

Bench work Hammer Head

Objectives:

1. To provide basic knowledge about the bench work tools and machines and working operations of workshop technology.
2. To familiarize with safety measures to be taken in workshop.

INTRODUCTION:

Hammer is a striking tool. It has a handle and head. Generally the head is made of high carbon steel and the handle is made from wood, which fixes solidly into the head. Hammer is used for hitting other tools or the work pieces to make straightening, bending, shaping, riveting and striking nail, etc.

Hammers are classified according to the shape of peen. There are different types of hammer such as ball peen, straight peen, cross peen, etc which are used in chipping, riveting, assembly work and centre punching.

Cross peen hammer has a flat peen and forms a cross with the hammer handle. This type of hammer is used widely in bench work and sheet metal shop for providing channel in sheets, swaging, etc.

MATERIALS USED:

1. Square bar of mild steel: square 20mm x 82mm long 1 piece

MEASURING AND MARKING TOOLS USED:

1. steel rule
2. Tri square
3. Scriber
4. centre punch
5. Number punch

HAND TOOLS USED

1. Bench vice
 2. File
- A. Rough cut file (15 teeth/cm)
B. Second cut file (16 teeth/cm)
C. Smooth cut file (25 teeth/cm)

3. Cross peen Hammer
4. Hand hacksaw with hacksaw blade of (24 teeth/inch)
5. Drill bit (metal of high speed steel) of diameter 8.5mm.
6. Counter sink bit.
7. Threading tap of M8.
 - A. Taper tap
 - B. Intermediate tap
 - C. Plug tap.

MACHINE TOOLS

1. Power Hacksaw
2. Bench drilling machine

PROCEDURE:

1. A work piece (w/p) of 93mm length was cut from a 16mm square bar.
2. The w/p was clamped in the vice and one end of the w/p was filed and made flat. Using tri square, its flatness was checked.
3. Taking the flat end as the datum surface, all lines and points were marked as mentioned in the drawing with the help of scale, scriber and centre punch.
4. The unwanted materials of the work piece was removed with the help of file to get the required inclined surface.
5. That inclined surface was filed with the help of rough file. Using tri-square, its flatness was checked.
6. Then, 45mm line was marked in those sides as mentioned in drawing from the datum surface and a point in the centre of that line was marked and punched with centre punch.
7. The 8.5mm hole was made in the work piece taking punched mark as the centre with the help of drill machine and 8.5mm drill bit and counter sink with dia. 10mm for surface of work piece.

8. Work piece was clamped on the vice and a thread of M8 was cut with the help of tap holder and tap of M8. First taper tap was used, then intermediate tap and finally plug tap was used to obtain the required internal thread.

9. After getting actual length of the work piece, all sides of the work piece was filed one after another, checking flatness and right angle with the tri-square.

10. The edge of the square end was filed at an angle of 45° to obtain a chamfering of $1 \times 45^\circ$ as mentioned in drawing.

11. Roll no. and faculty was punched on the finished w/p.

12. Finally, the w/p was spread with little mobile oil.

13. Thus, required head was made.

SAFETY PRECAUTIONS:

1. PERSONAL SAFETY

1. We should report any accidents however small, immediately to our supervisor.
2. We should wear safety shoes, apron and gloves.
3. We should be careful of the bars and the sharp edges.

2. MACHINE SAFETY:

1. We should switch off the machine immediately if anything goes wrong.
2. We should remove drill chuck key before starting drilling machine.

CONCLUSION:

Hence, cross peen Hammer of $90\text{mm} \times 15\text{mm}$ is prepared by using above-mentioned tools.

LATHE WORK: HANDLE:

MATERIAL USED:

1. Round rod of mild steel, dia. 20x120mm long. 1 piece.

MEASURING AND MARKING TOOL USED:

1. Vernier calliper
2. Number punch

CUTTING TOOLS USED:

1. HSS roughing (chamfering) cutting tool.
2. HSS finishing (facing) cutting tool.
3. centre drill.
4. Smooth cut file.
5. cross peen Hammer
4. M8 die.
5. Die Handle.

MACHINE TOOLS USED:

1. power hacksaw/ Hand Hacksaw
2. Lathe machine

PROCEDURE:

The speed, feeds and depth of cut for different operations was set as recommended. Following sequence of operations was followed.

1. The job was loaded on three-jaw chuck of lathe machine from one end.
2. By facing tool, the end of the job was faced.
3. By turning tools, the dia. 18mm x 60mm was turned.
4. By chamfering tools, it was chamfered at 1mm x 45°.
5. The job was unloaded again and again loaded.
6. The end of the job was faced for length of 150mm i.e., total length by facing tool.
7. The centre of the job was drilled by facing centre drill on the tail stock.

8. Then by corner tools, dia. 18 x 150 mm as whole length was turned.
9. By chamfering tools, 1 mm x 45° was chamfered.
10. The external thread was cut in 18 x 19 mm by using M8 die and die wrench.
11. 1 mm x 45° was chamfered by using chamfering tools.
12. The job was unloaded from the machine and roll no. was punched.

SAFETY PRECAUTIONS:

1. PERSONAL SAFETY:

- a. We should wear safety shoes, aprons, etc.
- b. We should ensure that the hammer heads are not loose.

2. MACHINE SAFETY:

- a. We should switch off the machine immediately if anything goes wrong.
- b. We should remove chuck key before starting the lathe work.

CONCLUSION:

Assemble Cross peen Hammer and handle with tightening by screwing. Then, cross peen Hammer was manufactured.

SHEET METAL WORK (DUSTPAN)

OBJECTIVE:

1. To be familiar with common sheet metal cutting, measuring and marking tools and making hem, seam and shaping different kinds.
2. To be familiar with different types of sheet.
3. To know how to join one metal sheet with another.

INTRODUCTION:

The sheet metal process is one of the important process in workshop technology, which deals with the working of different kinds of metal sheets. The various operations performed in a sheet metal shop are cutting, forming into shape and joining, shearing, bending, etc.

It has its own significance as a useful trade in engineering work and also for our day-to-day requirements. Common examples of sheet metal work are hoppers, dustpans, ducts, covers, funnels, steel cabinet and steel furniture.

RAW MATERIALS USED.

- a. G.I Sheet 24 gauge (200mm x 210mm 1 piece)
- b. G.I sheet 24 gauge (300mm x 30mm 1 piece)
- c. Aluminium flat rivet (ϕ 3mm x 6mm)
- d. Pop rivet ϕ 3mm.

MEASURING AND MARKING TOOLS USED:

1. Steel rule
2. Tri-square
3. Centre punch
4. Marking scribes.

MACHINE TOOLS USED:

1. Foot shearing machine.
2. Notching machine
3. Bending machine
4. Drilling machine
5. Pop riveting machine.

HAND TOOLS USED:

1. Mallet Hammer
2. Hand shear (Snip)
3. Bench vice
4. Centre punch
5. Anvil
6. Stake
7. Drill bit ($\phi 3.2\text{mm}$) / Drift punch
8. Round head hammer
9. Rivet set
10. Smooth file
11. Number punch

PROCEDURE:

1. First of all, 24 SWG (Gauge), GI sheet was taken and 200mm x 210mm dimension was marked with marking scriber and lever-shearing machine for cutting required part.
2. Then, the work piece was marked with dimension according to lay out by using scriber and tri-square.
3. Using hand shear (snip) unnecessary part of sheet was cut off.
4. Then, metal sheet was hemmed by using hammer and bench vice.
5. The work piece was then folded at 90° with the help of Bending machine, if not available Bench vice, stake and mallet hammer can be used as per the lay out.
6. Then the 400mm x 30mm sheet is taken and hemmed on both edges with the help of mallet hammer and bench vices for the handle purpose.
7. The handle was given round shape with the help of cylindrical rod and bench vice.
8. Then the two centres are marked with centre punch on both dustpan and handle.
9. Both handle and dustpan are drilled of 3.2 dia. clamped by wrench on drilling machine.

10. Then the flat Aluminium rivet of 3mm dia was riveted with the help of hammer and rivet set on the handle to the dustpan and can be used by pop rivet and pop rivet machine.

11. The sharp edges of the dustpan were slightly filed to remove burrs and sharp edges for safety.

12. Roll no. and faculty were punched when finished.

SAFETY PRECAUTIONS:

1. We should wear aprons.
2. Drilling should be done only after centre punching on the work piece.
3. Work piece should be carefully clamped while drilling.
4. All the tools should be handled properly.
5. The edges of dustpan should be burred in order to get rid of injuries.

CONCLUSION:

Thus, we became familiar with different workshop tools and we can know how we could join the two metal sheets. Hence, a dustpan was constructed.