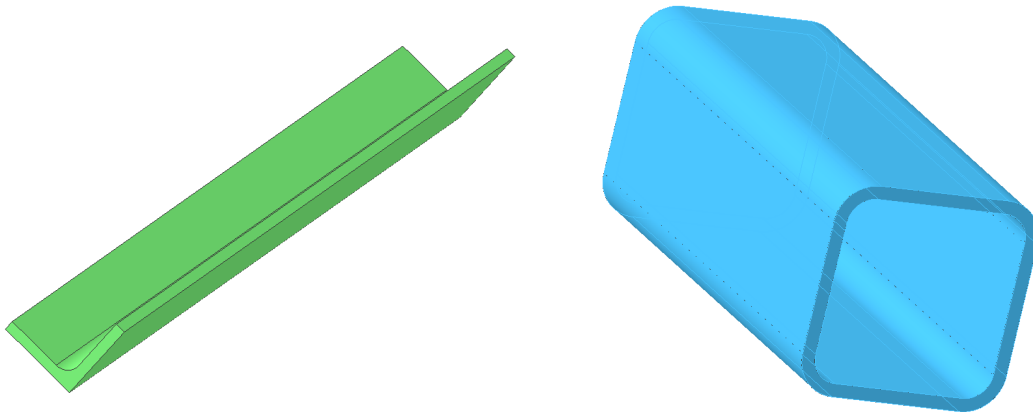# Drawing Angle Iron and Square Tubing with Alibre® PE

## By R. G. Sparber

Copyleft protects this document.[1]

This is how I draw angle iron and square tubing using the Computer Aided Design program called Alibre PE. The key tool to use is the ***extrusion*** function. I draw the cross section and extrude to the needed length (the tool calls it depth).

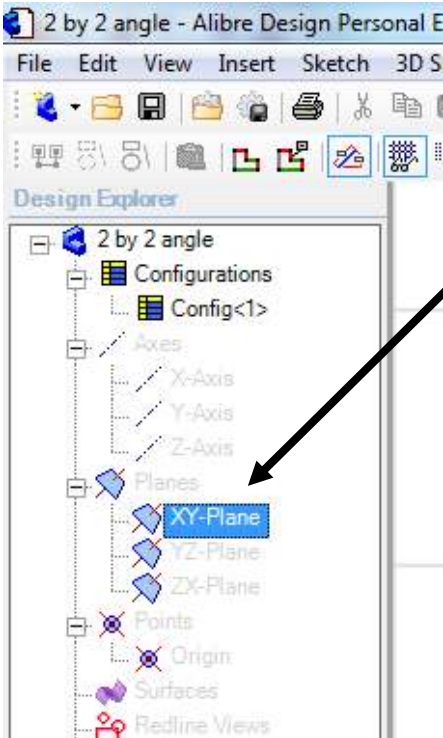At the risk of insulting some readers, I will assume minimal knowledge of Alibre.

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[1] You are free to copy and distribute this document but not change it.

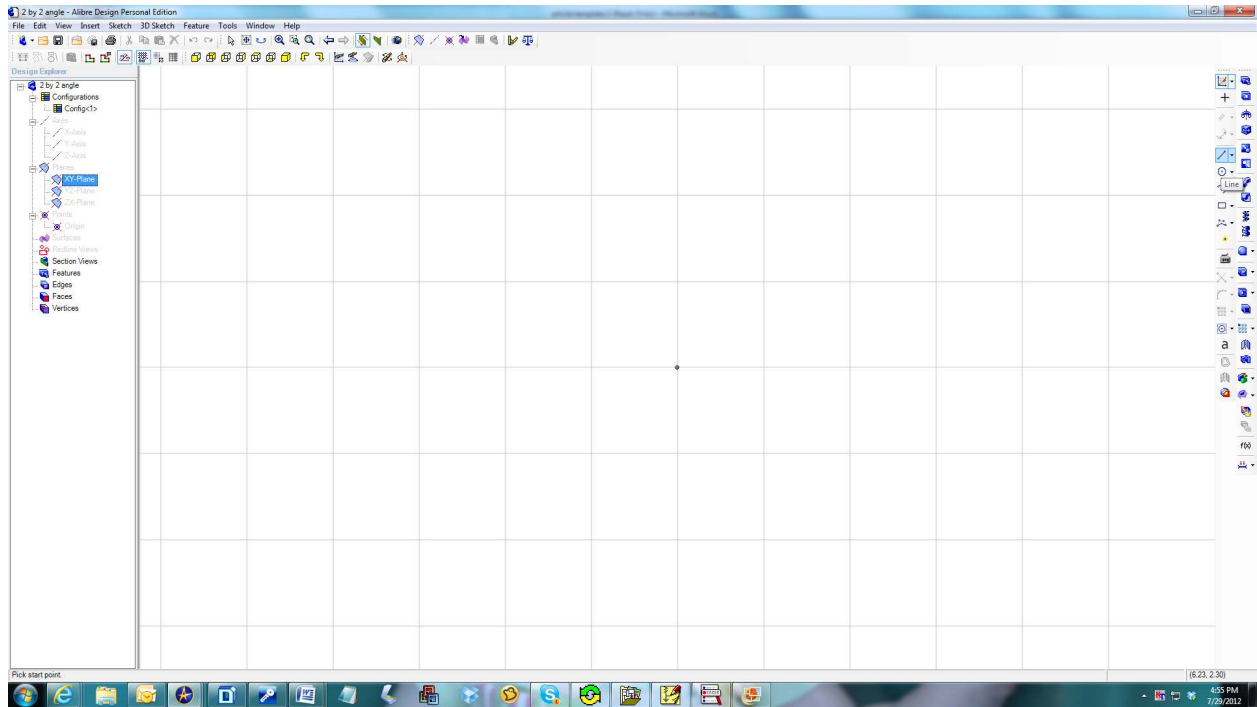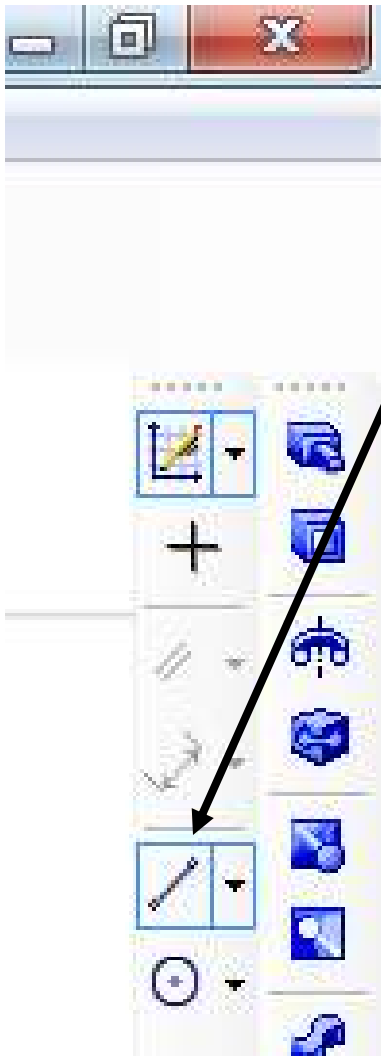After starting Alibre and telling it I wanted to draw a new part, I was presented with like this screen.
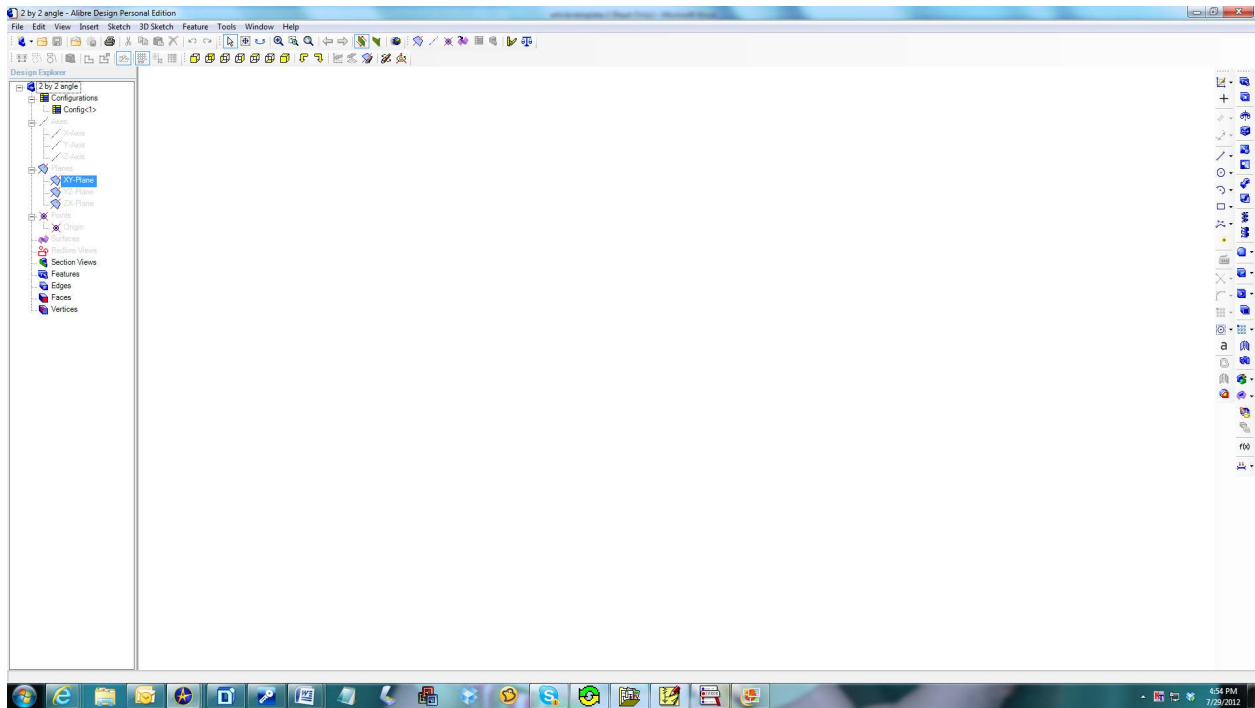
I first clicked on the "Activate 2D Sketch" icon in the upper right corner.

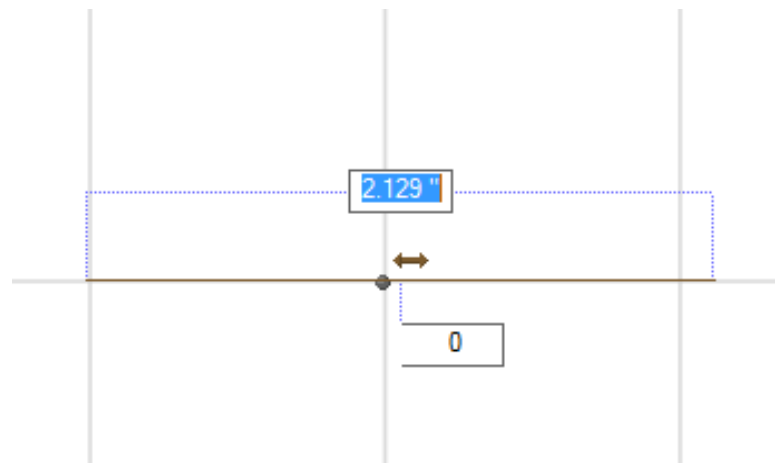And then selected the XY plane as my drawing surface from near the upper right corner.
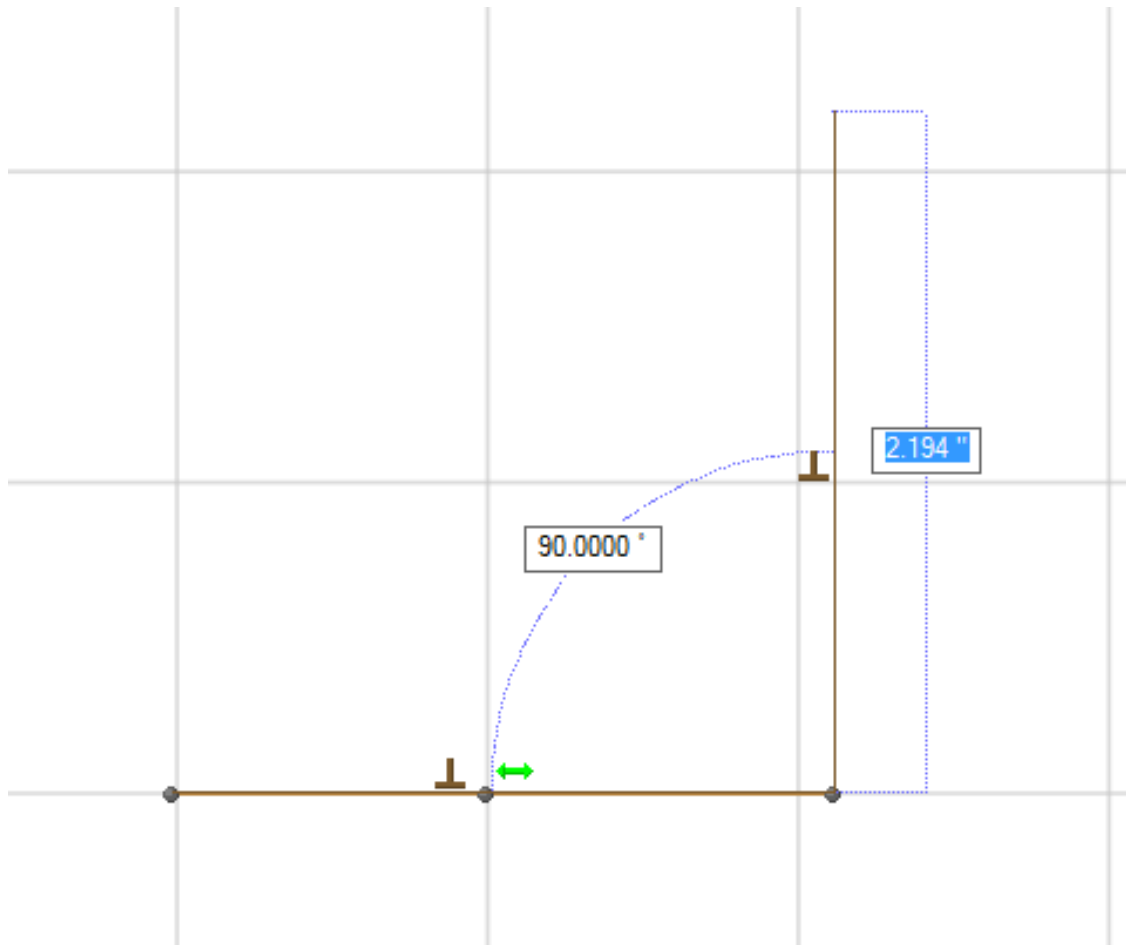
I was then ready to draw.

I selected the line tool,
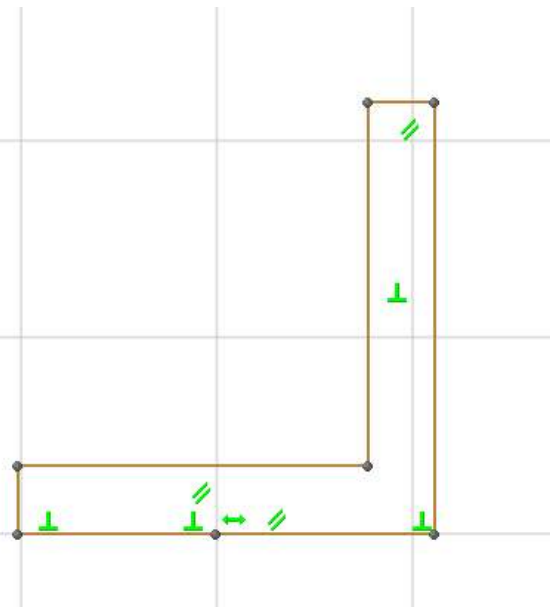
and drew a horizontal line a bit longer than 2".

2.129 "

0

2.194 "

90.0000 °

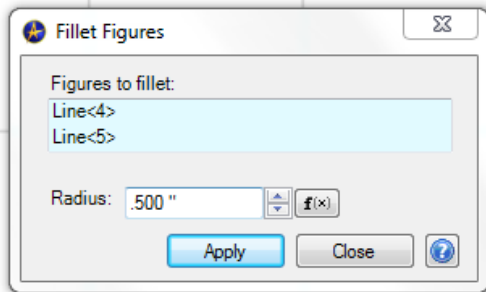Then I drew a vertical line that had snapped to 90° and was a bit over 2" long.

Four more
lines were
then drawn
to roughly
define the
shape of my
angle iron
cross
section.

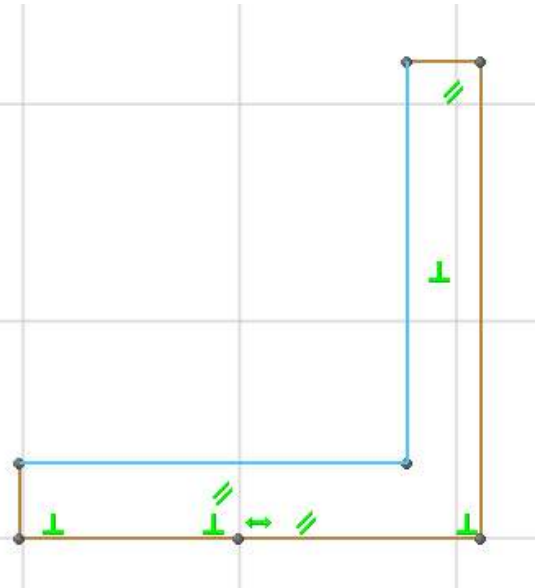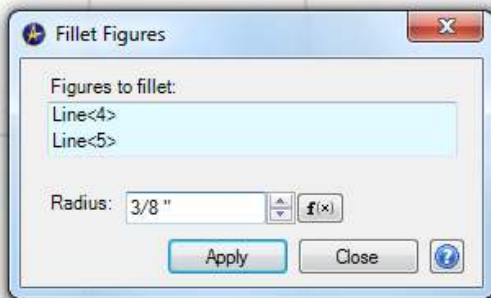The inside fillet came next. I first selected the fillet tool.

The fillet tool dialog box promted me to select two adjacent lines. I could have also specify the radius if I didn't like the default of 0.500".
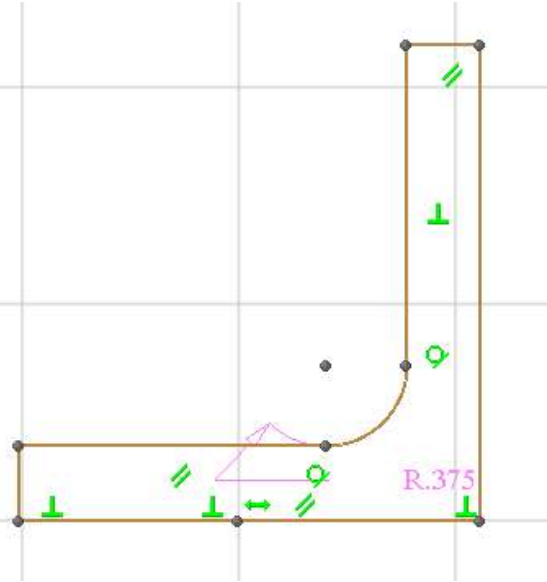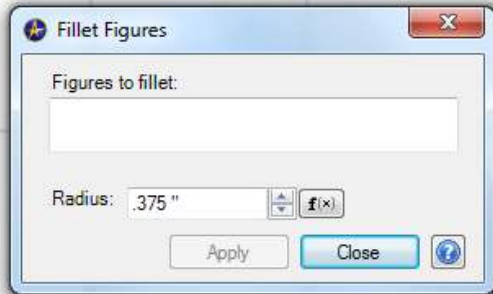
Fillet Figures

Figures to fillet:

Radius: .500 " f(x)

Apply   Close

Fillet Figures

Figures to fillet:
Line<4>
Line<5>

Radius: .500 "   f(×)

[Apply]   [Close]
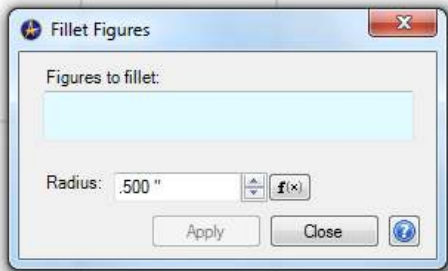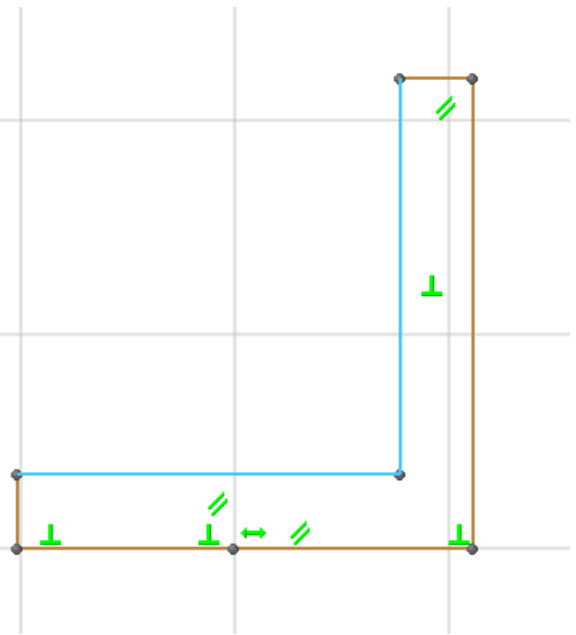
The two lines I selected are shown in blue.

Fillet Figures

Figures to fillet:
Line<4>
Line<5>

Radius: 3/8 "   f(×)

[Apply]   [Close]

I changed the radius to 3/8. The program will accept decimal inches or fractions.

When I clicked "Apply", the button went gray, the selected lines were erased, and the desired fillet appeared in the figure. That "R.375" in purple is my radius.

It was then time to accurately set the dimensions of the sides and thickness. I selected the Dimensions tool.

Dimension
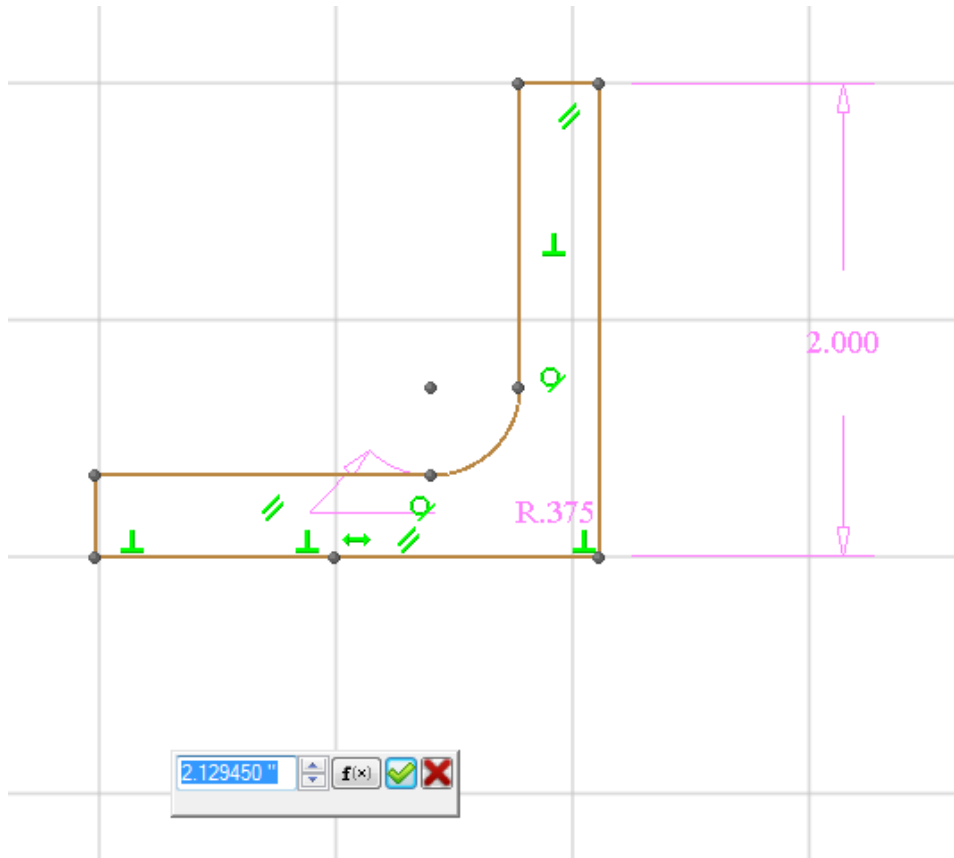
I clicked on the right most vertical line and set its length to 2". Here you see me setting the bottom horizontal line length. It was at 2.129450" and I will just type 2 and hit enter. The data entry box's default is to directly accept a number.

.250

R.375

2.000

.250

2.000
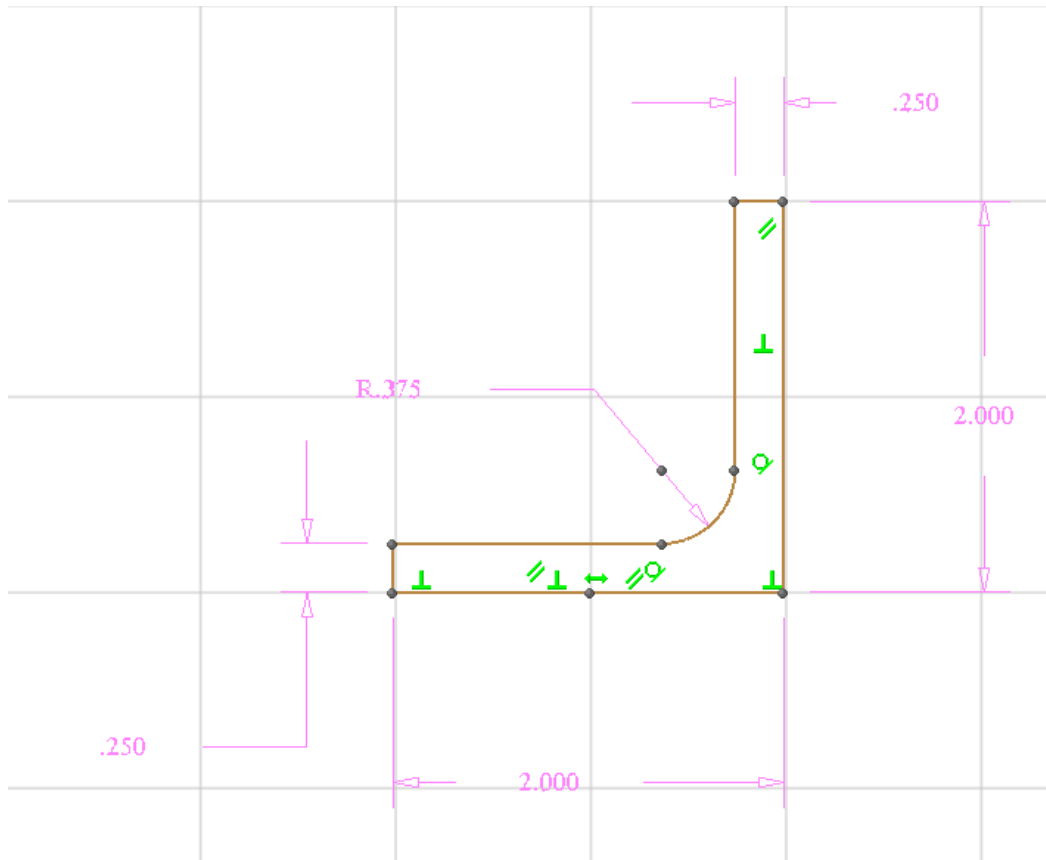
I have finished defining my cross section using the dimension tool. I also moved the radius label so it is more readable. Just drag it around to place it.
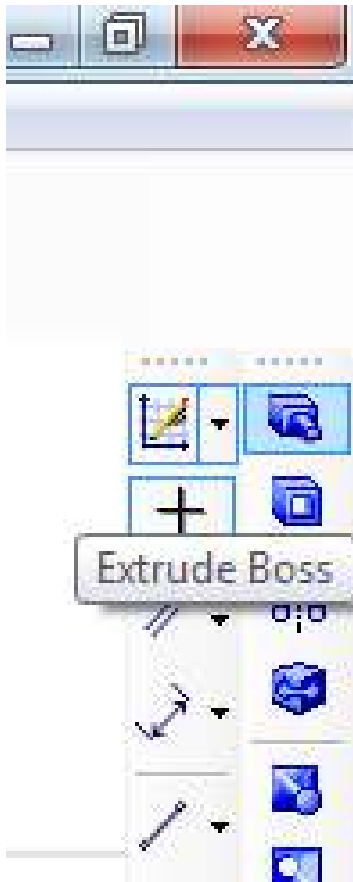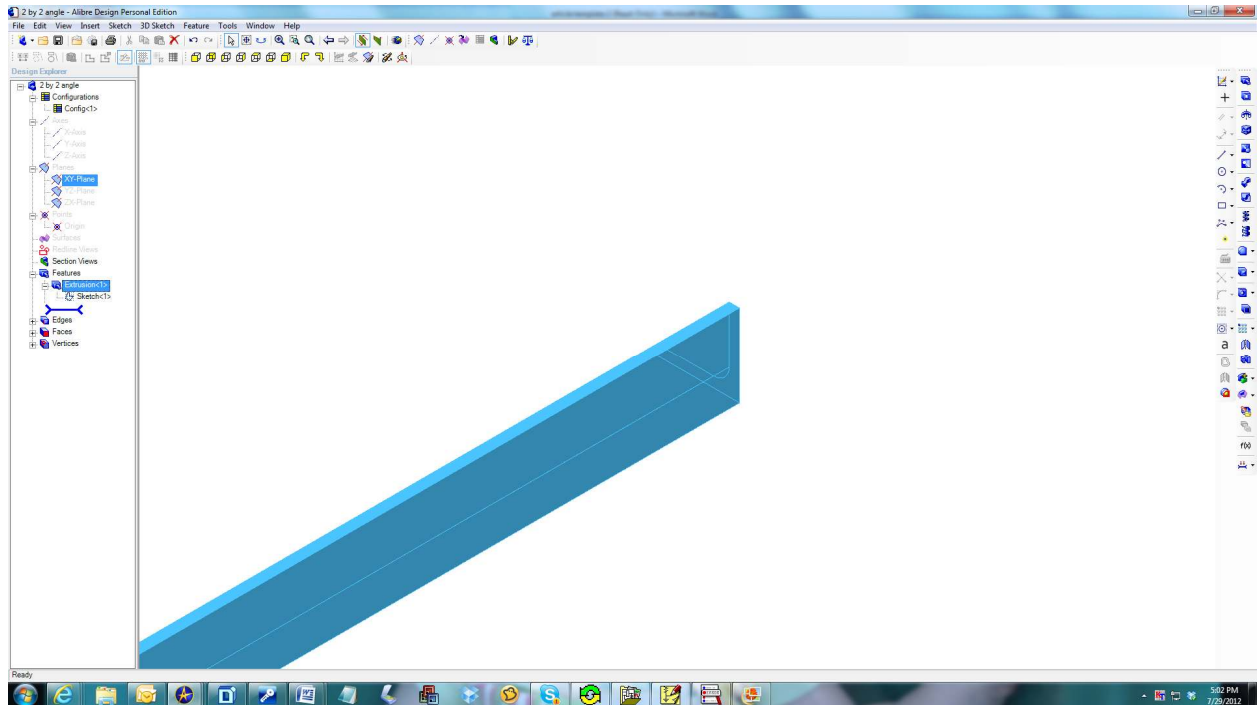
With the cross section done, it was time to select the Extrude Boss tool.
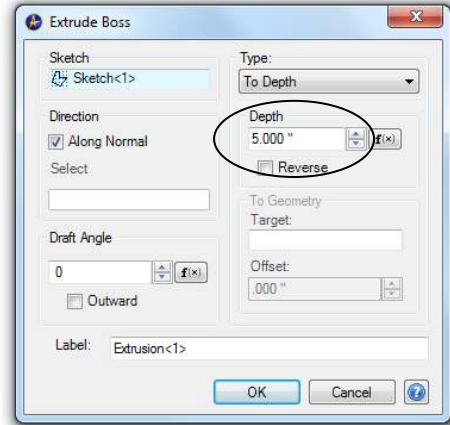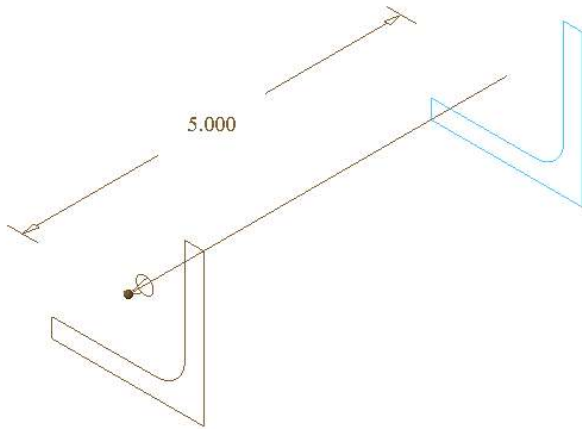
Extrude Boss

When I clicked on the Extrude Boss tool, up came the dialog box that let me set the "depth" (i.e. length). It does a lot more than that but we only need the main function. The default depth was 5.000".
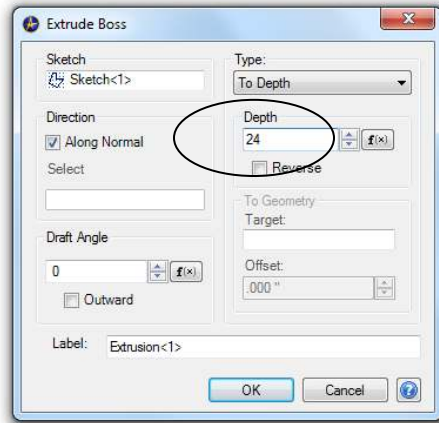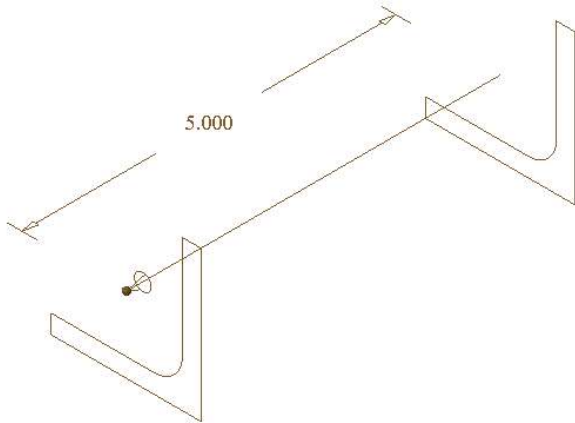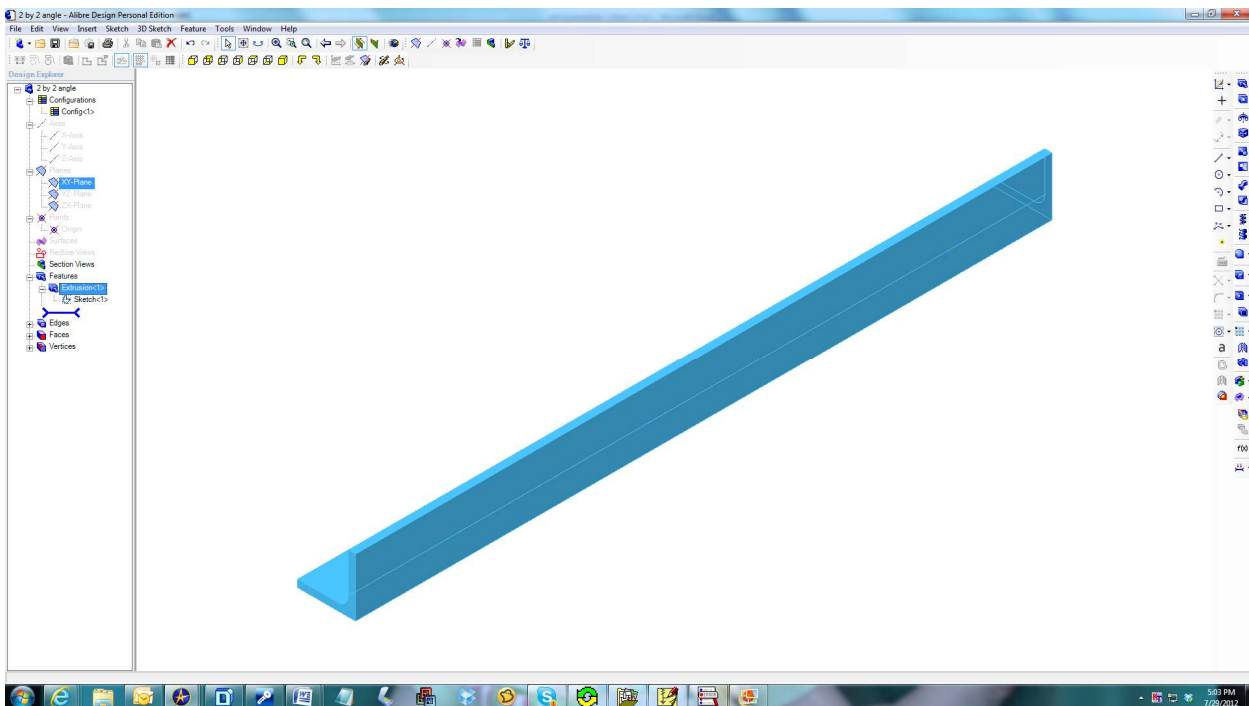
I clicked in the Depth dialog box and typed 24. Then I clicked OK.

The dialog box went away and I was left with the extruded part. I couldn't see all of it so getting a better view was my next step.
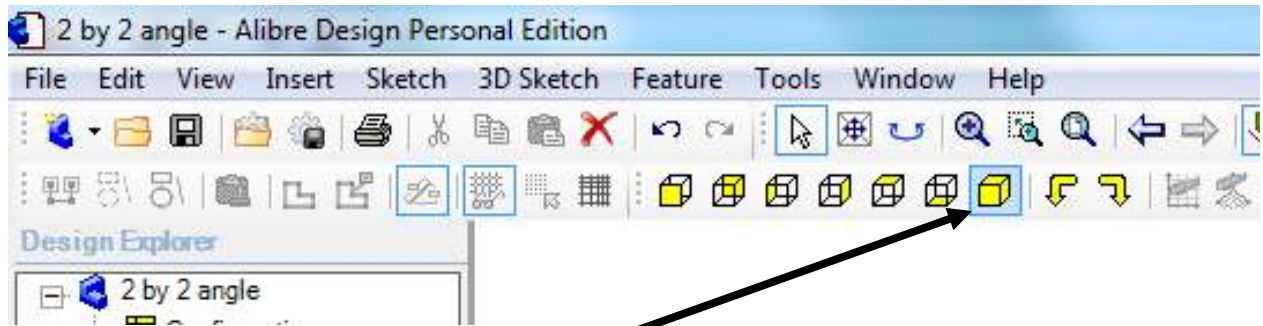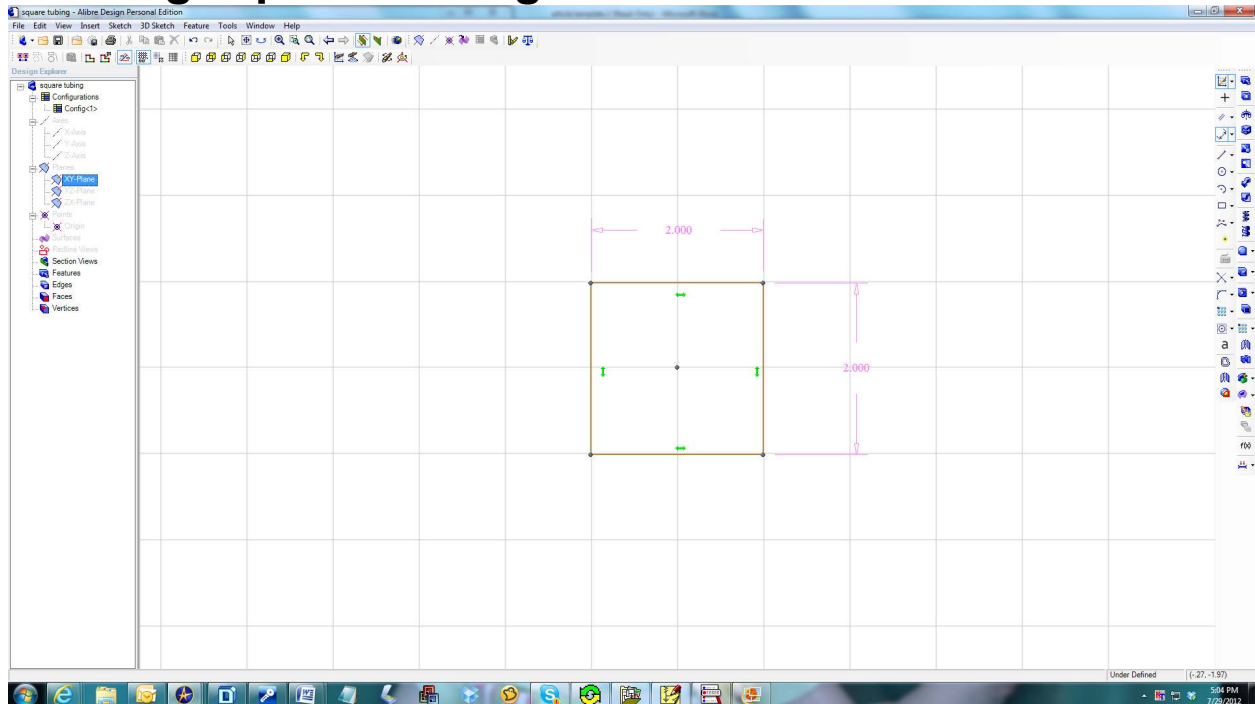
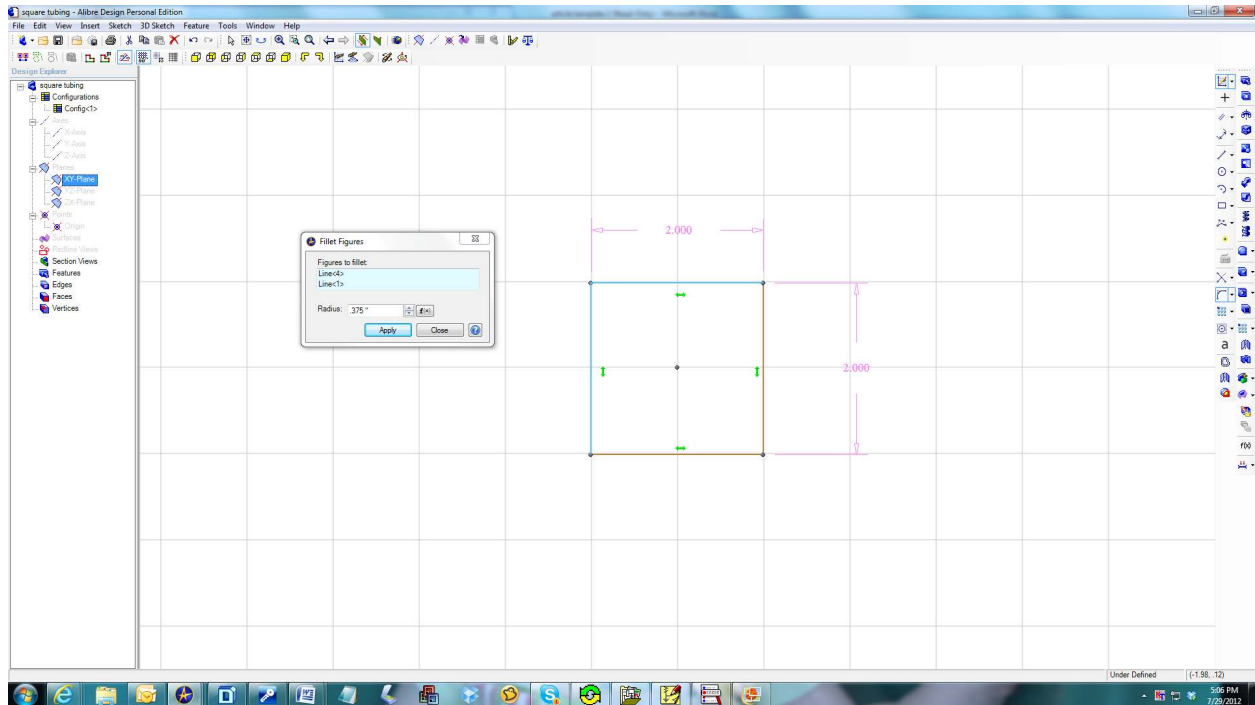I clicked on the Orient to isometric icon.

Now I could see it better. I did a save of the file was done with the task.

Drawing Square Tubing

The steps that are similar to drawing the angle iron are not shown in as much detail.

I have selected my plane, drawn a box either by using the line tool or using the box tool. Then I used the dimension tool to set it to 2" by 2".
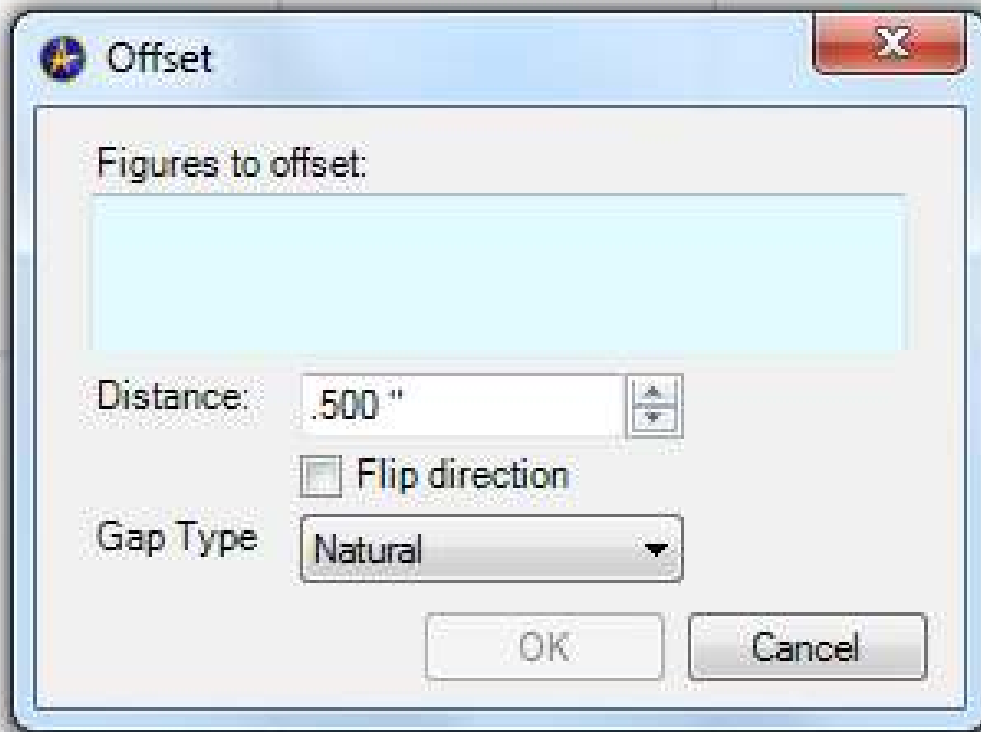
I called up the fillet tool and will round all corners. Here you see the top and left lines selected so the fillet will be drawn in the upper left corner.
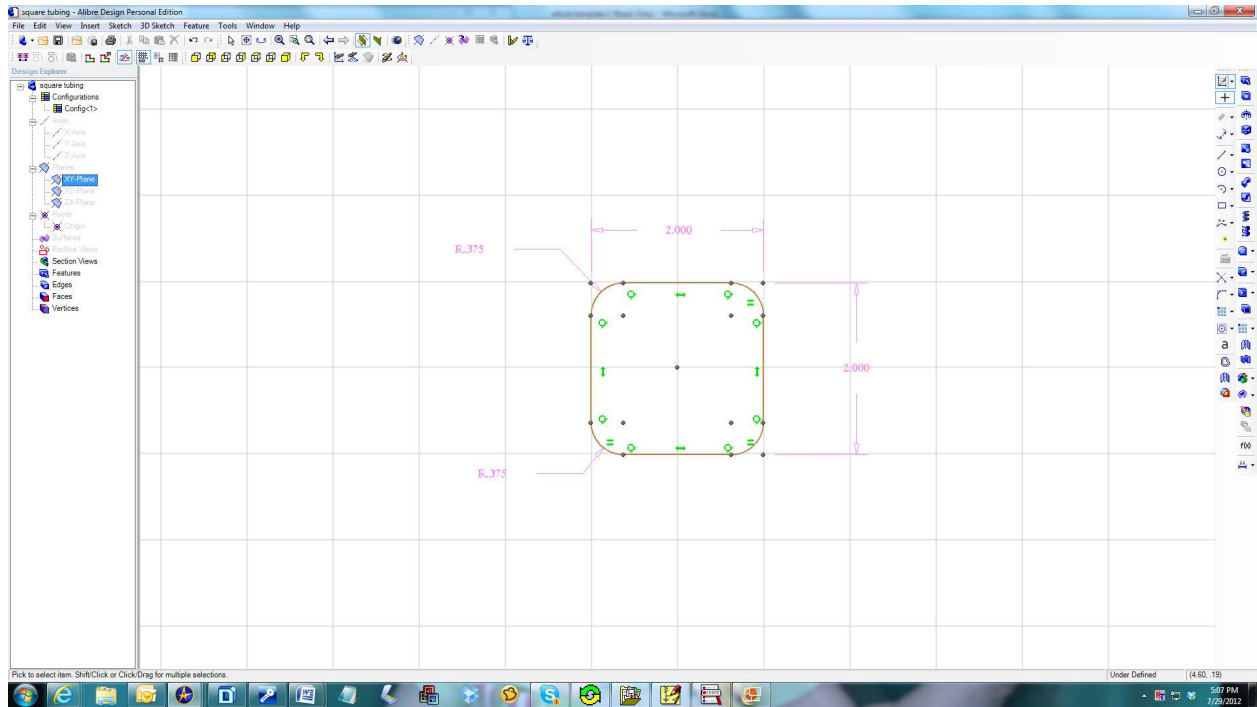
I used the fillet tool four times. The outside of my square tube is now done.
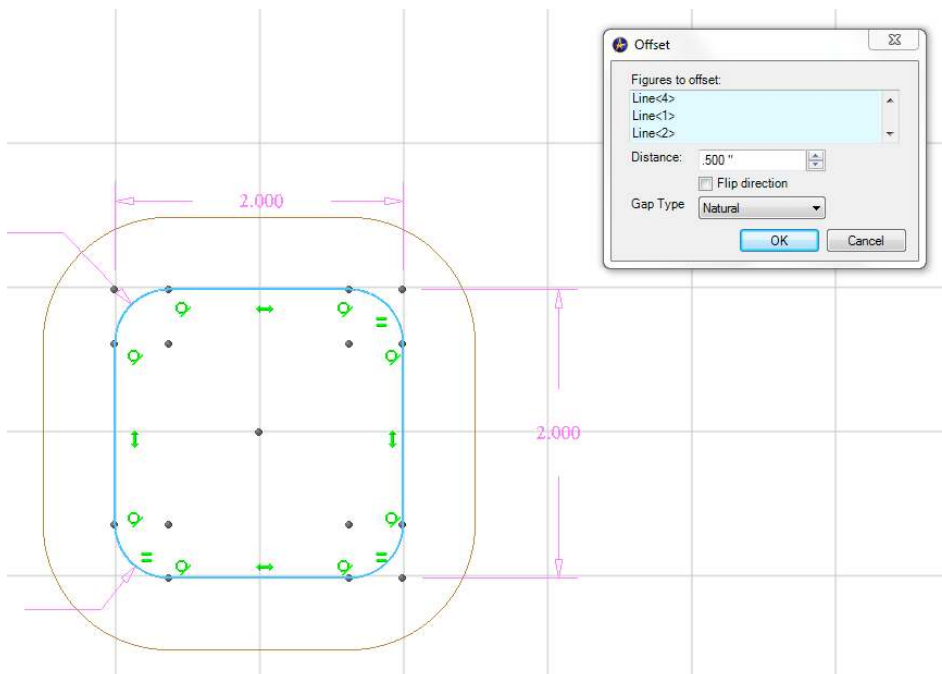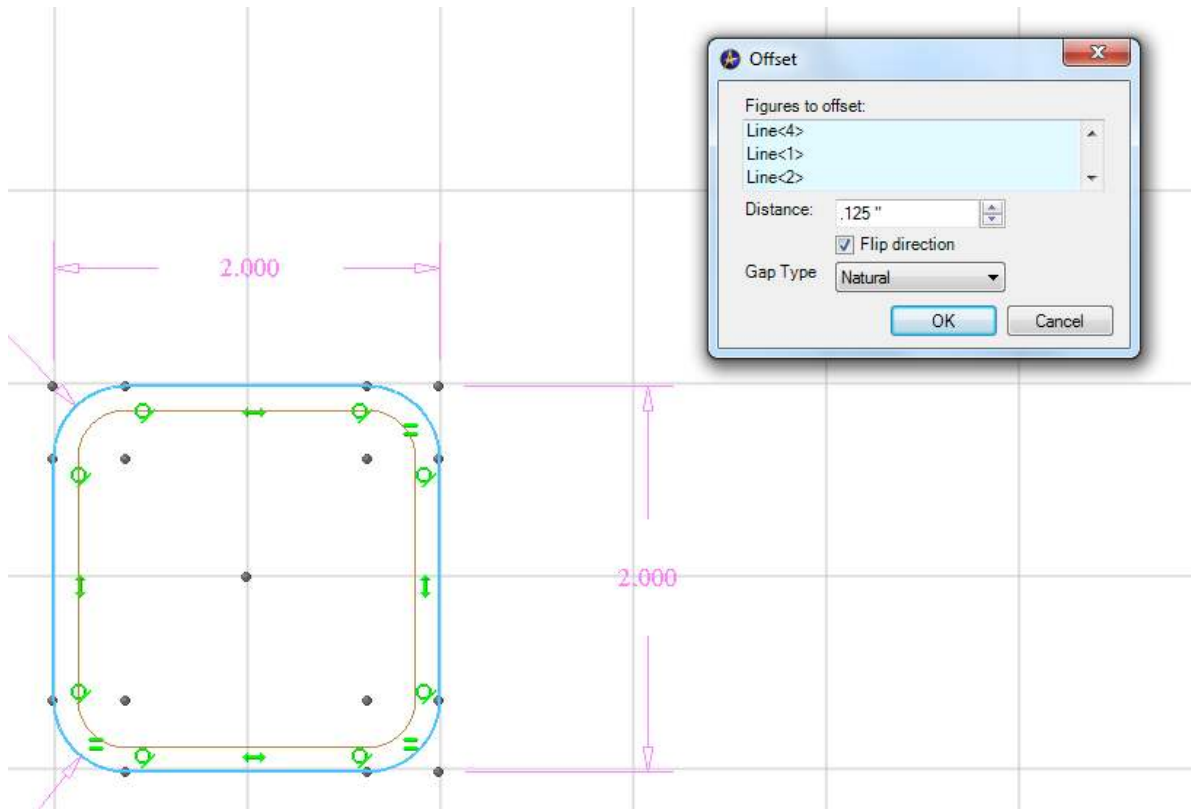
Next I selected the Offset tool which enables me to draw congruent lines. This is a fast way to draw the wall of the tube.

Up came the Offset dialog box. I must select which lines I want to copy and offset plus specify the Distance to offset if I don't want the default of .500".

I clicked on all lines that defined the outside of my box including the fillets. They were all are listed in the "Figures to offset" dialog box. But wait, they were on the outside. I wanted these lines on the inside. I also wanted to change the distance from .500" to .125".

Offset

Figures to offset:
Line<4>
Line<1>
Line<2>

Distance: .125 "
☑ Flip direction
Gap Type: Natural

OK   Cancel

2.000

2.000

I changed the distance to .125" by clicking in that box and typing the new value. I then checked the Flip direction box and then things look right. Note that the tool changed the inside radii in order to keep a constant distance of .125". My cross section was then done.
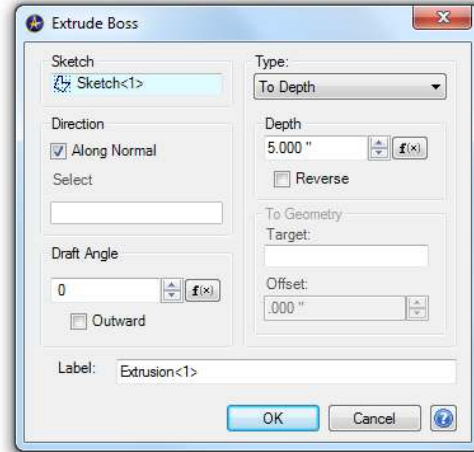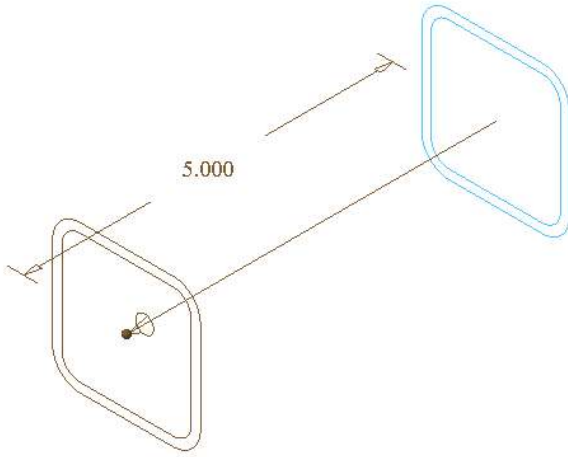
As with the angle iron, I called up the Extrude Boss tool. In this case I have decided to accept the Depth of 5.000".
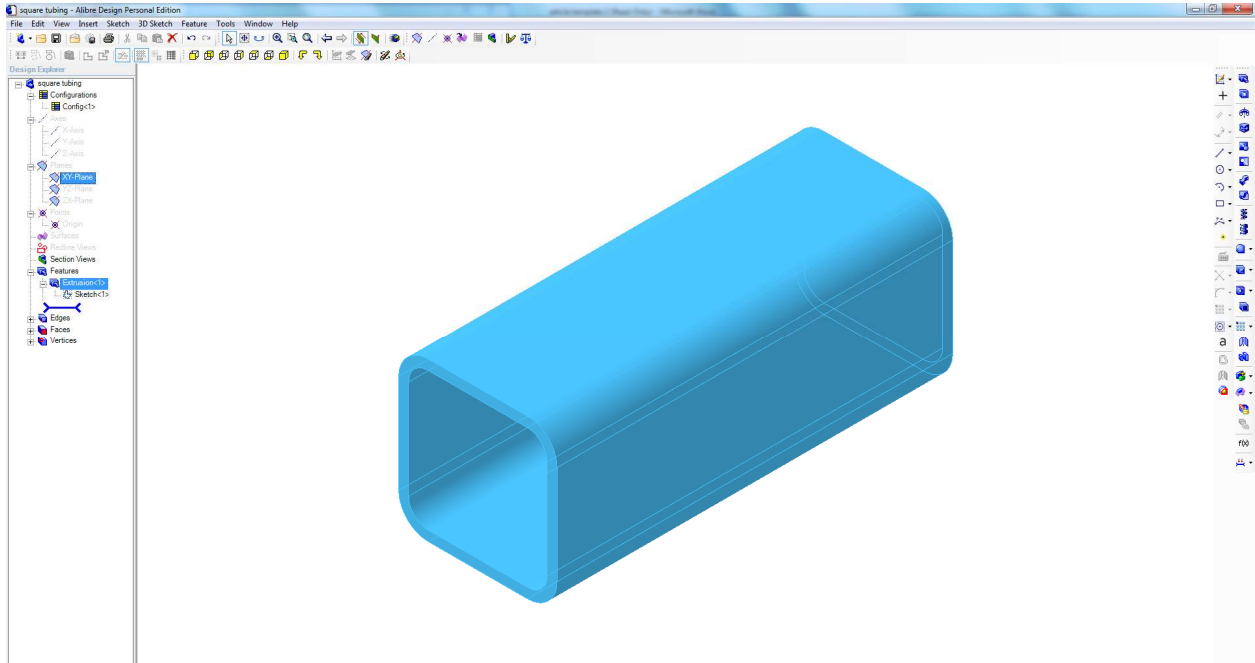
Acknowledgement

Thanks to Dan Benoit for asking the question.

I welcome your comments and questions.

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