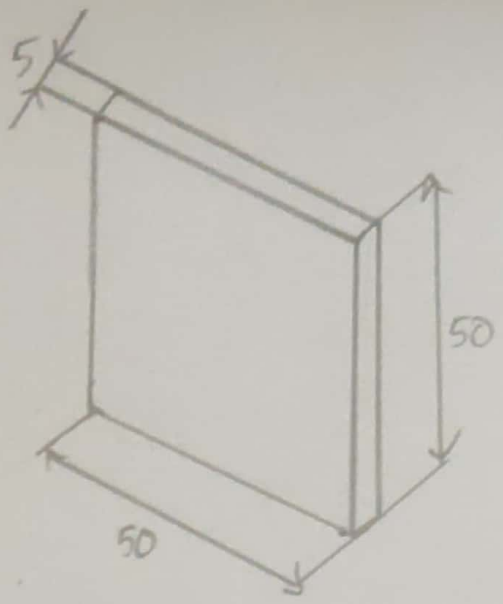
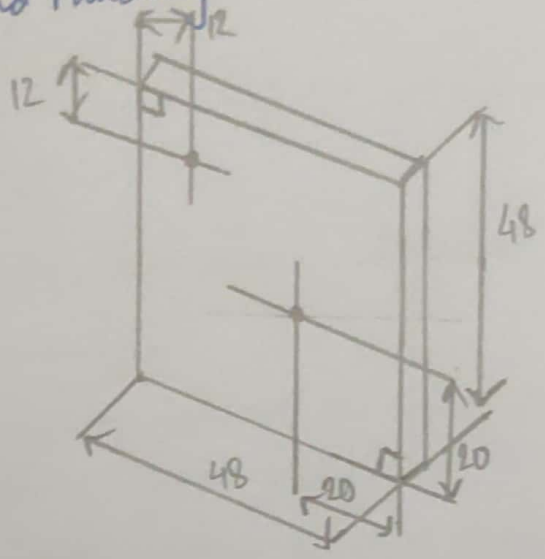
EXP: 8
DATE: 20.11.21

DRILLING AND TAPPING

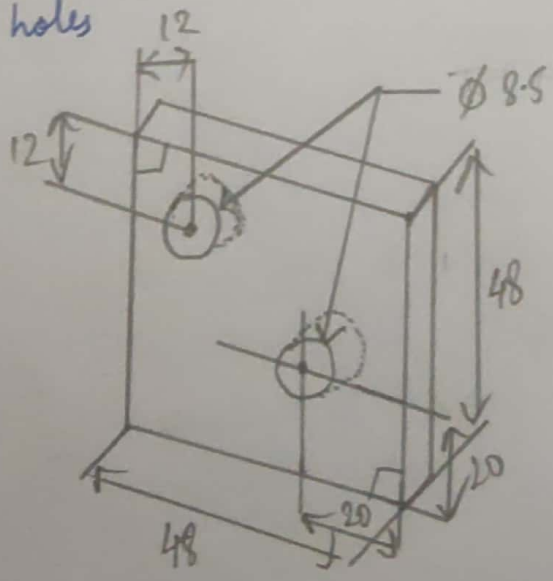
(1) Raw material



(2) Marking and Punching



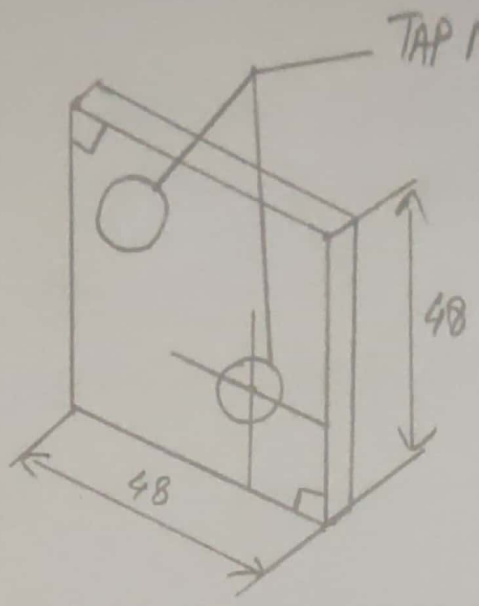
(3) Drilling of holes



FORMULA

TAP DRILL SIZE = TAP SIZE - PITCH SIZE
= 10 - 1.5
= 8.5 mm

(4) Tapping



ALL DIMENSIONS ARE IN MM.

★ AIM:
To make a drill and tap on given mild steel work piece.

★ APPLICATION:
Fitting industries, fasteners industries, automobiles industries.

★ MATERIAL SPECIFICATION:
Mild steel metal plates of dimension is 50 mm x 50 mm x 6 mm.

★ TOOLS REQUIRED:
(1) Steel rule (2) Try Square (3) Jenny Caliper (4) Bench vice (5) 12" Flat rough file (6) Center punch (7) Ball pen hammer (8) Drilling M/C (9) 6mm, 8.5mm, 13mm Drill bits (10) Thread pitch gauge (11) 10mm x 1.5mm Hand tap set (12) Adjustable tap wrench.

P.T.O

★ CALCULATION:

Tap drill size = tap size - pitch size
= 10mm − 1.5mm = 8.5mm

★ SEQUENCE OF OPERATION:

(1) Preparation (2) Marking (3) Drilling (4) Tapping (5) Finishing

★ WORKING STEPS:

(1) Preparation:
→ Check the initial dimensions using steel rule.
→ Fix the job on a bench vice and file the two adjacent sides using a flat file to form right angles.
→ Check for the perpendicularity with try square.

(2) Marking:
→ Apply chalk on the work surface.
→ Measure 20mm using jenny caliper from the steel rule.
→ Transfer the measured dimensions to the work piece with edge 12mm.
→ Draw lines along the dimensions on work piece with scriber.
→ Make dots inter center point using center punch.

(3) Drilling:
→ Place the work piece on the drilling machine platform.
→ Using drilling machine make two holes on the dotted place made by center punch.
→ Pour some oil for smooth drill and drill the work piece properly by adjusting the pilot.
→ Repeat the steps twice for better finishing.
→ Lastly go to bed thread pitch gauge machine & complete the drilling procedure on the work piece.

(4) Tapping:

→ Fix the work piece in the bench vice in such a way that it should not move.

→ Using Tapping tool 1 make threads in the holes.

→ Repeat the procedure for both holes, then take the tapping tool 2 and use it carefully by rotating in clockwise, simultaneously do this process for both holes.

(5) Finishing:

→ Using a 10mm screw, check the accuracy of the finish.

☆ PRE AND POST LAB QUESTIONS:

Q1. Define drilling.

Ans= Drilling is a cutting process that uses a drill bit to cut a hole of circular cross-section in solid materials. The drill bit is usually a rotating cutting tool, often multipoint.

Q2. List out the types of drilling machine?

Ans= The following are some types of Drilling machine:

(1) Radial drilling machine.
(2) Upright drilling machine.
(3) Automatic drilling machine.
(4) Multiple Spindle drilling machine.
(5) Deep hole drilling machine.
(6) Sensitive drilling machine.
(7) Portable drilling machine.
(8) Gang drilling machine.

Q3. Mention the type of drilling tool?

Ans= (1) Flat or Spade drill.
(2) Straight Fluted drill.
(3) Twist drill.

Q4. What is tapping?

Ans= Tapping is the process of cutting a thread inside a hole so that a cap screw or bolt can be threaded into the hole. Also, it is used to make thread on nuts. Tapping can be done on the lathe by power feed or by hand.

Q5. How to calculate tap drill size?

Ans= Tap drill size can be calculated from the formula:

∴ Drill size = Tap size − Pitch size

Q6. What is Twist Drill cutting angle?

Ans= The cutting angle is the angle between two lips when it is projected on a plane parallel to the axis. Normal of value of point angle is 118°.

Q7. Mention the center punch angle?

Ans= The tip of a center punch has an angle between 60° & 90°.

Q8. How to hold the drill bit?

Ans= Insert the drill bit into the drill chuck. Tighten the drill chuck only by hand until it clicks several times. Rotate the chuck back the opposite way, until you hear and feel one, single click. Once you hear and feel the last click, the drill bit is locked securely into place.

Q9. How to measure the whole diameter in drilling process?

Ans= Using a vernier caliper.

Q10. How to measure the pitch in tapping process?

Ans= The tapping drill can be calculated by subtracted the pitch from the diameter of the thread.

★ RESULT:

→ The required holes with proper measurements was obtained drilling and tapping techniques.

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