Producing a pipe clamp

Pipe clamps are brackets or holders used to mount or secure things like pipes, tubes, electric lines and cables. You can find pipe clamps all around you on such items as bicycles, signs, gutters or curtain rods.

Task: You want to install a pull-up bar with a diameter of 37mm between two doorposts and plan to secure the bar with two pipe clamps. Make your own pipe clamp out of 1mm thick sheet metal. The difficulty is: once you have bent the sheet metal, you can no longer cut it. This means you have to calculate the total length of the strip of sheet metal needed in advance. Proceed with this task just like a mechanical engineer would: First, prepare a sketch that includes all the specifications and then make a prototype. Prepare a presentation for your classmates that includes your sketch, work process steps and results.

The procedure:
Use this workflow chart to guide the steps in your work process. Most likely, you will go through the steps more than once before you have the perfect product in your hands.

Please note:
• Strips of paper, carton and bendable metal are available for you to use for initial experimenting.
• Before you can produce your prototype in the workshop, you must tell your instructor the exact total length of the piece of sheet metal they should cut for you.
• On the back of this page (or in the PowerPoint presentation ‘Producing a pipe clamp’) you will find instructions about how to bend metal for a pipe clamp.

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Author: mascil team Freiburg, Germany in cooperation with SSS Siedle company

The mascil project has received funding from the European Union’s Seventh Framework Programme for research, technological development and demonstration under grant agreement no 320 693
Procedure for producing the pipe clamp

1. Sketch the bending edges
   a) Draw a line through the middle of the sheet metal’s width (1a). Note: For exactness, use a marker with a fine tip.

   b) Also draw lines for the other two bending edges at the beginning and end of the sheet metal to mark where the clamp tabs will be. Keep in mind that the sheet metal is 1mm thick (1b).

2. Bending the semicircle
   a) Span the sheet metal in the vice for bending. When doing so, make sure that the line you drew to mark the middle of the sheet metal is aligned with the middle of the bending cylinder and the edge of the vice. Double check that the entire width of the sheet metal is aligned (2a)!

   b) Hammer firmly near the bend until a right angle forms (2b and 2c).

   c) Now turn the sheet metal so that the unbent end is pointing up (2d). Make sure that all the measurement marks are positioned as before and use the hammer to bend this end, too. This should result in a semicircle (2e).

3. Bend the tabs
   a) Span the sheet metal for bending the first tab. Make sure that the markings are aligned with the bending block. As you can see in photo 3a, you will also need the bending cylinder.

   b) Turn the sheet metal so that the other end is up and bend the second tab just like you did for the first one.

   Congratulations, your pipe clamp is finished!