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September 2017

16th Annual AUGI Salary Survey

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- AutoCAD for 3D Modeling and Visualization
- Expanding on Details in 3ds Max
- Tech Manager Show and Tell

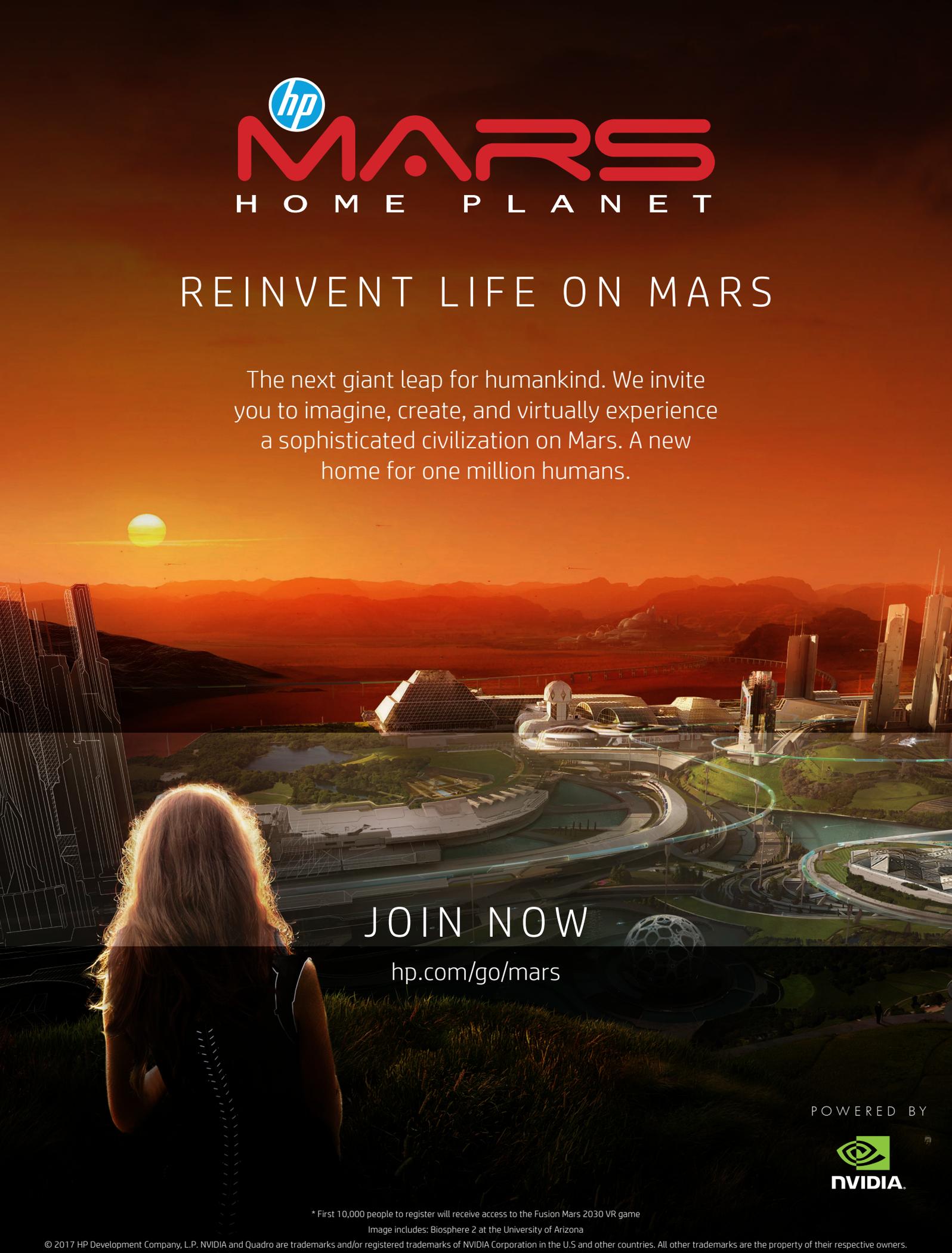


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contents

product focus



- 6 AutoCAD**
AutoCAD for 3D Modeling and Visualization
- 10 Revit Structure**
Customizing the Graphical Column Schedule
- 16 InfraWorks, Civil 3D and Civil View**
A Civil View from Your Seat



- 28 3ds Max**
Expanding on Details
- 30 AutoCAD Architecture**
AEC Wall Objects



columns

- 4 Letter from the President**
- 14 CAD Manager**
- 24 Inside Track**
- 26 Tech Insights**



special feature

- 34 16th Annual AUGI Salary Survey**

Letter from the President



It's September, which means it's back-to-school time! As a kid, I always hated to see summer go, but shopping for school supplies was some consolation. Even today, I find myself craving fresh new pencils, crisp notebooks, three-ring binders...never mind that I rarely use those things anymore! The fact that we've gone digital just makes the nostalgia stronger.

It's not only the sales on crayons and safety scissors that made me choose to write about education for this month's letter. AUGI is focused on two big events right now that tie back into that theme: the Salary Survey and Autodesk University 2017.

The results of the 16th Annual Salary Survey are published in this month's *AUGIWorld*. Once again, Melanie Perry has collected data from thousands of design professionals just like you and turned it into a fascinating picture of compensation trends across a variety of demographics, including education level, job title, and firm size. If you've ever wondered how your job stacks up against those of your peers, here's your chance to find out. And if you've used the Salary Survey before to see where you stand, it's a great opportunity for a status check, to see what has changed from year to year.

It might be a bit of a stretch to call the Salary Survey "education," but I think I can make a case for it. One definition of education is "the acquisition of knowledge," and learning how your salary compares to that of people in similar jobs certainly qualifies! By educating yourself on the state of the industry, you gain an understanding of your own value. Then you can begin to make a plan: either to educate your boss about why you deserve a raise or to educate yourself to gain new skills and earn that raise!

If you fall into the latter camp, Autodesk University is a great place to start. This year's event in Las Vegas has something for everybody. Whether you are just beginning to learn a new program, are trying to develop your management skills to advance at your firm, or want to see what cutting-edge advancements are happening in your industry, AU can help you find what you need. The classes I take each year are always different, yet somehow they've always been what I was looking for.

If a trip to Las Vegas (or one of the international AU events) isn't in the cards this year, consider online learning. Browse the *AUGIWorld* archives for invaluable nuggets of information, or take a deeper dive into topics with recorded conference sessions from AU Online—much of it provided by instructors who are also AUGI members!

Speaking of AU, have you looked at the AUGI Wish Lists lately? Now would be an excellent time to peruse the current wishes to see if there are any you would like to rank or buy (with your virtual Wish Cash) to help us generate this year's Top 10 lists, which will again be presented to Autodesk at AU 2017.

Like the Salary Survey, the Wish Lists depend on your participation. Every member's contribution improves our results. There are over 400,000 of us worldwide—what power our voices could have! Imagine if every AUGI member logged in and voted for their top 10 wishes. That would be four million wishes for the products you use every day. Pretty impressive!

So, login to AUGI.com today. Vote for wishes. Educate us on what you want. We might all learn something!

Kate Morrival
AUGI President

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Editors

Editor-in-Chief

David Harrington - david.harrington@augi.com

Copy Editor

Marilyn Law - marilyn.law@augi.com

Layout Editor

Debby Gwaltney - debby.gwaltney@augi.com

Content Managers

3ds Max - Brian Chapman
AutoCAD - Walt Sparling
AutoCAD Architecture - Melinda Heavrin
AutoCAD Civil 3D - Shawn Herring
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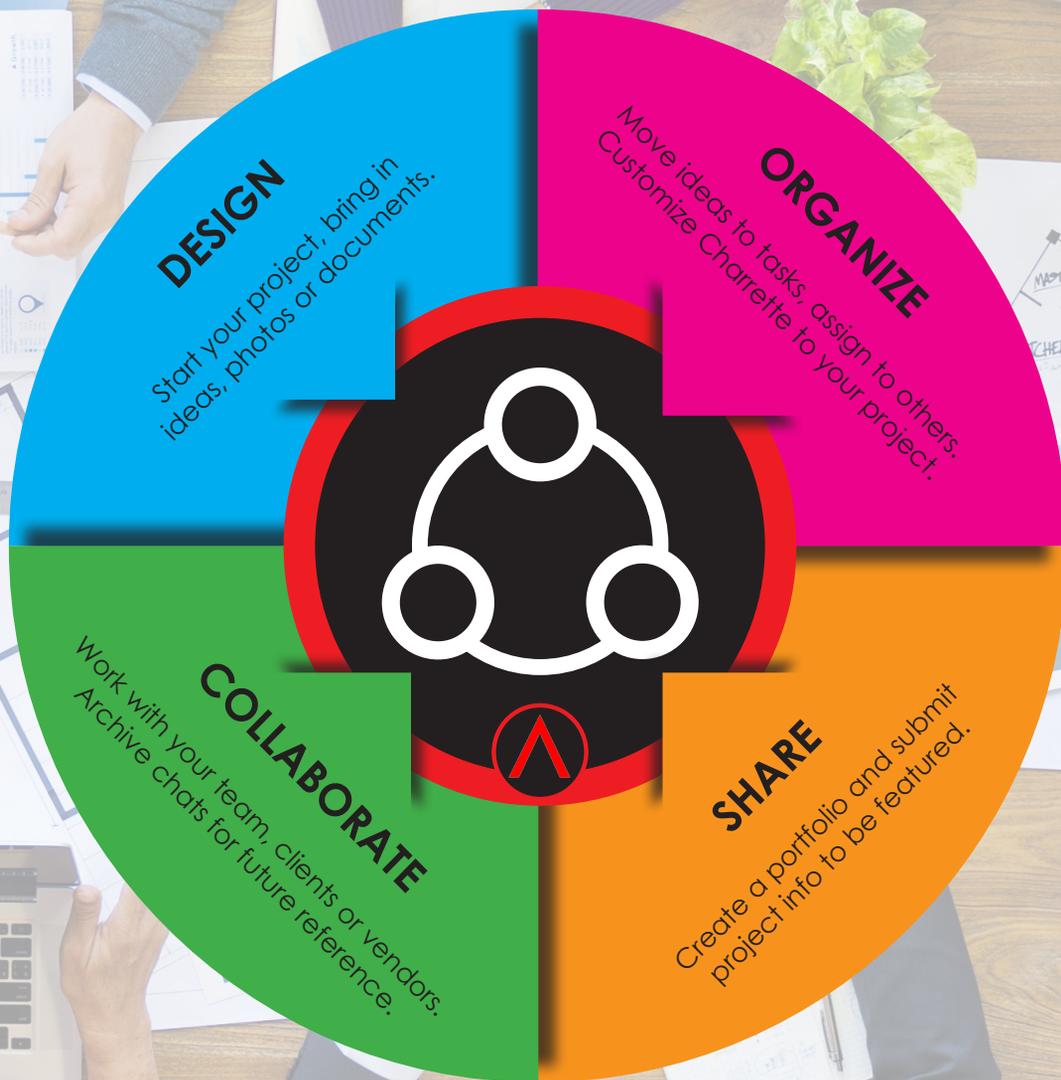
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AutoCAD for 3D Modeling and Visualization

About three quarters of the world's population are visual learners. This fact highlights the importance of quality visuals when communicating ideas. Clear images can be more accurately interpreted and lead to project success.

Our ability to communicate in the AEC industry currently depends on the right software and modeling tools and how to get the most out of them. Better options for visualization have been exponentially improved due to advances in reality capture, GPU/CPU capacity, and rendering quality. There are many tools available for 3D modeling and visualization but some of the best tools are just within reach—that is, they are available in recent versions of AutoCAD®. Tools for working with point clouds, solid modeling, and internal renderings within AutoCAD have been forgotten in the shuffle, but still provide value due to their availability. Let's uncover what they can do.

WORKING WITH POINT CLOUDS

As sensors get cheaper, the number of construction projects using laser scanners increases, especially when dealing with renovation work. These sensors are capable of collecting millions of points with millimetric accuracy, representing existing conditions in a scene. AutoCAD

has your back if you want to visualize and interact with point clouds.

Under the Insert tab is the Point Cloud tools panel (see Figure 1). The first tool launches Autodesk® ReCap™, which is used to index, create, or edit point cloud project files. The second icon allows you to attach ReCap files (.rcp or .rcs only). If your point clouds are saved in a different file format, ReCap can convert those for you from the most generic content (.txt, .las, .laz) to the most specific laser scanning brands (Faro, Leica, Topcon, Riegl, DotProduct, and more).

Once the file is inserted, there is another set of tools you can use to interact with your point cloud (see Figure 2). Even with Autodesk's improvements to develop better tools and faster rendering of point clouds, these files are usually going to be large datasets that could create performance issues. In this case, your best friend could be the toolbar where you can control information related to Display/Visualization and Cropping. For example, the Level of Detail determines the number of 3D points shown on the screen. This is a huge help when you notice your computing performance starting to decline. The other handy tool that could save the day is Cropping. If you know you only need to partially visualize or model from part of the point cloud, you could save a ton of time by just turning off the points that are not going to be needed.



Figure 1: Inserting the point cloud file

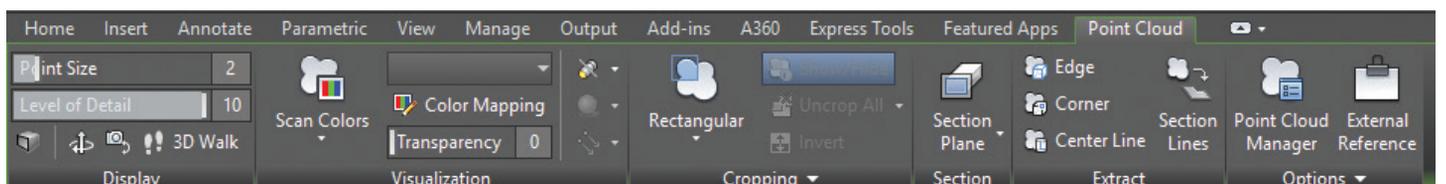


Figure 2: The point cloud toolbar

On the modeling aspect of point clouds, there are also commands to extract edges, corners, or centerlines of cylinders based on groups of points (see Figure 3). This is a big timesaver to find and model wall edges, openings, or pipes. This is part of the effort of creating smarter point clouds. There's huge interest in algorithms for point cloud segmentation in the research community, and there's plenty of room for improvement.

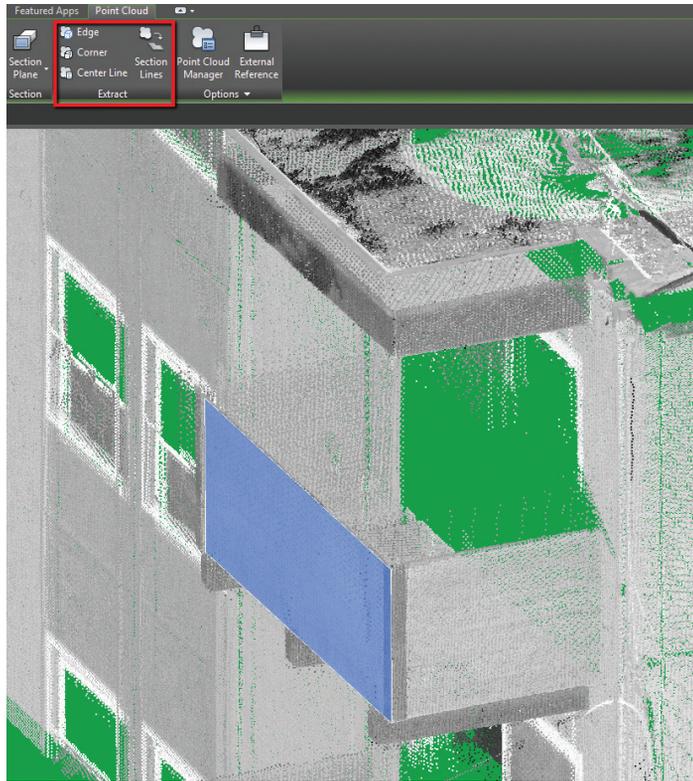


Figure 3: Extracting geometry from point clouds

ADDING CONTEXT TO VISUALIZATION

Creating a mixture of content from different source types can enrich our models and make the process more flexible depending on the desired outcome. AutoCAD has features that provide more options while creating models such as interacting with 3D solids, 3D surfaces, and 3D meshes (see Figure 4). Some of these elements are more efficient to work with and others require more computing power; however, they complement each other, providing a variety of modeling features for the task at hand.

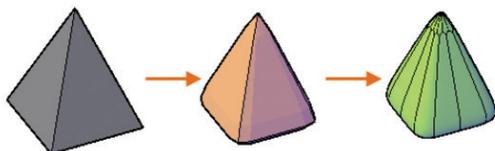


Figure 4: 3D element formats: solid, surface, and mesh (Source: knowledge.autodesk.com)

Combining reality capture with native AutoCAD elements, we are able to create models that give us more detailed information about the ideas we want to communicate. Figure 5 shows a point cloud in the middle of masses representing structures in a small area of an urban neighborhood.

The 3D solids help to give the context of the surroundings to plan and make better assumptions on this and similar projects.

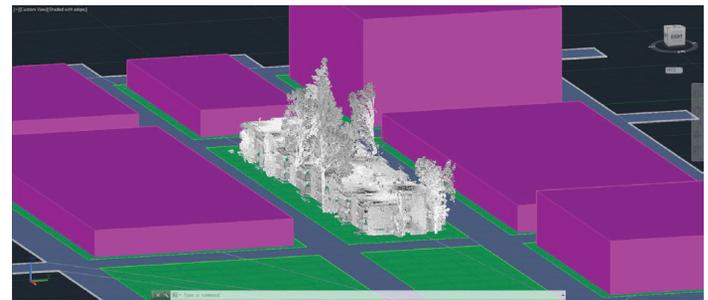


Figure 5: Modeling 3d solids to create context

Recently, UAVs (drones) have been used more widely for commercial purposes. This increase in usage yields higher quality data that can be used to share with other stakeholders. Figure 6 shows building masses created from tracing building footprints and converted into solids using extrusion tools. Notice that the underlying image is a processed orthomosaic whose planimetry (i.e., not skewed) is accurate, compared to raw aerial images taken directly from a camera.



Figure 6: Building footprint tracing

AutoCAD

REALISTIC VISUALIZATION

So far, we have covered visualization and modeling from a conceptual point of view. However, there is a point in the design process when we want to get realistic output. AutoCAD provides a library of realistic materials to enrich your renderings (see Figure 7). If the project requires custom textures, they can be incorporated as well. However, if the files are opened on a different computer, you will lose bitmaps if they're not transferred.

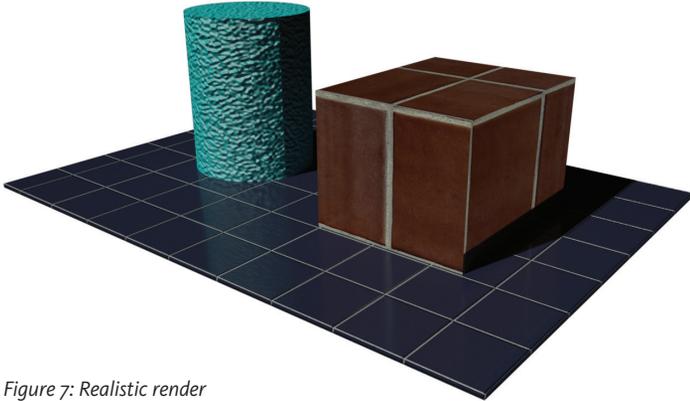


Figure 7: Realistic render

As a rule of thumb, initial renderings should be processed in low quality using a setting in the Render Presets Manager (see Figure 8) so that time is not wasted during tuning of minor details (i.e., lights, materials, and camera position).

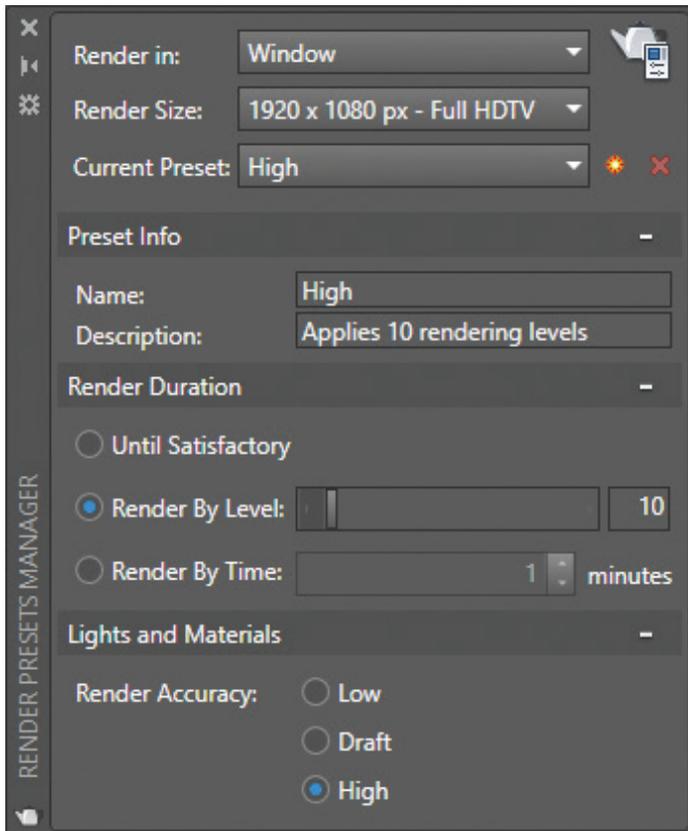


Figure 8: Render Presets Manager

Now you can share your projects using A360 (Figure 9) and be able to reach a larger audience that doesn't use AutoCAD, just a web browser. It is possible to create multiple predefined views or the user can orbit the model. On the negative side, there are some issues with the conversion of materials, as we see on the cylinder below. In addition to that, custom textures will not show in the A360 viewer.

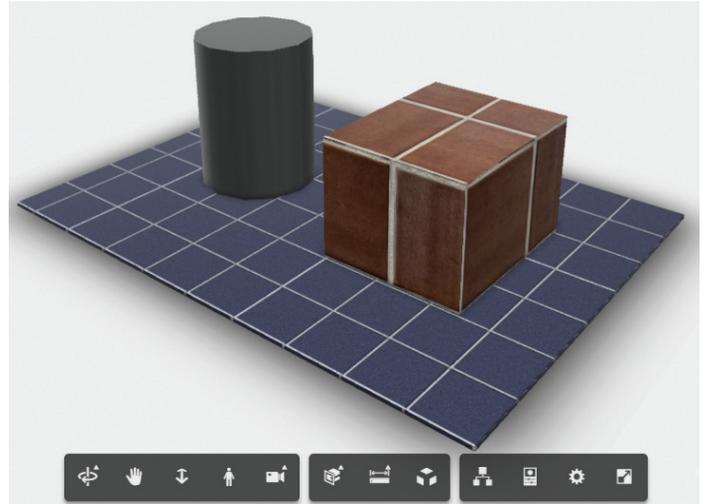


Figure 9: A360 viewer

In conclusion, if we want to encourage the use of a richer form of communication without jumping through endless software hoops, AutoCAD's wealth of 3D tools is the answer. Or just add this to your repertoire of tools to improve the visualization of your output. We want to stress the different options that may be available. For instance, if you do not have access to a laser scanner, there are cheaper solutions by using drones and photogrammetry. And if you do not have a rendering machine, you could also rent a powerful virtual machine online to render in the background while you keep producing. In this day and age, there's no excuse for not impressing your clients with powerful and contextualized output.



Xavier Loayza started using CAD software during high school. These drafting skills boosted him to collaborate very early in the AEC world to later pursue a path to civil engineering in Ecuador. After gaining experience over the years in transportation, geotechnical engineering, and surveying, Xavier got interested in UAVs (drones) for mapping, construction monitoring, and urban planning as a time and cost effective tool, leading him to establish a service company. In 2015, after this entrepreneurial project, Xavier joined a Construction Management graduate program at University of Houston. Currently, he is collaborating with Axoscape, a BIM consulting company. He is always eager to learn and share.



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Customizing the Graphical Column Schedule

 The structural tools in Autodesk® Revit® have some quirks not found within the other disciplines in Revit. One of those is the graphical column schedule. You can create a graphical column schedule from the View ribbon, in the Schedules drop-down, but it will appear under Views in the Project Browser instead of in Schedules/Quantities. And typically, model elements do not appear in schedules, but actual columns do appear in graphical column schedules. Therefore, graphical column schedules really are unique.

Structural columns are identified in graphical column schedules by intersecting grid lines and by their top and bottom constraints and offsets. Architectural columns do not display in these schedules, nor do any other model elements, for that matter. The columns in these schedules are viewed from the south.

Graphical column schedules are system families in Revit and have instance and type parameters. Typically, there is not a great deal of customization with system families in Revit. However, graphical column schedules are unique, and there are several methods you

can use to customize them to fit the needs of your project. For example, you can control which levels and structural columns appear, you can adjust the size of rows and columns, you can adjust the appearance of the grid lines and text, and you can add symbols for column splices and baseplates. Oh, and you can tag the columns inside the schedule. So yeah, graphical column schedules do not behave like other schedules at all!

CONTROLLING LEVELS

One of the first things you should do with a graphical column schedule is adjust the levels shown. Often in a building project, several levels are created for the various needs of the project. However, it is likely that not all of them need to be shown in the graphical columns schedule. When a graphical column schedule is the active view, the instance properties appear in the Properties palette.

To control the levels, scroll down to the Other grouping. Here, you can set the Top Level and the Bottom Level. The default levels used are the highest and lowest, respectively (see Figure 1).

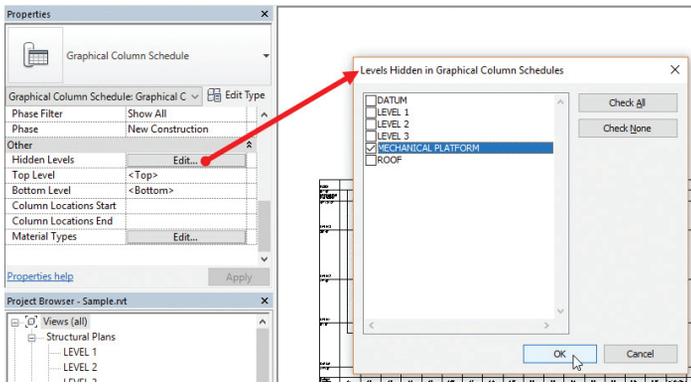


Figure 1

To control the levels that are visible in the graphical column schedule, click Edit... next to Hidden Levels. This opens the Levels Hidden in Graphical Column Schedules dialog. So technically, you are specifying the levels that are hidden. To hide a level from the schedule, simply select it in the list.

REMOVING COLUMNS

In addition to having unwanted levels in a graphical column schedule, you may have unwanted columns as well. To take care of these, simply select them and hide them in the view. You can select columns in a graphical column schedule the same way you can in an elevation or section view. Then, once the columns you want to hide are selected, right-click and select Hide in View > Elements (see Figure 2).

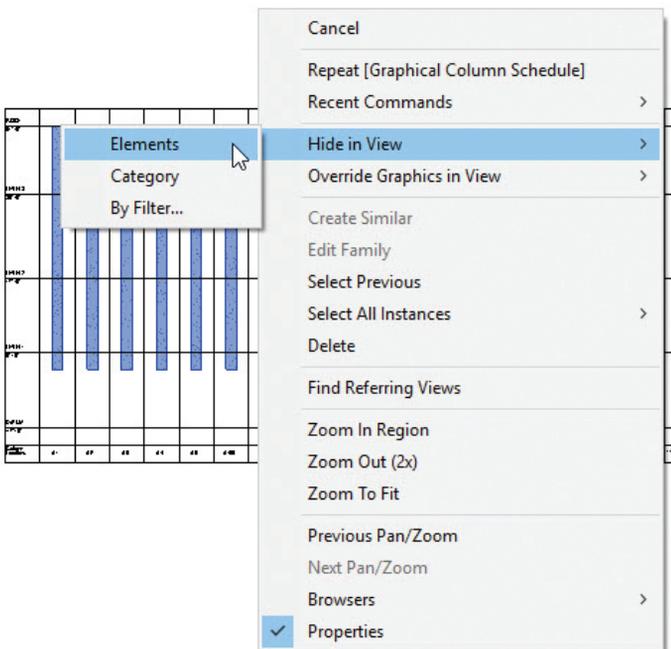


Figure 2

SHOWING OFF-GRID COLUMNS

To include off-grid columns in the graphical column schedule, simply select Include Off-Grid Columns in the Properties palette. Then you can control the Off-Grid Units Format. This is important because the column locations for off-grid columns will display with the distance to the nearest grid (see Figure 3).

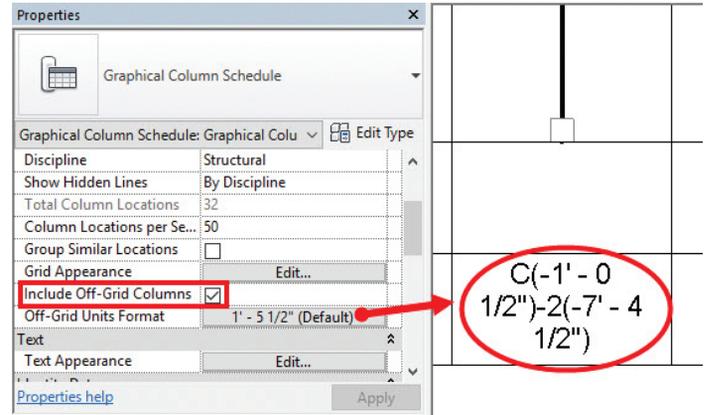


Figure 3

ADJUSTING ROW AND COLUMN SIZES

To adjust the width and height of rows and columns, you need to open the Graphical Column Schedule Properties dialog. The sizes cannot be adjusted by dragging the grid lines in a graphical column schedule. In the Properties palette, click Edit... next to Grid Appearance to open this dialog. On the Grid Appearance tab, there are two areas: Horizontal Widths and Vertical Heights.

In the Horizontal Widths area, you can control the width for the columns containing the structural columns (For Column Locations:) as well as the width for the column containing the level names (For Level Names:).

In the Vertical Heights area, you can control the row height for the row above the top level (Above Top Level:) and the row below the bottom level (Below Bottom Level:). You can also specify the distance between schedule segments (Between Segments:) for instances where there are multiple segments in the schedule (see Figure 4).



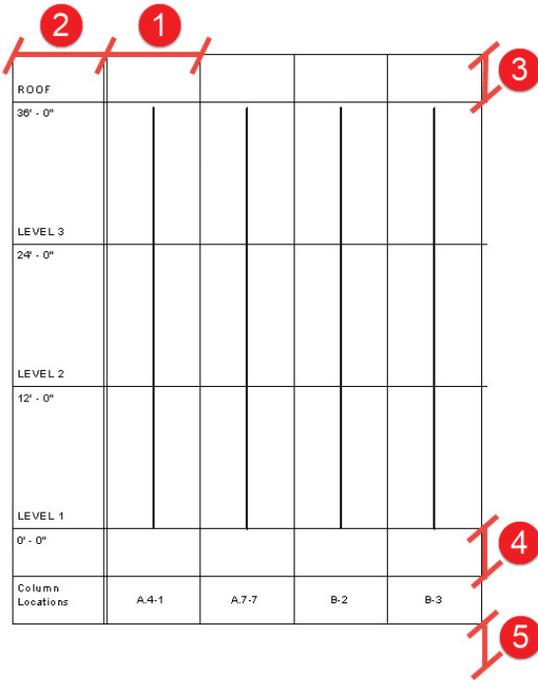
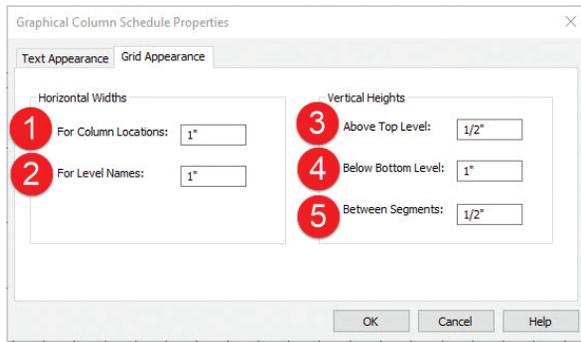


Figure 4

ADJUSTING THE LINE STYLE OF GRID LINES

There are no instance parameters for graphical column schedules to control the line style of the grid lines. These lines are controlled by the Thin Lines style in Revit. This line style is controlled in the Lines Styles dialog for the entire Revit project. In other words, if you modify the style in the Line Styles dialog, it will update everywhere that line style is used.

To adjust the line style for just the graphical column schedule grid lines, you can open the Visibility/Graphic Overrides dialog for the view. Then on the Model Categories tab, expand the Lines category and adjust the settings for Thin Lines. You can control the line weight, line color, and line pattern.

CONTROLLING TEXT APPEARANCE

In the Properties palette, click Edit... next to Text Appearance. This opens the Graphical Column Schedule Properties dialog to the Text Appearance tab. Here, you can control the Title text,

Level text, and the text used for the Column Location. You can specify the text font, size, and additional text attributes, such as Bold, Italic, and Underline (see Figure 5).

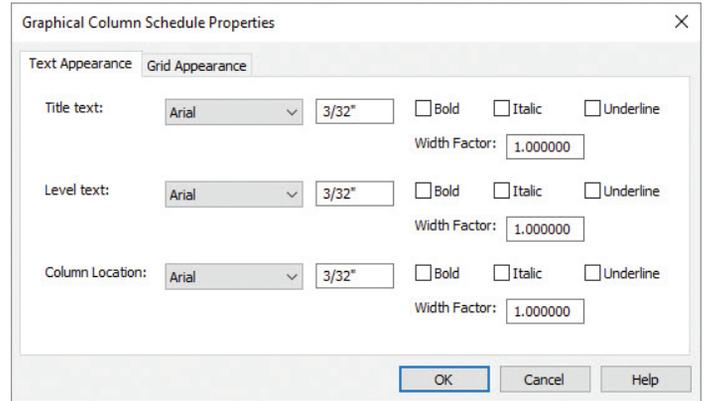


Figure 5

ADDING ANNOTATION SYMBOLS FOR SPLICES

You can use annotation symbols to show splices in graphical column schedules. The process is similar to the method of showing structural framing symbols in a plan view. Essentially, the connection symbols created in the Structural Settings dialog will be available for selection for the structural column parameters.

In the Structural Settings dialog, there is a Connection Symbols area. When you expand the “Display Symbols for:” drop-down, you can select Beams and Braces, Column Base, or Column Top. Depending on the situation and symbols you use, you can create a connection symbol for both, or just one end. With the desired end selected in the drop-down, click New. This opens the New Connection Type dialog. Enter an appropriate name for the Connection Type; and then you can select a loaded connection symbol family in the “Annotation Symbol:” drop-down (see Figure 6).

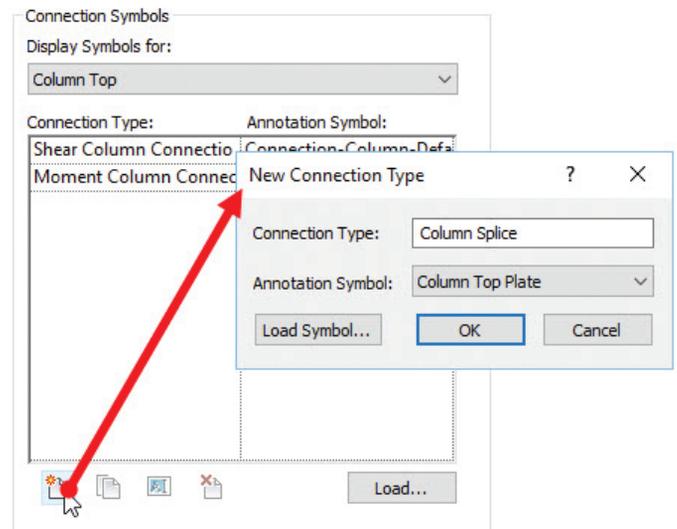


Figure 6

As a side note, you can create your own connection symbol families, if needed. An easy way is to start with the Generic Annotation family template and then change the Family Category to Connection Symbols.

Once you have connection symbols created in the Structural Settings dialog, you can select them for either the Top Connection or Base Connection parameter for structural columns. Take note that these are instance parameters for columns (see Figure 7).

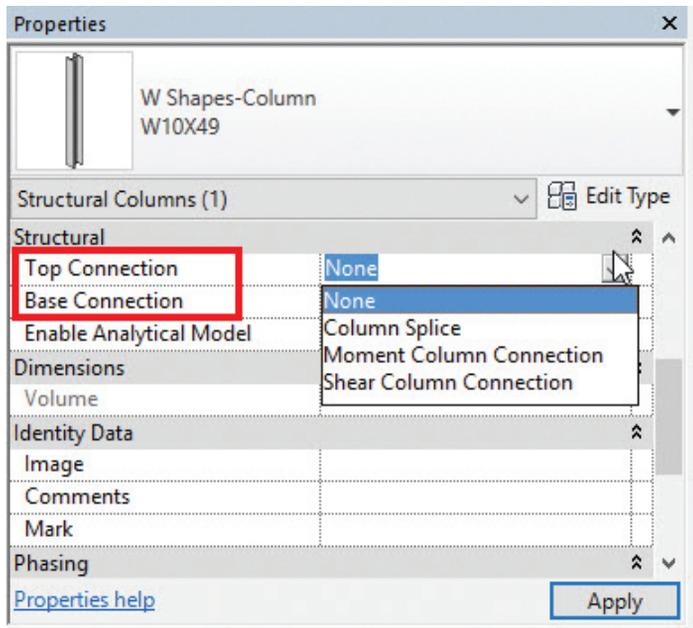


Figure 7

Finally, you can control the distance between the columns in the Structural Settings dialog in the Symbolic Cutback Distance area (see Figure 8).

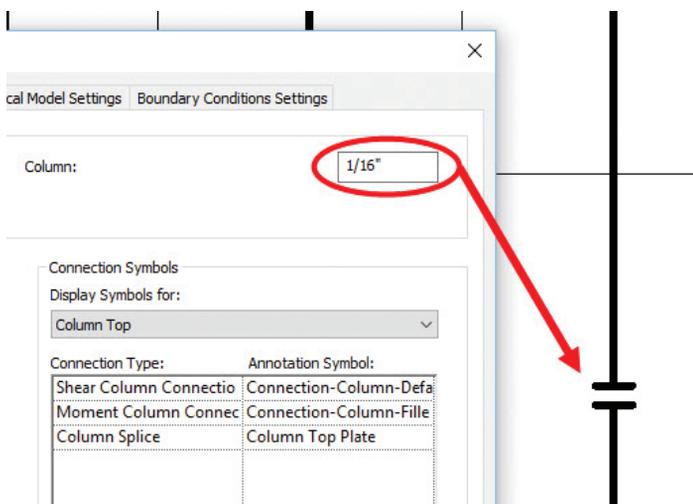


Figure 8

ADDING INFORMATION

You can add text, tags, keynotes, spot elevations, spot coordinates, and spot slopes to graphical column schedules. While all of these are great methods to add information (except non-parametric text), tags are really a great way to add customization to a graphical column schedule. You can use shared parameters to create column families, and then add those shared parameters to labels in tags.

A great example is adding baseplate information to a graphical column schedule. You can create an extrusion in a column family to represent a baseplate. Make sure to use reference planes to control the extrusion geometry, and then dimension the reference planes. After that, you can assign a shared parameter to the dimension so the parameter will drive the dimension. Lastly, add the same shared parameter to a label in a tag family. Then you can tag the column in the graphical column schedule and have the information display.

Along those lines, you can add shared parameters to the column families to input information such as the number of bolts and bolt diameter. These parameters would not be associated with any geometry. You could then add them to tags to display this additional information in the graphical column schedule.

CONCLUSION

If you use graphical column schedules in your projects, you should spend some time going through these methods to customize your schedules. It is important that the correct information is displayed, and that it is displayed the way you want. These methods can help you achieve both! And, on a final note, once you have the graphical column schedules configured the way you want, save it as a view template.



Jason Boehning is the Building Content Manager for all BIM and architectural CADLearning products from 4D Technologies, driving BIM content and developing on-demand learning material for Autodesk software, including Revit and Dynamo. He is also a repeat speaker at RTC North America and Autodesk University.



Marcello Sgambelluri currently serves as the Building Information Modeling (BIM) director at John A. Martin & Associates Structural Engineers in Los Angeles, California. He has worked on many BIM projects over the last 18 years as a project manager, design engineer, and BIM director.



Way back in November 2006 I wrote an article for *AUGIWorld* about the need for CAD Managers to make sure they do not become invisible to their firms. I referenced a saying that I have used over the years to put it all into perspective...

“When I am doing my job right, I become invisible.”

I then reviewed the good and bad impact of becoming invisible. I recently discussed this with a colleague and it reminded me of what I wrote. This article will build on that one. You can go back and read that one if you have access to old issues (a perk of advanced AUGI memberships). In a nutshell, when things are going good and your environment is humming, it appears that the CAD Manager does not exist. You need to make sure that people know you are there. You need to do a little of what you did in kindergarten...

SHOW AND TELL

In early childhood, everyone was encouraged to bring something to school for “Show and Tell.” In what may have been their first experience in public speaking, each little student would stand in front of the classroom and share something with fellow classmates. They would hold an object and talk about it.

For some, this exercise was the chance to gather all eyes and ears on them and they loved it. For others, it was torture to have everyone looking at them and listening to every word they said. I am not sure where you fell in that continuum, but everyone had to participate.

You should continue to participate today. After reviewing the AUGI Salary Survey in this issue, you may be elated or depressed. You are either ahead of the crowd or maybe behind it. By showing your stuff and telling others about your accomplishments, you stand a better chance of increasing that salary.

I am encouraging you to continue to Show and Tell at work. Not by standing in front of the room and holding up your coffee mug and telling everyone that you got it for Father’s or Mother’s Day, but by showing others what you can do and then telling them what you have done.

In a classic “Calvin and Hobbes” cartoon strip, Calvin is at school during Show and Tell. He is standing in front of the room and says, “Today for Show and Tell, I refuse to show you what I brought and I refuse to tell you anything about it.” Needless to say, he did not do well and ended up going to the principal’s office. Do not follow his lead.

SHOW IT

Most Tech Managers got where they are by showing that they have the savvy to make more progress than others. They are more productive.

They manage well. They are at the top of their tech game. They are planning and executing with vigor. They are getting so much done. They are impressing their peers and management with the knowledge they have. They are doing a great job of showing that they have what it takes.

When asked if something is possible, Tech Managers roll up their sleeves and jump in. They are determined to prove their worth by action. What a great attitude. They don't make promises unless they know they can keep them. They back up their words with work. They dig in and figure out the answer to tech troubles. They demonstrate the software, train the staff, and take charge when problems come along. When their solution is challenged, they prove it works. They may say, "Words are nothing, actions are everything."

"Isn't that what it takes?" they ask. "Getting things done is more important than talking about it," they continue. This is very true. If you are all talk and no action, then people will soon lose interest and go find someone who can get things done.

You must get things done. This is the Show part. Show me what you can do—don't tell me. If you have nothing to show for all the effort you put in, then your salary will not reflect the value you bring. You have to show what you know. But you cannot stop there. People will be impressed, but may soon say, "What have you done for me lately?"

TELL IT

You have to tell people what you are doing and what you have done. Most people are too busy to notice what you are doing. They are too busy trying to get their own jobs done and may not even see what you bring to the table. If they do not see your actions, then they certainly will not remember what you have done for them in the past. You have to tell them.

Take the time to tell people what you are up to. "I don't know how to put this... but I'm kind of a big deal" - Ron Burgundy. You may not want to come off like the Anchorman, but you do need to speak up. It is so ingrained in us not to brag that we fail to mention what we have accomplished. We need to remind others of our contributions, with humility and at the appropriate time. When you do, there are some things to keep in mind:

Do it at the right time

Don't just walk up to a group and spout off about what you just achieved. They may not care or even worse, they may be offended. Bring up your efforts when the topic moves to an area where you contributed. You may make it a question: "Did the tip I provided help?" They then know there was a tip or trick and that you provided it. They may give you positive feedback and thanks (they recall and recognize what you did) or they may tell you that it did not (allowing you to "show" them some other tip).

Don't compare yourself to others

Saying that you completed the project on time or early is fine. Saying that you completed the project faster than others (and using their

name) is not. Comparing yourself to others is not well received. Don't put others down, either. Don't preface your comments with, "You know that problem that no one could fix? I fixed it."

Tell a story

Couch your accomplishments in the middle of a story that includes others. The team did a great job and you contributed "this piece." Bring up your part in the successful efforts only in moderation. Don't blow that horn too long or too loud.

Be brief

Don't go on and on about what you did. Keep it short and to the point. If no one comments, just move on. If they ask questions, expound a little more and then stop. Too often we are tempted to go on about some milestone we hit or a problem we fixed. Just drop a line or two and let the words do the work. People will register what you said and take notice over time. Don't push it.

Keep a list

I have come across many Tech Managers who cannot quickly show me what they have done in the last few months or year. They are extremely busy and effective, but they may not have anything to "show" for it. It wasn't that they didn't accomplish anything, but that they do not recall what it was. They are so focused on the present that they forget the past. They are shocked when others do not recall or notice what they have done. Make a list in your head, digital, or on paper. Reviewing it yourself will bolster your confidence and give you reminders on what you might share when the time is right.

So going forward, make a list of the things you have done in the past few months or year and start dropping things into conversation. It takes practice to know what to share and how to share it. Just keep practicing your show and tell skills.



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



A Civil View from Your Seat

During the “suites” era, many companies upgraded from a single license of Autodesk® Civil 3D® or another vertical product because the upgrade was offered for free. However, not many used the products offered in the suites.

Now that 2016 has come and gone (and so have the suites) we have the Autodesk Collections. These Collections offer much more than the suites did.

This article will take you through a workflow for using your collection (or suite), to bring your Civil project from a bland, 2D visual to a realistic 3D animated model. You will need a good understanding of InfraWorks® and Civil 3D to follow these instructions.

The software used for this workflow is Civil 3D, InfraWorks, and Civil View, which is a plug-in inside of 3ds Max®. You don't have to be a 3ds Max expert to do this. In fact, you don't need to know how to use 3ds Max at all.

STARTING IN INFRAWORKS

This year, InfraWorks 360 was rebranded to drop the “360” and is now simply InfraWorks. With all the new features housed within InfraWorks, you can do 40 to 50 percent of your design work before you even open Civil 3D.

First, you will start by creating a Design Road in InfraWorks. You can lay out your horizontal road design using AASHTO (American Association of State Highway and Transportation) standards. You can then edit the vertical alignment by going to

InfraWorks, Civil 3D and Civil View

the Profile View under the Design, Review and Engineer Roads button, then clicking the Review and Modify Road Designs button.

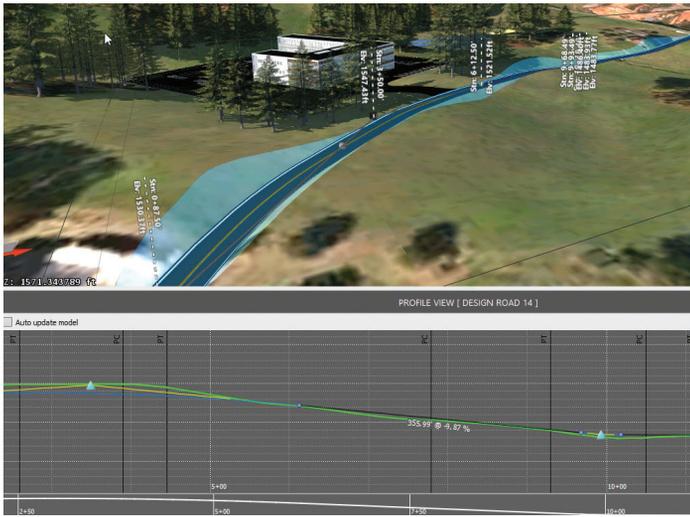


Figure 1

If you are satisfied with how the road looks horizontally and vertically, you can then export it out as an IMX file. You will select the area you want to export by polygon or box selection. Make sure you have a target coordinate system set before you click the Export button. This file will be the base for more precise tweaking and corridor creation within Civil 3D.

TWEAKING AND PREPPING IN CIVIL 3D

Open Civil 3D and start a new drawing. Make sure you do NOT have a coordinate system set. If you are using a template file with a coordinate system set in it, then go to the Drawing Settings and replace the coordinate system code with a period (.). When you import the IMX file, you will be prompted to assign a coordinate system.

In the 2018 version of Civil 3D, the InfraWorks importation has been revamped. The previous way to import was from the Insert tab, clicking on InfraWorks 360 and then opening InfraWorks 360 Model. Now there is a tab exclusively for InfraWorks.

Click Open Model. There is also an option in 2018 to Import IMX, but I recommend using the Open Model option. The difference between the two options is that with the Open Model option, you can pick and choose what to import into Civil 3D (roads, water areas, coverage areas, etc.). The Import IMX option does

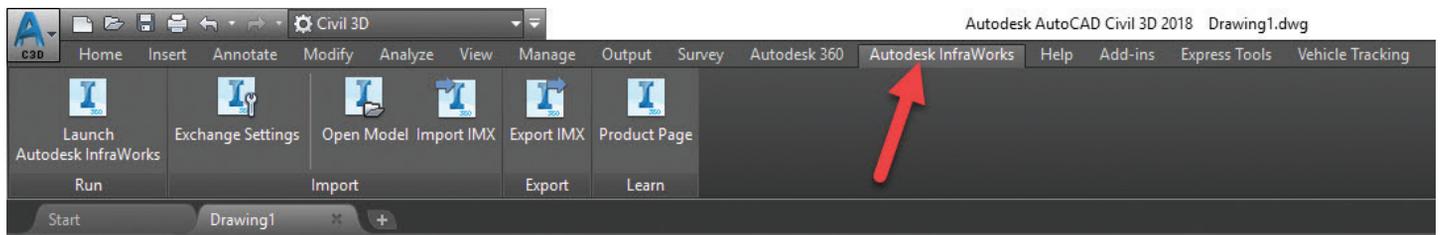


Figure 2

not give you any choices—it simply imports everything from the IMX file.

Design roads automatically create an alignment and have a profile associated with it. The profile view, once created, will show several vertical alignments:

- The proposed vertical alignment will be a random number assigned from InfraWorks (mine is 14)
- AIW_Existing_Ground
- AIW_Existing_Transportation
- AIW_Proposed_Ground

Now you will create a corridor from the design road's horizontal and vertical alignment. For this article, I have used the Basic Assembly, located in the Assemblies tab of the Tool Palette. Make sure to use the AIW_Existing_Ground as the target surface.

Now build a Corridor Surface using the Specify Code as Top.

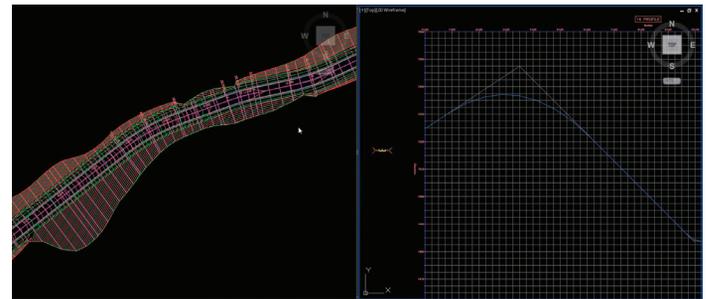


Figure 3

We are now finished with Civil 3D and can export it out to 3ds Max. To do this, click on the Output tab of the ribbon. In the Export panel, click Export to 3ds Max.

In the dialog box, uncheck your alignment, and make sure your corridor is checked. For surfaces, you only need to check the box for the corridor surface. Alternatively, you can also export the AIW_Existing_Ground, and in 3ds Max you can assign that existing ground an image. For this article, I'm opting out of that option.

Click Export.

This will create a .vsp3d file. We are finished with Civil 3D. Go ahead and close it.

InfraWorks, Civil 3D and Civil View

3DS MAX AND CIVIL VIEW

Importing Your Road Design

Open 3ds Max. During installation of the software, there is a checkbox to install Civil View. You will need this installed before you can go any further. If you did not check the option to install it, you can do so by following the directions below:

1. Run the software installer and follow the on-screen instructions
2. On the screen where you check the box to include 3ds Max in the install, check 3ds Max for install
3. Click the drop-down triangle beneath the 3ds Max checkbox to open the options section
4. Scroll to locate and select the Civil View option
5. Close the Options section
6. Install

Once you're ready, click Civil View in the menu. This will initiate the plug-in. Everything we will do from here on will be done inside of the Civil View pull-down menu.

Click Civil View>Geometry Import>Civil 3D (VSP3D) file. Click the Open button, then browse to the file you exported out of Civil 3D (.vsp3d).

Once the dialog box appears, right-click on Corridors [1], and choose Select All.

Click OK.

3ds Max has a Global Import Shift because it doesn't know

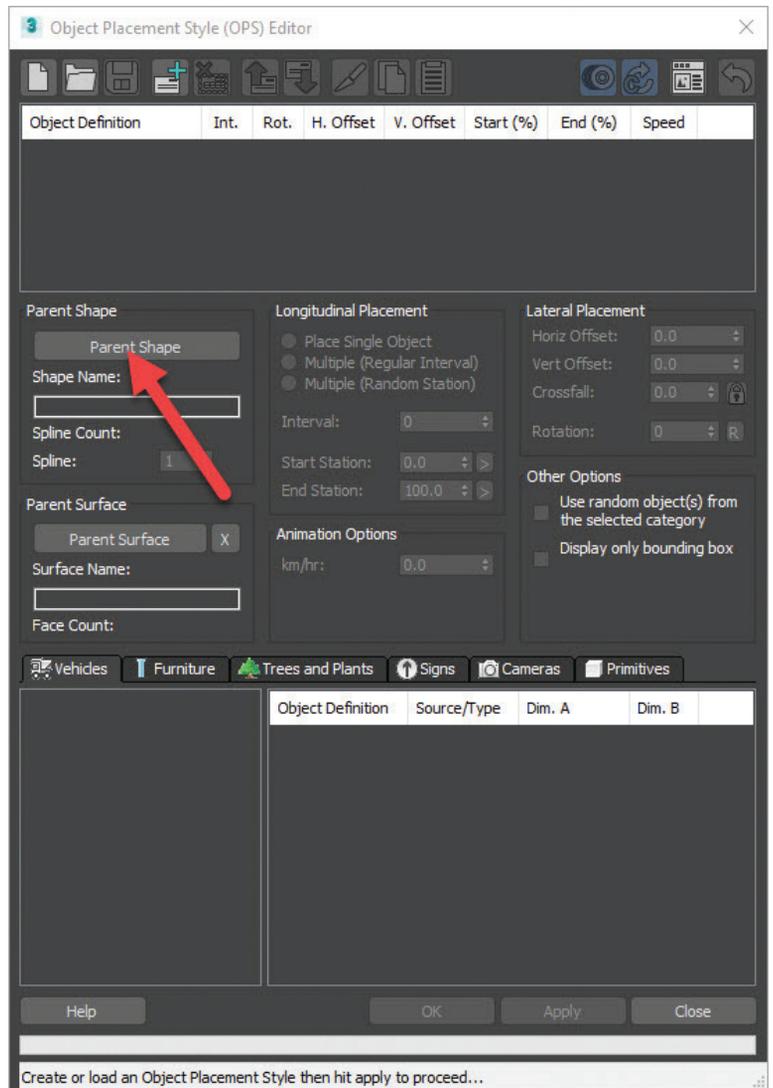


Figure 5

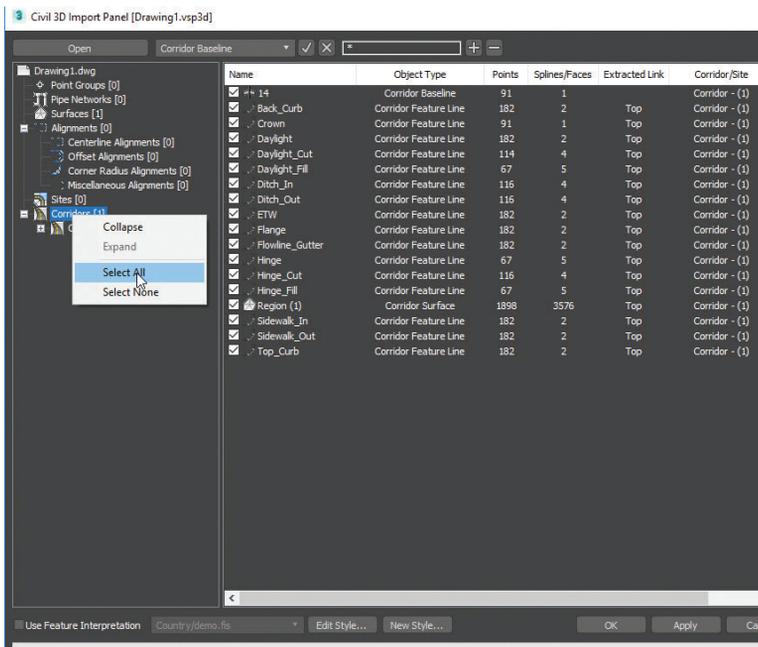


Figure 4

coordinate zones. It cannot function too far away from the 0,0 coordinate, so it shifts it. **This is not important unless you wanted to import it back into InfraWorks.**

Click Yes, then click Yes again.

You will now see your road with the daylighting features attached to it.

Creating Your Scene: Adding Lamp Posts

Click on Civil View>Civil View>Object Placement Style Editor

This will bring up the Object Placement Style (OPS) Editor dialog box. From this dialog box, you will create your scene and animation.

The first thing you need to do is select the Parent Shape button.

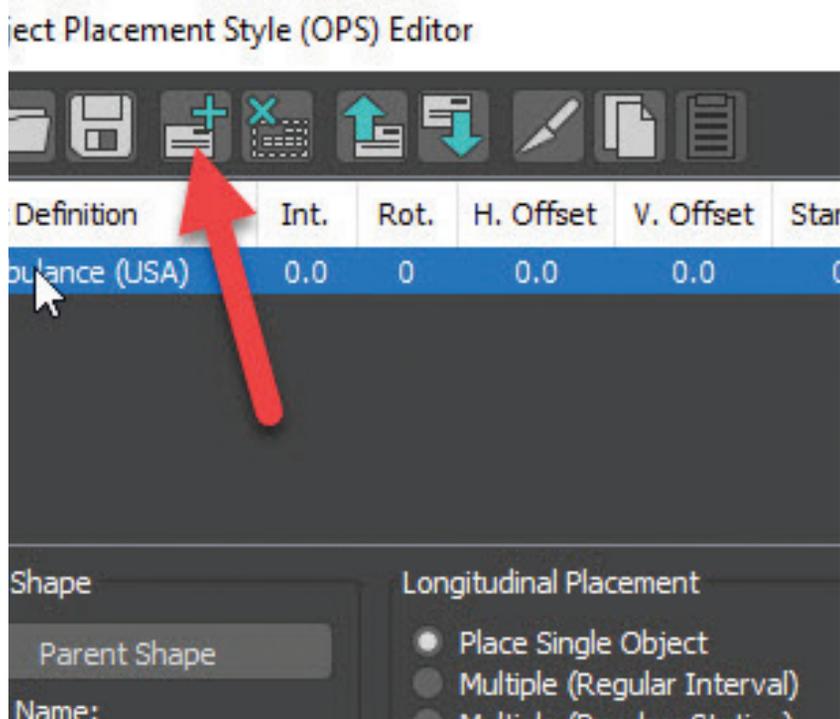


Figure 6

When you move the cursor over the corridor, you will see the different lines that highlight. For this workflow, you are going to place everything off the centerline of road.

Click the centerline of the road.

Notice the Shape Name populates as a C3DfeatLine (a Civil 3D feature line).

Now you can add the elements. Start with adding light poles.

Click on the Add New Element button at the top of the dialog box.

There are six tabs at the bottom of the dialog box: Vehicles, Furniture, Trees and Plants, Signs, Cameras, and Primitives. Click the Furniture tab, then highlight Lamp Columns. To the right, pick a style of lamp column (i.e., 45' Single Column).

Under the Longitudinal Placement, toggle the radio button for Multiple (Regular Interval). The default interval is 200'. Leave it at 200.0.

Add a Horiz Offset. Start with 15.0. Click Apply and check to see if this is where you want the lamp posts. If not, change the Horiz Offset value, then click Apply to check it. Your dialog box should look something like Figure 7.

At the top, under the Object Definition column, right-click on the lamp post and choose Copy. Right-click again, and choose Paste.

Change the Horiz Offset to -15.0 and the Rotation to 180.

Click Apply.

If you are satisfied with the way it looks, click Ok. You do not have to save the style, so select No.

Adding Street Signs

You are going to perform the same steps as before, but you will place signs instead of lamp posts.

Open the Object Placement Style (OPS) Editor by click Civil View>Civil View>Object Placement Style Editor.

Click the Parent Shape button, then select the center line of the road.

Click the Add New Element button at the top. Click the Signs tab at the bottom. On the left, click Miscellaneous (15).

Under Longitudinal Placement, toggle the radio button for Multiple (Random Station). Change the Count to a lower number, something like 10.

To the right, under Other Options, check the box for Use Random Object(s) from the Selected Category.

Now set your Horiz Offset. Start with 30. Click Apply.

Your dialog box should look something like Figure 8.

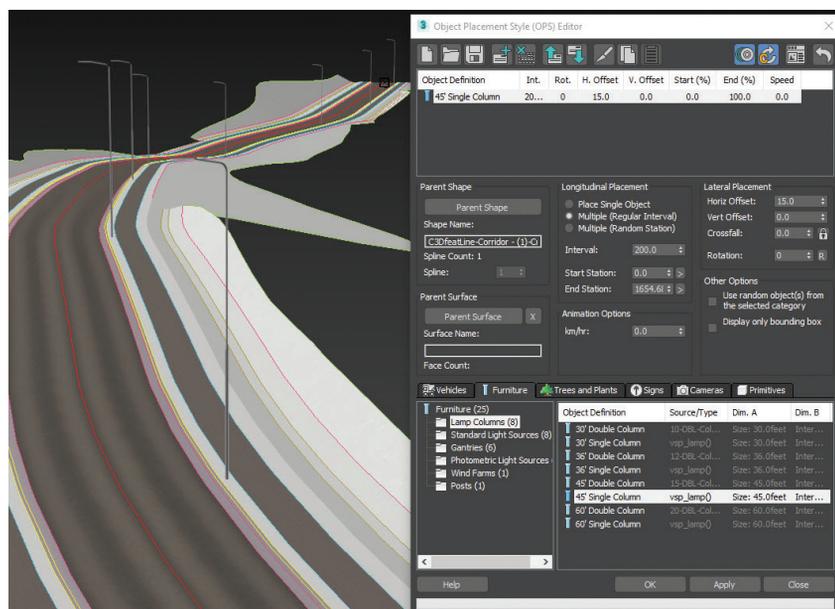


Figure 7

InfraWorks, Civil 3D and Civil View

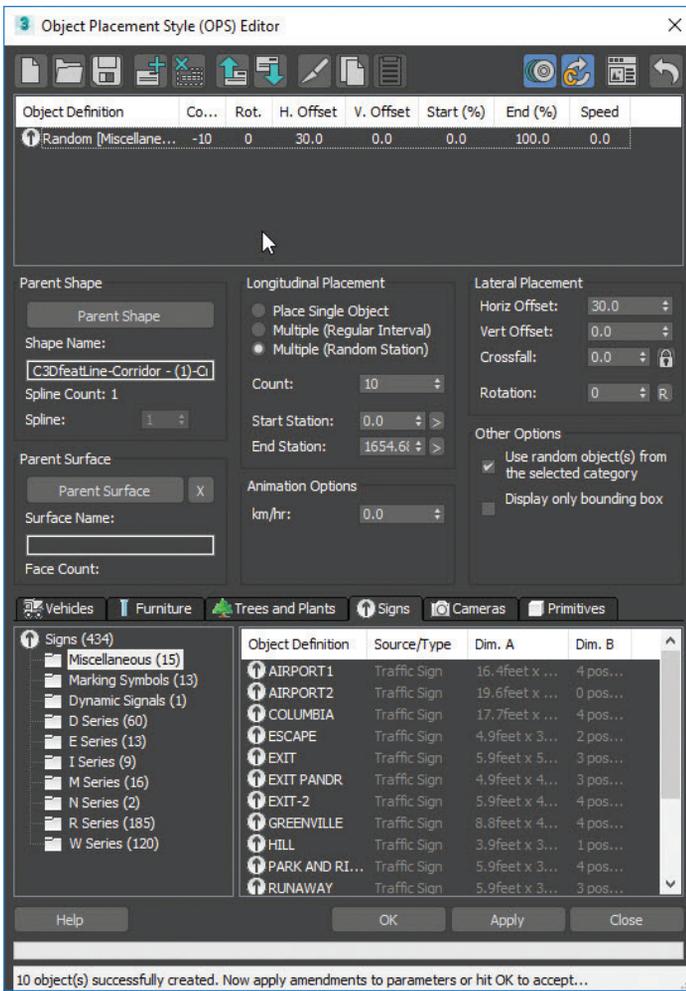


Figure 8

At the top, under the Object Definition column, right-click on the Random [Miscellaneous] and choose Copy. Right-click again, and choose Paste.

Change the Horiz Offset to -30.0 and the Rotation to 180.

Click Apply.

If you are satisfied with the way it looks, click Ok. You do not have to save the style, so select No.

The signs have sort of a transparency to them. They will not look like this with the final result.

Adding Vehicles

Once again, you are going to perform the same steps as before, but you will place vehicles instead of signs.

Open the Object Placement Style (OPS) Editor by click Civil View>Civil View>Object Placement Style Editor.

Click the Parent Shape button, then select the centerline of the road.

Click the Add New Element button at the top. Click the Vehicles tab at the bottom. On the left, click Cars (16).

Under Longitudinal Placement, toggle the radio button for Multiple (Random Station). Change the Count to a lower number, something like 8.

To the right, under Other Options, check the box for Use Random Object(s) from the Selected Category.

Under Animation Options, set your miles/hr to 65.

Now set your Horiz Offset. Start with 5.5. Click Apply.

Move the “scrubber” bar at the bottom to make sure your vehicles are moving in the correct direction.



Figure 9

Your dialog box should look something like Figure 10.

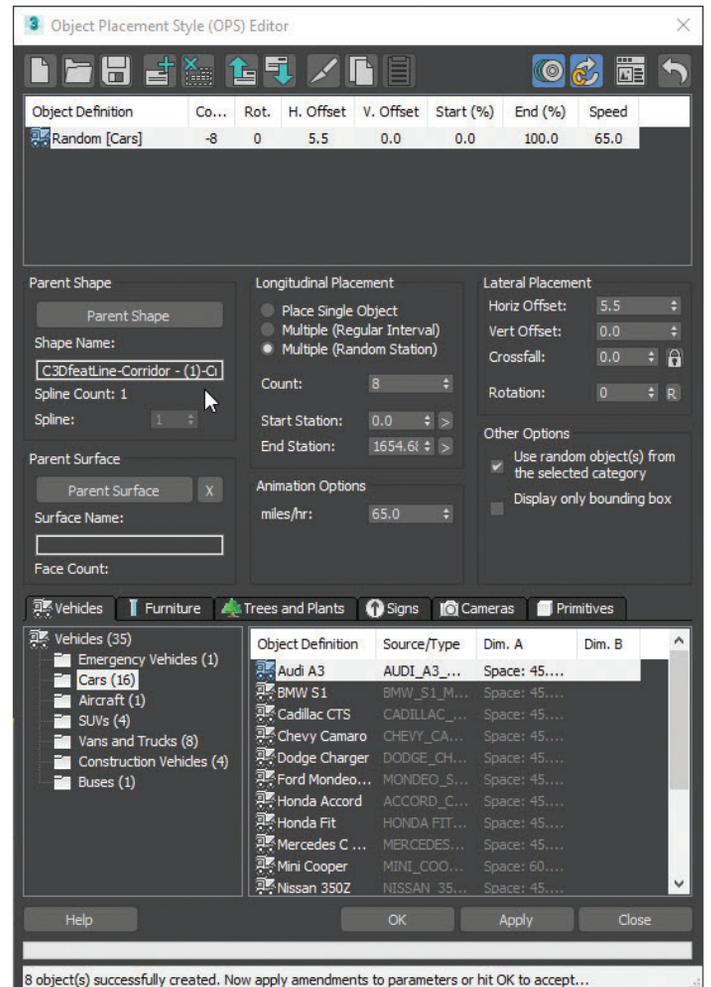


Figure 10

Note: If you want to use miles/hr instead of km/hr, then navigate to Civil View>Civil View>Preferences. Under the Localization tab, you can change the Distance Units to miles. Also, if you click the Resource Kit Paths tab, you can change the Active Country Resource Kit to US IMPERIAL.

At the top, under the Object Definition column, right-click on the Audi A3 and choose Copy. Right-click again, and choose Paste.

Change the miles/hr to a -65, the Horz Offset to -5.5 and the Rotation to 180.

Click Apply.

Move the scrubber bar to make sure your vehicles are moving correctly on both sides of the road.

If you are satisfied with the way it looks, click Ok. You do not have to save the style, so select No.

Adding a Camera Path

Click on Civil View>Civil View>Object Placement Style Editor.

Select the Parent Shape button, then pick the centerline of the road.

Click on the Add New Element button at the top of the dialog box.

At the bottom of the dialog box, click the Cameras tab. Select the Wide Angle Lenses (5) on the left. On the right side, choose the 035mm Lens.

Under the Animation Options, change the miles/hr to a value slower than the vehicles. For example, 40, since the cars are moving at 65 miles/hr. This will cause the cars to pass the camera and seem like a more realistic scene.

Add a Horiz Offset of 5.5, and a Vert Offset of 10.

Click OK and then No.

Animating Your Scene

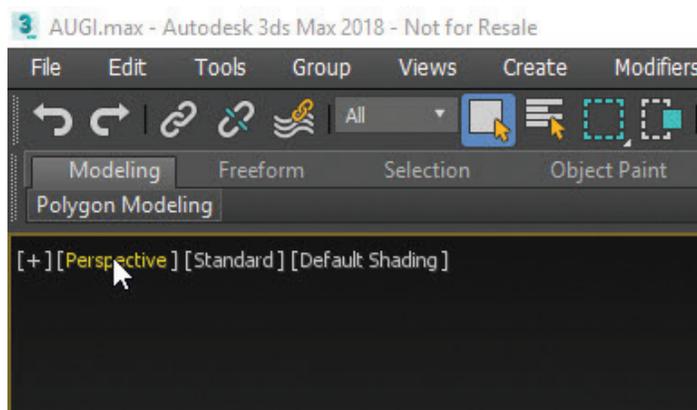


Figure 11

For the final touch, you will animate your scene. Locate the in-canvas visual style selector.

Click the word Perspective. Under Cameras, choose the Came-035mm Lens-001. Once the scene jumps to the location, press the play button down toward the bottom right.



Figure 12

If you want to make a more realistic scene, you can add plants and trees. Also, you can look up how to create a sky with clouds to add to the scene to make it more realistic.

CONCLUSION

As you can see from this tutorial, there are many different ways to perform the same procedure in placing objects in your scene. There are also many other features in 3ds Max that will allow you to really bring your project to life.

I would love to hear your feedback on this article and see the projects for which you would like to use this workflow. Please feel free to call or email me anytime.



Todd Rogers is a certified Partner Service Expert (P.S.E.) and certified Autodesk instructor with over 23 years of experience in teaching, managing, and providing hardware and software solutions for hundreds of engineering firms throughout the greater Houston, Texas area. Todd is a valued member of the Infrastructure Support Division (ISD) for Graitec USA (formerly Total CAD Systems, Inc.), where he works as an Autodesk Instructor, Support Specialist, and Customer Success Manager. He also holds the “Autodesk Expert Elite” status—a program to recognize individual community members who have made extraordinary contributions with helping customers by sharing knowledge, providing community leadership, and exemplifying an engaging style of collaboration that drives a healthy and valuable Autodesk customer community. He is an active blogger, sharing tips and solutions through his personal blog website: civil3dj.wordpress.com.

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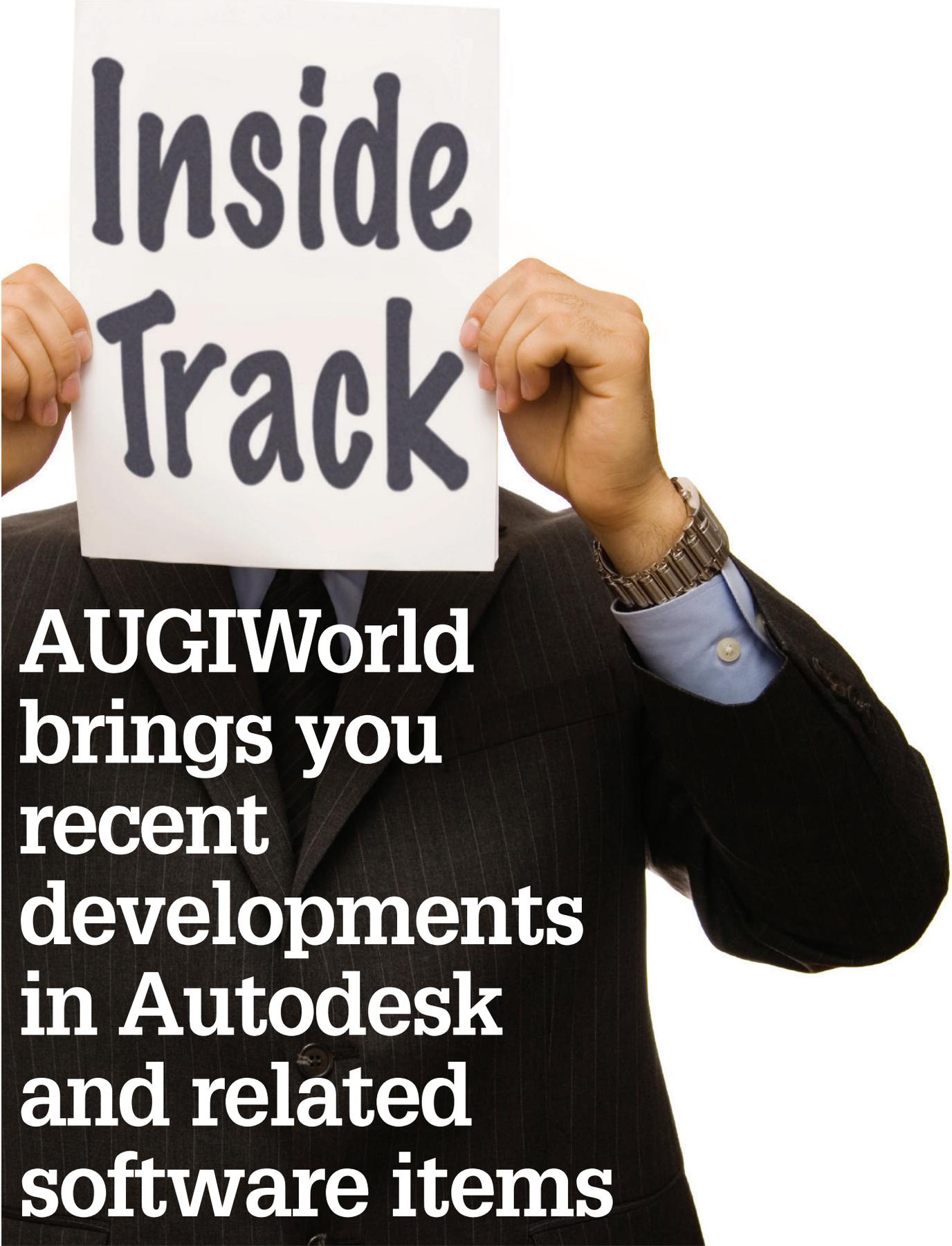


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- + Adjust geography-specific lighting by date and time for a sense of where shadows will fall.
- + Present compelling, interactive presentations on the go.

<https://apps.autodesk.com/3DSMAX/en/Detail/Index?id=7221085778557027350&appLang=en&os=Win64>



ADVARRAY

The AdvArray modifier is an advanced parametric array type modifier for 3ds Max®. Being that 3ds Max does not ship with any sort of parametric array modifier, AdvArray has been programmed to fill that void. In addition, it includes a number of advanced array features not found in 3ds Max by default, and even some that cannot be found in other third-party modifiers.

https://apps.autodesk.com/RVT/en/Detail/Index?id=8420591257342001611&appLang=en&os=Win32_64



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

by Robert Green

Get Fast, Stay Fast with Intel and HP



Achieve blistering speed with Intel® processor technology, HP Turbo Drives and HP Performance Advisor

It's no secret that Autodesk users want fast workstations. In fact, have you ever heard someone complain their workstation was too fast? But have you ever experienced the problem of workstations becoming slower as time goes by due to system issues like obsolete drivers? To obtain the best possible performance over the lifetime of a workstation you need not just the fastest processors, but also the fastest memory and disk systems with a continually optimized configuration that keeps up with technological change.

Intel's latest generation of Core™ and Xeon® processors give substantial core speed advantages over their predecessors and support super fast memory architectures available while HP's Performance Advisor provides system optimization over the life of the workstation. In this edition of Tech Insights, we'll examine some tips to get the best possible workstation for your needs and the best application performance over the life of your HP Workstation.



HP Z240 SFF and Z240 Tower Workstations

START WITH THE RIGHT PROCESSOR

For CAD centric workflows like AutoCAD, Inventor and Revit a single processor architecture focusing on high clock rates can be found in HP's Z2 Mini or Z240 Workstations. Utilizing a range of available Intel® Core™ and Xeon® processors (including the 4.2 GHz Intel® Core™ i7 7700K) CAD users can maximize the speed of their software via Intel® Turbo Boost Technology 2.0 to reach up to 4.5 GHz core speeds in a cost efficient single processor architecture workstation.

For more aggressive workflows - like CAD combined with high performance rendering or analysis - high clock rates are still required yet more cores to handle the computational load will greatly benefit total workstation performance. For these usage scenarios, the HP Z440 and Z640 Workstations configured with select Intel® Xeon® E5-1600v4 processors utilizing Turbo Boost Max Technology (TBMT) 3.0 provide multiple high-speed cores as seen in Figure 1.

Turbo Boost of top Intel® Xeon® Processors

Intel® Xeon® E5-1680v4 3.4 GHz

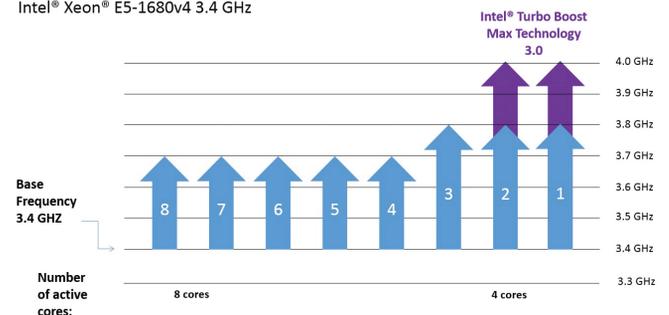


Figure 1 – As cores go up base frequency drops but TBMT 3.0 technology always keeps two cores running at maximum boosted speeds.

GET THE RIGHT RAM

Even the highest speed Intel® processors can only do their job if they have the right memory (RAM) to support the computing tasks at hand. Getting the right RAM is a function of three parameters: The total amount of RAM (in GB), the memory technology (DDR4 being the latest) and the speed rating (expressed MHz). By using an ample amount of the highest speed, highest technology memory the processor can support, you'll achieve the greatest possible performance.

Select HP Z Workstations using the latest Intel® processors can support at least 32 GB of high speed DDR4-2400 RAM modules (with the HP Z440 and HP Z640 supporting far more). By installing all available memory slots with the same size, same technology, same speed memory modules you'll achieve the fastest possible memory performance. And when in doubt, buy more RAM rather than less with 16 GB being the practical minimum for Autodesk applications.

HP TURBO DRIVE G2

Since data files for Autodesk applications can be huge, workstation performance also depends highly on the speed of the disk storage utilized. For the processor and RAM to do their job the data file must be loaded into the RAM and that means that the speed of the disk storage in the workstation is crucial. In fact, spending good money on faster processors and RAM means little if the disk storage isn't up to the task.

To achieve the highest disk throughput available, all HP Z Workstations support HP Z Turbo Drive G2 solid state drives (SSD's). Delivering 4x higher throughput than conventional SSD's (and over 14x better than conventional SATA technology hard drives) HP Z Turbo Drive G2's deliver from 250 GB to 1 TB of SSD storage to support everything from standard CAD to even the most aggressive rendering and analysis workflows. For data intensive Autodesk applications an HP Z Turbo Drive G2 disk should be specified.

CONFIGURE WITH HP PERFORMANCE ADVISOR

When you acquire a new HP Z Workstation you'll have a great tool at your disposal and you'll likely install your Autodesk applications right away. But how will you know that you have all the approved graphics drivers for those applications? And over time how can you be sure that everything on the workstation stays up to date? Add into the mix operating system updates, Microsoft .NET Framework updates for Autodesk tools and new versions of Autodesk software over the years and you can see that keeping a workstation up to date is not an easy task.

HP's Performance Advisor is a software utility installed on every HP Workstation that deals with all the three vexing problems of keeping a workstation up to date – graphics driver maintenance, and system performance configuration.

HOW IT WORKS

In short, HP Performance Advisor keeps up with the components, drivers and software that are present on your HP Workstation and compares them to a database of known good drivers from HP to determine if everything is running optimally. Far more than just telling you that something needs to be updated, Performance Advisor finds the correct graphics drivers for your system and software and installs them.

In Performance Advisor each software program has individual parameter recommendations. The workstation may be maintained simply by using the latest driver and recommended BIOS settings to achieve the best performance. So rather than having to check several software vendor's web sites to figure out if your applications are up to date, Performance Advisor will do the work for you.

BUY FAST NOW, STAY FAST LATER

With HP Workstations you can leverage high performance Intel® technology, super fast memory and SSD architectures, and achieve optimal machine configurations with HP's Performance Advisor. With HP and Intel® you don't just buy a fast workstation, you buy a workstation and software system that maintains itself over time to give a low cost, high performance solution over the life of the workstation.

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ABOUT ROBERT GREEN

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



1. Multi-core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

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Expanding on Details

In previous articles, I've mentioned how details affect our work. I'd like to expand on that by presenting two methods you can use to add complex details to your scenes quickly.

IMPORTING AND WORKING WITH PATHS FROM PHOTOSHOP

I'll start with the metallic lion mounted on the pillar shown in Figure 1. Using Adobe Photoshop with 3ds Max®, we can add objects like this lion to our scene in just a few minutes.



Figure 1

First, locate (or create) an image similar to the one in Figure 2. Open the file with Adobe Photoshop. Refer to Figure 2 where I marked the following steps in numerical order. Using the magic wand tool (1) with the contiguous option unchecked (2), click a point on the image that makes up the shape you want to import into 3ds Max. Once the shape is selected, navigate to the Paths tab (3) and select the Make Work Path from Selection option (4). Next, export the path to an Adobe Illustrator format using the File Menu -> Export -> Paths to Illustrator option.

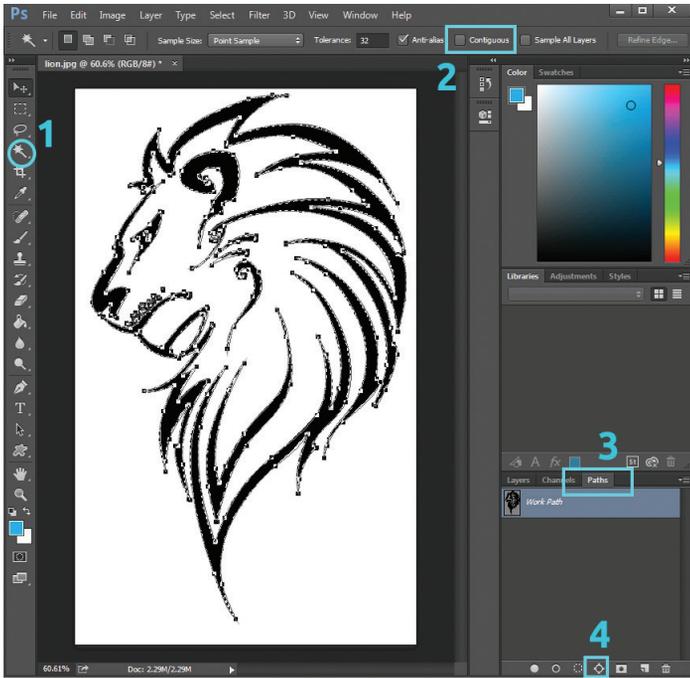


Figure 2

In 3ds Max, select the File menu and choose Import to import the file. 3ds Max will ask if you want to merge the file into the current scene, completely replace the scene, and if you want the path to be a single object or multiple objects. Once your selections are complete, 3ds Max will insert the path as an editable spline. Apply the Edit Poly modifier to the spline object(s). You can now extrude the faces or work with the object however you'd like.



Figure 3

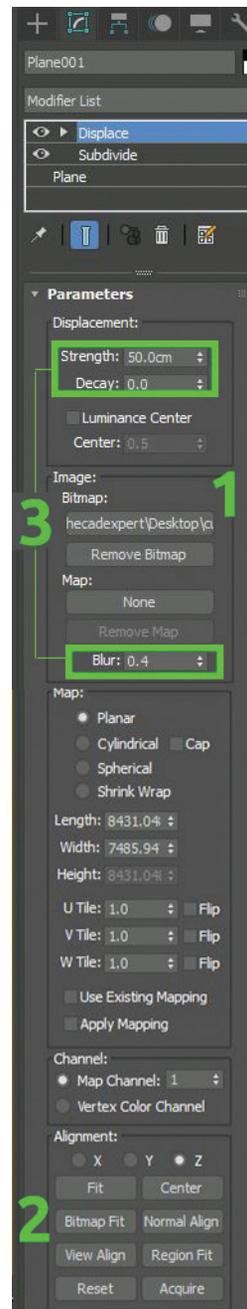


Figure 4

WORKING WITH THE DISPLACE MODIFIER

With the Displace modifier we can engrave or emboss images in our objects to add detail or use as guides for reconstruction. See the tiger engraved into the wall of the child's room in Figure 3. Like the lion, this took just a few minutes to create.

First, select an image similar to the one displayed in Figure 2. I chose an image of a tiger for this exercise. Insert a plane with length and width segments set to one. Next, apply the Subdivide modifier and navigate to its parameters. Since we are trying to engrave a fairly detailed image into our object we need to adjust the size of the subdivision until we have plenty of triangles to form our shape.

Next, apply the Displace modifier. The Displace modifier has several properties. Start by selecting your image using the button in the bitmap category identified as step 1 in Figure 4. Be sure to adjust the image to fit your particular plane by using the Bitmap Fit option under the Alignment category marked by number 2 in Figure 4.

Finally, adjust the strength, decay, and blur values until you achieve the level of detail you want. If you have trouble achieving the desired detail, you may have to readjust the Subdivide modifier parameters to have a higher number of triangles to work with.

Please note there are usually alternate methods to achieving desired results. For example, normal bump maps could be used with materials or the displace feature could be applied through a material to achieve similar results that I presented in this article. It's just a matter of exploring the options and applying them as they are appropriate for your needs.



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



AEC Wall Objects

In AutoCAD® Architecture, a wall is an AEC object that represents the real-world features of an interior or exterior wall. The wall object contains all the geometry needed to represent a wall in 2-dimensional (2D) and 3-dimensional (3D) views. Walls are the basic components of any building plan. You can create very simple wall types that rely on standard settings and add them on the fly. A wall has one or more components, which are the materials used to construct the wall. Some components include brick, CMU, concrete, studs, air gaps, and insulation. The components of walls can also have modifiers, which change the shape of the component or its surface.

Wall styles control the appearance of wall objects. With wall styles, you can specify components, endcaps, materials, and other characteristics to create new types of walls, such as concrete walls, masonry walls, and brick cavity walls (see Figure 1). Catalogs provided with AutoCAD Architecture include sample wall styles for common wall types, such as concrete walls with footings or furring, CMU and brick cavity walls, and various stud partition

walls. You can also work with casework wall styles that include counters, base units, and upper units.

When you add a wall to a drawing, you select a wall tool and then specify the points that define each wall segment. A wall can have both straight and curved segments. Wall direction is significant for some modifications to walls. Sample wall styles provided with AutoCAD Architecture were created with the intent that you place perimeter walls in clockwise fashion. After placing a wall, you can determine the wall direction by selecting the wall. The wall direction grip indicates the wall direction.

You can also reverse the direction of a wall. When you add doors, windows, door/window assemblies, and openings to a wall, the wall automatically adjusts to accommodate the object and adds endcaps where needed. By default, these objects are anchored to the wall and remain with the wall if you move it. If you remove an object from a wall, the wall repairs itself in the space where the object was located.

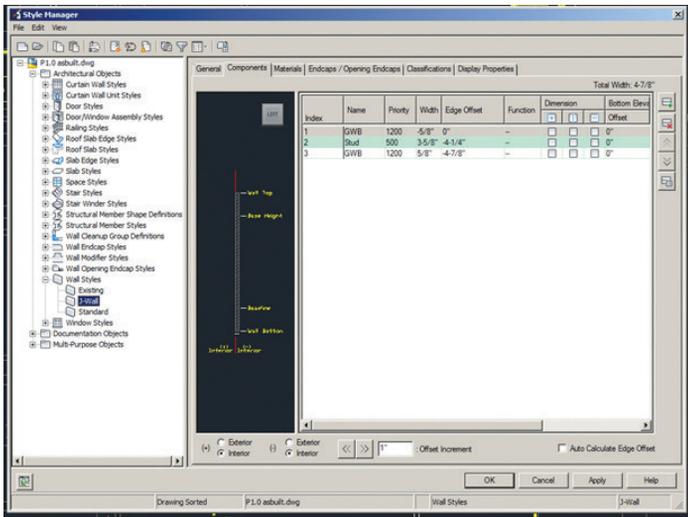


Figure 1: Style Manager

WALL STYLES

Many characteristics of a wall are determined by the wall style. You can create simple wall styles that have a more symbolic display, or you can create detailed walls styles with a representational display, containing many elements the real wall will have. These settings are defined in the wall style:

- **Property Set data** – if you want to tag a wall in a drawing or include it in a schedule table, you need to attach property set data to the wall or the wall style. Property data attached to a wall style typically contains automatic properties, like the wall height or the wall width, or manual properties that are identical for all walls of that style, such as the fire rating, for example.
- **Wall Components** – in a wall style, you can define wall components.
- **Materials** – in a wall style, you can define materials for the 2D and 3D display of walls, as well as for the rendering display of the wall. You assign materials to the wall components in the style. The components are then displayed using the display properties of the assigned materials. AutoCAD Architecture provides a large number of predefined materials for common design purposes. You can use these materials, modify them for your project requirements, and define new materials. To use a material in a wall style, it needs to be defined first in Style Manager.
- **Specifying Wall Display** – the visual appearance of a wall is defined in the wall style. Define the layer, color, linetype settings of the individual wall components, hatching, and the cut plane display of the wall in plan views. The display settings defined in the wall style can be overridden for an individual wall.
- **Specifying Default Wall Settings** – access the Options dialog box and specify the defaults for dimensioning walls and for wall cleanup. The cleanup settings apply only to new walls.
- **Using Wall Tools** – tools provided with AutoCAD Architecture let you quickly place walls by selecting a wall tool with a specific

wall style and other predefined properties (see Figure 2). You can also use wall tools to convert linework to walls and to apply the settings of a wall tool to existing walls. You can also access Stock Tool, Sample palette, and Design Tool catalogs. When you place walls using wall tools, you can use the default settings of the tool or you can change settings for any wall properties that are not controlled by the style.

You can work with wall and opening endcaps to create endcap conditions:

- **Modifying Wall Endcaps with Edit in Place Grips** – you can use Edit in Place grips to modify wall endcaps and create the wall endcap conditions that you want. Vertex and Edge grips are displayed for all wall components at the wall endcap that you specify.
- **Creating Wall Endcaps with Calculate Automatically** – you can use the Calculate Automatically feature with appropriate polyline linework to create wall endcaps. Calculate Automatically will add boundary segments to complete an endcap configuration if the initial polyline is drawn with regard to location and orientation of the particular wall component.
- **Creating Wall Endcaps with AEC Modify Tools** – you can use AEC Modify Tools to manipulate wall components to create appropriate wall endcap configurations. Use Trim, Extend, Subtract, and Merge tools as necessary to do this. You can modify single wall components or you can modify all components at your wall endcap or opening at once.
- **Specifying Wall Endcaps by Style** – in the wall style, you can define endcaps for the wall start and end. The standard endcap style is a straight line. If you need different endcaps, you need to create a wall endcap style and then assign it to the wall style.
- **Specifying Opening Endcaps by Style** – in the wall style, you define the endcaps for any doors, windows, and openings inserted in the wall. By default, the opening endcaps are four straight lines for the jamb start and end and the sill and head of the opening.

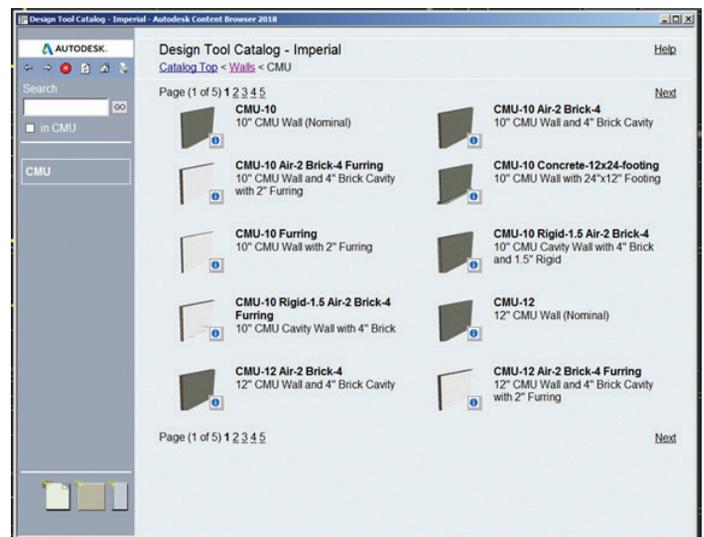


Figure 2: Wall Styles

AutoCAD Architecture 2018

EDITING WALLS

After placing a wall, you can change its style, location, size, shape, basic geometry, and override the component priorities and the endcap styles of the wall. You can also move a wall, merge or join walls, reverse the direction of a wall, and change the shape of the roof line and the floor line of a wall. In addition, you can modify walls using other objects as interference conditions or body modifiers.

Depending on the type of editing you want to perform, various methods may be available:

- ✦ After selecting a wall, you can click any non-grip point along the perimeter and drag the entire object to a new location.
- ✦ You can drag the grips that are displayed on a selected wall to reorient it, resize it, or change other physical characteristics.
- ✦ For grip edits where you are changing a dimension or an angle, the Dynamic Input feature lets you enter a precise value instead of moving a grip.
- ✦ You can apply the properties of a wall tool to an existing wall or the properties of a curtain wall tool, slab tool, or roof slab tool to an existing wall.
- ✦ You can change settings on the Properties palette (see Figure 3).
- ✦ You can use editing commands from the object's context menu.

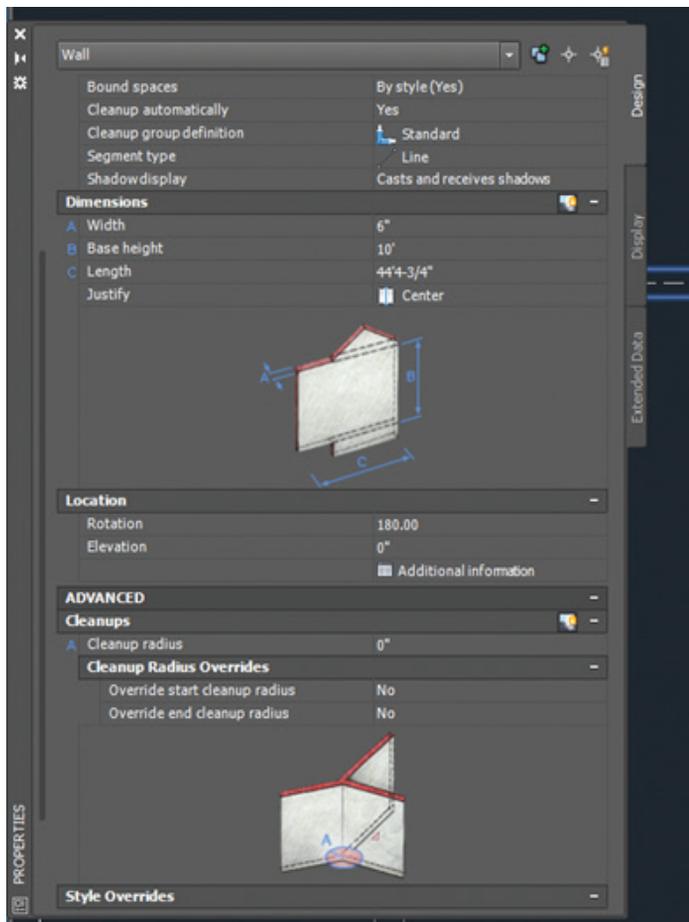


Figure 3: Properties palette

CUSTOMIZED WALL SURFACES

Wall sweeps, wall (plan) modifiers, body modifiers, and interference conditions are features that you can use to create special conditions, such as chases, and to customize wall surfaces. These menus can be found when you right click on a wall (see Figure 4).

A wall sweep is a wall or a wall component whose shape is extruded horizontally from a profile that was created from a closed polyline. The profile “sweeps” along the length of the wall to define the shape of the wall or the wall component. The height and the width of the polyline you use to create the profile define the height and the width of the wall component. The profile is not scaled when swept on the wall. The insertion point of the profile becomes the lower-left corner of the wall component. After you create wall sweeps, you can miter wall sweeps that meet at a corner. You can also change how the sweep is applied to the wall:

- ✦ You can edit the geometry that defines a sweep.
- ✦ You can assign a sweep profile to a different wall component.
- ✦ You can adjust the miter angles at each end of a wall that has a sweep profile.
- ✦ You can remove a sweep profile from a wall or a wall component.

Wall modifiers use the 2-dimensional (2D) geometry of an open polyline to customize the shape of a wall or a wall component. To use wall modifiers, you draw a polyline in the shape you need and create a wall modifier style from the polyline. You can then add wall modifiers of that style to any wall. A wall can have more than one wall modifier attached to it. You specify the placement of a wall modifier, including its vertical and horizontal position and its depth. The wall modifier can be added at the drawn size of the polyline or scaled to a specific size. The wall modifier is then extruded vertically along the wall surface. You can add the wall modifier to one or both sides of the wall. When you select the face, you can also offset the wall modifier from the opposite face to create a bump-out, such as for pipe chases or interior columns.

After placing a wall modifier, you can adjust its placement, or assign the modifier to a different wall component. You can also edit the geometry of the wall modifier and save the changes to the current wall modifier style or to a new style. Wall modifiers take on the material assignment and the display properties of the wall component to which they are assigned. This allows you to use the same wall modifier on different types of walls. You save the geometry of a wall modifier as a wall modifier style. You can create the style when you add the wall modifier to a wall. You can also create a wall modifier first and then apply it to walls as needed.

Body modifiers use the 3-dimensional (3D) geometry of an object, such as a mass element or a mass group, to add to, subtract from, or completely replace one component in a wall. If the wall has only one component, the body modifier applies to the entire

wall. If the wall has multiple components, the modifier applies only to the component that you specify. If you add the body modifier to a wall component, or use a body modifier to replace the component, the body modifier uses the material assignment and display properties of the wall component. After you create a body modifier from an object, you can delete the original object. However, if you have created a complex object, such as a mass group comprising many mass elements, you may want to retain the object in the drawing until you are sure you have the results you want for the wall.

Interference conditions use the geometry of 3D objects to create custom openings or cutouts in walls. You can specify how the interference condition is applied to the wall: added to the wall, subtracted to the wall, or ignored. Interference conditions apply to all wall components that the interfering object touches. The wall stops at the interference condition. The way in which you apply the interference condition to the wall determines how the shrink-wrapping of the wall is affected by the condition in plan view.

In model views, the interference condition is always subtractive, regardless of the shrink-wrapping option you selected. When you edit the object that acts as the interference condition, the wall changes to accommodate the changes to the geometry of the object. For example, you can move the interfering object to change its location on the wall. When you edit the object that acts as the interference condition, the wall changes to accommodate the changes to the geometry of the object. For example, you can move the interfering object to change its location on the wall. Moving the object off the wall does not remove the interference condition for the object. You can also change how interference conditions are applied to a wall, and you can delete interference conditions.

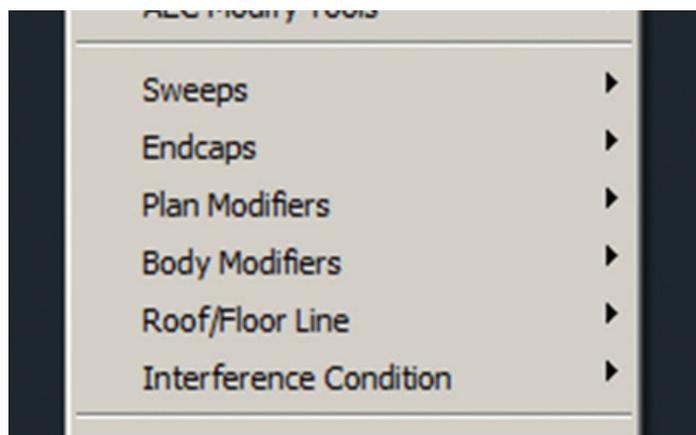


Figure 4: Wall menu

WALL AND OPENING ENDCAPS

You can define different kinds of wall endcaps and wall opening endcaps conditions. When you encounter an unsuitable wall end-

cap configuration, you can modify the shape, width, and depth of individual wall components to achieve the desired result.

Generally, you create a specific wall or opening endcap condition to use with a specific wall style. To modify endcaps, you can use the Edit in Place mode and manipulate wall components with Vertex and Edge grips. You can hide or show component edges. You can also use Fillet, Chamfer, Trim, Extend, Subtract, and Merge tools to modify wall components to create the configuration that you want. The Calculate Automatically feature can also assist you in adding boundary segments to complete your partial endcap designs. When necessary, you can override the wall endcap style assigned in a wall style. When you override the assigned endcap style, you can select a different endcap style for one or both ends of a wall segment.

Wall endcap styles are also used as a basis to define endcap styles for wall openings (see Figure 5). When a wall has an opening, such as a window or a door, the shape of the wall endcap at each edge of the opening can be defined. You use opening endcap styles to specify the wall endcap style applied to each edge of the wall adjacent to an opening. When you change a wall endcap style, all opening endcap styles based on that style are also modified.

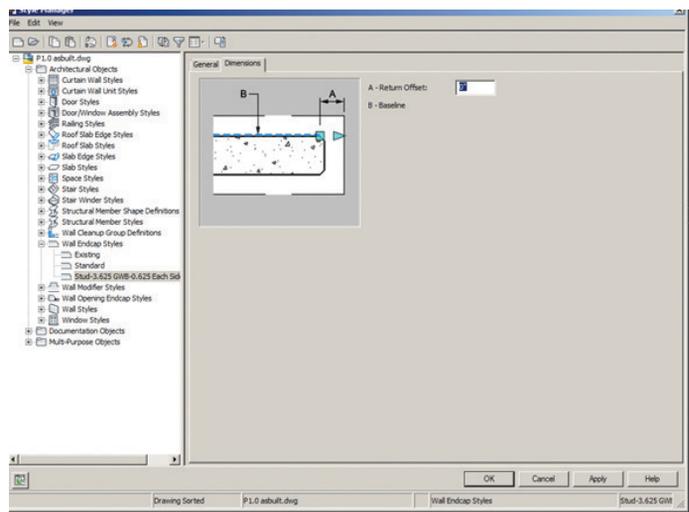


Figure 5: Wall endcap styles



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

16th Annual AUGI Salary Survey

Thank you to the over 4,100 members who took the time to contribute to this resource for users, by users!

Lets dig in and see what has been happening in our industry since last year's survey.

Please keep an eye out for email blasts, social media channel updates and the surveys column in HotNews next summer so you can participate, too!

I have to start out by thanking so many of our members for taking time out of their days to volunteer the information that makes this report possible. You can be assured that the higher the number of responses received, the more accurate the reported numbers are. Just as with all of the AUGI programs, volunteers like me and these survey participants are what make the magic happen in our community.

In 15 years overseeing this report, I constantly receive and consider feedback from the membership, so as always (once you've read the FAQ) feel free to send me any suggestions for Hot Topic issues you'd like to see gauged, or other important statistics which may have been neglected.

The first question is always the differences in Cost of Living in various areas. Thirty percent of survey participants are from outside of the US, and the metro areas and rural areas can be costly or affordable no matter the country, so be sure to check local resources for those variances. I am a big fan of www.Indeed.com/Salary and the ETC Salary Calculator, as well as industry- or role-specific surveys from other professional organizations. The salaries reported here (in US dollars, as participants were given a link to a currency convertor) reflect salary and bonuses for those who work 40 hours a week; they are calculated to exclude overtime pay.

Negative factors (job insecurity, layoffs, reduced pay) continue to decline slowly, while those starting new jobs are on a slight increase. Market share for industry specialties hasn't changed much since last year. Keep reading to see which market segments are doing the most hiring.

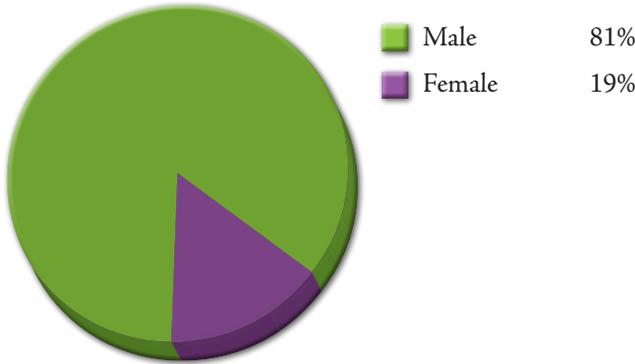
Wages in larger companies average 14 percent higher than those in the smallest firms. Regular use of cloud services has increased from 3 percent of respondents to 5 percent since last year, though most are still resisting due to company policy and other concerns. However, use of cloud services on a limited number of a company's projects has jumped from 12 percent to 15 percent (when we first asked this question, only 5 percent were using cloud services in this manner).

Although 74 percent of our respondents are still in the same job they were last year, only a record low 44 percent intend to stay that way. We see in the March job search poll that 22 percent of users are currently searching for a new job due to dissatisfaction with their current role, and a further 10 percent plan to start looking soon.

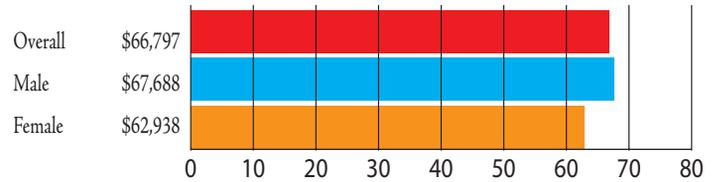
Without a doubt, most folks get their jobs through personal connections (45 percent), so be sure to reach out to your professional connections and start networking. And, when you get that new job offer, don't forget to negotiate your salary.

DEMOGRAPHICS

Employee Gender

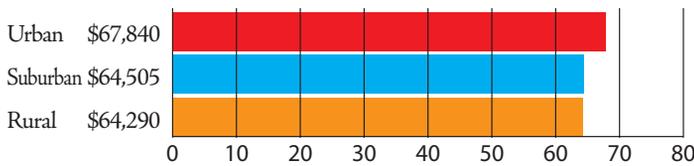


Pay by Gender

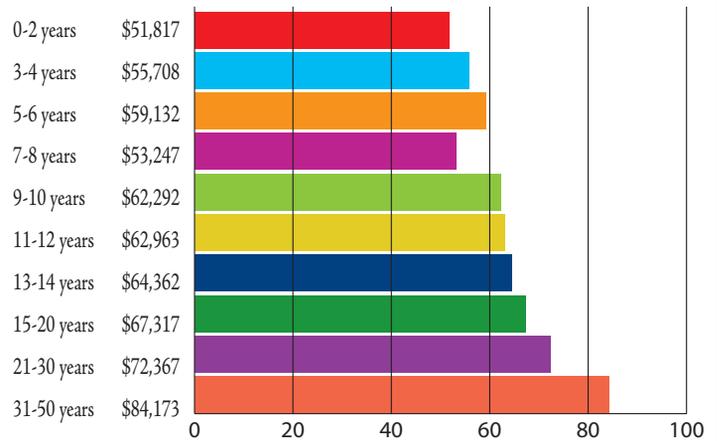


47% of respondents have a Bachelor's degree or higher, compared to 27% when this annual survey began in 2002.

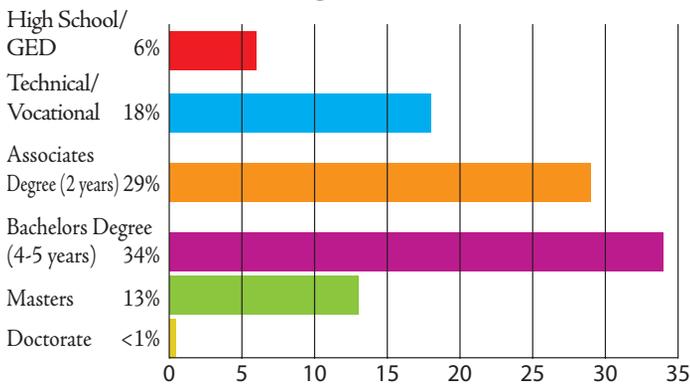
Pay By Work Location



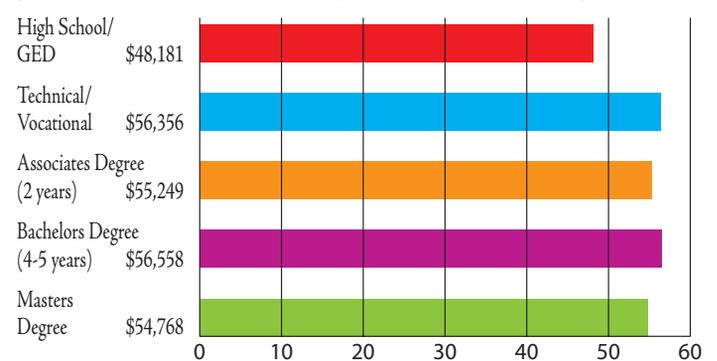
Average Pay by Years of Experience



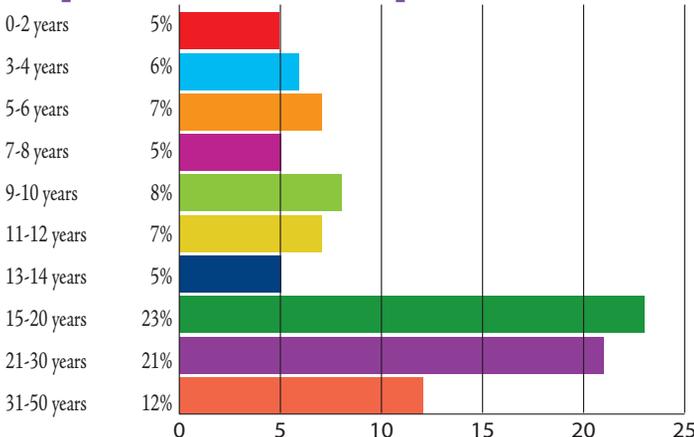
Education Level/Degree Attained



Average Pay By Education Level (for those with 5 or fewer years of experience)



Respondents' Years of Experience



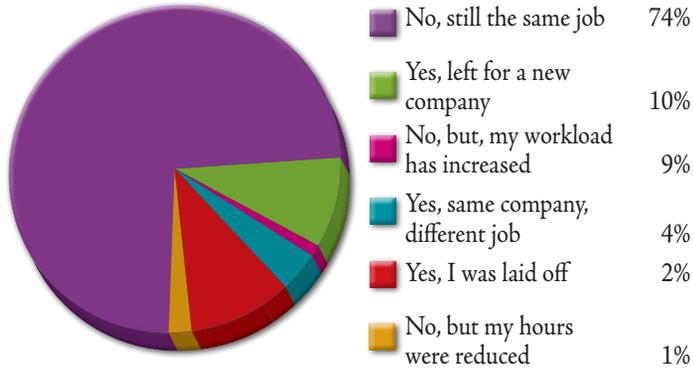
Check out these resources for additional information on pay:

- Indeed.com/salary
- Salary.com
- Payscale.com
- [ETC Salary Calculator](#)
- Glassdoor

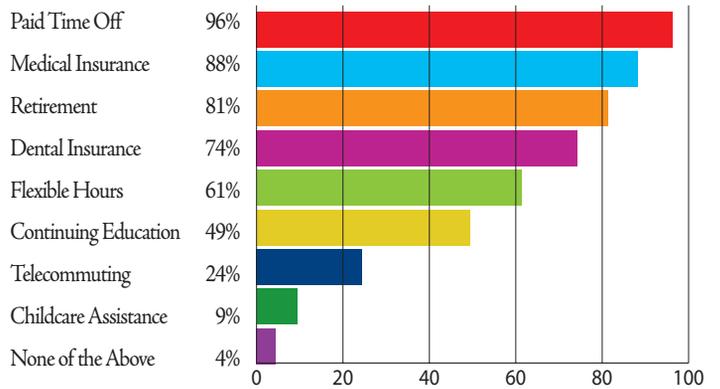
Search for other professional organizations related to your market to get more niche data.

COMPANY DATA

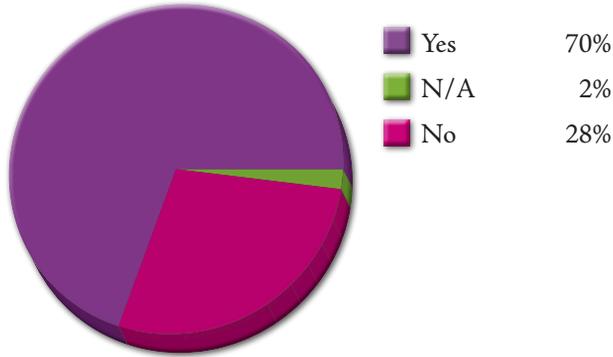
Change in Employment?



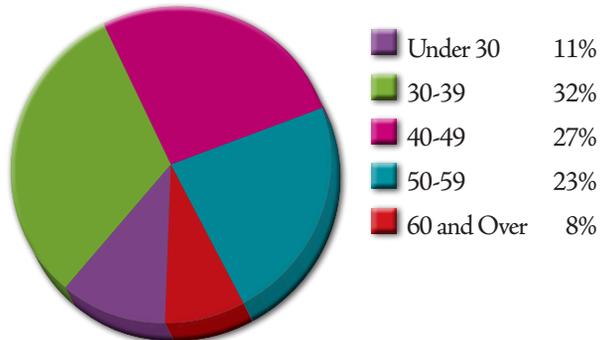
What Benefits Are Available To You?



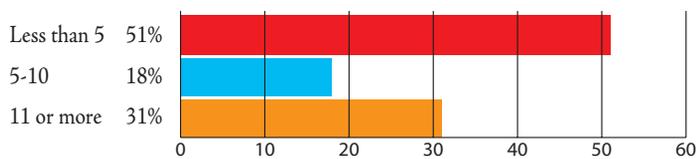
Does Your Company Have a Human Resources Department?



Age of Respondents

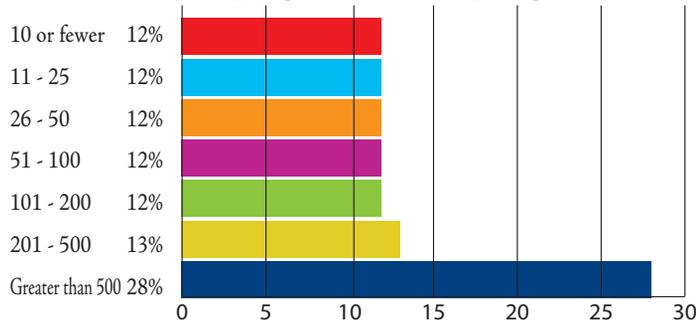


How Many Years Have You Worked for Your Current Employer?

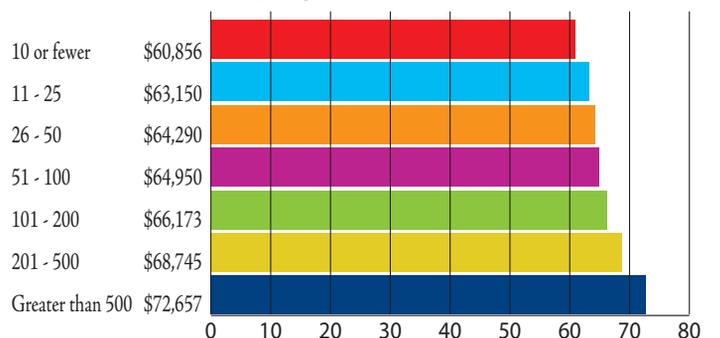


**Lack of benefits reduces average job satisfaction scores by more than 16%.
The ability to telecommute translates to job satisfaction 8% higher than the average worker.**

Number of Employees in Company

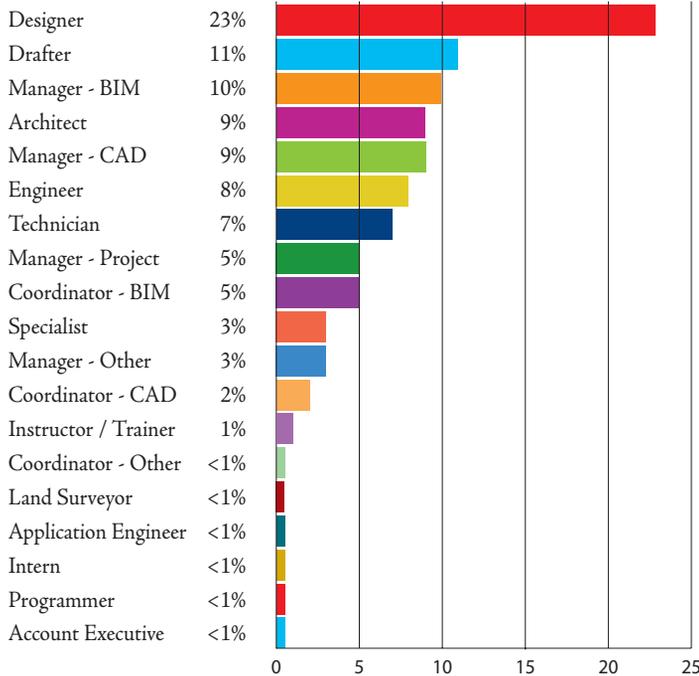


Average Pay by Company Size (Number of Employees)

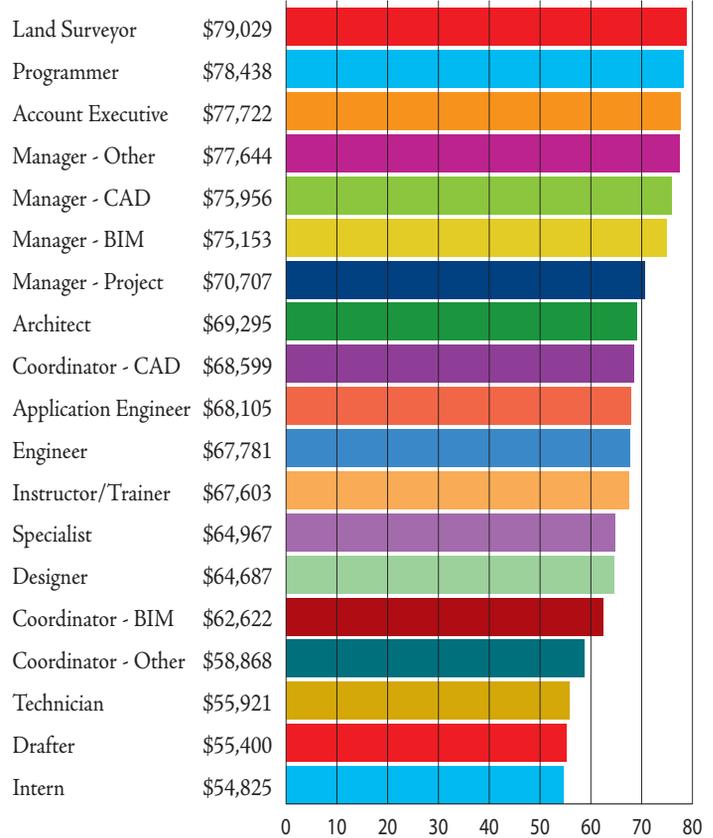


JOB TITLES

Survey Participants

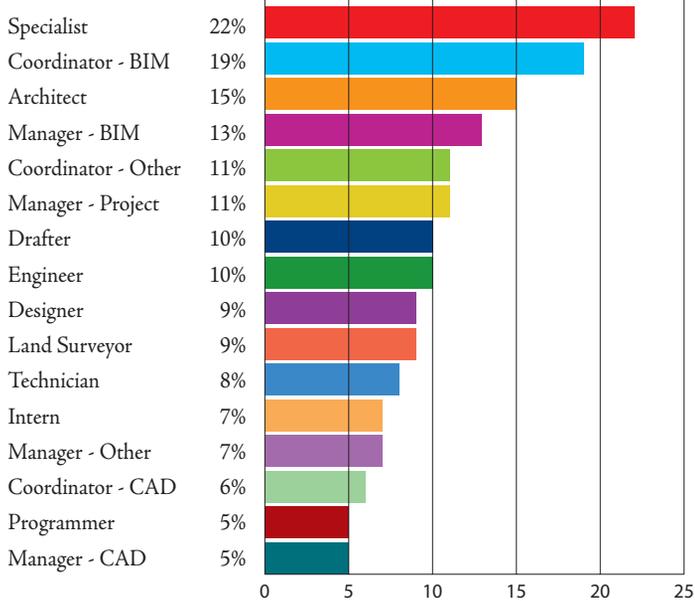


Average Pay by Job Title



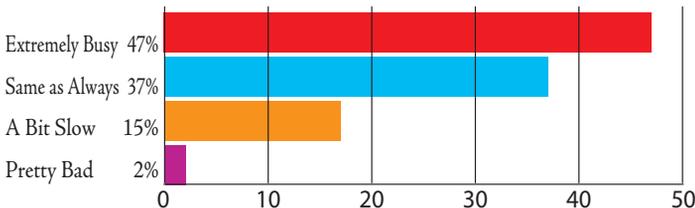
Jobs with the Highest Mobility

(Percentage of Each Who Reported Leaving for a New Role)

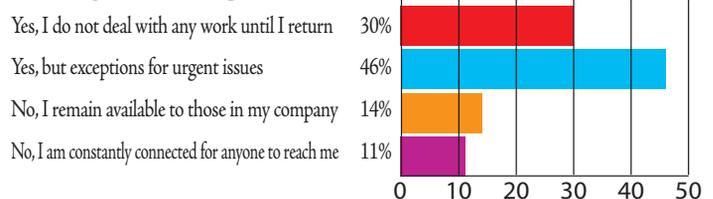


Reminder: All reported average pay is based upon a 40 hour work week. It would include potential bonuses, but workers who are paid hourly and earn overtime should expect their pay to be higher than the average shown here.

Current Workload



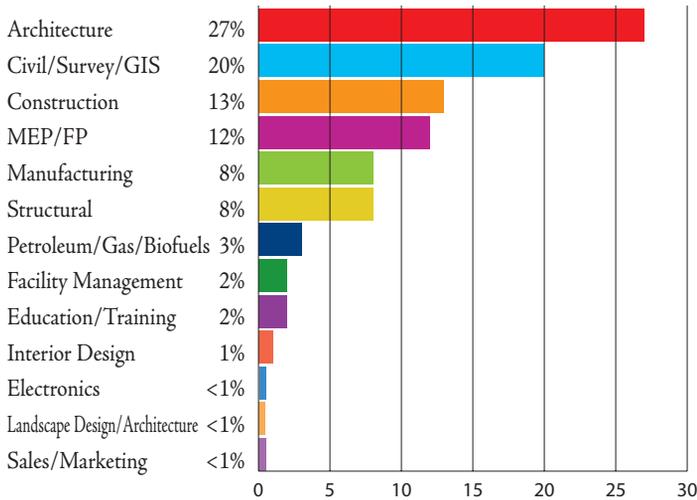
When You Leave for the Day, Are You Really Leaving Work?



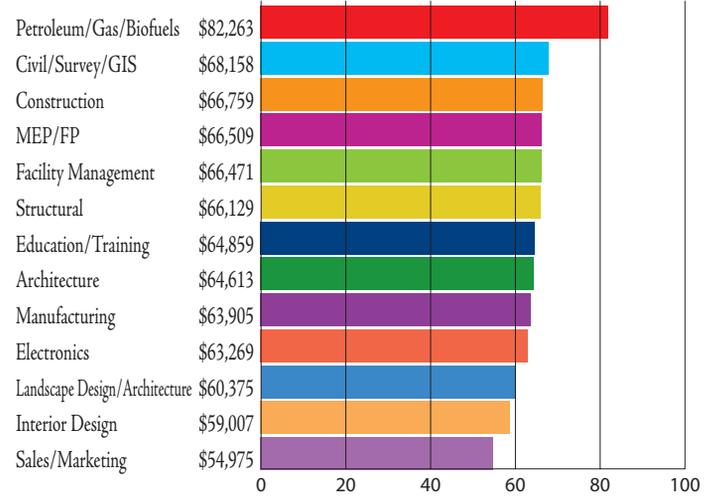
AUGI 2017 Salary Survey

INDUSTRY/DISCIPLINE

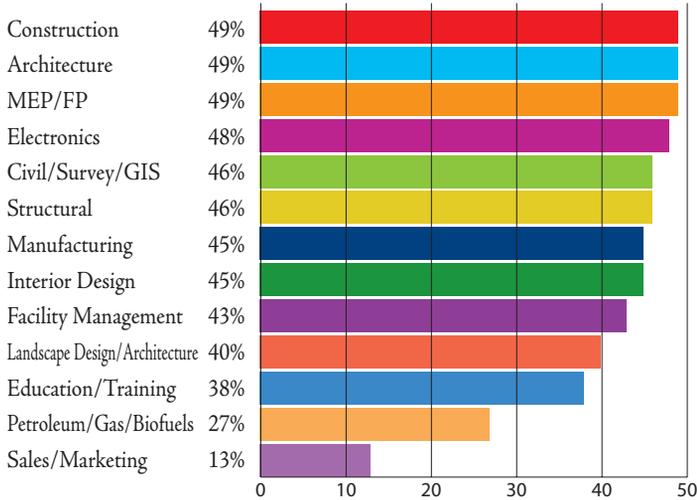
Survey Participants



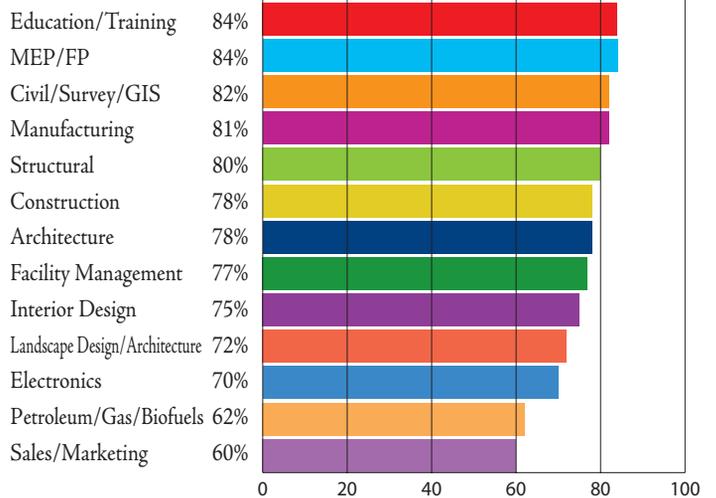
Average Pay by Field/Industry



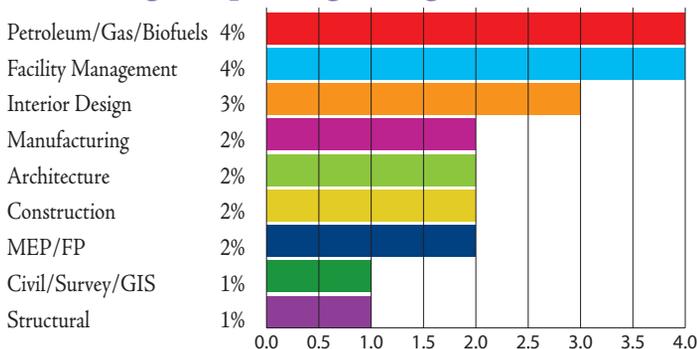
Percentage Extremely Busy Workload



Industries with Highest Percentage of Job Secure Rankings



Percentage Reporting Being Laid Off



The average age of an AUGI member is 43.

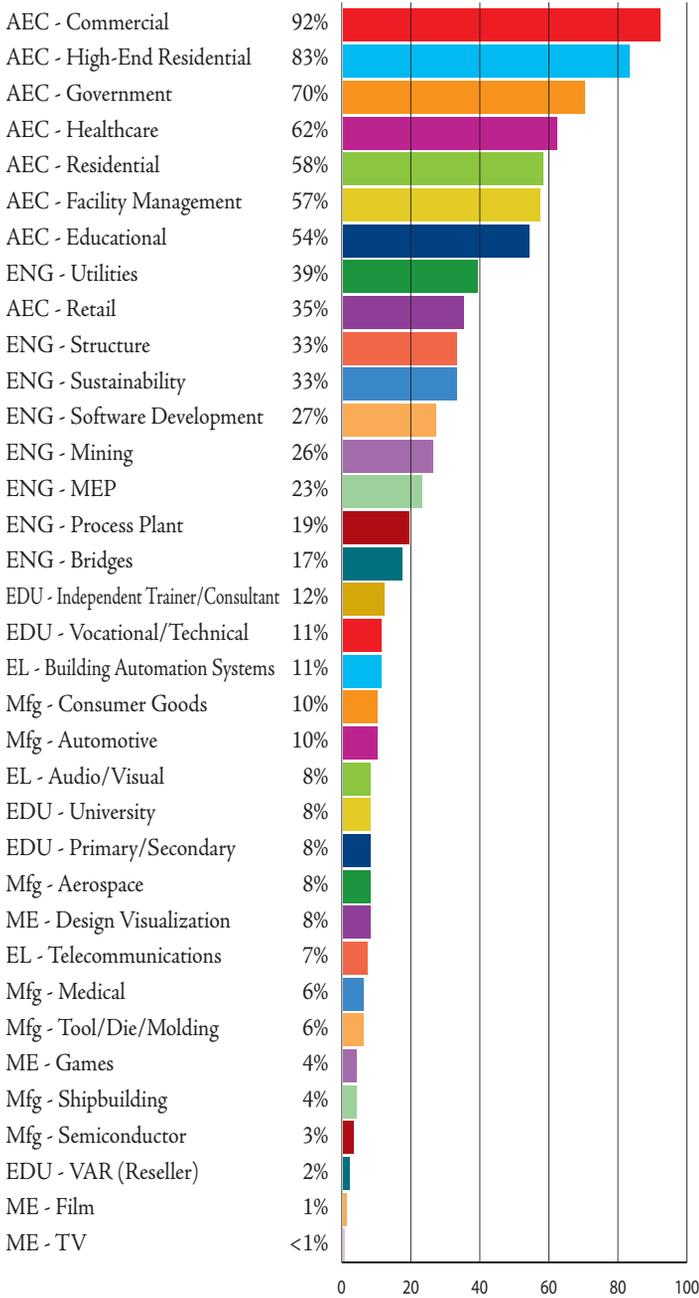
Fields with higher than average employee age are education, electronics, facilities, and manufacturing

19% of the industry is female.

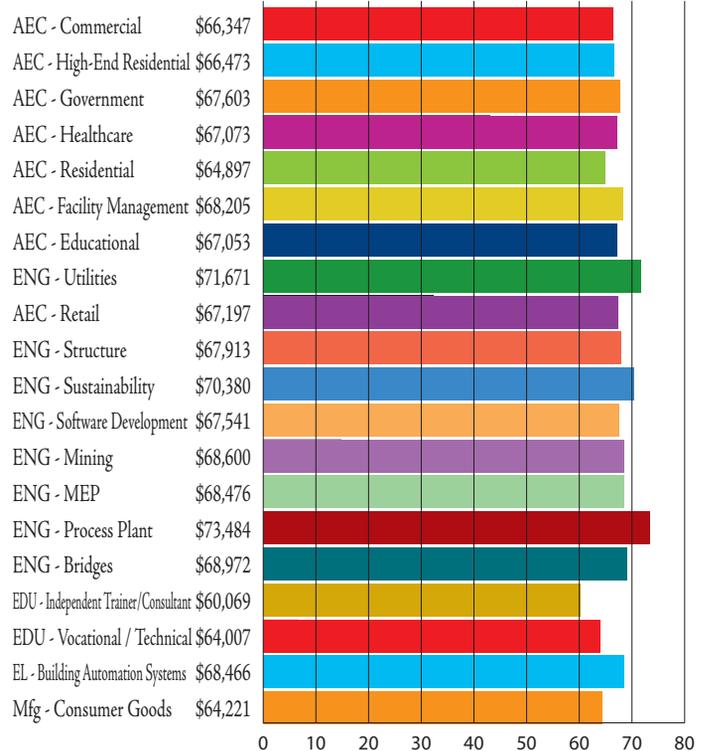
Fields with lower than average female representation are sales, fuels, manufacturing, MEP/FP, and construction.

MARKETS SERVED - INDUSTRY SPECIALTIES

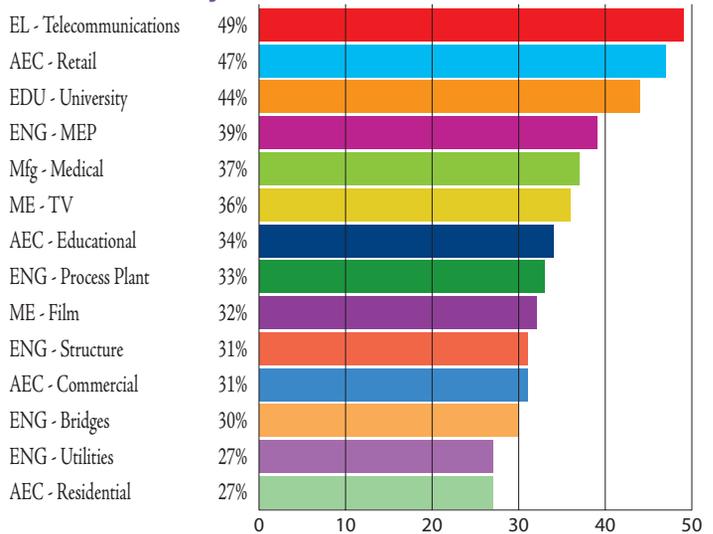
Size of Market Segments



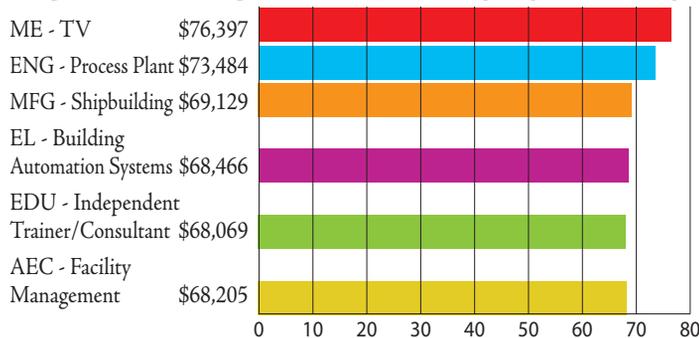
Average Pay of Market Segments



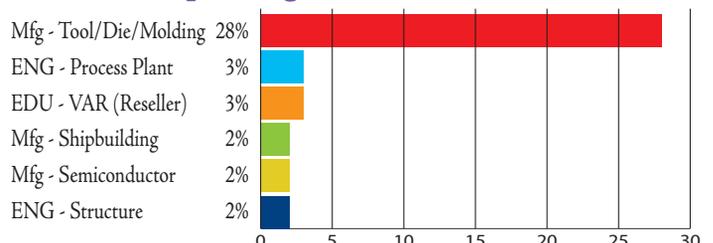
Percentage of Each Market Reporting Extreme Busyness



Highest Average Paid Specialty by Industry

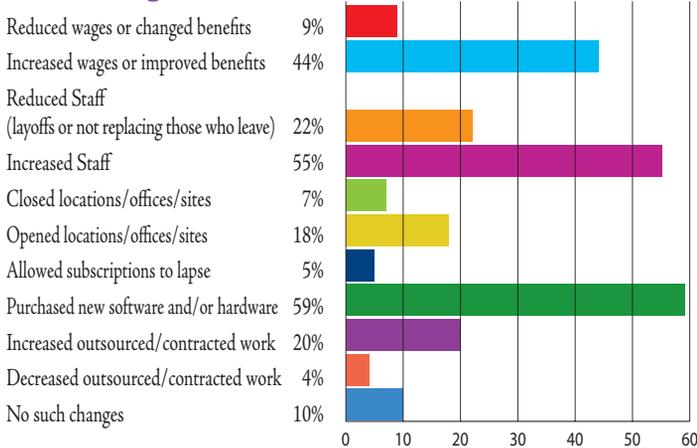


Markets Reporting Poor Workload

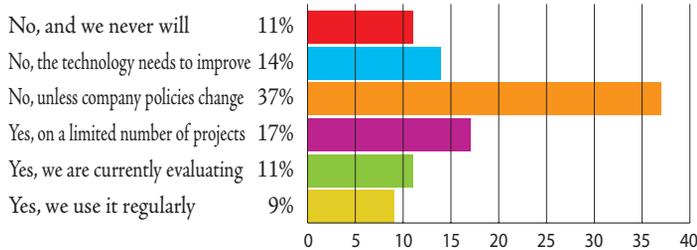


HOT TOPICS

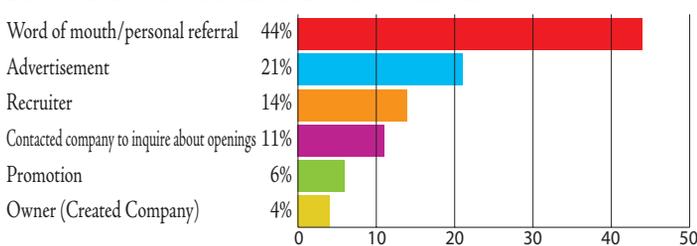
Has Your Company Done Any of the Following in the Past Year?



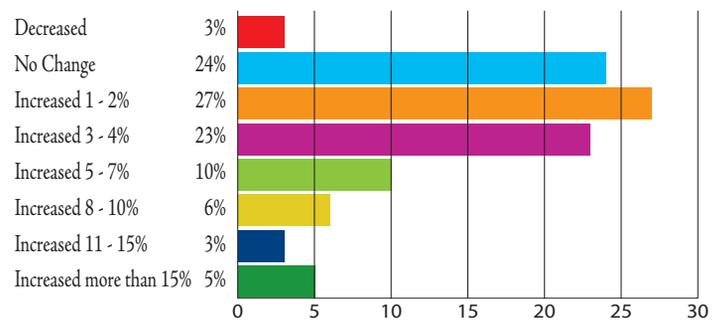
Do You Run CAD/BIM in the Cloud?



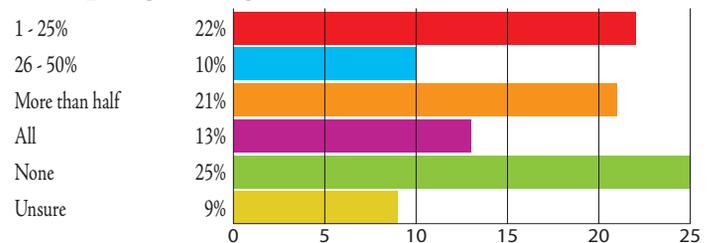
How Did You Find Your Current Job?



Has Your Salary Changed in the Past Year?



(If applicable) What Percentage of Your Company's Projects Are BIM?



The average pay for firms that do more than half of their applicable projects in BIM is 5% higher than those who use it on less than a quarter of their projects.

Today, 25% of applicable companies are not using BIM, down from 36% when we first asked this question in 2012.

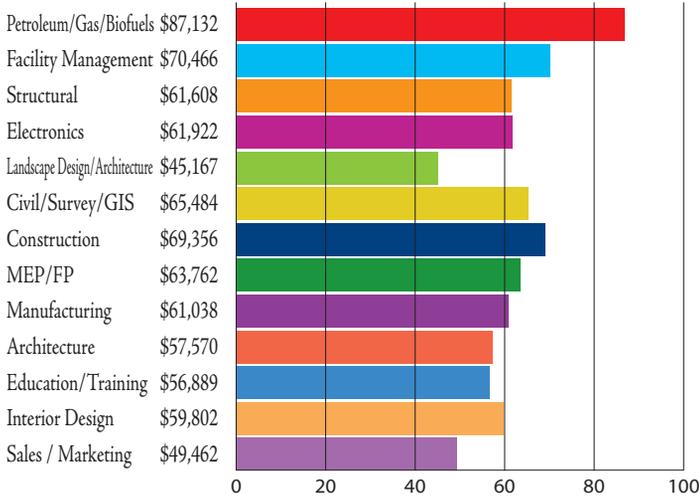
In 2007, 1.6% of respondents were BIM Managers; that number is 9% today, plus the 4% of respondents who are BIM Coordinators.

The fields paying out the largest raises this year were Construction, Architecture, and Electronics.

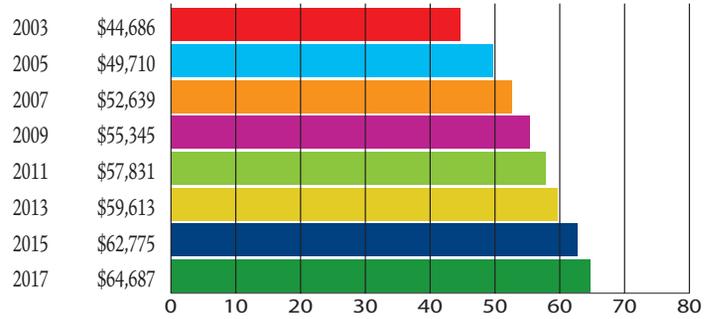
The positions receiving the highest pay increases this year were Programmers and BIM Managers.

DESIGNER CLOSE-UP

Average AUGI Designer Salary by Industry



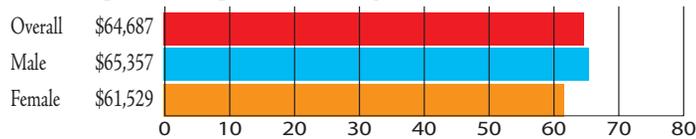
Average Designer Pay



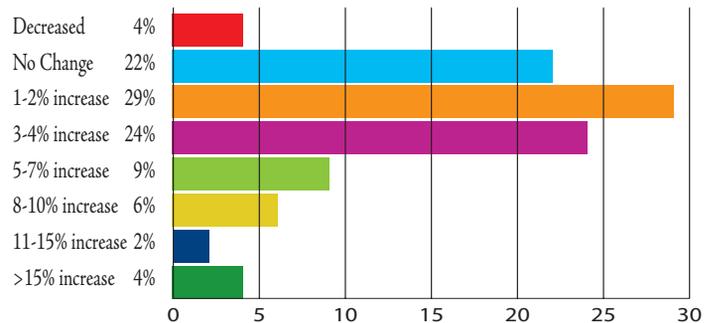
44% of Designers rate their workload as Extremely Busy, which is an increase from last year.

Designers have spent an average of 8 years working with their current company.

Average Designer Salary



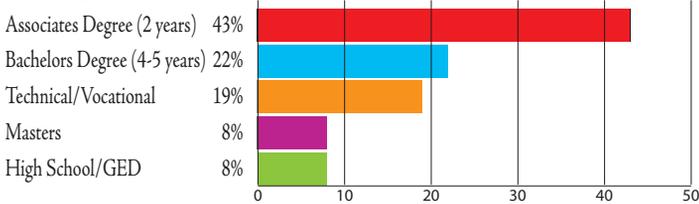
Change in Salary



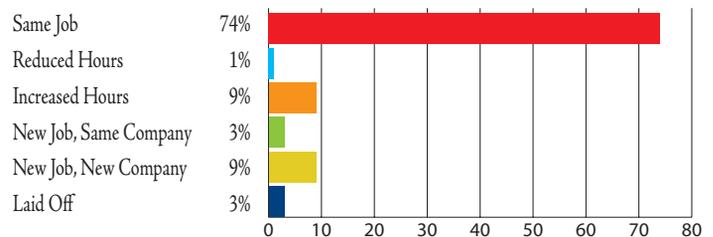
62% of Designers can work flexible hours.

Average designer has 18 years of experience in the industry.

Designer Education Levels



Employment Change in the Past Year



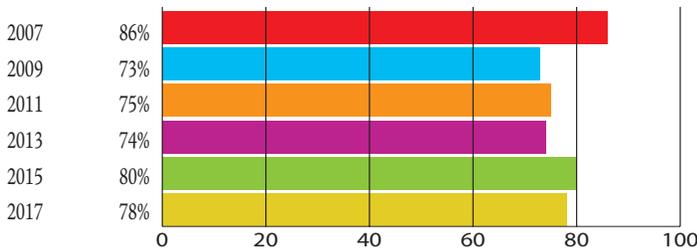
22% of Designers report the ability to telecommute.

76% of Designers feel secure in their jobs, this is down slightly (3%) from last year.

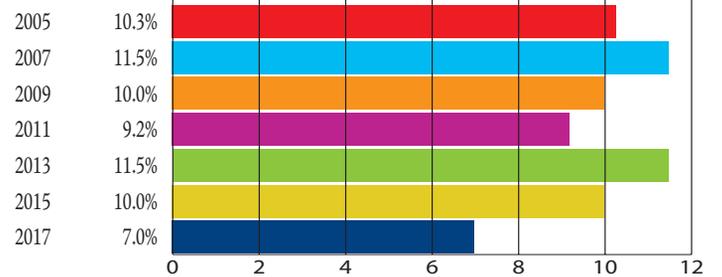
Average Age of Designers is 43.

A LOOK BACK

Percentage of Users Who Feel Secure

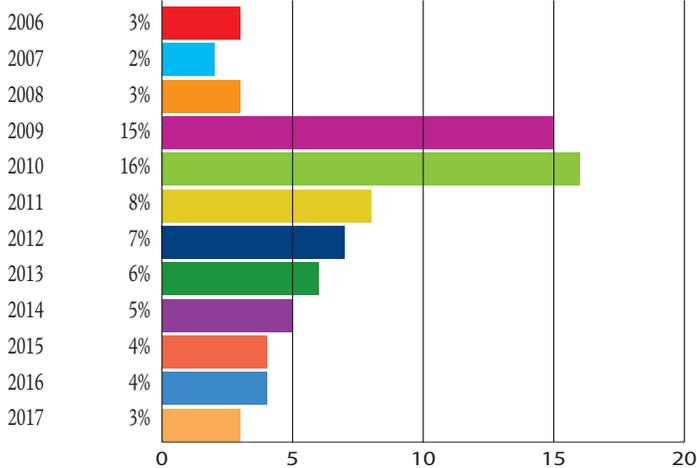


Percentage of Gender Pay Difference

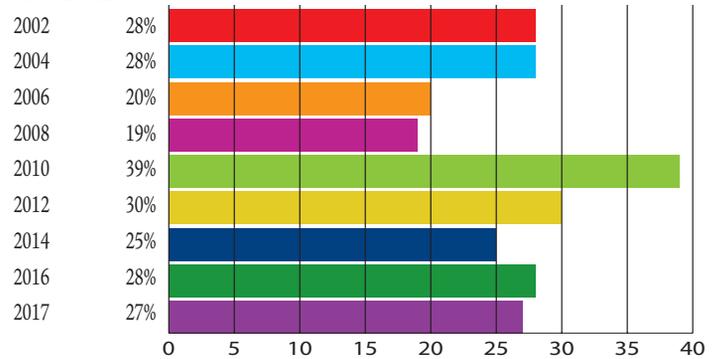


* these numbers reflect a 40 hour work week

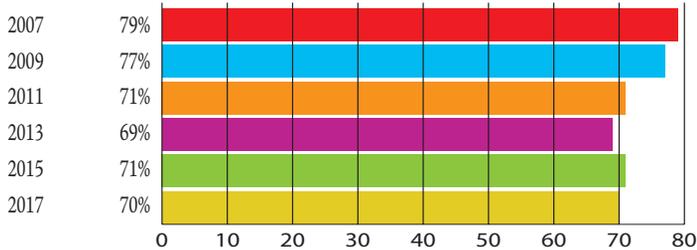
Users Who Experienced a Decrease in Pay



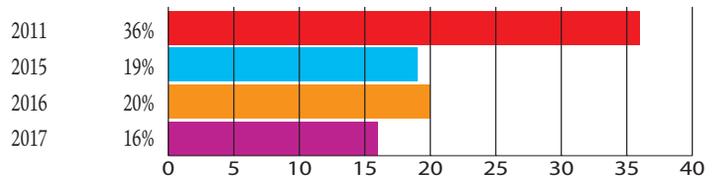
Percentage of Respondents Who Received No Raise



Percent of Users Who Are Satisfied



Percentage Reporting Poor Workload*



*this question was not asked every year

Since 2013, we have been polling our members about whether or not they leave work at work, or their availability after hours. Surprisingly, after hours availability has decreased 3%.



Melanie Perry is a CAFM Solutions Architect with InfoNarus. She is a past AUGI Director/Officer and is currently involved with the STLRUG. Melanie can be reached at mistressofthedorkness@gmail.com or found on Twitter as @MistresDorkness



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- *AUGIWorld* (last 12 months)

DUES: Free



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- *AUGIWorld* (last 24 months)

DUES: \$25



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