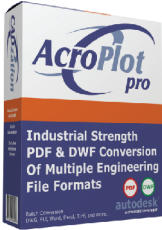
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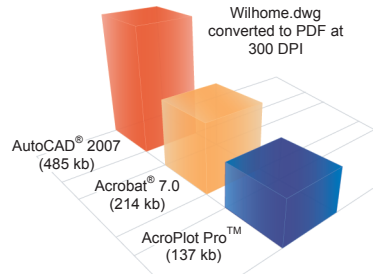


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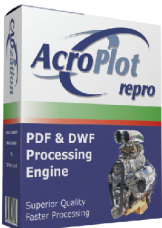
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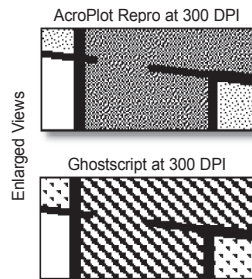
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Selecting Objects via AutoLISP

In AutoCAD®, generally you find yourself doing three different types of tasks as you work with a drawing: 1) Create objects; 2) Modify objects; and 3) Navigate the drawing. One of the things that many people overlook when modifying objects is the ability to use the QSELECT and FILTER commands to select the objects with which you want to work. AutoLISP allows you to do the same thing with your custom routines to select the desired objects.

The function SSGET allows you to select objects just as you can using many of the modify commands in AutoCAD. However, one of the most powerful features of the SSGET function is the ability to control exactly which objects are selected. Using a filter with SSGET allows you to create a routine that can count or add up specific types of objects on certain layers.

SSGET modes

The SSGET function supports many different modes that allow you to control how objects are selected in the drawing. Just as when you are prompted by AutoCAD for objects, you can select all objects in the drawing or select objects using the fence option with a list of points to select all objects along the fence line. The following is a listing of the modes supported by the SSGET function; admittedly, some are more useful than others based on how your custom routine needs to select objects.

Mode	Description
C	Crossing selection
CP	Crossing polygon selection
F	Fence selection
I	Implied selection
L	Selects last entity created in the current display
P	Previous selection
W	Window selection
WP	Window polygon selection
X	Select all
:D	Allow duplicates
:E	Select only objects within pickbox
:N	Retrieves additional information on owner
:S	Force single selection
:U	Enables subentity (face or edge) selection
:V	Disables subentity selection

Some of the modes require additional points or point lists for them to work, including the modes C, CP, F, W, and WP. The modes F, CP, and WP require a list of points in order to be used. Below are a few basic examples of using the SSGET function with different modes.

;; Allows the user to specify how objects are selected
 (setq SS (ssget))

;; Selects the last visible object in the drawing window that was created
 (setq SS (ssget "_L"))

;; Selects all objects using a window selection between the coordinates 0,0 and 5,5
 (setq pt1 '(0 0) pt2 '(5 5))
 (setq SS (ssget "_W" pt1 pt2))

;; Selects all objects along the specified path with a fence selection
 (setq ptlist '((0 0)(5 5)(7 5)(0 3))
 (setq SS (ssget "_F" ptlist))

Filtering objects with SSGET

Being able to filter objects when using SSGET is where the real power lies for your custom routines, because you can fine-tune the routine to work only with specific objects that have specific properties. SSGET uses DXF codes and logical group codes to create the necessary filter list. The DXF code 0 represents the object type that you want to filter for, and other DXF codes allow you to narrow your search for an object with a specific property, such as color or radius. For information on DXF codes, refer to the DXF Reference in the Developer Help found in the Online Help system of AutoCAD. To access the Developer Help file, click Help>Additional Resources>Developer Help.

Below is a basic example of using the filter with SSGET.

;; Allows the user to select only line objects
 (setq SS (ssget (list (cons 0 "LINE"))))

Logical group codes allow you to select multiple types of objects, or you can filter on a number of different properties at a time. Below are the four different logical group values that you can use.

Group Value	Description
"<AND> ... "<AND>"	All values must be part of the object being tested in order to be selected
"<OR> ... "<OR>"	One or more values must be part of the object being tested in order to be selected
"<XOR> ... "<XOR>"	One or more values must be part of the object being tested in order to be selected, but both values can't be valid with the object
"<NOT> ... "<NOT>"	All objects but the one with the matching value is selected

Below are a few examples of using logical group values with SSGET.

;; Selects arcs that are on the layer Obj or Obj2
 (setq SS (ssget (list (cons 0 "ARC")(cons -4 "<OR>")(cons 8 "Obj") (cons 8 "Obj2") (cons -4 "OR>"))))

;; Selects the blocks with the name DOOR30 on layer A-Walls-Doors
 (setq SS (ssget (list (cons 0 "INSERT")(cons -4 "<AND>")(cons 2 "DOOR30") (cons 8 "A-Walls-Doors") (cons -4 "AND>"))))

Counting circles

Creating hole charts, schedules in a drawing, or even a listing of the parts in a drawing can require some manual counting at times because AutoCAD doesn't support every possible way to count objects, with the exception of the Attribute Extraction Wizard. The routine below is a basic example of looking for circles in a drawing between a radius of 0.75 and 0.9875. Once the objects have been selected and counted, two text objects are created based on a user-specified point in the drawing. To test the routine, create a new drawing and draw some circles with different radii that are smaller than 0.75 and larger than 0.75. Make sure a few circles have a radius between the values 0.75 and 0.9875.

```
;; Count up the circles within the range of 0.75 and 0.9875
(defun c:Circ-Count ( / SS SS-FILTER SS-CNT LOOP-CNT SS-EN SS-GOOD)

  ;; Filter on circles only
  (if (setq ss (ssget (list (cons 0 "CIRCLE"))))
    (progn

      ;; Initialize the default variables
      (setq SS-CNT (sslength ss)
            LOOP-CNT 0
            SS-GOOD 0)

      ;; Loop through the selected objects
      (while (< LOOP-CNT SS-CNT)
        ;; Get the next object
        (setq SS-EN (entget (ssname ss LOOP-CNT)))

        ;; Determine if the selected circle falls into the defined range
        (if (and (<= 0.75 (cdr (assoc 40 SS-EN)))
                 (>= 0.9875 (cdr (assoc 40 SS-EN))))

          ;; Add one to the valid counter
          (setq SS-GOOD (1+ SS-GOOD))

          ;; Add one to the loop counter
          (setq LOOP-CNT (1+ LOOP-CNT))

          ;; Two lines of text are displayed that present information about the objects
          selected
          (command "_text" (getpoint) 2 0 (strcat "Circles selected: " (itoa SS-CNT)))
          (command "_text" (list (car (getvar "lastpoint"))) (- (cadr (getvar "lastpoint"))
            3)) 2 0 (strcat "Valid circles selected: " (itoa SS-GOOD)))
        )

      ;; Prompt is displayed when no circle objects are selected
      (prompt "\nNo circles selected.")
    )
  )
```

Conclusion

Custom commands that allow you to work with uniquely identified objects provide for some performance benefits when trying to modify objects or collect information about objects in the drawing. Filtering on specific object types and properties allows you to ensure that your custom routines work correctly and provide a way to fine-tune your object selection. Once you have the desired objects selected, you can do a number of things—from counting objects to manipulating objects—with the commands in AutoCAD.



Lee Ambrosius is the owner and operator of HyperPics, LLC an AutoCAD Consulting/Training company located in Wisconsin, USA. He specializes in AutoCAD Customization/Programming and uses AutoCAD 2004 through 2007, along with some of the AutoCAD based vertical products. He is the co-author of the book AutoCAD @ AutoCAD LT All-in-One Desk Reference For Dummies (based on AutoCAD 2007). Lee can be reached via e-mail at lee_ambrosius@hyperpics.com; other contact information can be found on his Website at <http://www.hyperpics.com> or his Blog at <http://hyperpics.blogs.com>.

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Moreover, certain controls can be combined, so that changes to one condition result in changes to another one. Therefore, a 2-seat table can be transformed into a 12-seat table with one click, not only adding 10 seats, but also changing the dimensions of the table as well.

This ability to combine several variations of the same design element into a single, easily modified block has truly changed the way we think of blocks and has drastically decreased the size of our block libraries. Moreover, as with many features in Au-

todesk® Architectural Desktop (ADT), we are continuously inventing creative ways for application.

What dynamic blocks can (and cannot) do

Certainly, dynamic blocks have caused quite a bit of excitement among users and have boosted productivity to yet another level. The ability, for instance, to stretch a picket fence just by dragging the grip and have the posts array to the desired length of the fence, is surely preferable to the execution of ARRAY or COPY commands, where you end up with each post being a separate entity.

It seems that the applications of dynamic blocks are endless; however, there are some limitations. Being an AutoCAD feature, dynamic blocks do not work with AEC elements or Multi-View Blocks. Basically, one needs to assume that an already dynamic AEC object cannot be made more dynamic through this new feature. Rather, a combination of two-dimensional static elements can be combined and made into an interactive dynamic ensemble of entities—a dynamic block. Surely, in the near future one hopes to see 3D dynamic blocks or Multi-View dynamic blocks. But until then, let's look at some indispensable applications of the currently available dynamic blocks.

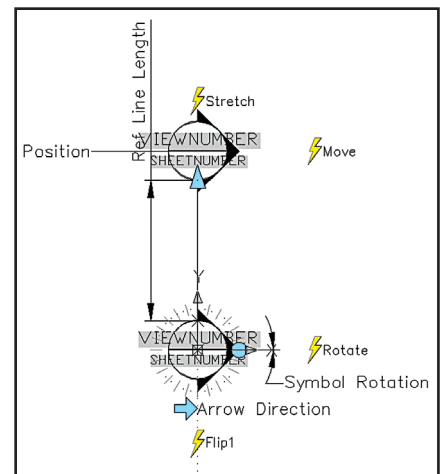


Figure 1: Converting Callouts to Dynamic Blocks.

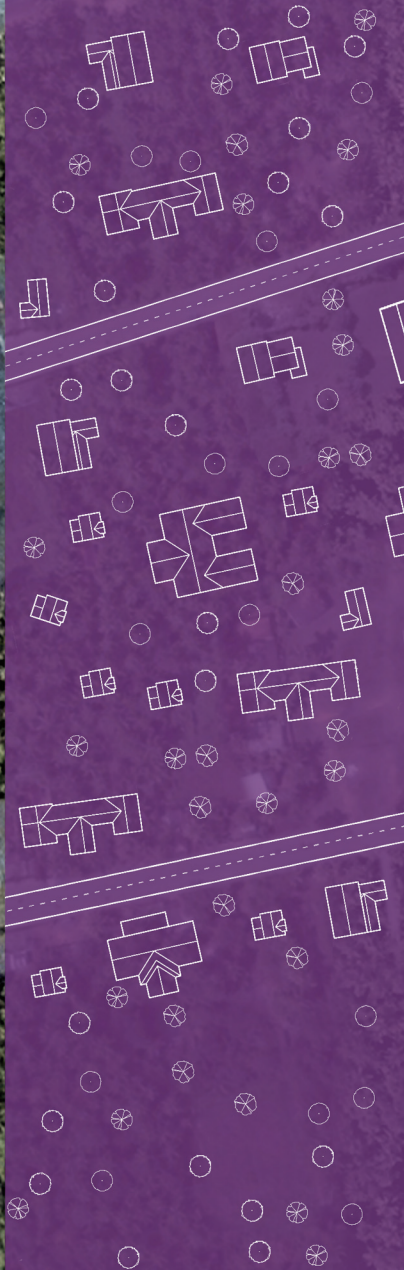
Callouts

Ever since I created the first dynamic callout, I'm convinced that this is one of the best applications of dynamic blocks. Callouts are a great feature in Project Navigator, but their limitation is that upon insertion, they remain as separate entities. Very often, one needs to adjust the length of a title block line or to stretch one of the section marks just so it misses a dimension, or to reverse it so it points in the opposite direction. All of these error-prone actions can be easily combined in one dynamic block, saving time and decreasing chances for error.

The example in Figure 1 shows a two-sided section mark that is being transformed into a dynamic callout. This procedure actually follows an out-of-the-box dynamic block sample for a section mark, but has been modified to include fields for the attribute definitions. With the parameters and actions added, you can stretch, rotate, move, and flip the mark to accommodate any condition (Figure 2, Figure 3, and Figure 4).

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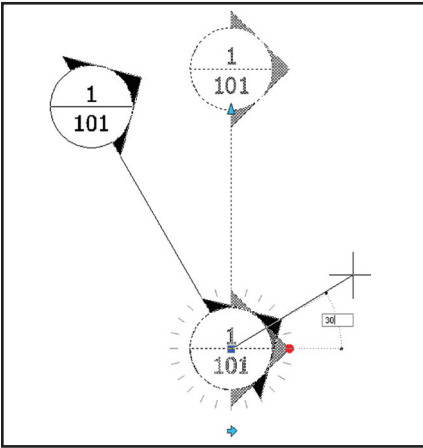


Figure 2: Rotate Action

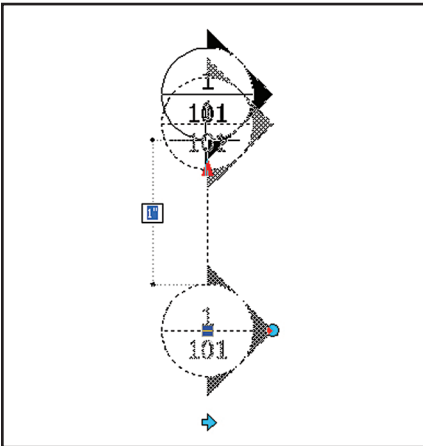


Figure 3: Stretch Action

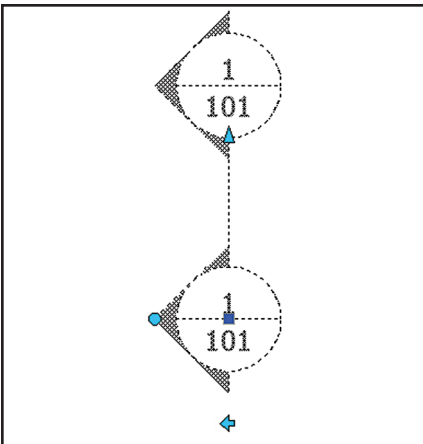


Figure 4: Flip Action

While this transformation seems flawless at first, there are some side effects. When callouts are transformed into dynamic blocks, they lose their link with the Project Navigator structure. They are simply inserted as blocks and do not follow the Place Callout Wizard where one naturally would select whether the section (as in this example) is being drawn within the same

drawing or what the scale of the callout should be.

There is, however, a workaround. Once inserted, the new dynamic callouts can be linked back to Project Navigator simply by dragging them over the palette to attain their values. Therefore, one could still argue that dynamic callouts are a much cleaner solution. With some enthusiasm, one can combine almost all of them within a single block.

Parking spaces

Parking spaces are probably one of the most tedious linework items one needs to create. When curtain walls were introduced in ADT, some creative users had gone to great lengths to use their AEC capabilities in order to facilitate the drawing of parking spaces. That has been a very inventive application of curtain walls with its limitations. Using dynamic blocks, you can not only array the number of spaces desired, but also modify individual elements such as stretching the islands; moreover, you can add a field that counts the parking spaces, as well as choose from a list of parking space sizes. Parking spaces, or any other entity that is composed of array elements such as bathroom stalls and picket fences, are great examples of Stretch and Array actions in the dynamic block.

Structural members

Now you can list a major part of your structural member catalog within a list that is composed through the Lookup parameter of a dynamic block, thus modifying with one click the structural member kind on the screen.

Additionally, each member can have several of its components manually modified to create custom shapes and sizes. Notice all

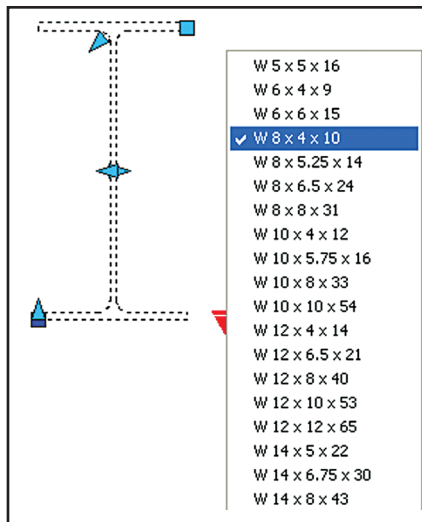


Figure 5: Lookup table for Structural Members

the arrow grips on the I-beam in Figure 5 that can be stretched out to increase or decrease the size of the individual elements.

North arrows

Several north arrows can also be combined into one block and, with the use of a Lookup table and visibility states, you can choose from various designs. A Rotation action is further needed to enable the arrow to point at a desired angle position.

Bar scales

These are great dynamic block candidates. One can choose from several scales within a list provided by the Lookup parameter and quickly adjust the bar scale of the drawing.



...final notes

The capabilities of dynamic blocks are many, thus making it hard to evaluate all the possible applications. But whether it's a simple north arrow that has a rotation action or a complex foundation detail that combines all actions in the palette, the ability to have a block with an intelligent interdependency among its components achieves much-needed flexibility, downsizes our drawing libraries, and increased production while decreasing time and effort.



Velina Mirincheva works at studioVIM, an architectural and CAD consulting firm and has been an AutoCAD user for 8 years. She is an ADT 2005 Certified Expert. Velina can be reached at vmirincheva@studiovim.com



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Schedule is subject to change.

Jumping to 3ds Max 9

One of the major NO-NOs in the field of 3d is to use a new release of a program on a project before you've tested it. Normally, I wouldn't even mull over the idea of doing this and I even refrain from installing it altogether, just to avoid temptation. The latest release of 3ds Max®, however, was different. The new features and improvements were enough to justify taking the risk of jumping to 3ds Max 9.

mental ray

One of the very first things that excited me about the new release of 3ds Max 9 were the improvements made to mental ray. I've made a few diligent attempts in the past to learn how to use mental ray, but found it to be as easy as racing a dirt bike for the first time with one arm tied behind my back. The quality of the rendering has always been there, but the ease of use had been lacking...until now. All of you who have had experiences similar to mine should give mental ray another try. You won't regret it.

Mental ray sun and sky is a new solution to give the end user the ability to make accurate daylight scenarios. The daylight is achieved by two special photometric lights and an environment shader that all work in concert with one another. Sun and sky are a high-dynamic range photometric lighting system requiring that the Logarithmic Exposure control be turned on in the environment dialog. Since the skylight is a form of indirect light, Final Gather should also be enabled or the shadows produced will be very dark.

The methodology is simple. Select mental ray as the current renderer. Create a daylight system set to the desired location and time of day. In the sunlight drop-down, select mr Sun. In the skylight drop-down, select mr Sky and agree to place the mr Physical Sky map in the environment slot. That's it!

There are also parameters available that can be changed to make the necessary adjustments to the look of the rendering. Time and location will produce very different results as well as changing the haze val-

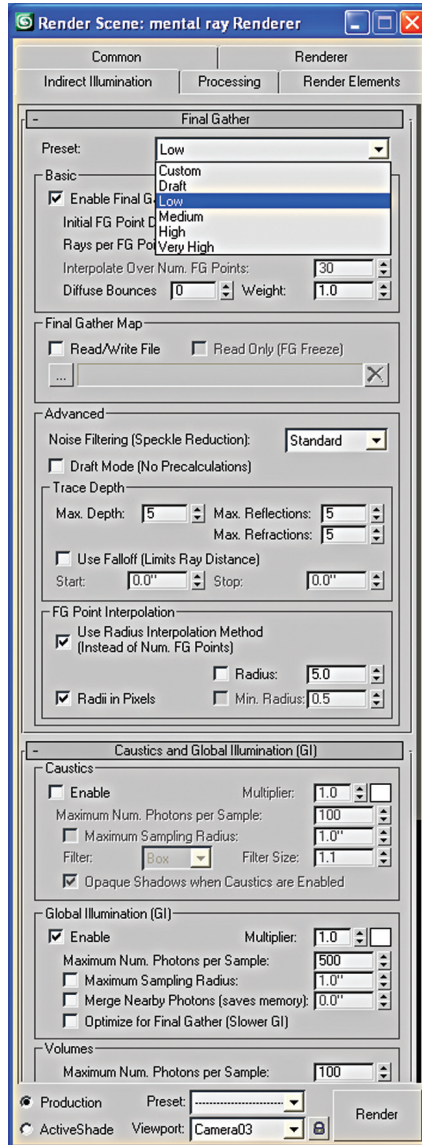


Figure 1 – Render Dialog

ue. The haze value represents the amount of particulate matter and water vapor in the air. Adjustments can also be made on the brightness and contrast in the Logarithmic Exposure Control.

The next major enhancement in mental ray is the new Arch + Design material, which is designed to handle pretty much any surface type used in the architectural and design fields as well as to increase

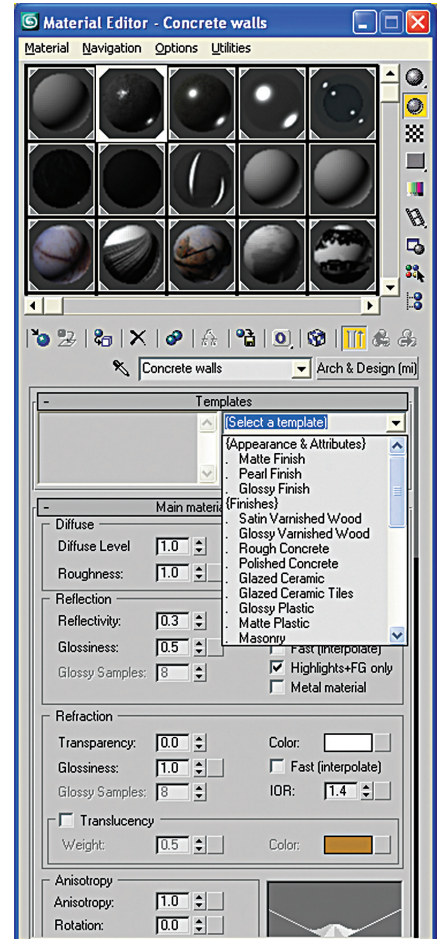


Figure 2 – Material Editor

speed and ease of use. The focus has been to make the setup logical and easy. Templates allow the user to access common materials from a drop-down list. When tweaking is required, the controls are arranged in a logical fashion based on frequency of use. Glossy reflections and refractions have seen a large speed increase as well as the ease at which they are implemented. The BRDF (bi-directional reflectance distribution function) is now editable by the end user, allowing full control of how reflectivity happens on a surface.

The new changes to the Final Gather rollout have been a great timesaver. A set of presets has been instituted to allow the user access to quick and easy pre-made solu-



tions for Final Gather. The presets are both efficient and effective, but still allow you to tweak the settings for speed and quality. These changes can be saved into the mentalray_fg_presets.ini file as new settings or modifications to the existing ones.

Performance

One of the big-ticket items that a lot of people have been calling for is a 64-bit version that could harness the power and memory resources of the new 64-bit workstations. The installation disk comes with both a 32-bit version and a 64-bit option, depending on what operating system and hardware you are running.

Another pleasant change I noticed was the overall speed increase in the viewports. The ability to work with high-resolution meshes in the viewports makes creating and editing geometry more efficient and allows you to work at a level of detail that you prefer. A bitmap proxy solution also provides some speed increase in the viewports by switching between high-res and low-res versions of the bitmap.

Modifications and additions

There have been a lot of modifications to existing tools as well as some major additions with a pretty good distribution across the different areas of the program.

The ProBoolean and ProCutter compound objects are a great addition and should be added to your modeling toolbox.

In fact, the strength of ProBoolean has caused me to change my approach to modeling—or at least to how I assess my approach to the best technique for modeling a particular model.

The animation layers feature allows the user to place animation onto separate layers with a wide range of controls for blending

and turning animation on/off. In addition, a wide range of adjustments allow you to make adjustments without modifying the keyframes. There have also been a number of improvements to Character Studio's Biped, allowing the user a lot more freedom over key adjustments and general editing of animation.

The Hair and Fur world space modifier allows for hair styling to be done in the viewports directly on your model.

The new Havok 3 engine has been added to reactor, increasing the speed and accuracy of the rigid-body dynamics simulations. The point cache modifier has been expanded to include adjustable playback ranges, Nth-frame sampling, strength adjustment for blending, and improved cache file management.

Max for everybody

This release opens up Max to new users because, in a lot of areas, it reduces the learning curve—or at least makes decent results possible in a very short time with very little effort. All in all, speed, ease of use, and quality have been improved.

Although I'm still not finished going through all of the new additions and improvements to 3ds Max 9, I can honestly say that making the jump to 3ds Max 9 will have you jumping for 3ds Max 9. Have fun!



Dwayne D. Ellis is the lead 3D computer animator at Hrycay Consulting Engineers, a firm specializing in motor vehicle accident reconstruction. He is also the founder of Lifeseyes Studios and be reached at dwayne_ellis@yahoo.com.

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2D Drawing to Inventor Solid, the Easy Way

You know all of those old AutoCAD® drawings in your database? They are all waiting to be used with Autodesk Inventor®. Those new solid models look so slick that your 2D AutoCAD drawings want to join the party. Up until now, you've just created your solid models from scratch. Oh, yes, you've heard that those "old" files can be used, but you've always thought, "My way is faster, and more accurate."

Faster?
Faster than what?
More accurate?
More accurate than what?

It's all relative. While some part files are probably quicker to start from scratch, with others it is a lot more useful to use geometry that already exists.

A word of caution, here. When using existing geometry, make sure it is to "scale." I've worked a few places where the drawings can be made quickly and the information, when plotted, looks really good. However, and it's a mighty big "however," the drawing files are not to scale and they have no value down the road for other applications. They will have to be redrawn every time they are used for a different application. Where did that time savings go? Please take my advice and have your co-workers draw to scale—always. What seems easier and quicker now will come back to haunt you later. Draw to scale—I can't say it enough, but I've said it enough for now.

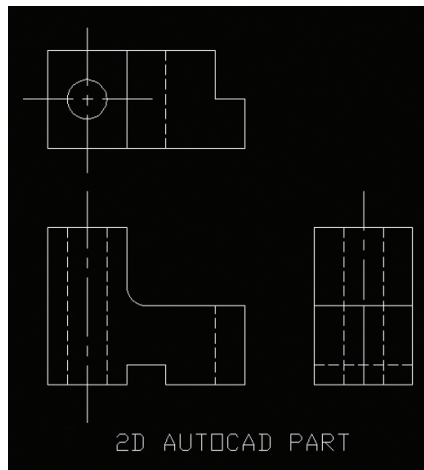


Figure 1

Back to topic. You've decided that 2D part thingamajig is just the part you need for the Slice Inverter you're working on.

Also, you feel it's time to bring that 2D to the party. But how?

First you will need a drawing that is either an AutoCAD .dwg or a .dxf file. Either file format will work just fine. Figure 1 shows the drawing file from which I will create my solid model. This will be easy.

Open Inventor (by the way, I'm using Inventor Pro 11, but other versions work very similar to this) and select the File pull-down, then select Open. From the "Files of Type" pull-down, select DWG. This will allow you to open a drawing in AutoCAD .dwg file format. Locate your drawing file and select Open (see Figure 1).

Leave the radio button for "AutoCAD or AutoCAD Mechanical File" selected. If you have previously gone through a Configuration setting, you may select the Configuration saved from before. I realize that some of you may have already used a .dwg file before. In this case, I'll select the "Next>" button. If you have a Configuration, you could select the "Finish" button. This might take a few seconds.

Figure 2 illustrates the next dialog box you'll see. The upper left box allows for deselecting layers that you don't want to import. With my model example, I do not need to import the hidden layer, so I unchecked the box. To save time, you could uncheck the "All" box and select the layers you want to import. I'll accept the other defaults for "Inches" and "Constrain End Points." The import Preview Box shows the

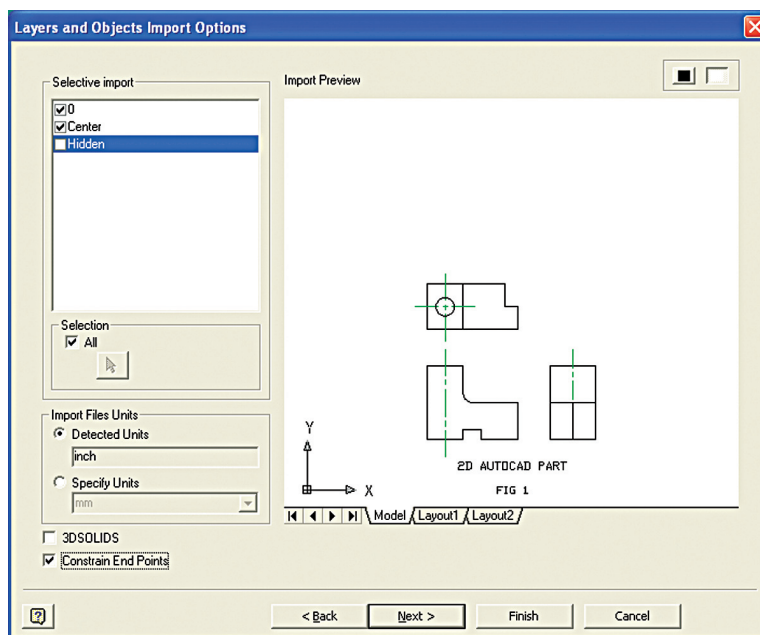


Figure 2

drawing from Figure 1. At the bottom of the Preview Box, you can select Model Space or the various Layout Tabs.

“Next>” Button

Import Destinations Options dialog box.

Upper left section, Destination for 2D data:

If you want to create a drawing file, you can select the “Finish” button and your IDW drawing will load with your AutoCAD 2D data. Just add dimensions or additional data as needed, save and plot.

That is fine; however, we want to create a solid model. I’ll select the radio button for “New Part.” There are several

other options for you to configure as well. After exploring the other options and configuring the Destination Options, you have the ability to “Save Configuration.” This is the configuration you may use in future

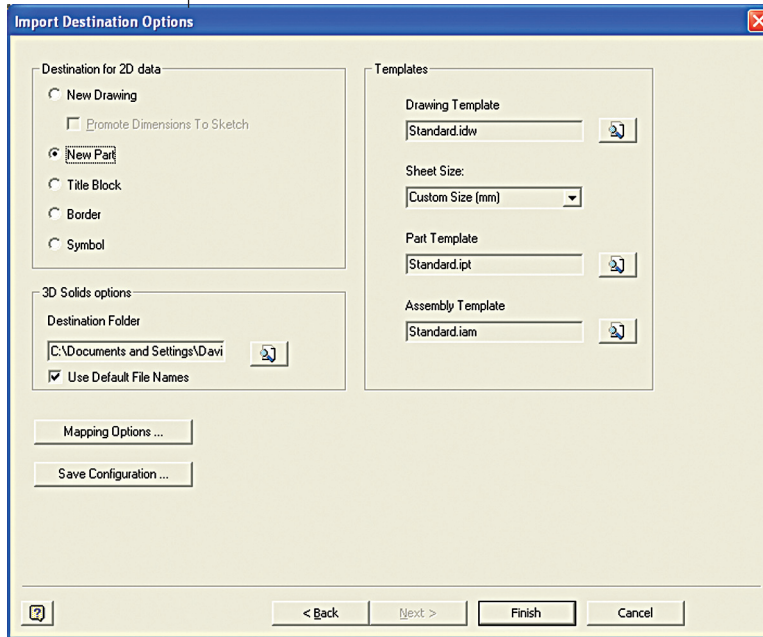


Figure 3

conversions, as noted above with Figure 2. I’ll accept the rest of the defaults and proceed by selection “Finish.”

Congratulations! You have just brought an AutoCAD .dwg file into Inventor. As dis-

played in the Model Browser Bar, we have three sketches—the default sketch1, 0, and Center. Layers transfer into sketches. The more layers you have, the more sketches you have. As you know, you can delete sketches you don’t need, so if you inadvertently brought in layers, just delete them.

Let’s start making our solid model. There are several ways to do this—one way is to use sketch1, or you may use either the 0 or Center sketch. I’ll work from the model view and not work from a “Sketch.” Select the “Extrude” icon and select the front view. Figure 4 shows the area selected.

Next select the arrow beside the 1.25 in, and select “Measure.” From the import-

ed AutoCAD side view, select the line at the bottom, as this is how thick our part is, then select the “OK” button. You now have a solid, and the sketch you used to create that solid is invisible or has been turned off.

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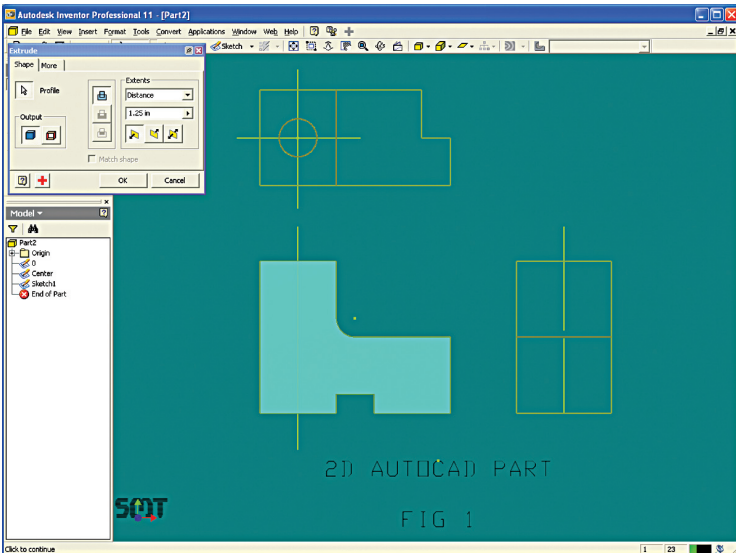


Figure 4

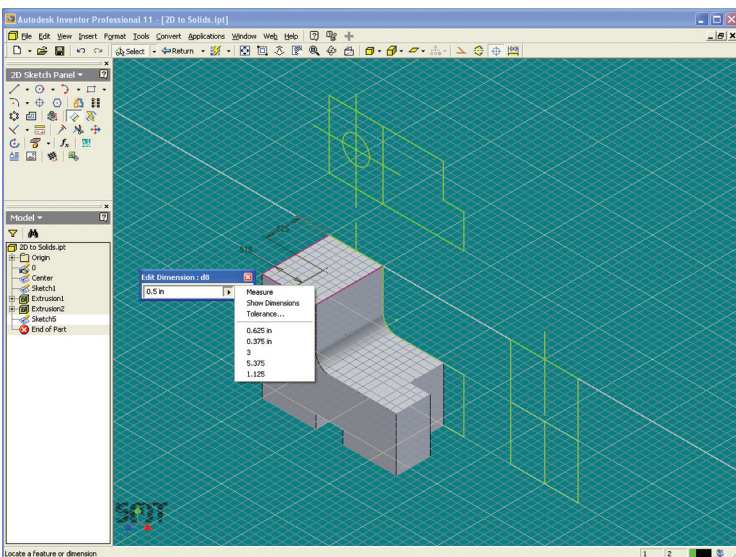


Figure 5

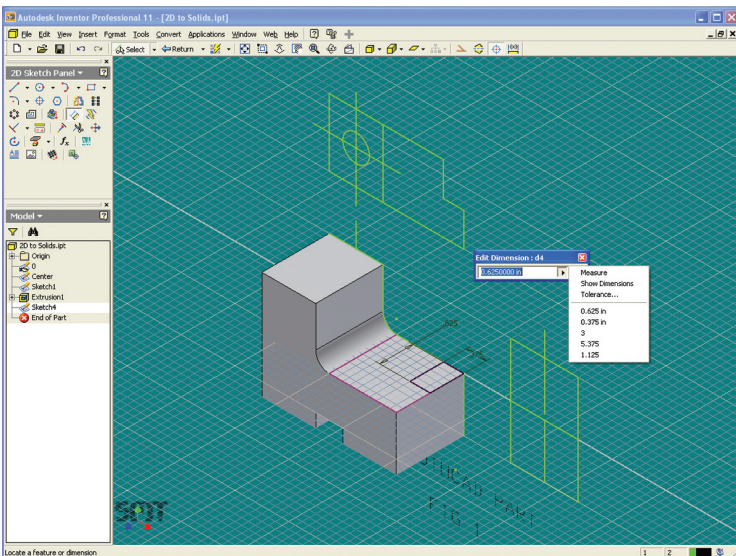


Figure 6

It was turned off because it has been consumed. If you need to use the data again, right click on sketch 0 and select Visible to turn it back on.

Next, let's remove material for the offset on the right side. I made Sketch 0 visible, selected the top surface (see Figure 5) for the new sketch, selected rectangle, and sketched from the right corner. For dimensions, I selected the line I wanted to dimension; from the dimension dialog box, select the side arrow then select "Measure."

From the imported AutoCAD top view, select the corresponding line and the dimension will reflect the length of the selected line. Repeat for the other side of that rectangle (see Figure 5). Next "Extrude" the feature with cut to remove material.

Next, let's put the hole through the part. Select the top most surface of the part for a new sketch as shown in Figure 6. I use the "Center Point" feature to locate the center of the hole. As before, we will use "Dimension" to locate the Center Point. Place your dimension, then from the dimension dialog box, select the arrow, and select "Measure." From the imported AutoCAD top view, we will select a corner point first, then select a center line. Select the green check mark to complete. Repeat for the other dimension.

Those old drawings that you have on your server or local hard drive are useful and can easily be converted to new Inventor solid models.

Note: If you select a line first, the measure feature will take the length of the line. You cannot measure a distance from line to line, which is why I used a point on the line from which I want to measure. Again, select that corner point first.


Now we can press "H" on the keyboard for Hole and complete our hole feature. Uncheck the visible for the following sketches that you don't need, Sketch 0, Sketch Center, and., with my drawing, I'll also need to uncheck Sketch1.

Congratulations! You have just created your first (of many, I hope) solid models using your existing AutoCAD data. Those old drawings that you have on your server or local hard drive are useful and can easily be converted to new Inventor solid models. Now that I have completed this exercise, I see that it is even easier and quicker than I originally thought—and I have imported AutoCAD or .dxf files several times. I hope your experience is the same.



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 10 years and Autodesk Inventor for more than two years. He can be reached at d_keener@smt-ind.com

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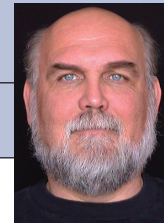
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On The Back Page



David Kingsley

It was the best of times, it was the worst of times...

Project collaboration via email. We all do it; we all have a love/hate relationship with it. Sometimes I think email is at once the best and worst thing that ever happened to interpersonal communications. It places people from around the globe at your fingertips, while at the same time confusing the issues on which you are collaborating.

Email is the “killer app” that places us all a keystroke away from one another and significantly warps the time-space continuum. I’m sure its creators never imagined that we would be using it as the primary communication tool with a person separated from us by six feet and one office partition.

How many times have you found yourself unsuccessful at trying to piece together a multi-person email conversation that directly affects your design parameters? I have had entirely too many email conversations that should have taken place in what I find myself of late referring to as “meat space” (no, that’s not a typo).

Fancying myself a writer, I’m not one prone to slang terms, but I like that one because it is so unambiguous. One of my email rules is: If you cannot explain or resolve an issue with a co-worker in two volleys, then go to meat space.

Why did the shortstop bean the first baseman?

A few weeks ago I called a friend of mine at work after hours. I still chuckle at his voicemail greeting. “Yes, my voice mailbox is full. Yes, my email box is full. However, this does not absolve you from doing your job!”

A common email abuse is to “lob it over the wall” via email and then fail to follow through because it is “not in your court.” It is a plain and simple cop-out when in the status meeting your co-worker, the recipient of your “over the wall” email, looks like a deer in the headlights when you say, “Didn’t you read my email?” At work, people too often forget that the same person signs all their paychecks. This means that

you all play for the same team. This kind of cop-out is like the shortstop deliberately beaming the first baseman.

Wiki Wiki (what what?)

For the past few months I have been working with a company that has not developed common engineering discipline. The default collaboration tool is Outlook. Released drawings that should be controlled documents are scattered in a half-dozen inboxes, with no master set to be found.

An email passes for an engineering change notice. I could go on for pages about the problems this creates.



My humble opinion is that with regard to project collaboration, email has too many limitations. Any project involving more than three people should use another tool. What I want to deploy in my case is a Wiki.

How do we Wiki?

A Wiki is a website that can be edited by anyone, however, you can tightly control who can read, write to, or edit it. Arguably, the most powerful Wiki today is Wikipedia.org. Thousands of people contribute to this free online encyclopedia. Do a search there on any topic of interest to you. Also check out Socialtext (socialtext.com), Confluence

(atlassian.com), or Twiki (twiki.org) for examples of Wiki collaboration tools.

Writing to a Wiki is as easy as writing an email. Instead of emailing to everyone about project events, you write them in the Wiki. All subscribers to the Wiki receive notification when changes are made. Any document format can be attached to a Wiki page. Once information is posted, the team can read it and open attachments like any website.

A Wikified project scenario

Field sales makes a proposal to a customer. They create a new Wiki page and write a brief description of the proposal. They attach the proposal text and drawings. In a few days, in-house sales posts the customer’s purchase order in the Wiki. They describe the terms, expected delivery date, statement of work. Later, engineering creates a new Wiki page and posts a preliminary drawing. Manufacturing reviews it and post comments. As drawings are released, they are attached to a “Released for Manufacture” page. If an ECN is issued, the link is changed to the revised drawing. Purchasing may post that they are having delivery delays from a vendor.

To the Wiki reader, this appears as a website. As the project progresses, the Wiki serves as the chronological journal of all directives, discussions, decisions, milestones, documents, and revisions made during the course of one project. With no more effort than emailing, the Wiki builds an organized master data set and project website.

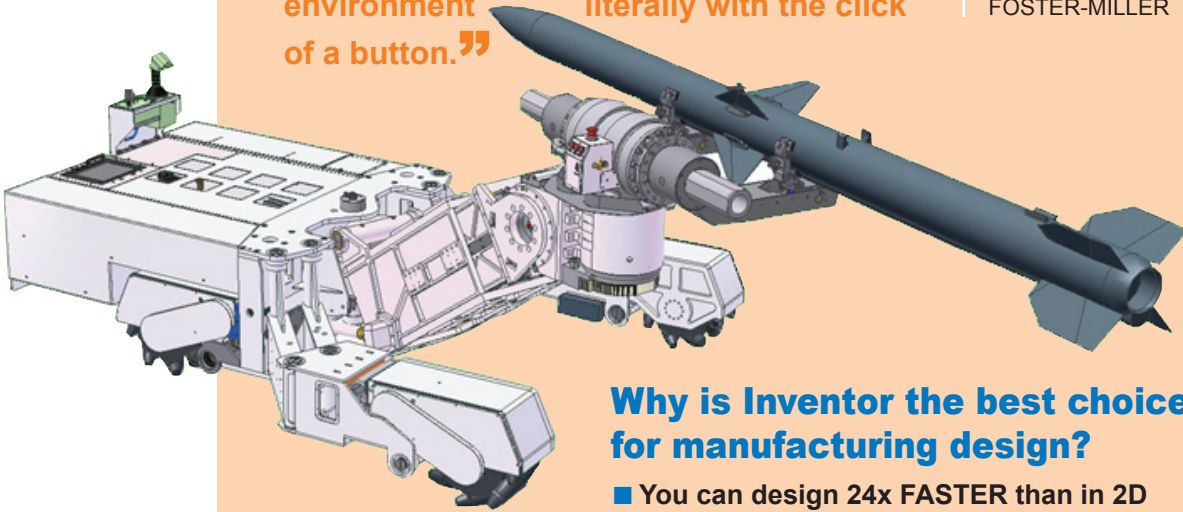
This has to be better than reading and re-reading month-long email threads and still not finding what Bruce wrote on October 27.

David Kingsley served from 1999-2004 on the AUGI Board of Directors and is the Director of Electrons at CADPlayer Web Courseware. He can be reached at djkingsley@cad-tv.com

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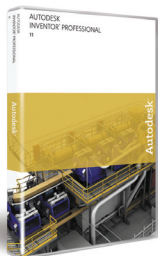
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