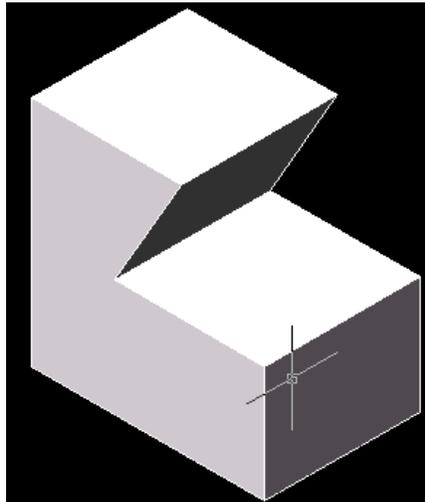**Draftsight's Unspoken 3-D Features - Lesson 11**

A Short 3-D Tutorial of Draftsight

THE "BELTBLOCK" – MAGIC OR SCIENCE?

DIRECTIONS: The following pages contain a Draftsight tutorial made for you to learn a little about how Draftsight can be used to make a three-dimensional solid model. **Bold type indicates Draftsight's response to you.** Underlined type indicates your response to Draftsight.

STEP 1 - Getting Started

   Begin the drawing session by moving the mouse with your hand on the desktop and locate the Draftsight program shortcut icon. Double click your left mouse button on top of this icon to execute the program. The icon looks like this:

STEP 2 - *Assigning a Name to Your Drawing Field*

| NOTE: Begin the drawing with an ASIZE.DWG drawing sheet in the Layout Space. |

    With the Command window **:** prompt showing in the Status bar at the bottom of the drawing editor, select the File menu's Save as: command option to save the drawing screen as a name of your own choosing such as YOURNAME. Type YOURNAME in the File name area and direct your Save in: to the Windows Desktop. Conclude this command by selecting the Save box with your mouse.

STEP 3 - *DRAW/LINES*

| Hint: If you make a mistake in this Step, press the "U" key to "undo" the last entry made. |
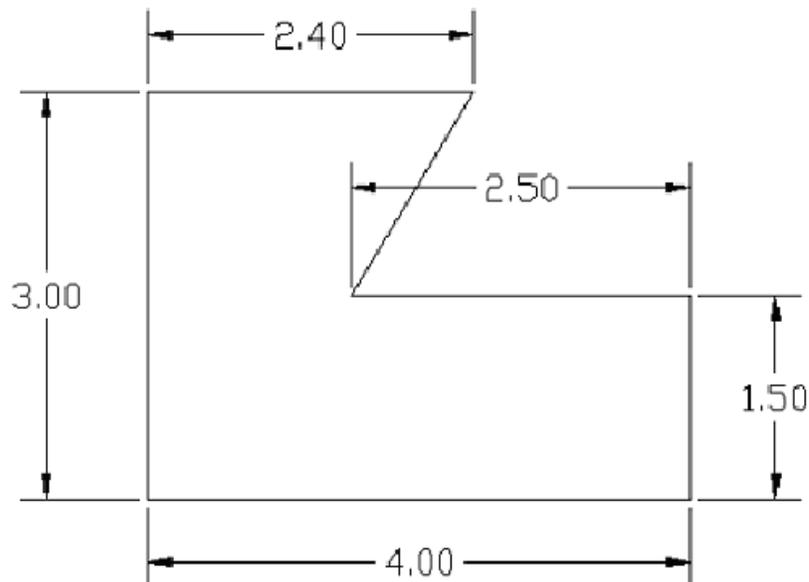
    At the Command window**:** prompt, type L (a fast way to enter the Line command) and press <Enter>.

1. Using absolute coordinate entry at the Line from point: prompt type 5,5 and <Enter>.
2. Using polar coordinate entry at the **To point:** prompt type @2.4<180 and <Enter>.
3. Using polar coordinate entry at the **To point**: prompt type @3.0<270 and <Enter>.
4. Using polar coordinate entry at the **To point:** prompt type @4.0<0 and <Enter>.
5. Using polar coordinate entry at the **To point:** prompt type @1.5<90 and <Enter>.
6. Using polar coordinate entry at the **To point:** prompt type @2.5<180 and <Enter>.
7. Now, press C on the keyboard (to close the geometric construction) and <Enter>.

STEP 4 – ZOOM (Magnify) the VIEPORT

Your object may look a little small in the drawing editor screen. Type Z (for Zoom) and press <Enter>.

When prompted, **Bounds, Center, Dynamic, Fit, Left, Previous, Selected, specify a scale (nX or nXP or**: follow up by pressing an "E" (for Extents) and <Enter>. This is your first experience to teach you that Draftsight honors many AutoCAD commands as Zoom – Extents is an AutoCAD command option.

We will continue using many AutoCAD command options from here on out but also offer you the Draftsight option for you to use in the command structure of Draftsight.

STEP 5 - DISPLAY/VIEWPORTS

At the Command window **:** prompt, enter the Viewports command (View Tiles). Type VPORTS and press <Enter>.

When the program offers a popup **"Viewports" window,** use the mouse to highlight the Two:Vertical option and then click the left mouse button on the "OK" button box.

Of the two viewports on the screen now, the one with the heavy border is the one "current" that we may draw in, while the other, with the arrowhead, is for viewing purposes only. The current viewport can be changed by selection. Use your mouse to try switching between the two viewports now. Conclude this step with the right viewport current (**bolded**).

STEP 6 - DISPLAY/VIEWPOINTS

Again, from the Command window**:** prompt, with the right side Viewport current, enter the Viewpoint command by typing VPOINT and pressing <Enter>.

When the program prompts, Rotate/<Viewpoint> <1,-1,1>: you respond by pressing <Enter>.

NOTE: The command option in Draftsight to perform this operation is View-Named views – Defaults SE Isometric. The SE stands for Southeast.

The southeast viewpoint to an object would be like us hovering over the intersection of Rt. 38 and Malta Road in a helicopter looking back at our Kishwaukee College campus in Malta, IL.

Those who are using this handout not in the class can check out our campus on Google Earth to get a perspective.

STEP 7 - SOLID REGIONS

   Next we are going to create a solid region of the geometry already on the screen. At the Command window **:** prompt, with the right side viewport current, type REGION and press <Enter>.

> Note: When geometry is highlighted, it is shown in stitch lines.

   When prompted to **Select objects:**, use the cursor with mouse to select and highlight all 6 lines on the screen. The program will respond **: 6 found, 6 total.**

Press <Enter>. The program will respond **: 1 regions created.**

STEP 8 - SOLID EXTRUSION

   Now we are going to extrude the solid region to give it a "Z" axis depth. At the Command window **:** prompt, type EXTRUDE and press <Enter>.

   When prompted to **Select objects:**, use the mouse cursor to select the region and press <Enter>.

   When prompted for **Extrude Height >:** type 2 and press <Enter>.

STEP 9 - HIDE/SHADE/RENDER

   You should now see a 3-D wireframe CAD model after the extrusion is completed.

  To check our model for correctness, at the Command window **:** prompt, issue the HIDE command and press <Enter>. (View – Hide)

   To check the model with a greater degree of reality, at the Command window **:** prompt, issue the SHADE Command and press <Enter>. (View – Shade)

You should now see a shaded solid model.

   When you are finished, feel free to experiment with the Constrained Orbit command option of the View menu of Draftsight to examine your model from different perspectives.

STEP 10 - LAYOUT 1

Next, we are going to make a drawing take off of the solid model as follows.
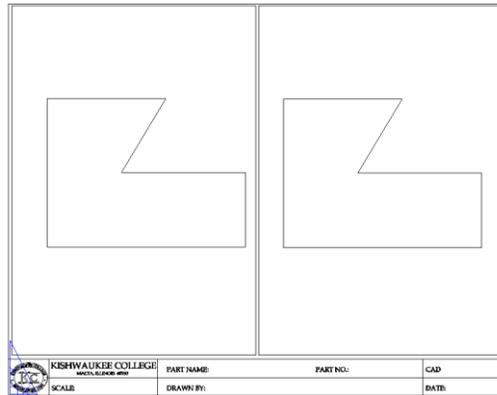
Put the mouse on the Layout 1 tab above the Command window area <u>and press the left mouse</u> <u>button.</u>

The Layout area is where we normally plot drawings from as hard copy in CAD.

STEP 11 - SCALE / STRETCH /COPY VIEWPORTS

From Layout 1, with the single viewport showing inactive (not bolded), perform the following operations:

    I. **Scale** the viewport by half.
    II. **Stretch** the viewport vertically to fill the drawing border as per the one above at left.
    III. **Copy** the 2-D one at left to be a second 2-D one at right.

NOTE: All three of these commands are Modify menu commands.

STEP 12 – SET A NEW VIEW TO A VIEWPORT

    With the viewport at right active in Layout space, review Steps 6 and 9 above and set that viewport to some form of 3-D pictorial view as shown below using **View-Constrained Orbit**.
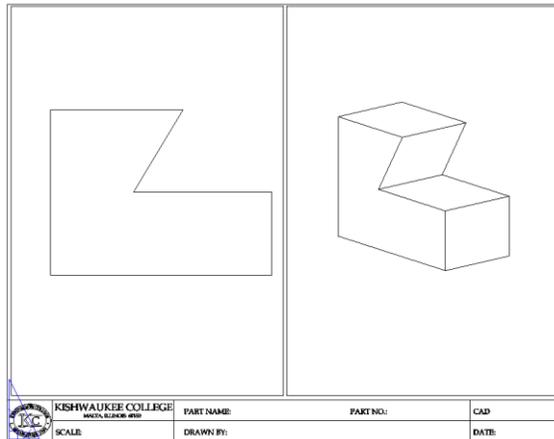
NOTE: There are three dimensions in space; width, depth and height. Notice how the viewport on the left contains two of the three dimensions while the one on the right contains all three. Hence the expressions; 2-D and 3-D.

Saving Your Work – Soft Copy & Hard Copy

After you complete the title block information in Layout space, **Save** your drawing file as a magnetic file to disk.

Next, you can try to **Printer** plot your file as hard copy. Understand you are plotting a DWG CAD file at this point.

If you want to save your file in a format others can see and plot without CAD, **Export** your file as a PDF file.

NOTE: All three of these commands are File menu commands.

So what's up with the title of this exercise, "BELTBLOCK Magic or Science?"?

You can take a belt from your pants and stick it into the cut of the block and then balance them off of the end of your finger or table edge. You can even balance it off of the end of a pencil!

This exercise represents an experiment in physics on static equilibrium where opposing forces keep an object motionless in space.