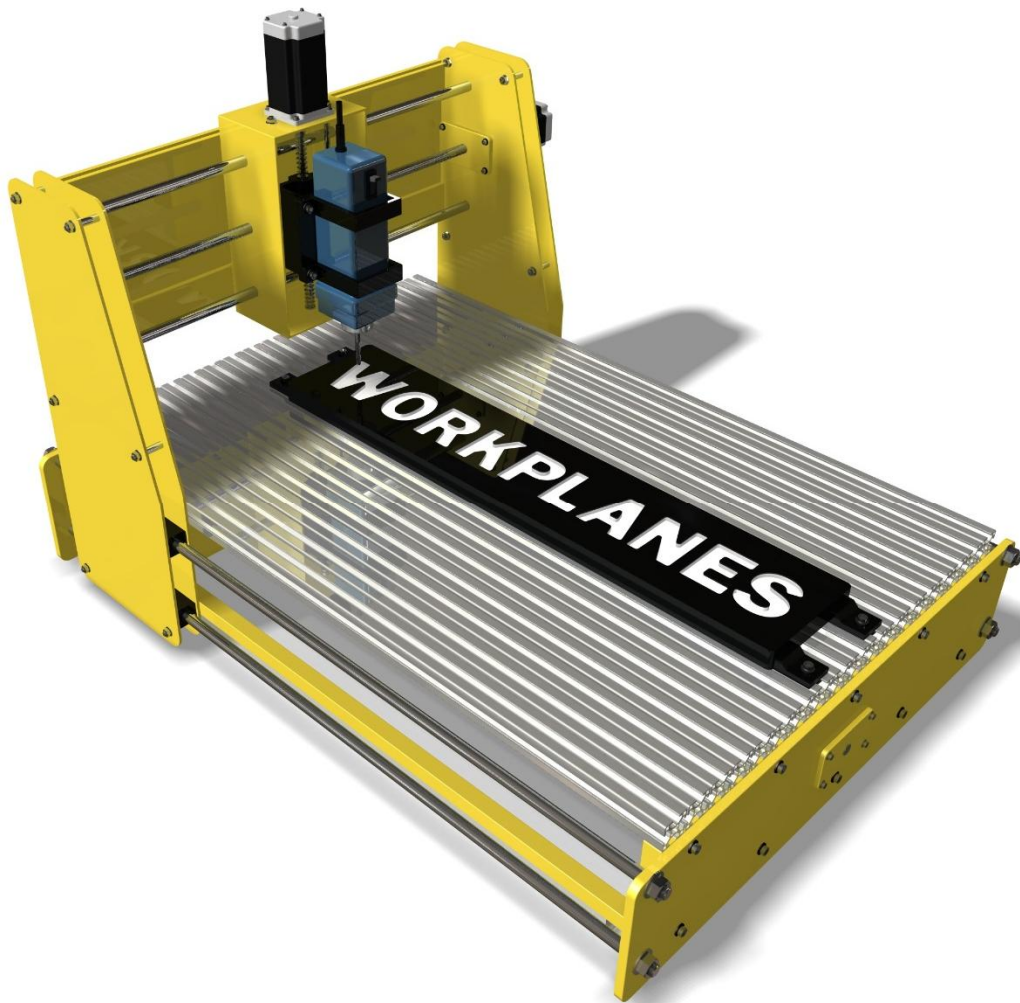


TurboCAD Pro V21 - Workplanes

Demystifying TurboCAD Workplanes

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Special Note

All of the work presented within this tutorial is based on TurboCAD Pro V21. Although users of previous versions are welcome to try the tutorial it cannot be stated what results will be achieved. Many changes, some subtle and others not so subtle, are made with each program revision. Although many steps and directions would be generic some may not be. The same can be said for tools between versions. Older versions may not have the same tools as Pro V21 and if the same tools are available the tools themselves may have been revised and hence, work in a different manner than they previously did.

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Introduction

One of the fundamental concepts in TurboCAD, when it comes to drawing in 3D, is the use and understanding of workplanes. Most new users are initially overwhelmed by this concept, but once the user puzzles out what workplanes are all about they quickly realize that they weren't that complex after all.

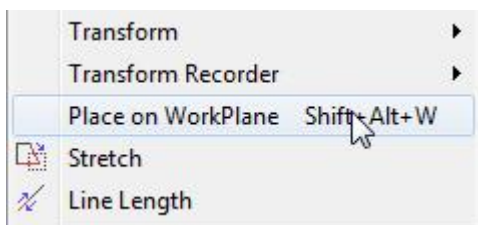
Each workplane tool, complete with a user-friendly explanation and example, will be illustrated within this tutorial and this will be done by having the reader work through various examples keystroke by keystroke. By the time the reader reaches the end of this tutorial any confusion about workplanes should have lessened significantly.

Perhaps an analogy might help start the process of demystification. Think of a workplane as the table underneath a piece of paper. When you draw on the paper the table supports the paper, it keeps the paper flat and stable. This stability, this structure, ensures that the pencil doesn't poke through the paper and ensures that the graphite is laid down smoothly and clearly. Work proceeds just as planned. Let's say then, that the paper is moved off the table and held in the air. Now, when one attempts to draw on the paper one is plagued with problems. The paper is flimsy, one cannot lay down a straight line of graphite and if one pushes too hard the pencil can poke right through the paper. In this analogy, this is so because the table, and its stable structure, was left behind. In order, then, to be able to draw in different views or on different surfaces the table must be moved and placed under the paper *wherever* that paper may have been moved to, much like one may adjust their drafting table to a different angle.



One very important thing for the beginner to remember, right from the start, is that the table (workplane) is required to employ *all* the 2D tools, be it lines, circles or the myriad other tools. It is also required with *all* the 2D modification tools. As well, after some procedures, such as mirror copy, the objects will need to be selected and placed on the current workplane to utilize other 2D tool functions or processes such as line length, offset, parallel or tangent.

Objects are placed on the workplane by selecting them and invoking 'Place on WorkPlane' from Modify menu at the top of the TurboCAD desktop.

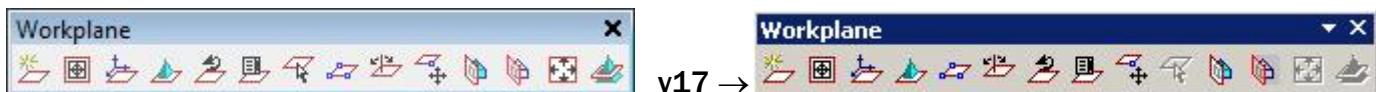
















Since this is a frequent need, many users create a shortcut tool on their TurboCAD desktop or use the shortcut keys (Shift + Alt + W). Below is an image of the tool the author has on his desktop. A text toolbar is created first and then the text icon is changed to the down arrow icon via the 'change button image' customize dialogue.



Many users find the above part especially confusing and often ask why? In essence every item is created on its own workplane even though it looks like they are on the same workplane. Issues don't arise until the 2D objects are copied and then functions such as line length, offset, parallel, tangent and so forth are employed. It is just something a user has to get used to as it has been this way for all versions of TurboCAD. Eventually a user will come to know instinctually when to place their 2D objects on the workplane.

Because the "table" (workplane) is required continually while drawing the developers of TurboCAD have included several workplane tools to facilitate 'the move' quickly and efficiently. Tool discussion will follow the V17 toolbar layout. Slightly different order than the V21 toolbar, but the same tools.



-  ← Show / Hide Workplane
-  ← Workplane by Active View
-  ← Workplane by World
-  ← Workplane by Entity
-  ← Workplane by 3 Points
-  ← Workplane by Z Axis
-  ← Previous Workplane
-  ← Set Named Workplane
-  ← Workplane Origin
-  ← Edit Current Workplane
-  ← Workplane by Facet
-  ← Auto Workplane by Face
-  ← Fit Workplane to Window
-  ← Show/Hide Intersections between WorkPlane and 3D Objects

This tutorial will assume that the reader has the Platinum edition of TurboCAD Pro V21 (64-Bit), although no Platinum specific tools are used, that the author is aware of. The author does not have the 32-Bit version of TurboCAD V21 but foresees no issues with doing this tutorial in the Basic Pro edition.

Show/Hide Workplane & Fit Workplane to Window

It is now time to begin looking at the workplane tools.

Select the Show/Hide Workplane icon from the Workplane toolbar to turn it on.

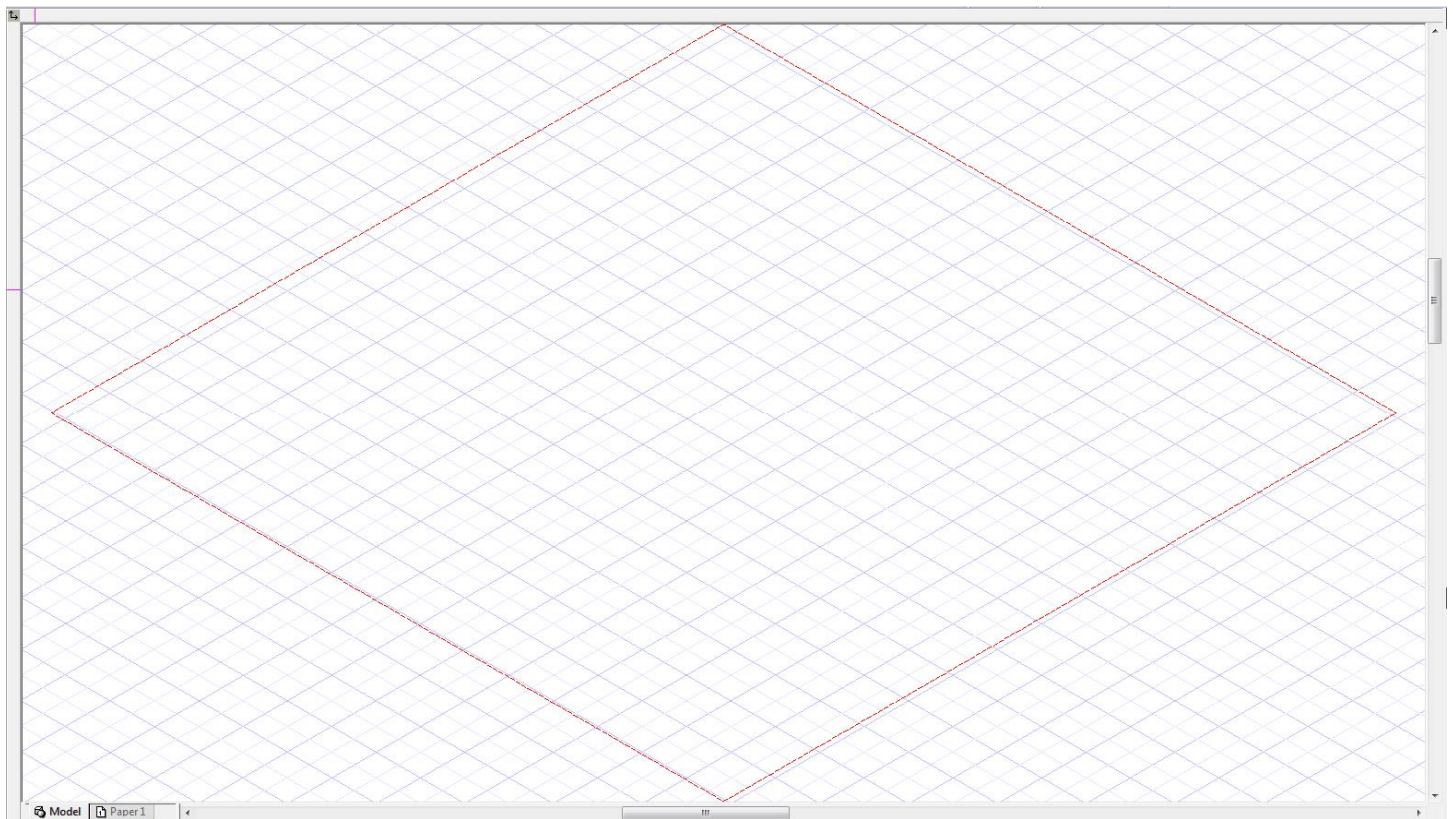


This tool creates an on-screen dashed red rectangle that corresponds with the two-dimensional X-Y plane of the workplane.

It may not be immediately visible so select the Fit Workplane to Window tool from the Workplane toolbar.



The workplane indicator appears.

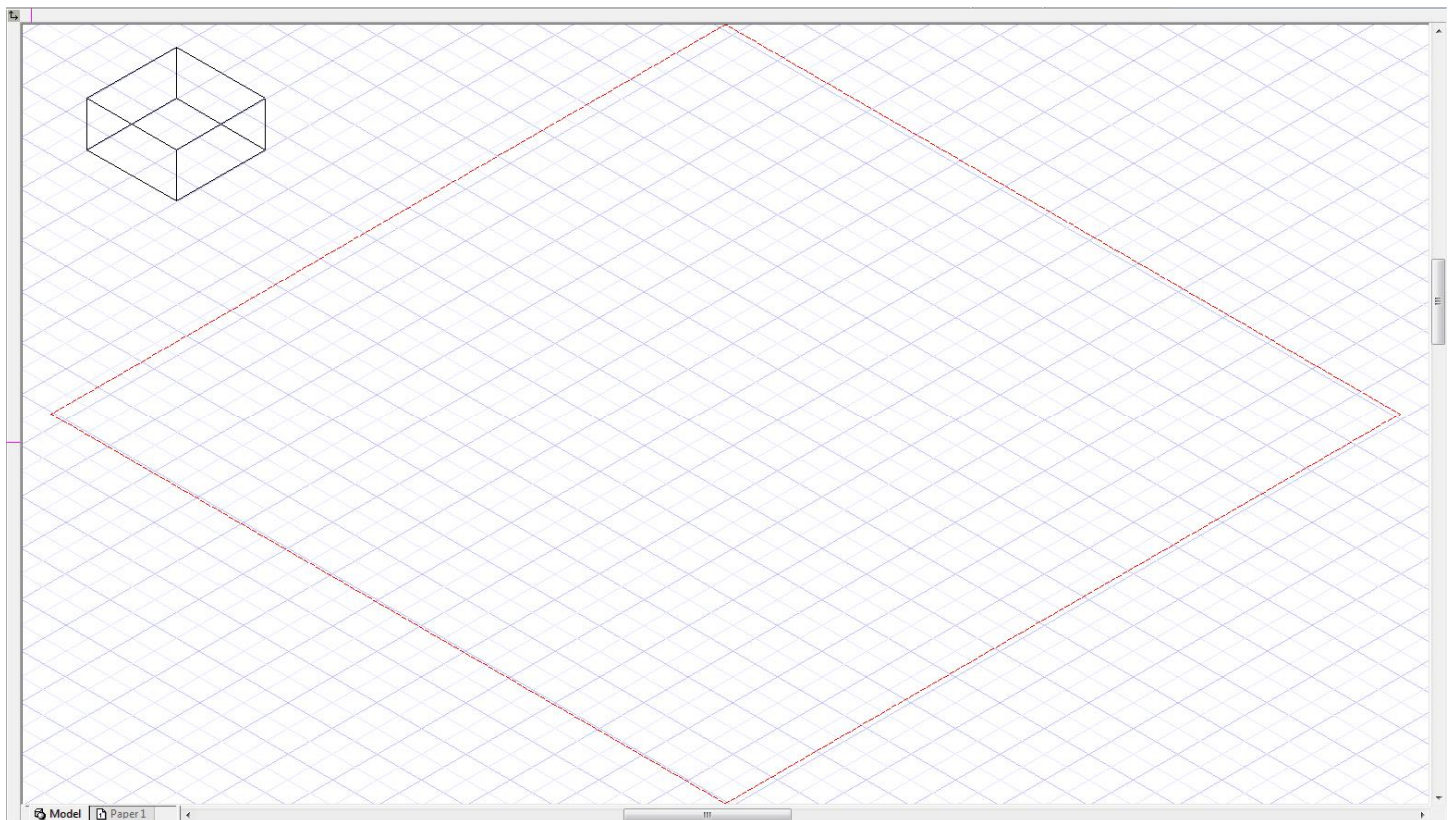


Please note that the Fit Workplane to Window tool cannot be selected unless the red workplane indicator is set to *Show*.

To see further how this functions, select the Box tool from the 3D Object toolbar.



Near the upper left hand corner of the drawing window place the cursor over a grid intersection and press the G key (G SEKE snap) to snap the first point of the box in place. Tab into the Inspector Bar and enter 4 in the Width field, 4 in the Length field and 2 in the Height field. Press Enter.



Press the Space Bar to exit the tool.

Left mouse click on the box to select it.

Select Zoom Selection from the menu bar at the top of the TurboCAD desktop.



Press Esc to deselect the selection.

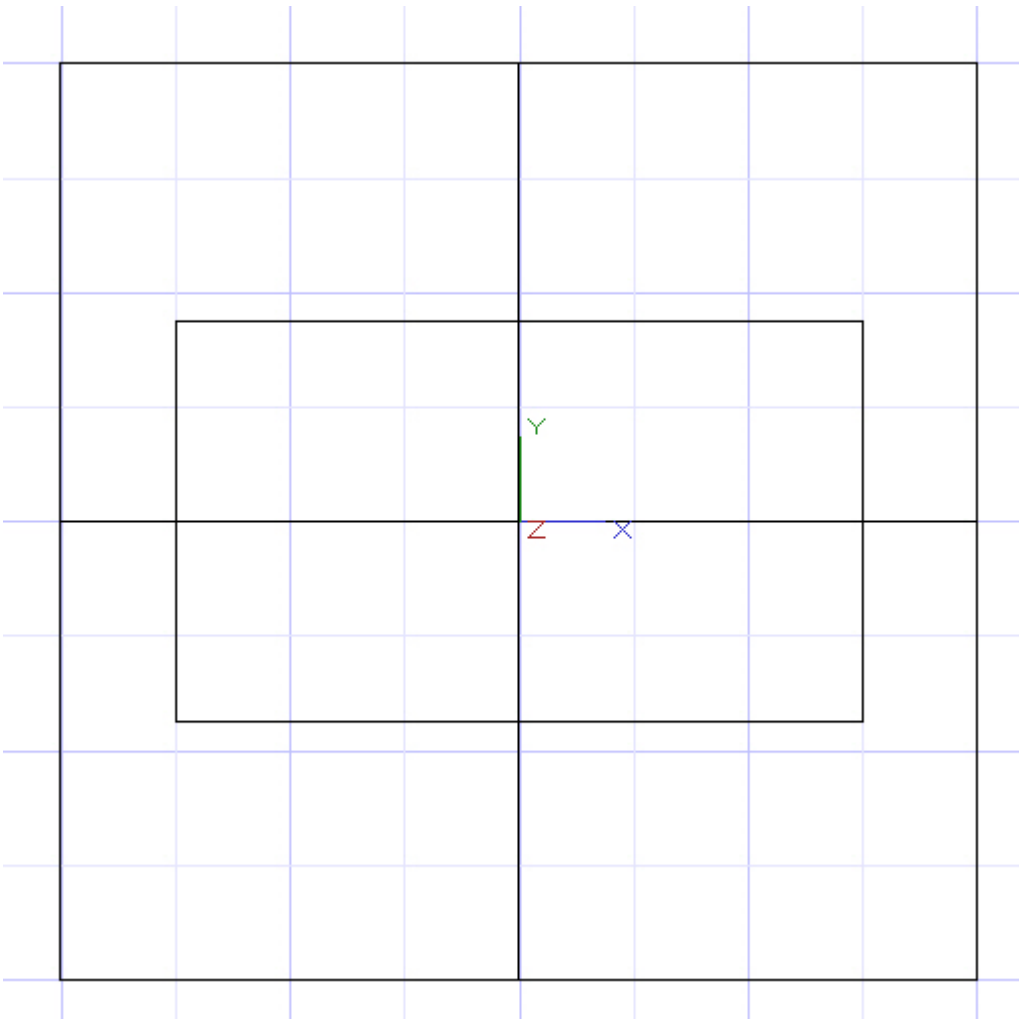
Select the Fit Workplane to Window tool from the Workplane toolbar. The red indicator moves into view.

Workplane by Active View

Select the Workplane by Active View tool from the Workplane toolbar.



Note how the grid moves on-screen parallel to the view. This is, in a nutshell, the function of the Workplane by Active View tool. It places the workplane parallel to the viewing screen no matter what view the drawing may be in.

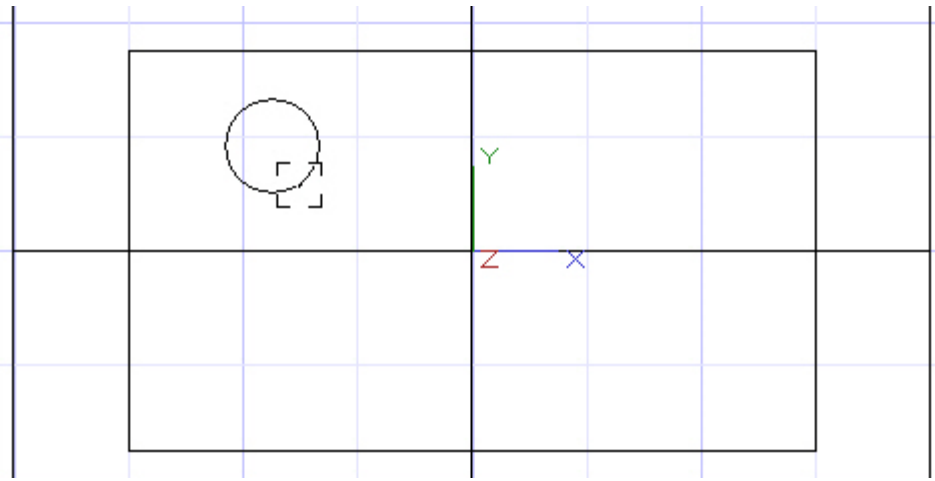


This is where an important thing must be highlighted about the Workplane by Active View tool. One can utilize the 2D tools in this view but any created entities will **not** be placed on the face of the entity closest to the screen, they will be placed on the parallel plane at 0.

Select the Fit Workplane to Window tool, if need be, to clear it from the box view.

To demonstrate, select the Circle Center and Point tool from the Circle/Ellipse toolbar.

Using two left mouse clicks place a circle as indicated in the picture below.



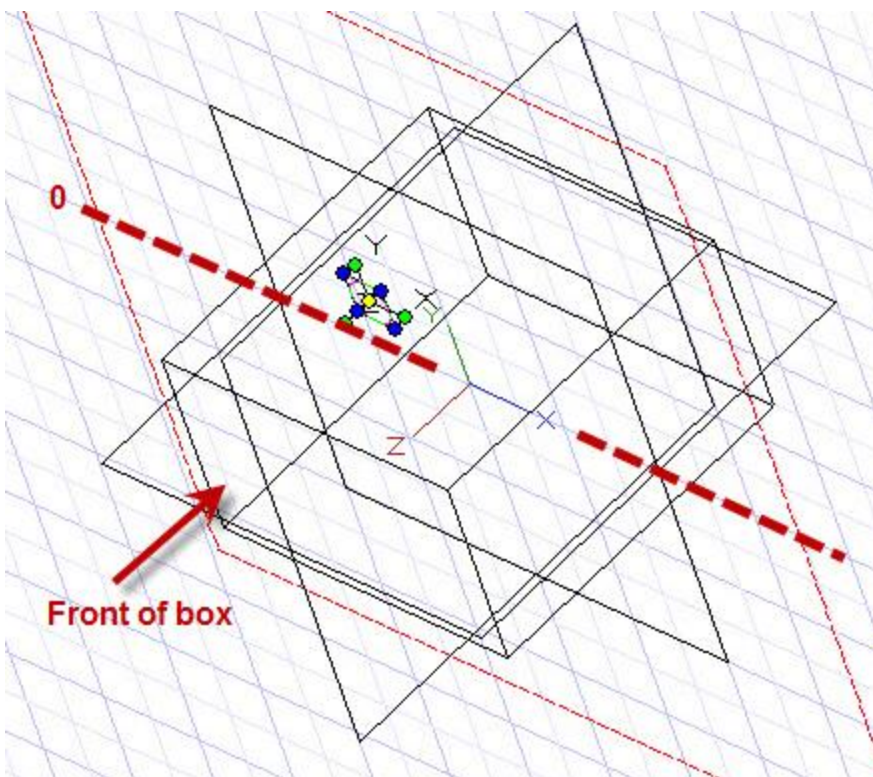
Press Space Bar to exit the tool.

Select the circle.

Select the Examine tool from the Walkthrough toolbar. (Alternately a user may also be able to hold down the wheel button and move the mouse to orbit (was something new to V17)).

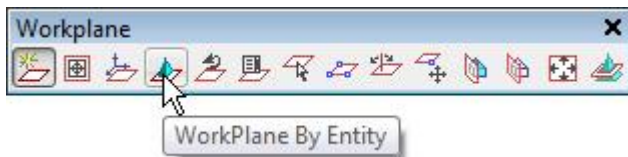


Left mouse click on screen and hold the mouse button down. While holding the left mouse button down move the cursor in a left downwardly direction. Keep an eye on the circle in relation to the workplane indicator. Note that the circle is indeed on the workplane, not on the front face of the box. Release the mouse button.



Workplane by Entity

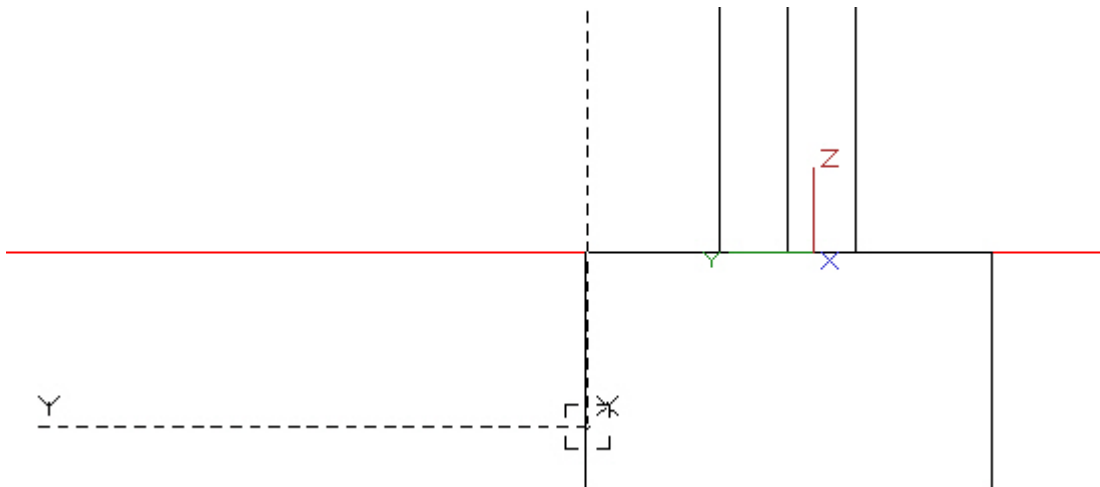
Select the Workplane by Entity tool from the Workplane toolbar.



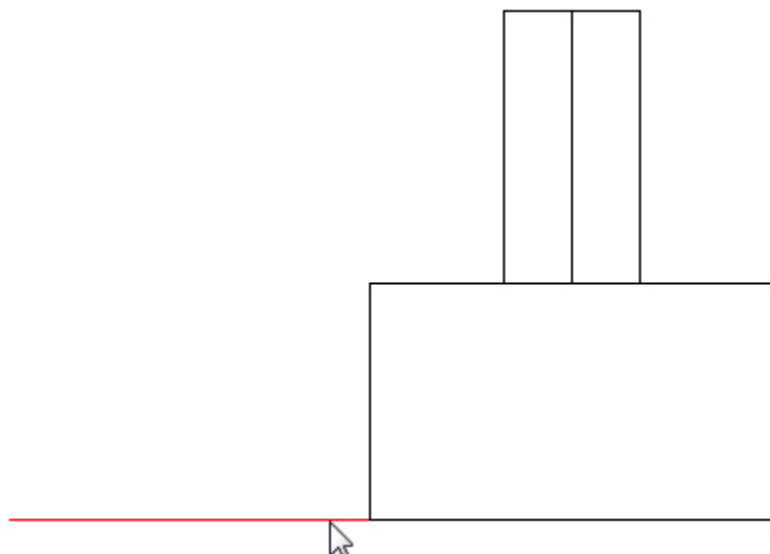
The Workplane by Entity tool places the workplane along the same plane that the entity was created. In the case of a 3D object that will be where its base points were placed. This is often handy if a user wants to continue drawing on those workplanes. This workplane tool works with 2D objects as well.

With the Workplane by Entity tool active left mouse click the box. In this case the indicator may disappear, so switch to Isometric SE view temporarily. Select the Fit Workplane to Window tool from the Workplane toolbar and then switch back to Left view. Note that the workplane indicator has indeed moved to the bottom of the box, the plane on which the box's base points were placed.

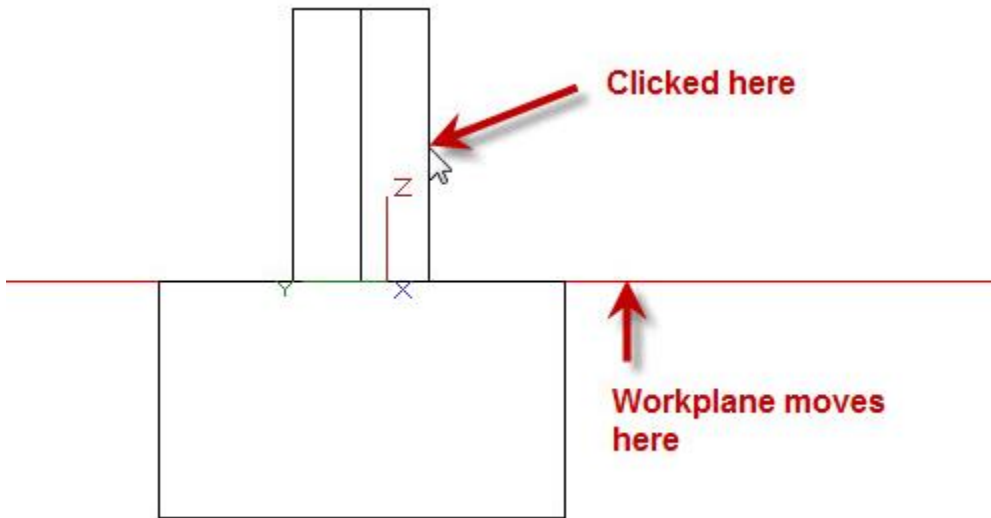
In progress.



Like so.



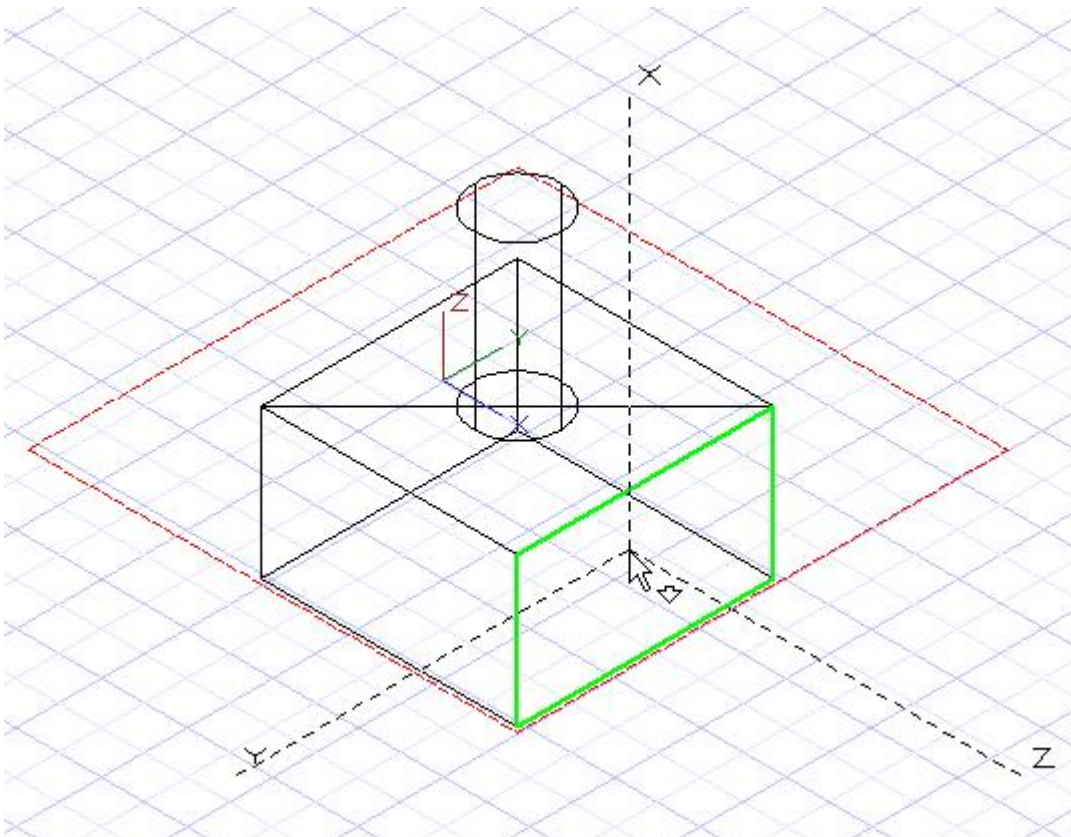
Select the Workplane by Entity tool again. Left mouse click the cylinder that sits on the box. Remember - its workplane was the top of the box. So the indicator should move to the bottom of the cylinder when it is clicked.



Switch to Isometric SE view.

Select the Workplane by Facet tool from the Workplane toolbar.

Place the cursor over the right face of the box and when the right facet is highlighted left mouse click to define the new workplane. In progress below.



Select the Torus tool from the 3D Object toolbar.