

PROJECT – PENCIL CASE

Sheet Metal

In this activity you will build an awesome hinged-lid Pencil Case.



The Preparation...

**READ THESE INSTRUCTIONS THOROUGHLY
BEFORE YOU BEGIN!**



For this activity you will need the following:

- 26ga sheet steel two pieces 8.5"x11"
- 1/8" pop rivet, short reach (2)
- Glue
- Scissors
- Centrepunch
- Hammer
- Files, sandpaper, belt sander
- Whitney Punch with 1/8" punch
- Demonstrated safe use of Hand Drill
- Pop Rivet Gun

To save time in layout, this project has been

Computer Designed to fit onto 8.5" x 11" sheets of metal.



CAD stands for Computer-Aided-Design. "Computer Designed" doesn't mean "perfect," it just means "very accurately done wrong." You are still at the mercy of whoever designed it.

SAFETY

You should wear eye protection ANY TIME you are working in the shop.

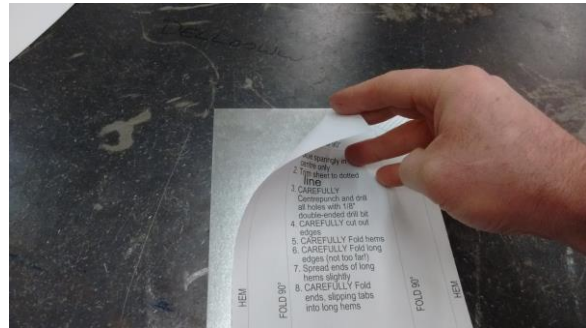
Get some now.



STOCK BREAK OUT & LAYOUT

Glue each printed pattern sparingly on the sheet of metal. A smart cookie would glue two adjacent edges so you only need to trim the metal twice.

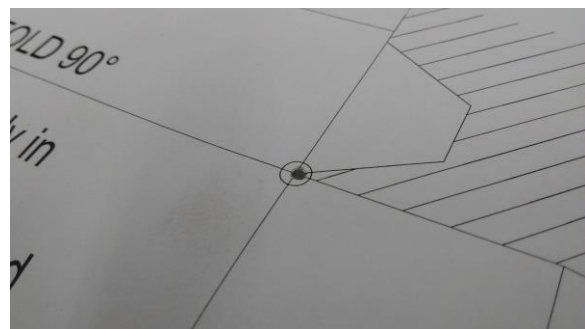
A less smart cookie would glue it in the exact metal, and then have to cut FOUR sides. If this is YOUR friend, point and laugh.



Center punch ALL marked holes with a hammer and a center punch.

You don't need to kill it – just a good dent.

Center Punching makes a wee dent in the metal for the drill bit to follow. Without it, the drill bit will go heaven knows where, but not where YOU want it to go. Center Punching is ALWAYS done before drilling



HOLE PUNCHING

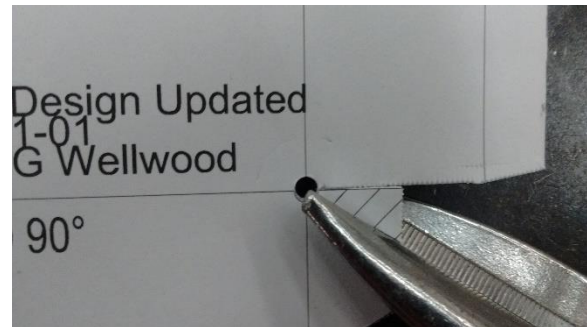
Use the Whitney Punch with a 1/8" punch to punch ALL holes. Use the centerpunch mark to locate the Whitney Punch punch.



AVIATION SNIPS

Snips come in different colours: RED has the waste come off the left side. GREEN has the waste come off the right side. YELLOW doesn't do either really well.

Use the pair(s) that work best for you; you'll figure it out.



Cut INTO the hole – have the snips END their cut IN the hole (don't over-cut!!)



Cut ON the lines. Sheet Metal does not forgive "Sloppy & Careless."



Give it a good look over – make sure you didn't miss anything.

BOX & PAN BRAKE – *HEMS*

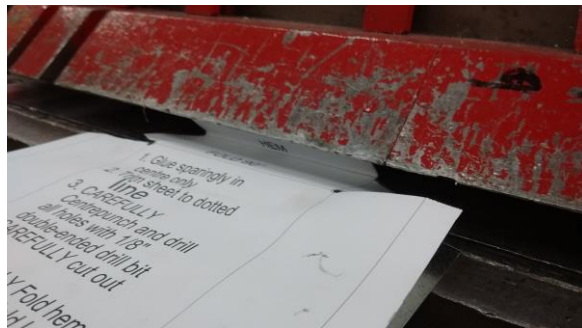
HEM all four sides by lining up the fold line with the fold line on the BRAKE.



Fold ALL THE WAY OVER....



..... then SQUISH it FLAT under the Brake Fingers



Do ALL FOUR sides



BOX & PAN BRAKE - *FOLDS*

Fold the LONG HEMS first, to 90° (straight up)



Metal is a little springy (springs are made from it, eh?!), so you have to bend it just a tick further than its "range of elasticity" so it will sit at 90°



Use a SMALL flat-blade screwdriver to gently spread the ends of the long hems open a bit. *TIP: Where are you going to place your holding hand so you don't stab yourself with the screwdriver when it slips? I have Band-aids. Just sayin'.*

If the Box & Pan Brake is not already set up, make some fingers fit –just- inside the folded long ends so as to fold the short ends.



With the short end clamped down ON THE FOLD LINE, use your fingers to gently SPREAD the SIDES apart enough to clear the TABS...

(this isn't hard, but it's tricky – be gentle)
...as you fold the box up BY HAND (you don't really need machine, just fold with your hands)



Once the SIDES clear the TABS, squeeze the SIDES in again, so the TABS slip under the HEMS

Continued....



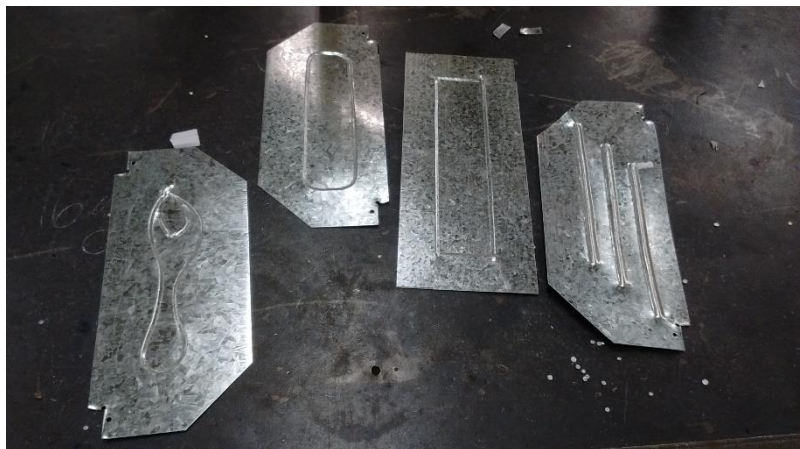
BOX LID

BEFORE YOU GLUE ON THAT SHEET:

CONSIDER ADDING BEAD-ROLLING and/or DECORATIVE ATTACHMENTS for MORE MARKS

Bead Rolling:

- MARK a perimeter 1-1/4" around the perimeter (32mm)
- DRAW a SIMPLE DESIGN for where you want the bead to be rolled (use felt pen, ruler, trace coins for curves, etc....)
- CHOOSE the profile you want ("STEP" or "BEAD" or a combination thereof)
- Place UNFOLDED lid in Bead-Roller, and tighten 1.5 turns past touching.
- WEAR LEATHER GLOVES SO YOU DON'T CUT YOUR HANDS
- TURN the wheel slowly while guiding and turning your lid.



BOX LID

There is no skill here that you haven't just learned. BUT....

Make dang sure you punch all FOUR holes, and cut ON the lines.



DRILLING FOR RIVETS

Place the BOX LID on the BOX, and then clamp it in a vice, as shown, BELOW the top of the vice. Look at that picture again.



SQUEEZE the Pencil Case together so it doesn't open or move, Drill a 1/8" hole through the HOLE you previously punched in the lid.

*The hole guides the drill bit – it **LIKELY** will not slip out and kill you.*



POP RIVETS

Pop rivets are one of the Seven Wonders of the World.



They kick butt at holding things together when you can't get to the other side.

They also make a sweet hinge.

Put the fat end through the holes you just drilled

(These rivets are a bit long, but it's what I had when I took these pictures)

Place the pop rivet gun over the skinny end, all the way down

Squeeze the handles together – this grabs the skinny stick, and tried to pull it out.



The skinny stick of the rivet has a fat ball on the end. Pulling the stick tries to pull the ball through the fat end. This distorts the fat end so it won't come back out the hole. Ask for a demo on how rivets work!

A couple of tries, and it will "pop" off. Hence the name, "pop rivet."



PUT YOUR NAME ON IT!

Theft is a reality with something this cool!

Use Letter Stamps with a hefty piece of steel under the metal as a small anvil.

Whenever you hit sheet metal, you need to have something behind it for support.



Hand in for marks!