



Pro/ENGINEER Sheetmetal - Pocket Tutorial

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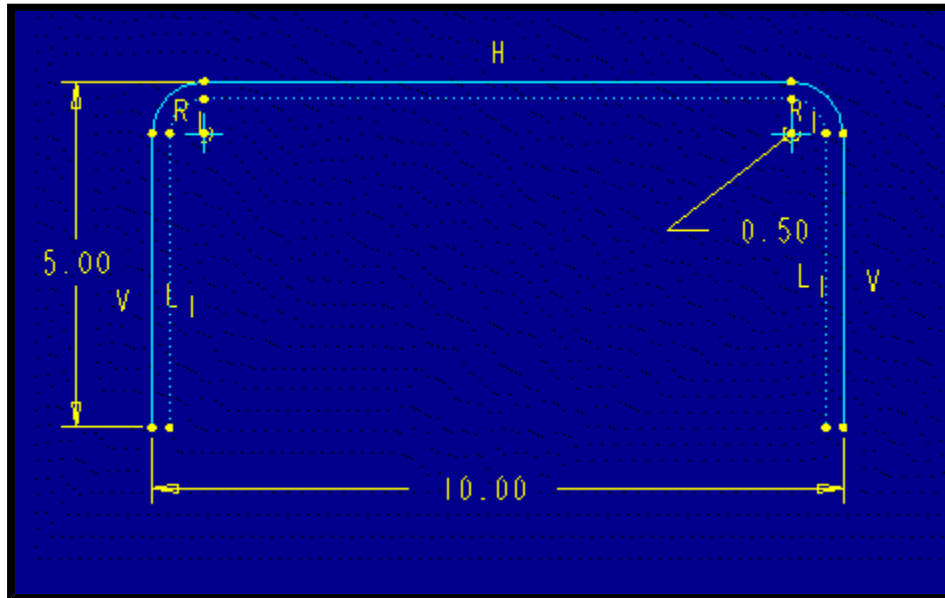
SUMMARY

This pocket tutorial is intended to highlight the basic functionality of the sheetmetal module. Specifically, topics covered include: flat patterns, deformation allowance, bend tables, working in both flat and "as designed" states, and full associativity between part, drawing and flat state. Ensure you have the sheetmetal module attached to your license of Pro/ENGINEER before beginning.

PICKS

1. Create a part (sub-type sheetmetal) with extruded wall as first feature; sketch as in following figure:

FEATURE / CREATE / WALL / EXTRUDED / DONE / ONE SIDE / DONE / select your planes etc...



HINT: Sketch the outer "solid line" first, then use SKETCH / FEATURE TOOLS / THICKEN / FLIP / OKAY / 0.25 / <CR> / Now place the 0.50 Radial dimension on the inside "dotted line radius. This will simulate the thickness of the sheetmetal. It is best practice to dimension sheetmetal bends on the inside radius.

Thickness = 0.25, Depth = 20

2. Unbend the part. Pro/ENGINEER allows you to work in the formed or flate states.

CREATE / UNBEND / REGULAR / DONE / select the top surface as fixed plane / UNBEND ALL / DONE / OK

Observe the model in wireframe and shown axes mode, you can now see the bend lines and the bend tangents. If you modify the first feature you will see the developed length of the bends as a modifiable feature. The default is fine for design purposes but we will drive this by a manufacturing specified bend table in the next step.

3. Assign bend table. Important if you have manufacturing bend table specifications, not necessary if you don't.

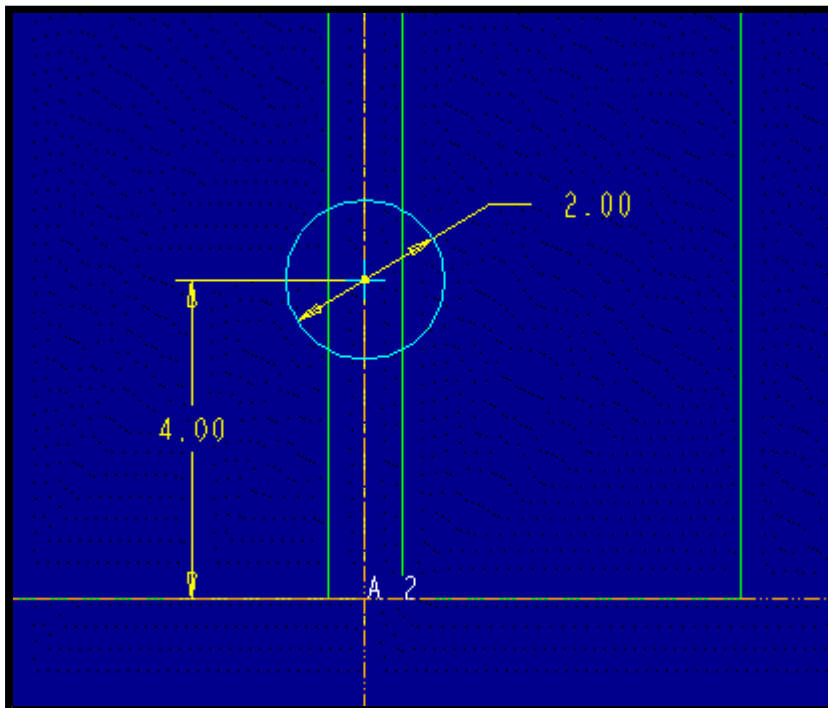
SET UP / BEND ALLOW / BEND TABLE / SET / CONFIRM / FROM FILE / TABLE1

4. Now view the table that you applied. These tables from the machinists handbook and are customizable if necessary.

SHOW / FROM PART / TABLE1 (for soft copper and soft brass)

5. Create a cut across the bend. This will make apparent the realistic deformation that is show in Pro/ENGINEER sheetmetal.

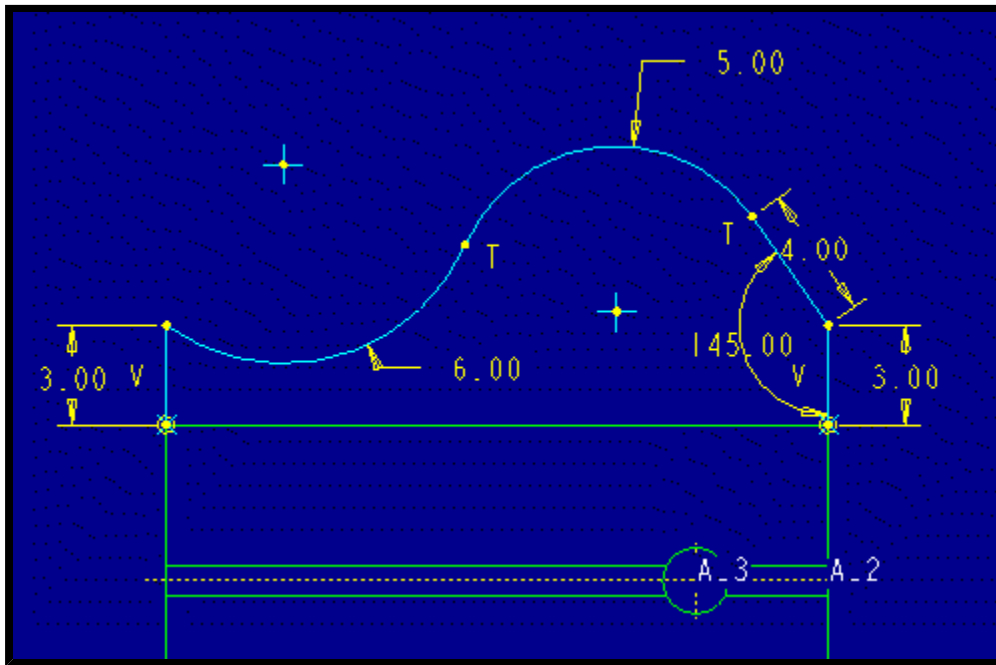
CREATE / CUT / DONE / select the top plane / DEFAULT ; sketch and align cut to axis as in following figure:



Make the cut THRU ALL / OK

5. Add a sketched flat wall. There are a variety of ways to create sheetmetal walls.

CREATE / WALL / FLAT / NO RADIUS / DONE / PART BEND TBL / DONE / select the edge of the part to attach to / OKAY / sketch as shown in the following figure:



6. Bend the part back up and notice the deformation created at the cut.

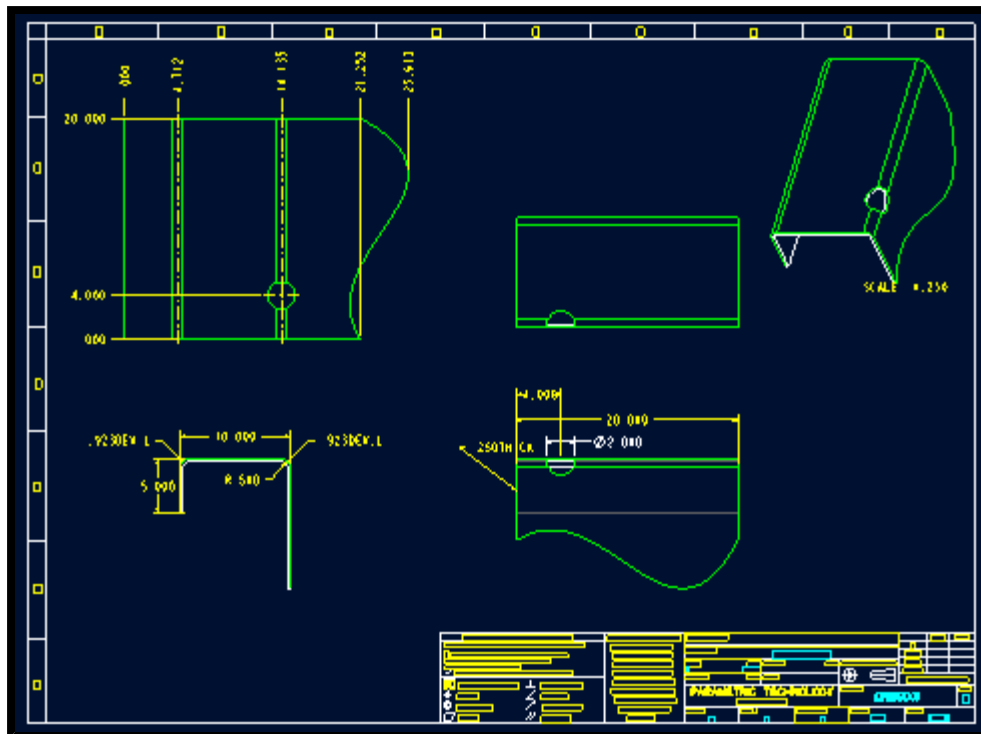
CREATE / BEND BACK / select the top surface as fixed plane / BEND BACK ALL / DONE / OK

7. Set up the flat state. This will be a fully associative family table instance for use in manufacturing drawings and tool paths. Having the two models allows users to design in the formrd state (add cuts, tabs, features, etc.) while having a fully accurate flat pattern for mfg.

SET UP / FLAT STATE / CREATE / <CR> (this names the instance, the default is Pro/E industry standard) / FULLY FORMED / select top flat surface / OK

This creates a family table instance that is always fully flat. This instance can then be used for flat pattern drawings and Manufacturing. Remember to do all design work in the bent state or generic, so your model will be correct.

8. Create drawing, showing bent and flat states on the same page. Show the dimensions on the bent part, create ordinate dimensions on the flat state.



9. Now retrieve the part. Change the bend allowance from Table 1 to Table 3. (Refer to step 3)
This alters the part's flat state to meet a new manufacturing requirement and shows the associativity of the model. Notice the effect on the developed length dimensions.

10. Create swept wall. It will be an additional flange.

CREATE / WALL / SWEPT / USE RADIUS / DONE / DONE/RETURN / select green curvy edge (will highlight entire edge) / DONE / OKAY / sketch horizontal 2" line / DONE / ENTER VALUE / 0.5 / OK

11. Note the change in the flat state family table instance. Either:

FILE / OPEN / IN SESSION / select the flat state

or

SETUP / FLAT STATE / SHOW / select the flat state

12. Return to drawing; notice changes have been incorporated due to change in bend allowance table and swept wall.

Final part:

