AutoCAD 3D Modeling—Tips and Tricks

Seth Cohen – **Advanced Technologies Solutions Inc.**

AC6388   AutoCAD software provides advanced 3D modeling and design visualization tools that enable you to get a better understanding of how a project will work before you build it. This course will cover tips and tricks of 3D modeling using real-world examples of 3D modeling concepts and processes. After this presentation you will be able impress your boss and co-workers with your newfound knowledge.

Learning Objectives

At the end of this class, you will gain 3D modeling tips in the following areas:

- Wireframe Modeling

- Surface and Solid Modeling

- Surface, Solid Modeling and Creating Models from 2D Profiles

- Plotting Solid Models

About the Speaker

Seth Cohen is Vice President Strategic Business Development and Senior Civil Infrastructure Specialist at Advanced Technologies Solutions Inc. He specializes in civil engineering and CAD applications including Autodesk InfraWorks, Civil 3D®, Map 3D, AutoCAD®, MicroStation®, and InRoads®. He has conducted many classes for CAD professionals and specializes in providing project start-up and CAD standards implementation for commercial and government organizations. He has over 15 years of civil engineering experience, working in the industry as a CAD technician and CAD manager designing and producing production plans for many state departments of transportation (DOTs) and municipalities.

e-mail: *scohen@atsicad.com*

Wireframe Modeling Tips

Wireframe modeling consists of using regular AutoCAD objects, along with some 3D basic objects to generate your design. Below are some tips and processes that will aid you in the wireframe modeling process.


Plan
SCALE = 1:8

Elevation
SCALE = 1:8

Isometric
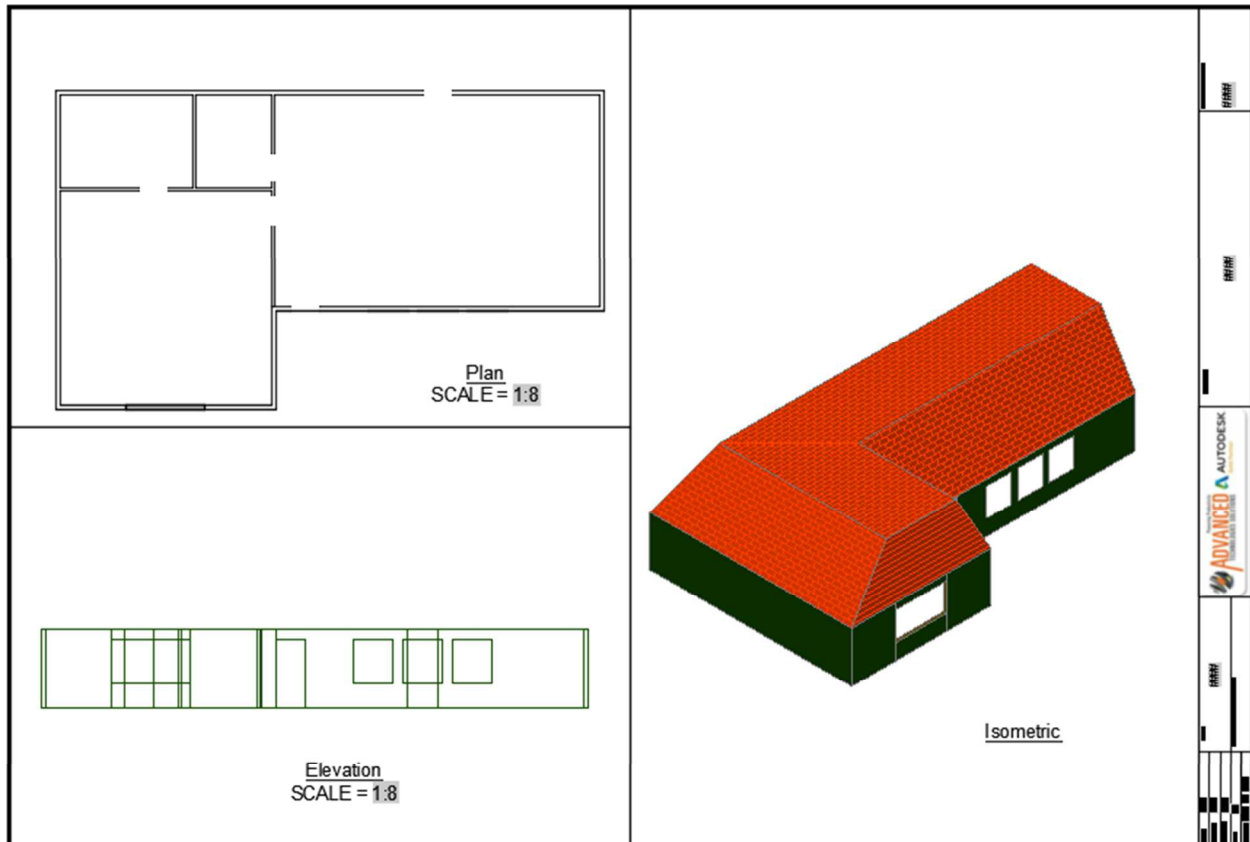
Command Tips

➢ There are 3D tools in the Drafting and Annotation workspace. To add the 3D tools tab, right-click anywhere on the ribbon, and add the tab.
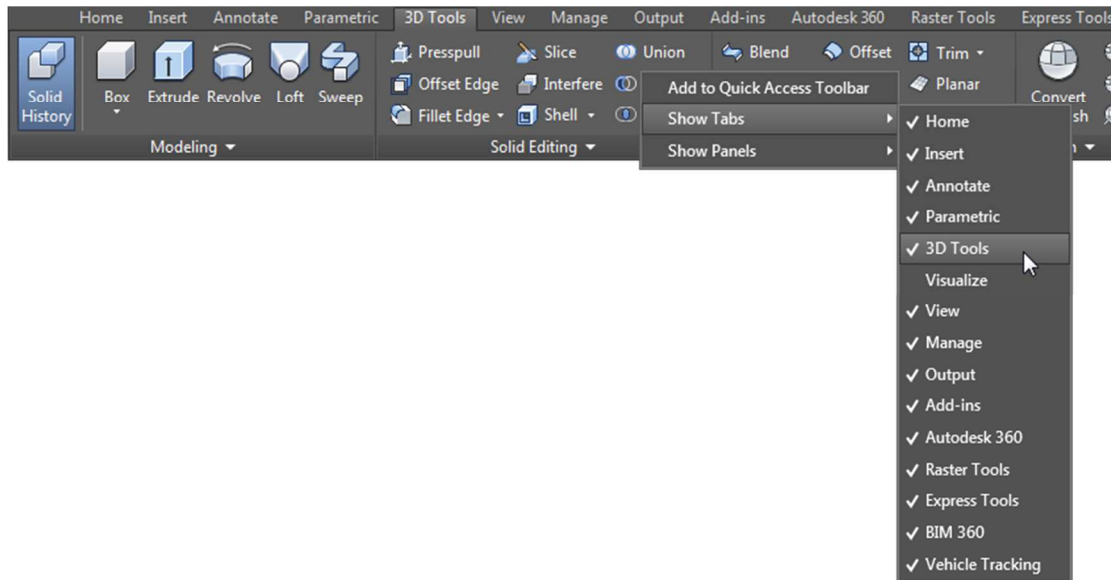
➢ For the complete set of 3D tools, use the 3D Modeling workspaces.
➢ Copy the 3D Modeling workspace, so that you always have the default workspace as a backup.
➢ To make sure your workspace is always saved as you make changes, make sure Automatically save workspace changes is toggled on.
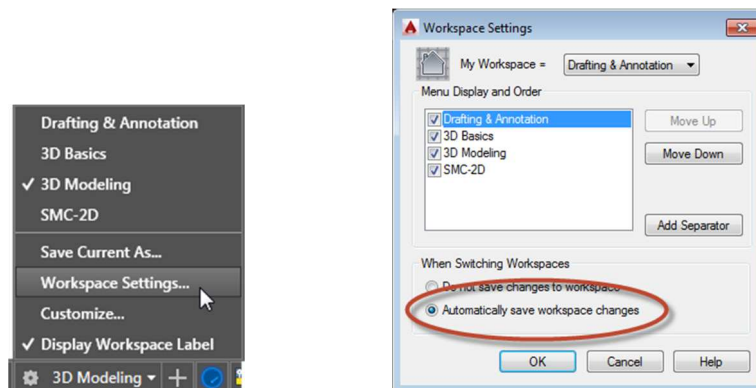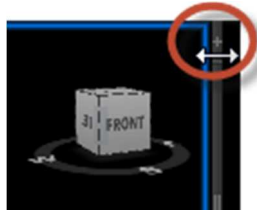
Viewing Tips

➢ Use SHIFT+MIDDLE CLICK to rotate the view
➢ Use the Viewport, Visual Style, and View Controls to aid you in the modeling process.
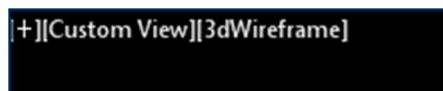
➢ In 2015, you can now change the size of any of the viewports by hovering and clicking on the two vertical bars.
➢ You can add viewports by clicking the plus sign

➢ Double-click the "+" for any viewport to maximize it
➢ Use the ViewCube to……
    o See your orientation.
    o Set UCS's (coordinate systems)
    o Rotate the view.

UCS Tips
➢ The UCS icon can be selected and used to rotate to a specific plane.
➢ To access additional UCS tools quickly, select the UCS icon, and right-click on it.
➢ Each viewport can have its own UCS defined.
➢ ALWAYS KNOW WHERE YOUR UCS IS!

> ➢ To easily identify where the UCS is, set the UCS icon to display at the origin. To do so, select it, right-click and choose **UCS Icon Settings > Show UCS Icon at Origin**.
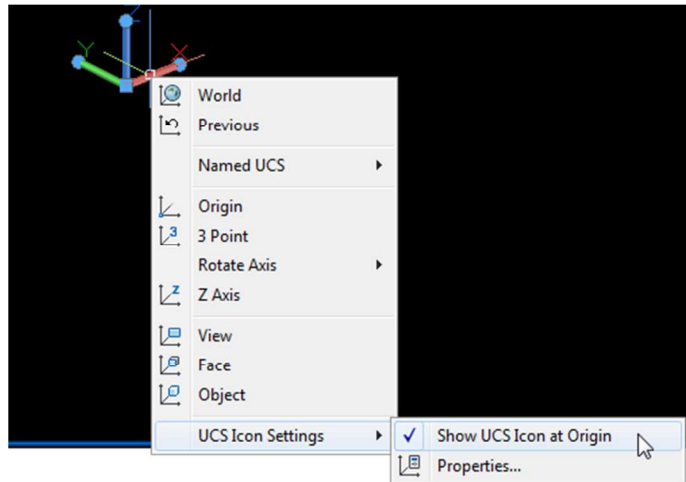

> ➢ To quickly rotate the UCS to a standard orthographic view (e.g. top, left, front, right, etc.), use the **View Controls**.

OTRACKing
> ➢ Use OTRACKing to aid you in getting to ANY geometric point.
> ➢ OTRACKing works in conjunction with your running OSNAP's
> ➢ Remember, **ACQUIRE, DON'T CLICK** to get the point you want.

Trimming in 3D
> ➢ When you need to trim objects in the 3D world make sure you check the Project command line options.
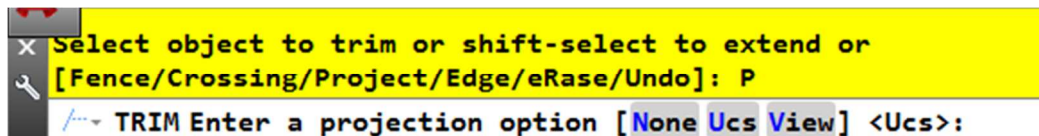
Converting 2D Objects to "Look" like 3D

➢ Regular AutoCAD objects can look like 3D objects. Lines, arcs, polylines, etc., can have a thickness applied to them, and they will look just like a 3D object.

➢ To apply hatching to look like it is on a 3D plane, rotate the UCS to the plane of the 2D objects.
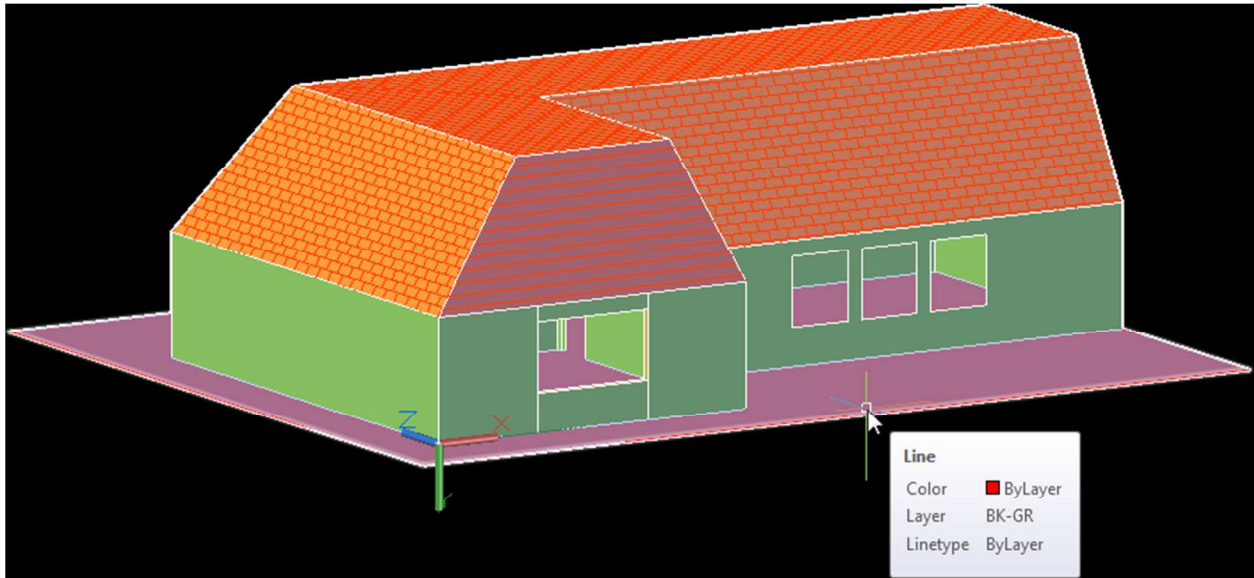
"Hidden" Commands

➢ To add shaded areas, you can use the following commands, depending on your needs:
   o REGION
   o SOLID
   o 3DFACE

Plotting Tips

➢ Use layouts and multiple viewports to display your design
➢ Add dimensions and text in paperspace to avoid the concern for scaling
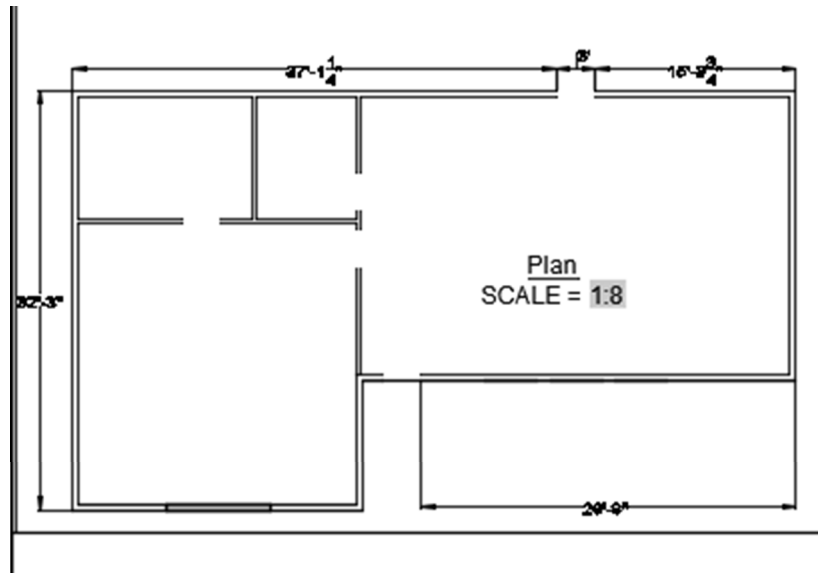
OR

➢ Add them to modelspace, use annotation scaling, and rotate the UCS to the projection you want to annotate (i.e. Top, Front, etc.)
➢ Put dimensions on different layers so that you can viewport freeze them
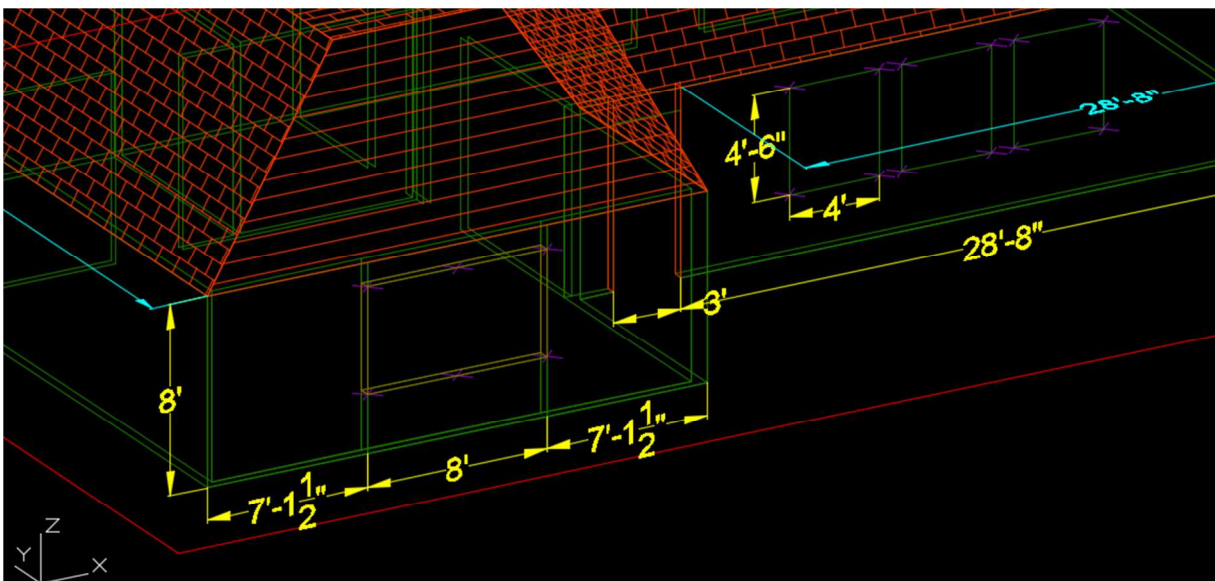
## Surface, Solid Modeling and Creating Models from 2D Profiles Tips

Surface and solid modeling consists of using 3D solids and surfaces to generate your design. Below are some tips and processes that will aid you in the surface and solid modeling process.

Viewing Tips
➤ See Wireframe Modeling tips above
➤ To isolate the viewing of 3D Objects, select them first, and then use any of the 3D Orbit tools to view them individually.

UCS Tips
➤ See Wireframe Modeling tips above.
➤ Use Dynamic UCS only in certain circumstances. For instance when looking to create objects at the center of a 3D face.
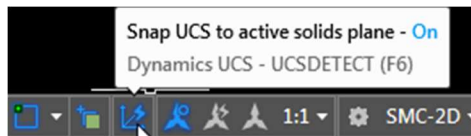

OTRACKing and 3D OSNAPing
➤ See Wireframe Modeling tips above.
➤ You can get to any Z value, by simply acquiring its point.
➤ OTRACKing can be used to acquire any point on a 3D face. Use a Temporary tracking point (SHFT+ Right-Click) to get the first point, and then use POLAR tracking to get the other point.
➤ To get the X, Y, or Z from any 3D object within your design, to use somewhere else, use point filters (SHIFT+ Right-Click).
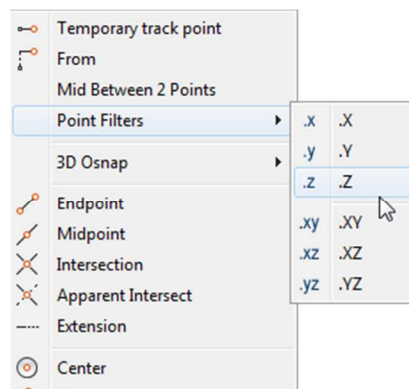
3D Gizmo Tips

➢ Use the 3D gizmo to quickly move, scale, or rotate 2D or 3D objects.
➢ For the 3D Gizmo to work, you must have your viewport set to a 3D visual style.
➢ To access additional 3D Gizmo options, right-click on it after selecting an object.
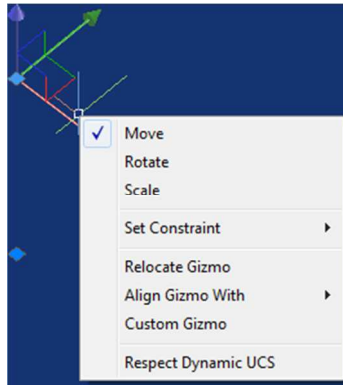
Converting 2D Objects to 3D Solids

➢ You can draw sections to create 3D data.
➢ The DELOBJ variable controls what happens to the 2D data used to create the 3D surfaces or solids. The DELOBJ variable can be set to one of the following settings (taken from the AutoCAD Help):

|	
0	All defining geometry is retained.
1	Deletes profile curves, including those used with the EXTRUDE, SWEEP, REVOLVE, and LOFT commands. Removes all defining geometry for CONVTOSOLID, CONVTOSURFACE, CONVTONURBS, and CONVTOMESH commands. Cross sections used with the LOFT command are also deleted.
2	Deletes all defining geometry, including paths and guide curves used with the SWEEP and LOFT commands.
3	Deletes all defining geometry, including paths and guide curves used with the SWEEP and LOFT commands if the action results in a solid object. Removes all defining geometry for CONVTOSOLID, CONVTOSURFACE, CONVTONURBS, and CONVTOMESH commands.
-1	Displays prompts to delete profile curves, including those used with the EXTRUDE, SWEEP, REVOLVE, and LOFT commands. Prompts to remove cross sections used with the LOFT command. The original geometry for CONVTOSOLID, CONVTOSURFACE, and CONVTOMESH commands is removed without prompting.
-2	Displays prompts to delete all defining geometry, including paths and guide curves used with the SWEEP and LOFT commands. The original geometry for CONVTOSOLID, CONVTOSURFACE, and CONTOMESH commands is removed without prompting.
-3	Displays prompts to delete all defining geometry if the resulting entities are a surface of any type. Deletes all original geometry resulting in a solid entity, original geometry for CONVTOSOLID, CONVTOSURFACE, CONVTONURBS, and CONVTOMESH commands is removed without prompting.

➢ The "2D Profile" commands are located in the Home tab > Modeling panel of the 3D Modeling workspace
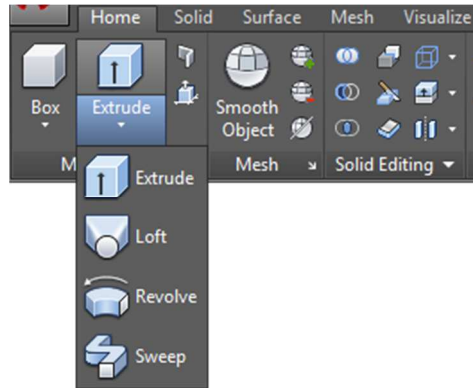
➢ To extrude a set of 2D objects quickly, press **CTRL+SHIFT+E**, and hover over the area.

Surface Modeling Techniques
➢ Almost all the solid modeling commands can also be used to create surfaces.
➢ The following commands allow you to create surfaces very quickly from standard 2D objects.
  o **RULESURF** and **TABSURF** – Add a Surface between Objects
  o **REVSURF** – Creating Circular Surfaces
  o **EDGESURF** – Using Edges to Define a Surface Plane
➢ To control the number of tabulations to be generated by the above commands, set the **SURFTAB1** and **SURFTAB2** variables appropriately.
➢ To make it easier to edit surfaces created by the above commands, convert the mesh to a surface, and then convert the surface to a Mesh surface.
➢ To make mesh surface edits to multiple faces at once, with certain commands, you can select multiple surfaces first, by holding the CTRL key down, selecting the faces, and then run the command.
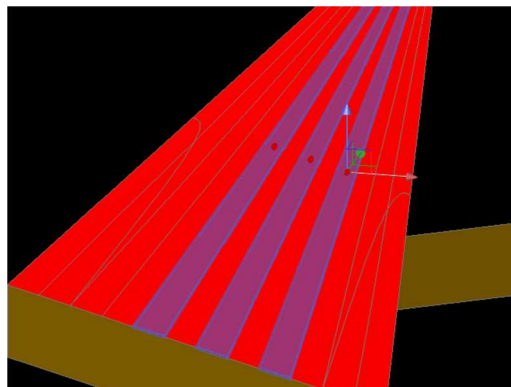
Editing Tips

> ➢ To make sure that a history for solids is recorded for all solids in the drawing, so that edits can be made, make sure that the SOLIDHIST variable is turned on.
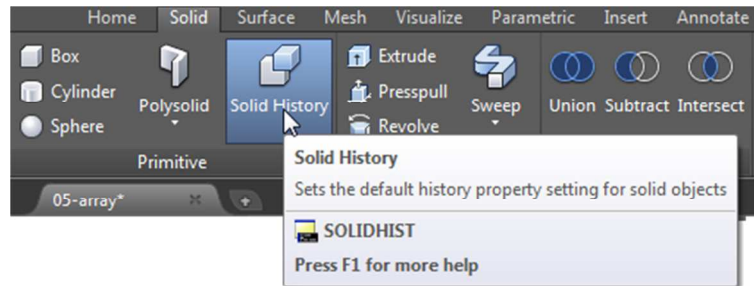
> ➢ Use the **Properties** palette to edit many of the properties of solid models or surfaces.
> ➢ Select objects first, and use the grips to make edits to different parts of a solid model or surface.
> ➢ When grip editing, to modify multiple locations, hold the SHIFT key and pick additional grips. The grips will become "hot" grips.
> ➢ Use the **Home tab > Solid Editing** panel to edit all different aspects of solid models.
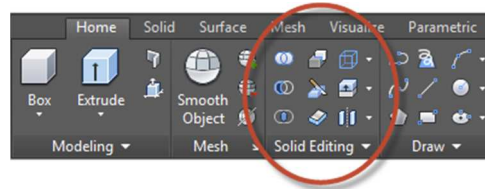
> ➢ In the **Home tab > Solid Editing panel > Edit Faces drop-down**, there are many tools available to make edits to surfaces when grip editing or the Properties palette are not sufficient.
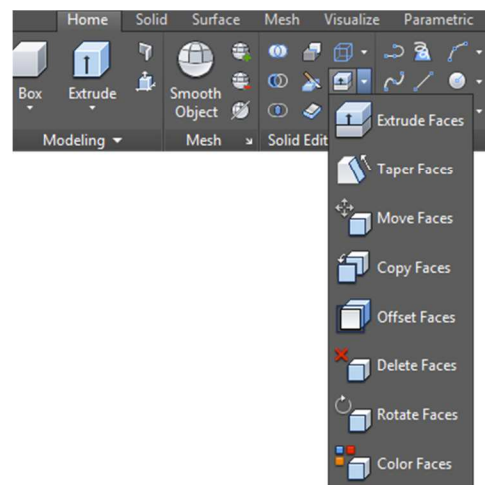
Using Arrays in a 3D World

➢ Arrays work with 2D or 3D objects.
➢ Use the Levels option to add objects at an elevation.
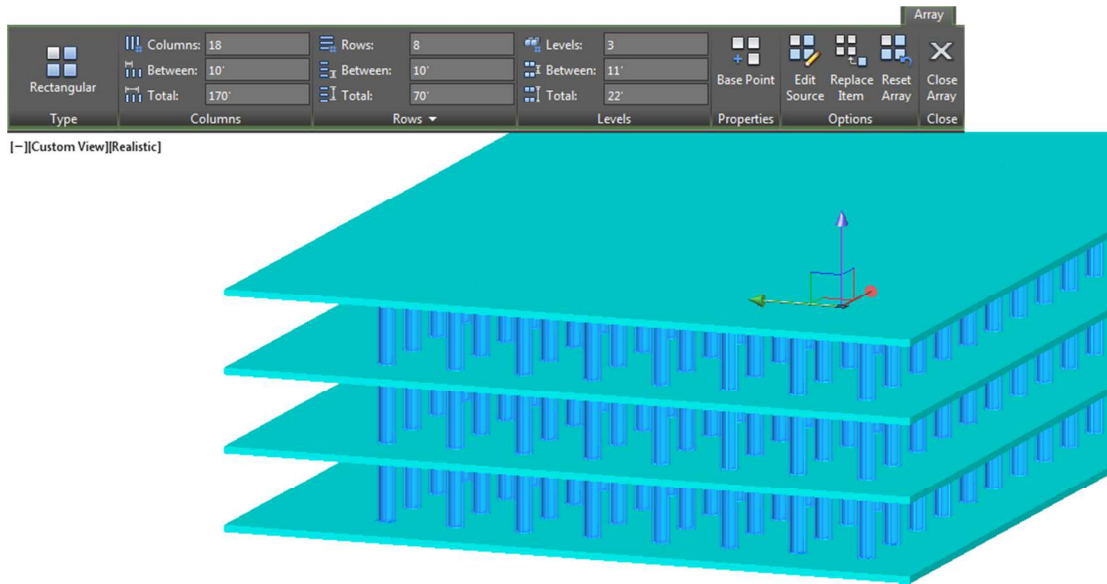
Tips for Plotting Solid Models

When needing to plot 3D models there are many ways to do so. The best way is to use the model documentation process introduced in AutoCAD 2012. Below are some tips and processes that will aid you in plotting models.

➤ The model documentation process is started with a base view. The tool is located in the **Home tab > View panel**.
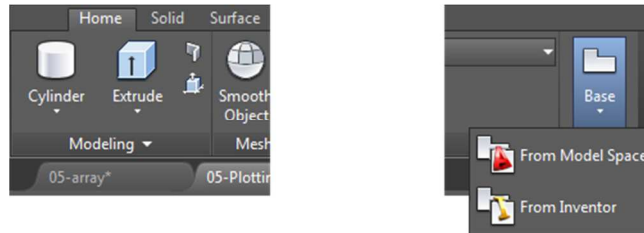
➤ Double-click a drawing view to edit it.

➤ To easily edit drawing view, select it first, and look to the contextual ribbon.
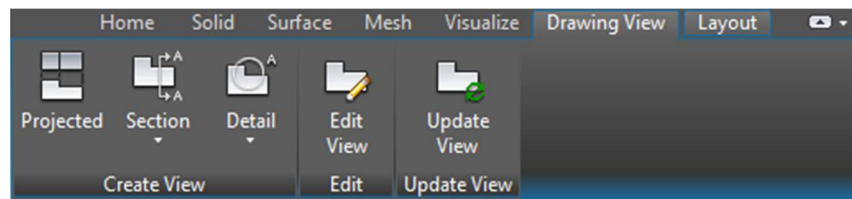
➤ To access additional functionality with a section or detail view, simply hover over any of the grips to access the multi-functional grip menu.

AC6388

AutoCAD 3D Modeling - Tips and Tricks

Thank You!

Please complete the Survey for this class for a chance to win a FREE pass to AU2015!

Seth Cohen

scohen@atsicad.com

www.atsicad.com