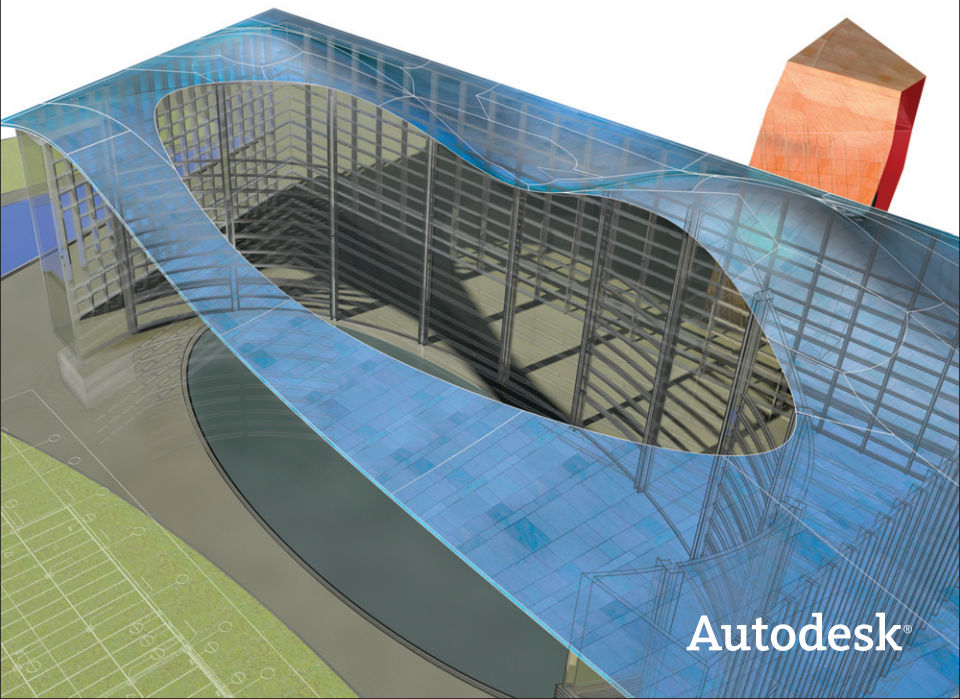Lynn Allen's Tips and Tricks
for Using AutoCAD 2011

AutoCAD®

Autodesk®

User Interface

The new context sensitive User Interface is more efficient than ever as it often switches automatically based on the objects selected.

Changing the Ribbon

For those of you who would like the Ribbon to take up less room you'll appreciate the new pull-down menu that was added to the ribbon cycle button. The new Minimize to Panel Buttons option displays large icons for each panel. The panel will expand when you hover over the button.
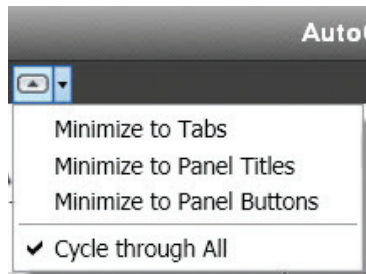
NOTE If you still aren't ready to use the Ribbon—you can switch back to toolbars and pull-down menus by switching your workspace to AutoCAD Classic.

Drawing Window

AutoCAD 2011 now displays a dark gray background in modelspace (by default). The Display tab in OPTIONS lets you easily modify the color.

The grid has now been modified to resemble graph paper (horizontal and vertical gridlines). You'll see red and green lines extending from the UCS to indicate the X and Y axes when the grid is enabled.
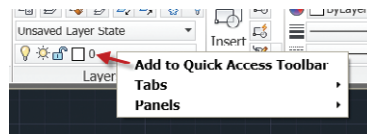

Quick Access Toolbar

There are two new additions to the Quick Access Toolbar, the Workspace menu and SAVEAS. You can also move the Quick Access Toolbar below the Ribbon.
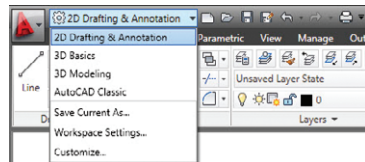

TIP Put the Layer drop-down list on the Quick Access Toolbar for speedy access at all times! A simple right click on the layer drop down list allows you to easily add it.


Customizing the Ribbon

New enhancements allow you to include Fold panels. As you change the size of your AutoCAD window or add and remove panels from a tab, Fold panels resize horizontally to fill the available space. You can specify a default, maximum and minimum button size for each panel in the CUI.
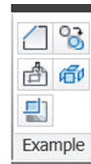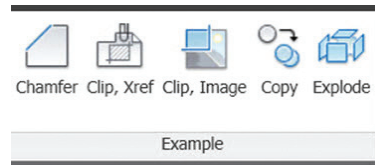
Navigation

A new Navigation bar replaces the navigation tools that were previously available on the Status bar. This new bar resides on the right side of the screen by default and includes Autodesk SteeringWheels, ViewCube, ShowMotion, Pan, Zoom and Orbit.
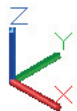
The Navigation bar also includes support for 3D Connexion devices when the 3D Connexion system driver is present.
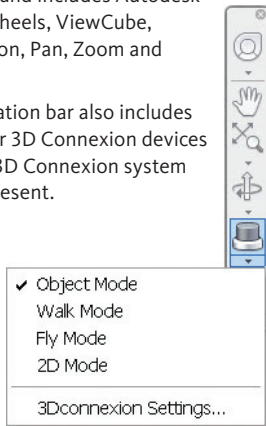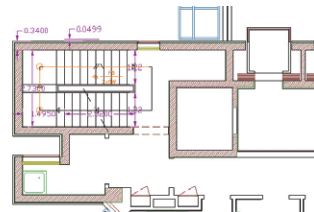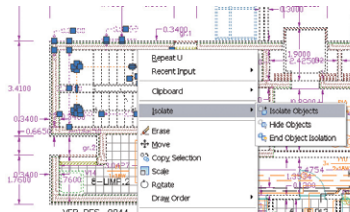

The ViewCube now supports the 2D Wireframe visual style (you might find the clockwise and counter-clockwise controls useful for rotating the viewpoint in the 2D plane).

UCS Icon

Each axis now has its own color: X for red, Y for green and Z for blue.

Object Selection and Creation tools

Object Visibility

Now you can control object visibility independent from layer visibility! The Isolate Objects tool (found in the right-click menu) displays just the objects selected (everything else is hidden). This makes it easier to work within complicated drawings.

You can use the Hide Objects tool (also found in the right click menu) to hide the objects selected.

Quickly restore the hidden objects with the End Object Isolation tool.

NOTE Use the OBJECTISOLATION-MODE (yikes!) system variable to control whether object isolation persists between drawing sessions. The lightbulb icon in the lower right corner of the status bar indicates whether object isolation is active in the drawing.
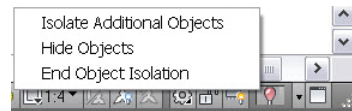
TIP These tools can be VERY valuable when working in 3D!
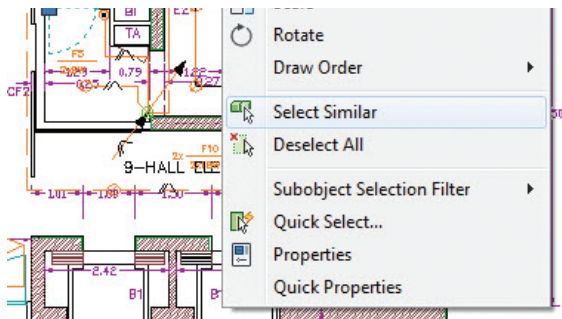
Object Selection

The new Select Similar tool allows you to quickly select objects of the same type and properties (much faster than Quick Select). Find this tool in the right-click menu when one or more objects are selected.

Use the Settings option to specify which properties to filter (only available when you enter SELECTSIMILAR from the command line).

TIP You can select more than one object to match with Select Similar. For example, if the Layer filter is enabled and you

select a circle and a line that reside on two different layers, AutoCAD will find all of the objects that match the circle AND all of the objects that match the line.

PICKADD

For you Programmers: the system variable PICKADD has a new default value of 2. The objects selected with the SELECT command will now remain in a "pickfirst" state after exiting the command.
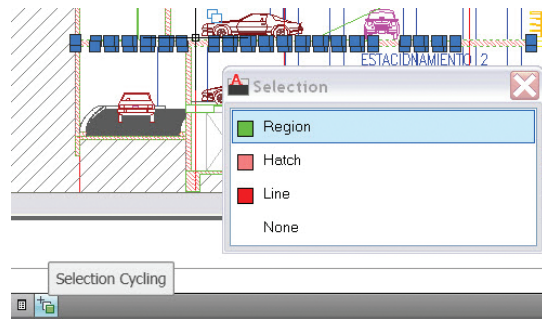

Selection Cycling

Easily select overlapping objects with the new Selection Cycling tool (controlled on the status bar). When you select an object that overlaps other objects, AutoCAD displays a list of all the overlapping objects. Objects highlight as you move through the list.

TIP Selection Cycling can be very helpful when working in 3D.

Object Creation

Need to draw an object with the same type and properties of an existing one? Use the new Add Selected tool to get the job done in no time! For example, select a polyline, pick Add Selected from the right click menu and AutoCAD is ready to create another polyline with the same properties. This is a HUGE timesaver!

Parametrics: Geometric Constraints
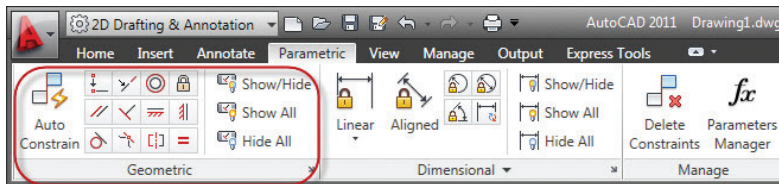
The addition of Parametrics to AutoCAD will make your AutoCAD objects smarter than ever!

Geometric constraints allow you to create a relationship between objects or key points on objects. Whereas traditional object snaps are temporary, constraints stay with the objects to ensure you are able to keep the design intent. For example, you may want two lines to always be perpendicular to each other, or an arc and a circle to always be concentric.

The Parametric tab makes it easy to add and control geometric constraints. You can also use the GEOMCONSTRAINT command.

Adding Constraints

Simply select a geometric constraint tool, such as parallel, and select the two objects you want to maintain a parallel relationship. The object selected first is key here as the second object will adjust to be parallel to the first. Such is the case with all the geometric constraints.

NOTE Geometric Constraints have now been improved for ellipses and text!

AutoCAD 2011 added in new constraint icons for Fix, Horizontal, Vertical and Symmetry constraints that are constrained to an object (rather than a point)


A new constraint icon for Symmetric about a line has also been added.

New to AutoCAD 2011 is the ability to easily repeat the last geometric constraint option just by hitting enter to repeat the last command. Each constraint now has its own individual command when selected from the Geometric Panel.

Geometric icons appear in constraint bars on the objects to indicate the attached constraints. These constraint bars can be dragged to any position on
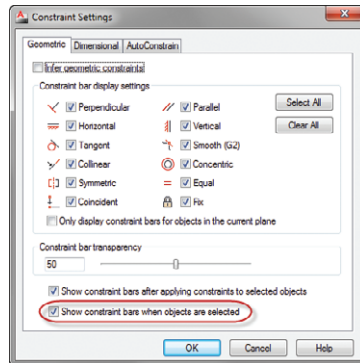
the screen, hidden by selecting Hide All from the ribbon or turned back on with Show All. The Show option lets you to select the objects you want to display constraint bars. Manage a variety of constraint bar options in the Constraint Settings manager including the new option that allows you to see constraint bars when objects are selected, even if they are currently hidden.

Inferring Geometric Constraints

AutoCAD 2011 makes it easier than ever for us to create objects with geometric constraints with the new Infer Constraints button on the status bar.


When Infer Constraints is toggled ON, constraints are automatically added as geometry is drawn (or edited). For example, Perpendicular object snaps add perpendicular constraints.

Inferred constraints work great with rectangles (made with the RECTANG command), fillets and chamfers by automatically adding the appropriate geometric constraints. Imagine a rectangle that actually acted like a rectangle (with perpendicular constraints) or fillets that followed their base geometry (tangent and coincident).

TIP You can use the Nearest object snap to apply a coincident constraint between a point and an object. For example, you can use Nearest to place a block on a line where the block can move anywhere along the line including the virtual extension of that line.

AutoConstrain

This is the best tool ever! Select a group of previously drawn objects and AutoCAD will automatically constrain them for you! Use the AutoConstrain tab in the Constraint Settings manager to set up priority, tolerances, etc. (CONSTRAINTSETTINGS command if you don't want to use the ribbon.)
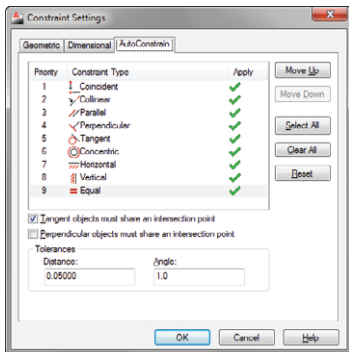
TIP Fix drawings with minor gaps and overhangs by setting the tolerance values in AutoConstrain. It's magic!

Parametrics: Dimensional Constraints

The geometry in AutoCAD has always driven the dimensions. We draw a line the correct length and then dimension the line. What if you could drive the geometry from the dimensions? You change the value of the dimension and the geometry automatically updates! That is exactly what we have in AutoCAD 2011.

You'll find the dimensional constraints located in the center of the Parametrics tab. You can also use the DIMCONSTRAINT command. Here you will find the familiar types of dimensions, but these dimensions are able to drive our geometry. For example, you can dimension a circle with the Radius option and later control that value. You'll want to use Dimensional Constraints on geometry you want to be able to easily change or on geometry you want to constrain to a specific size. If the distance between two holes needs to always be 3mm, constraining it dimensionally will force that distance regardless of what happens to the rest of the geometry.

TIP You can convert a traditional dimension to the new constrained dimension with the DIMCONSTRAINT command.
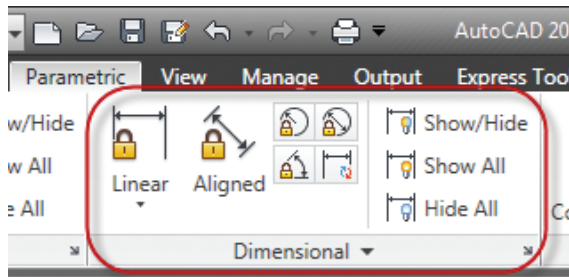
A lock icon displays to help you visually distinguish a constrained dimension from a traditional dimension. Their size is zoom-invariant (easily readable no matter how far in or out you zoom) and geometrically constrained dimensions do not plot. You'll notice that each is assigned a name such as D1 or Ang1. These names are completely customizable and expressions can be set to be dependent on other values as well.
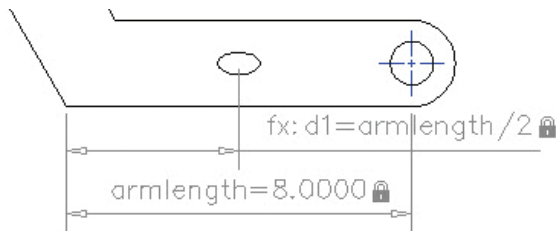
AutoCAD 2011 lets you select existing dimensional constraints to insert the constraint name (you Autodesk Inventor users will appreciate that). Dynamic dimensions that reference another parameter have a prefix of "fx".

You can easily edit a dimensional constraint with a double click on the dimension text or by changing the value in the Parameters Manager. You can rename the constraints in that fashion as well.

Changing to Annotational Dimensions

So what if you'd like to print these dimensional constraints? No problem—simply select the dimensions you want to print and convert them to Annotational dimensions in the Properties Manager. Here you'll be able to control their style, size, etc.
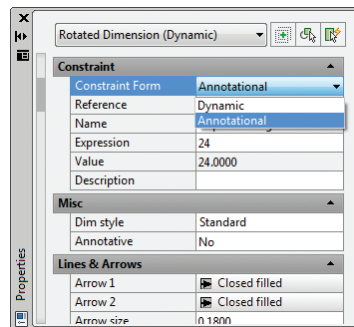
The good news is that these are still the smart geometric constraints which means you can still double click on them to change their value!
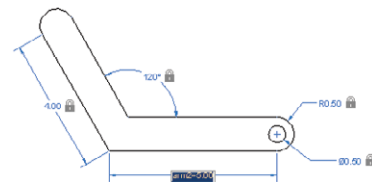
TIP If you prefer to work with annotational dimensions from the beginning, set the CONSTRAINTFORM system variable to 1 or select the Form option in the DIMCONSTRAINT command.

Constraint Settings Manager

The Constraint Settings manager controls the display of your dimensional constraints. Here you can switch the values to display without the expression or turn off the lock icon.
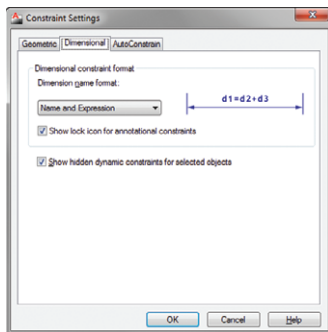
Parameters Manager

The Parameters Manager is simply a listing of the parameters in chart form. Here you can modify the names and values and even add in new user parameters. AutoCAD 2011 introduces a Filters pane to help organize your parameters (much like with Layers). Simply create a Filter Group and drag the parameters to the group.
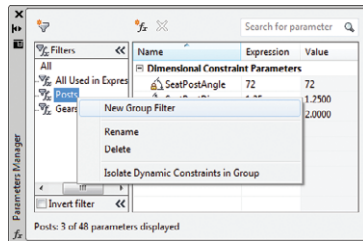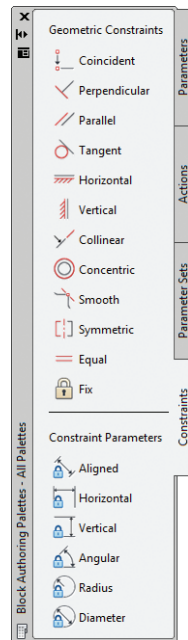
Parametrics: Dynamic Blocks

Great news! Parametrics can also be combined with the power of dynamic blocks!

Updated Block Editor

The block editor tab contains both geometric and dimensional constraints. The block authoring palette also contains a tab focused on parametric constraints.

Assigning geometric constraints in the block editor works much the same as in the drawing editor. If you bring constrained geometry into the block editor it will remain constrained.

Dimensional Constraints

Dimensional Constraint parameters can be added to dynamic block geometry. Their name is in turn exposed as a property for the block, much like the standard dynamic block parameters. When attaching Dimensional Constraints to block geometry, you can also control the number of grips available to the user for editing purposes.

NOTE Be sure your constraints are contained in the block definition, not added after the fact for the best results.

TIP Be sure to stick to the Block Editor ribbon when attaching dimensional constraints. (Don't grab them from the Parametrics tab!)

Construction Geometry

You can create construction geometry that displays in the block editor but not on the inserted block. The BCONSTRUCTION tool makes it easy to convert existing geometry to construction geometry which displays in a gray dashed linetype.

Test Blocks

No longer do you need to exit the block editor to test your blocks! The Test Block tool lets you try your block without requiring you to save changes and exit the block editor (which will save you plenty of time!).

Parameters Manager

You can access all of the assorted block parameters and attributes in the Parameters Manager. You can control whether a parameter is displayed in the Properties palette and the order that the parameters appear.
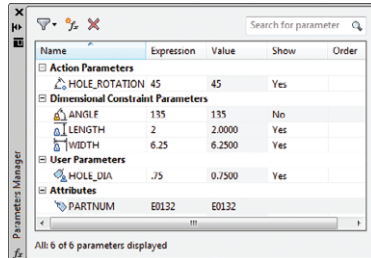
A new option has been added to the Show column to convert between constraint parameters defined in the drawing editor vs. the block editor.

Block Table

Here you can really kick up the power of your dynamic blocks! Using the Block Table tool (BTABLE), you can define different variations of a block. You can key these variations in manually or paste them in from an Excel spreadsheet.

You can even further control the block insertion by selecting the Block properties must match a row in the table thus avoiding the creation of random nonstandard parts.
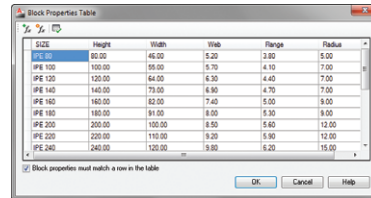

A grip on the inserted block lets you quickly switch between the different values listed in the Block table. Selecting Properties Table from the grip menu displays the entire block table so you can see all the values and even sort on different columns.
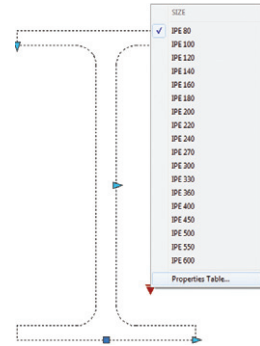
Block Editor Settings

You can control all the settings for the block editor environment in the Block Editor Settings dialog—including colors, sizes and alignment options.
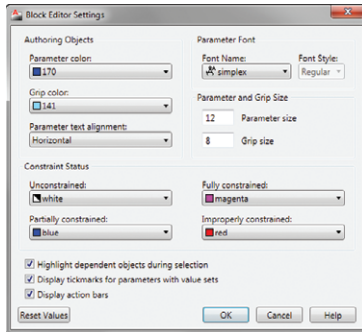

TIP Mixing the new geometric and dimensional constraints with the traditional parameters and actions can lead to varied results and is not recommended.

Powerful Time Savers

There are plenty of great timesaver tools inside of AutoCAD 2011—many wishes have been granted!

Transparency

Now you can assign transparency to objects and layers much like any other property! You can set the transparency to a value between 0 and 90. 0 indicates no transparency while 90 indicates high transparency.
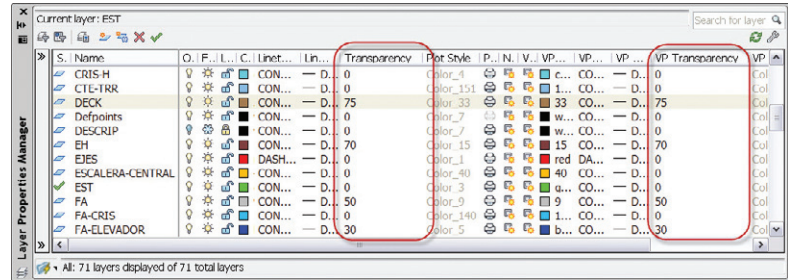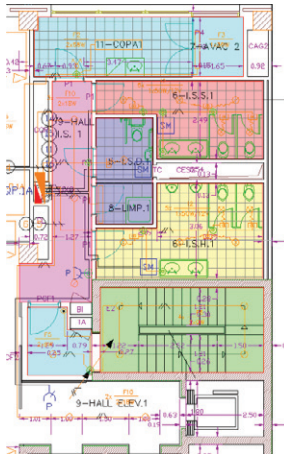

You'll find the new Transparency property in all the Layer Dialogs and you can even assign Transparency per viewport.

You can also set transparency per object (which will override the layer transparency setting). Transparency can be easily found in Properties or on the Home tab.

TIP The new system variable CETRANSPARENCY can be used to set the transparency property for new objects.

NOTE SETBYLAYER, Quick Select, Filter and MATCHPROP now include Transparency as an option.

You can temporarily turn off transparency, much like lineweights, from the status bar (this does not affect plotting). A new Plot option has been added to turn off Transparency.
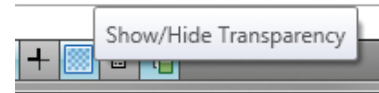
**TIP** Transparency works great with solid hatches!

Polylines

Polylines have extra grips to make editing much easier. New secondary grips are located at the midpoint of each segment. Hovering over a grip provides several valuable editing options such as stretch, add or remove vertex and Convert to Arc/Line.

Splines

AutoCAD 2011 lets you define a spline using fit point or control vertices (CV).
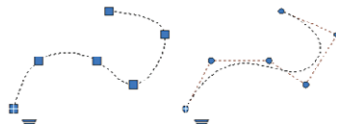
When drawing a fit spline, you can specify start and end tangencies, tolerance (how close the spline is to the fit point) and knot parameterization (which controls the shape of the curve as it passes through the fit point)

You can control the Degree of a CV spline (the number of bends—from 1 to 3—that the spline can take overall).

Use the intuitive grip menu to further control splines.

TIP Use a CV spline if you plan on creating 3D NURBS surfaces for best results.

SPLINEDIT has been updated to include more Edit Vertex options like add kinks or elevate order.

Spline to PLINE

The Convert to Polyline option in the SPLINEDIT command lets you quickly make the conversion. You will be prompted for a precision value between 0 and 99 with the higher value being more accurate.

NOTE Too high a value could impact performance.

You can also select a spline object in the PEDIT command and convert it to a pline. The new system variable PLINECONVERTMODE controls whether straight segments (0) or arcs (1) are used.

JOIN Command

You can now join lines, arc and polylines to 3D polylines or splines as long as they are contiguous. Just be sure to select the most complex object first (3D polyline or spline). You can also join a helix to a spline.

Scale Lists

You can now create a Default Scale List (Options command, User Preferences tab) that automatically displays across all of your drawings.

Missing SHX and Font Files

You can now ignore missing SHX files when opening a drawing without specifying a replacement (although text using the missing SHX files will not be displayed).

Text Alignment in Linetypes

A new option of "U" (for upright) can be added to your linetypes to maintain linetype readability in any orientation.
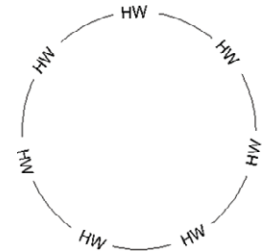
Improvements to Everyday Commands

Select Color

You can access the Select Color dialog box directly from the Layer drop-down list by selecting a color swatch. If the layer has a viewport color override it now has a white border. It's also much easier to tell which color you are looking at in the Select Color dialog with the new black border and arrow!

External References

The External References palette now includes an option to detach data extraction tables from a drawing. You'll also find that the corresponding reference highlights in the External References palette when selected.

You can easily fade reference files from the Reference panel on the Insert tab.
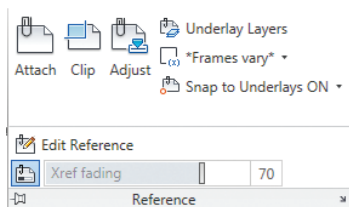
Attach PDF Files!

A big crowd pleaser—you can bring a PDF file into AutoCAD as an underlay. Easily clip, snap to, control layer visibility and fade the PDF.

NOTE OSNAPS only work in PDFs created from AutoCAD 2010 or higher.

Frames

The FRAME system variable lets you control the visibility of all your externally referenced files. FRAME overrides the individual frame system variables (such as IMAGEFRAME).

Create Smaller and Higher Quality PDF Files!

The default vector resolution has been increased from 400 dpi to 600 dpi (better linetype precision). True Type fonts are exported as text now (rather than graphics) thus decreasing the file size and lending itself to searching and copying text in the final PDF. You can also specify merge control, include the layer information and automatically view the PDF file when finished.
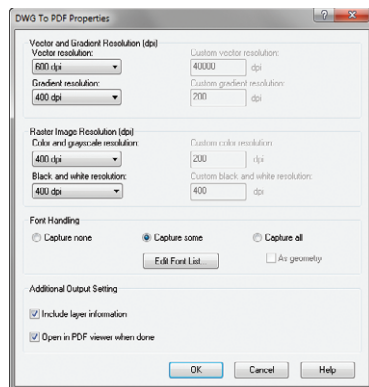
NOTE Be sure to select DWG to PDF. PC3 in the Plot command.

You can find similar options on the Output tab under Export to DWF/PDF Options including the ability to specify multi-sheet.

Reverse

Have you ever had a linetype with text heading the wrong direction with the text upside down? The REVERSE command makes it easy to reverse the direction of any linetype. This option has also been added into the PEDIT command.

Purge

An option for purging zero-length geometry and empty text objects has been added to the PURGE command. This should really help clean up your drawing!

Rotated Viewports

When you rotate a viewport in AutoCAD do you want the view to rotate with it? Well now you have a choice. When VPROTATEASSOC is set to O the view will not rotate. When VPROTATEASSOC is set to 1 (the default) it will!

Measuring Tools

The visual measuring tools in AutoCAD 2011 will make quick work of mining valuable information from your drawing.

The Utilities panel of the Home tab contains these updated measuring commands (also found in the MEASURE-GEOM command).

Distance

Used to measure the distance between two points, AutoCAD 2011 now visually displays the distance, delta x, delta y and the angle (in the xy plane). The Multiple option allows you to continue to pick points as AutoCAD displays a cumulative distance. If you need to include an Arc in the distance you can easily switch to Arc mode.

Radius

Use the Radius tool to quickly display the radius of a selected arc or circle. (Quick Properties would also work here.)

Angle

Quickly measure the Angle between two lines, of a vertex, two points on a circle, or an arc.

Area

Much improved over the standard AREA command, visual feedback makes your selection clear. Add and Subtract options are also available with the subtracted areas displaying in a different color. An arc option makes it easy to measure curved spaces.
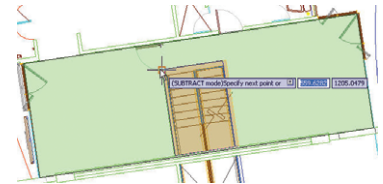
Volume

Easily add a height to a boundary to calculate the volume. You can also find the volume of solids and regions.

Hatches and Gradients
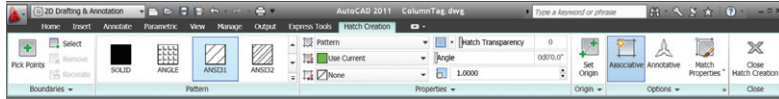
Hatching just got a whole lot better in AutoCAD 2011! The context sensitive Hatch Creation tab does a great job of making hatching much easier and more intuitive.

You will be immediately asked for an internal point. (What? No hatch dialog box?) Just passing your cursor over an eligible area shows you what the hatch will look like. Use the Hatch Creation tab to make changes dynamically.

NOTE Even though it looks as though you created separate hatches as you clicked—they won't actually be separate unless you have "Create Separate Hatches" selected (found under Options)

Grips

The Hatch Grip functionality is amazing. The new center grip allows direct manipulation of hatch objects. Hover over the grip to stretch, move, or change the origin, angle or scale.
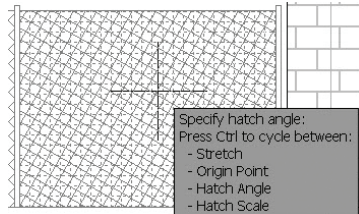
TIP You'll also find that it is easy to manipulate non-associative hatch patterns with grips!

Background Color

Hatches now support background color—this adds the effect of layered hatches within one object.

Hatch Layer

We often want our hatches to all reside on a specific layer. Now you can set a default layer for hatches that overrides the current layer.

Send Hatches to Back

Use the new HATCHTOBACK command to move hatches underneath all other objects. This command is located on the Modify panel of the Home tab.

3D Tips

There's never been a better time to journey into the world of 3D. The enhancements to 3D in AutoCAD 2011 make it easier than ever for you to turn your ideas into a 3D reality!

3D Workspaces

A new 3D Basics workspace is a great place to start your venture into 3D. This simple workspace contains the most basic tools for creating and visualizing your 3D designs. After you are familiar with the basics—you can move on to the full 3D Modeling Workspace.
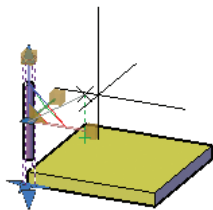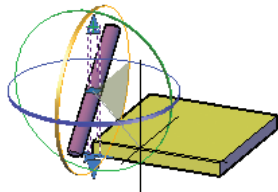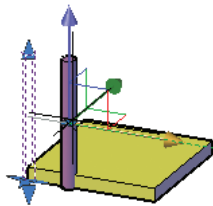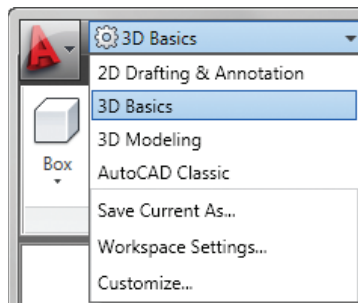
3D Object Snaps

A new set of 3D Object snaps are in AutoCAD 2011 along with a new button on the status bar to turn them on and off.
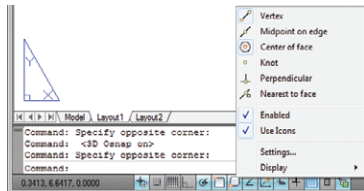
The 3D Gizmo

AutoCAD 2007 introduced the gizmo with 3D Move and 3D Rotate options. A 3D Scale gizmo was added for even more 3D functionality.

If you are using a 3D visual style the gizmo will display when an object is selected. The Sub-object panel on the Home tab makes it easy to change from one gizmo mode to another.
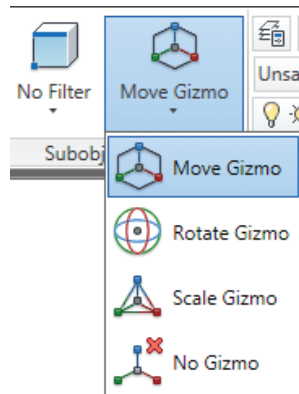
You can also go directly to a specific gizmo with the 3DMOVE, 3DROTATE and 3DSCALE commands. You'll find that the gizmos go directly to the center of the selection set. (Saving you that extra step.)

A right click on a gizmo lets you modify the gizmo's behavior. Here you can constrain to a different axis or plane, relocate it and realign it.
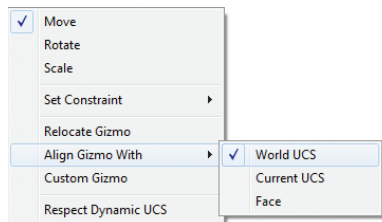
Solid Modeling

Updates to EXTRUDE, LOFT, REVOLVE and SWEEP allow you to select an edge or face for using as a profile or curve to create a new surface or solid.

NOTE You are no longer limited to using planar curves!

New Fillet Edge and Chamfer Edge

Found in the Solid tab, the new Fillet Edge and Chamfer Edge tools provide a dynamic preview and support direct manipulation by pulling on the attached grip.

Selecting edges, faces and vertices

In the past it has been tricky selecting between an edge, face or vertex. The Subobject panel on the Home tab makes quick work of this now! These options are also available from the right click menu when no objects are selected.
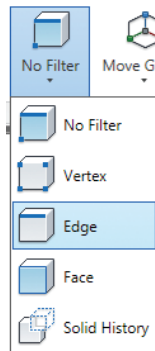
Surface Modeling
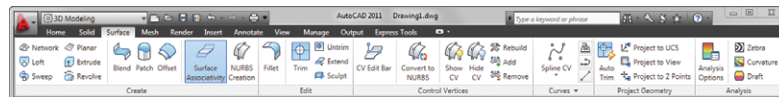
Surface modeling in AutoCAD 2011 has seen some dramatic improvements. A new type of surface—called a Procedural surface, is actually associated with its defining geometry. This makes it easier than ever to digitally sculpt your designs in 3D.

NURBS surfaces are not associative (and have no history). They have control vertices that allow you to sculpt your designs.

The new Surface tab provides easy access to the surface modeling tools.

Surface Creation Tools

There are three new analytic surface types in AutoCAD 2011: Blend, Patch and Network

The new SURFBLEND command can be used to create a continuous blend between two existing surfaces.
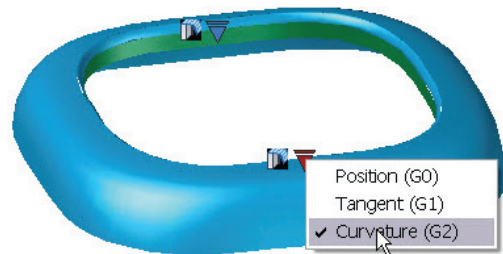
SURFPATCH lets you patch an open, closed-edge object.

SURFNETWORK is used to create a surface through a set of curves or between the edges of other surfaces and solids.

NOTE You can even choose a set of curves that are not connected to one another!

SURFOFFSET can be used to create a new surface by offsetting an existing one.

**TIP** Turn on Surface Associativity when creating surfaces so the surfaces can be driven by their defining geometry.

Surface Editing Tools

There are some great new surface editing tools in AutoCAD 2011—all found in the Edit panel.

The SURFFILLET tool creates a fillet between two surface edges.

The very powerful SURFTRIM tool can be used to create complex edges and holes.

NOTE Use the UNTRIM command to undo a trimmed surface.
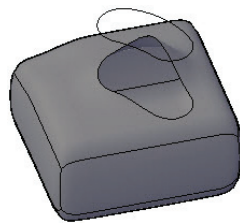
SURFEXTEND is used to extend a surface by selecting an edge.

SURFSCULPT creates a solid object based on the enclosed volume of more than two intersecting surfaces.
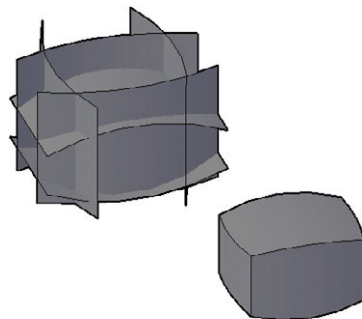
In the Project Geometry panel you'll find tools that let you project geometry on top of surfaces. AutoTrim is used to specify if you want surfaces automatically trimmed after a projection.
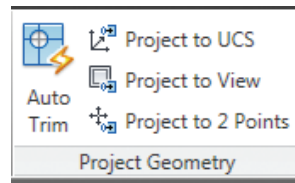
You can convert a surface or solid to a NURBS surface with the new Convert to NURBS tool. Use Show CV to display the vertices for editing with the gizmo along with the other tools on the Control Vertices panel.

NOTE You'll lose any associativity when you convert to NURBS.

Analysis Tools

A new set of analysis tools have been added into AutoCAD 2011 to help you validate the continuity, curvature and draft angles of surfaces.

Zebra: Maps stripes onto surfaces and meshes for analysis. The more the stripes line up, the higher the continuity between surfaces.

Curvature: Displays a color gradient that indicates high and low areas of curvature along with unacceptable sudden changes such as bumps, dents and ripples.

Draft Angle: Displays a color gradient indicating if there is adequate draft angle between the part and the mold.
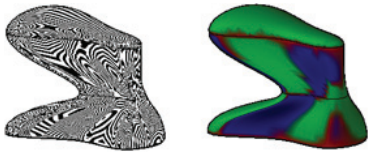
3D Printing

Use the 3DPrint command to send your 3D AutoCAD drawings to a STL supported 3D printing vendor. A friendly utility will walk you through the steps needed to ensure your model is 3DPrint ready. After selecting the solid objects you want to print you will find yourself in the Send to 3D Print Service dialog. Here you'll find a preview pane and scale controls (with a helpful finished output size). A final OK will send you to a site with possible 3D Printing vendors.
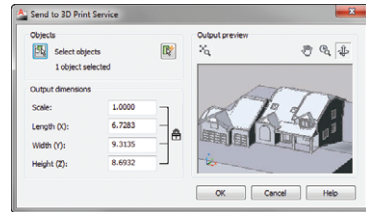
Mesh Modeling
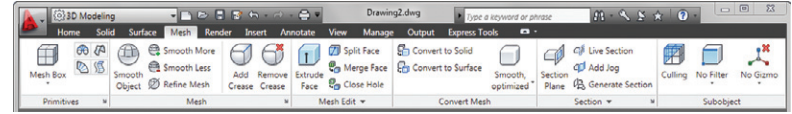
Mesh Modeling makes it easy for you to do free-form design.

All of your Mesh Modeling tools can be found in one location on the Mesh tab.

You'll find familiar shapes such as Box, Cone and Cylinder in the Primitives panel. Set up the number of tessellation lines and the default smoothness in the Mesh Primitive Options dialog box.
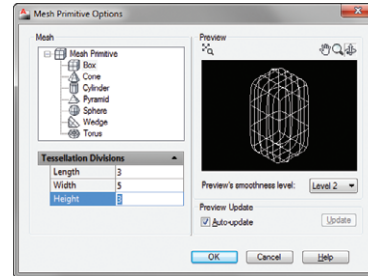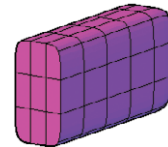

You can easily increase or decrease smoothness with the Smooth More and Smooth Less options in the Mesh panel.

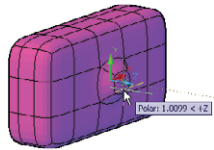Refining a mesh will increase the number of faces on your mesh.
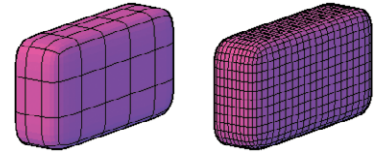
TIP Use the Smooth Object tool to turn a 3D solid object into a mesh object.

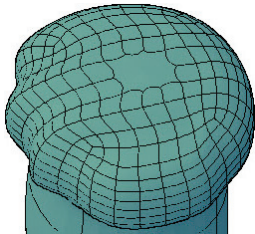To create a hard edge on your mesh you can use the Add Crease tool.

You can split or extrude a face in the Mesh Edit panel.

The biggest bonus? You can convert the watertight meshes (no gaps) to solids. These and more conversion tools are available in the Convert Mesh panel.
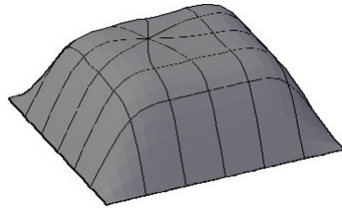
Merge Mesh Tool

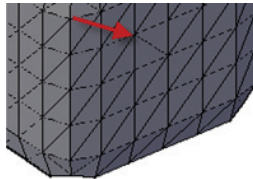The new Merge Mesh tool is used to merge two or more adjacent faces into a single face.

The Close Hole tool creates a mesh face between open edges.

Use the Collapse Face or Edge tool to force vertices of surrounding mesh faces to converge.

Use the Spin Triangle Face tool to rotate the edges that join two triangular mesh faces together.

Materials

The Materials Browser makes it easy to browse and search from over a thousand materials in the Autodesk Materials Library. The Materials Browser can be found on the Render tab of the 3D Workspaces.
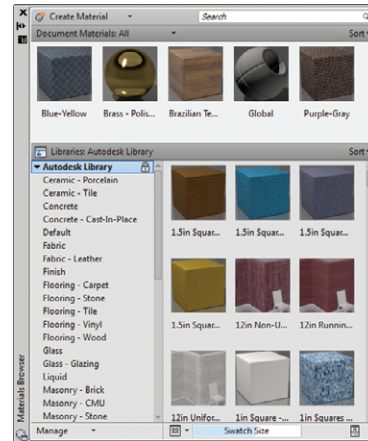
Easily create, categorize and open your own materials library from the Materials Browser as well. Use the robust search feature to find specific materials and then add them to the current drawing.

You can easily edit the materials in the updated Materials Editor. Materials that have been placed in the drawing will dynamically update.
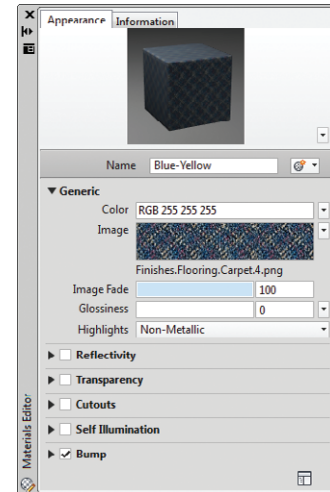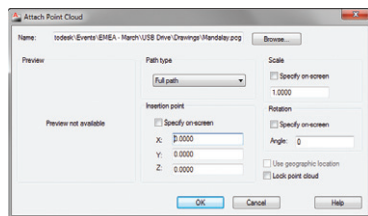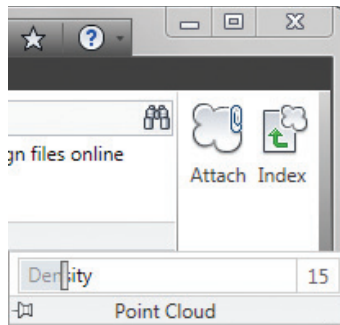
Point Clouds

You can attach and display point clouds created from 3D Scanning devices in AutoCAD 2010.
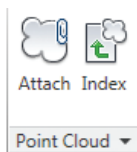
Point Clouds are attached much like other reference files and can contain up to 2 billion points!

TIP You'll probably want to lock down the point clouds so the points don't move.

You can create geometry from the point cloud data by snapping to points (the Node object snap). Adjust the point density in the Density slider bar.
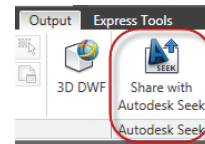
Added Extras

Online Help

The new online Help system makes it easier than ever for you to get up to date Help. You can revert back to the in-product help on the System tab in Options.

Autodesk Seek

Don't miss out on the great content available (for free!) up on Autodesk® Seek service. Easily get to Autodesk Seek from the Content panel on the Insert tab or from inside of Design Center.

More than 1200 manufacturers and 35,000 products are available on Autodesk Seek (over 100,000 DWG files).

You can also share your designs by uploading them directly from AutoCAD.

Lynn Allen, *Cadalyst* columnist and worldwide Autodesk Technical Evangelist, speaks to more than 30,000 users each year. For the past fifteen years she has written a monthly column in *Cadalyst* magazine called "Circles and Lines" and is the voice behind *Cadalyst's* "Tips and Tricks Tuesdays". Lynn started using AutoCAD® software with Release 1.4, over 20 years ago, and got her start by teaching at the corporate and collegiate level for 12 years. A sought-after public speaker with a unique comedic style, Lynn has served as the Autodesk University emcee for ten years and is always one of the highest rated speakers. Her latest book is entitled *AutoCAD Professional Tips and Techniques*.

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