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LATHE WORK : HANDLE

OBJECTIVES

- i) To get basic knowledge about the operations of lathe machine in workshop.
- ii) To become familiar with safety measures

INTRODUCTION

The lathe is the father of all machine tools. It is a tool that rotates the workpiece on its axis to perform various operations such as cutting, sanding, knurling, drilling or deformation, facing, turning with tools that are applied to the workpiece to create an object with symmetry about an axis of rotation. The workpiece is usually held in place by either one or two centres, at least one of which can be moved horizontally to accommodate varying workpiece lengths.

MATERIALS USED : i) Round rod of mild steel of $\phi 12 \text{ mm} \times 205 \text{ mm}$ length

- | | | |
|----------------------|---|-----------------------------|
| 1) Vernier Callipers | } | MEASURING AND MARKING TOOLS |
| 2) Steel Ruler | | |

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
- 6) M8 die
- 7) Die handle
- 8) Hacksaw

MACHINE TOOL USED

- 1) Lathe Machine

PROCEDURE

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

1. The work piece was loaded on three-jaw chuck of lathe machine from one end.
2. By facing tool, the end of the workpiece was faced.
3. The centre of the workpiece was drilled by facing centre drill on the tail stock.
4. By turning tools, the diameter 11mm was turned.
5. By chamfering tool, it was chamfered at $1 \text{ mm} \times 45^\circ$

SHEET METAL WORK: DUST PAN

OBJECTIVE

- (i) To be familiar with common sheet metal cutting, measuring and making tools and shaping into different kinds.
- (ii) To be familiar with different types of sheets
- (iii) To know how to join one metal sheet with another.

INTRODUCTION

The sheet metal process is one of the important processes in workshop practice. It includes working of different kind of metal sheets. The various operations performed on sheet metal shop are cutting, framing into shape and joining, shearing and bending etc.

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

MATERIAL USED

- (i) G.I. Sheet 24 gauge
- (ii) Aluminum flat rivet
- (iii) Pop rivet

MEASURING and MARKING tools USED:

- (i) Steel ruler
- (ii) Tri-square
- (iii) Centre punch
- (iv) Marking scriber

MACHINE TOOLS USED

- (i) Foot Shearing Machine
- (ii) Notching Machine
- (iii) Bending Machine
- (iv) Drilling Machine
- (v) Pop riveting machine

HAND TOOLS USED

- (i) Mallet hammer
- (ii) Hand Shear (Ship)
- (iii) Bench Vice
- (iv) Centre punch
- (v) Round head hammer
- (vi) Rivet set
- (vii) Smooth file
- (viii) Number punch
- (ix) Drill bit

- (x) Anvil
- (xi) Stake

PROCEDURE

1. First of all, 24 gauge GI sheet was taken and 210×190 mm dimension was marked with marking scribe and lever-shearing machine for cutting required part.
2. The workpiece was marked with dimension according to layout by using scribe and tri-square.
3. Using hand shear (snip), the unnecessary part of the sheet was cut off. (Notching machine could also be used).
4. Then, metal sheet was hemmed by using hammer and bench vice.
5. The workpiece 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 layout.
6. Then, the flat aluminium rivet of 3mm diameter was riveted with the help of a hammer and rivet set. Pop rivet and pop rivet gun could also be used.
7. All sharp edges of the dustpan were slightly filed to remove the burrs and sharp edges for safety.
8. Roll number and faculty were punched when finished.

SAFETY PRECAUTIONS

1. We should wear aprons while working in the workshop.
2. Drilling should be done only after centre punching the work piece.
3. Workpiece should be carefully clamped while drilling.
4. All the tools should be handled carefully.

CONCLUSION

A dustpan was manufactured by using different tools and sheet metal techniques.

6. The workpiece was unloaded and loaded again from the other side.
7. The end was faced by making the total length 200mm.
8. Using turning tools, the diameter 8 mm was turned for 15mm length. (Step-turning).
9. Again, chamfering was done at $1\text{ mm} \times 45^\circ$.
10. The workpiece are loaded again from the other side and it was diamond knurled upto 90mm.
11. Finally, the workpiece was unloaded from the machine. (Lathe)
12. The workpiece was fitted in a vice and external thread was cut in step-turned part by using M8 die and die wrench.

SAFETY PRECAUTIONS

PERSONAL SAFETY

- (i) We should wear safety shoes, aprons etc.
- (ii) We shouldn't wear loose clothes, wrist watch etc. while working on machines
- (iii) We should ensure that our one foot is on the emergency break of the lathe machine.

MACHINE SAFETY

- (i) We should remove the chuck before starting the lathe work
- (ii) We should follow proper instructions by the instructor to operate the machines
- (iii) We should switch off or press the emergency brakes if anything goes wrong.

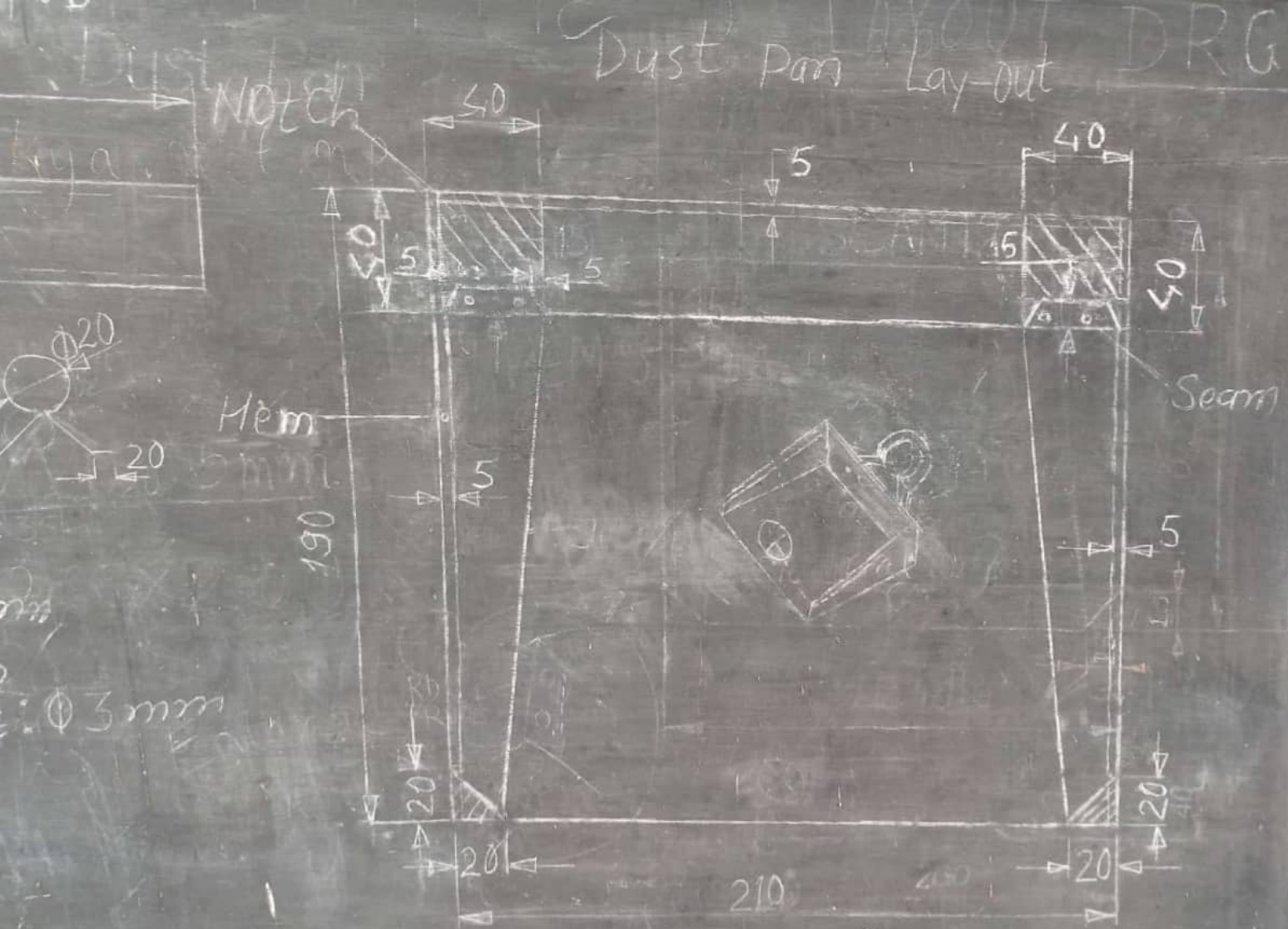
CONCLUSION

The lathe machine can be used to form a desired handle. The cross peen hammer head and handle were assembled by screwing. Thus, the cross-peen hammer was manufactured.

Effective Date \Rightarrow 080/08/16

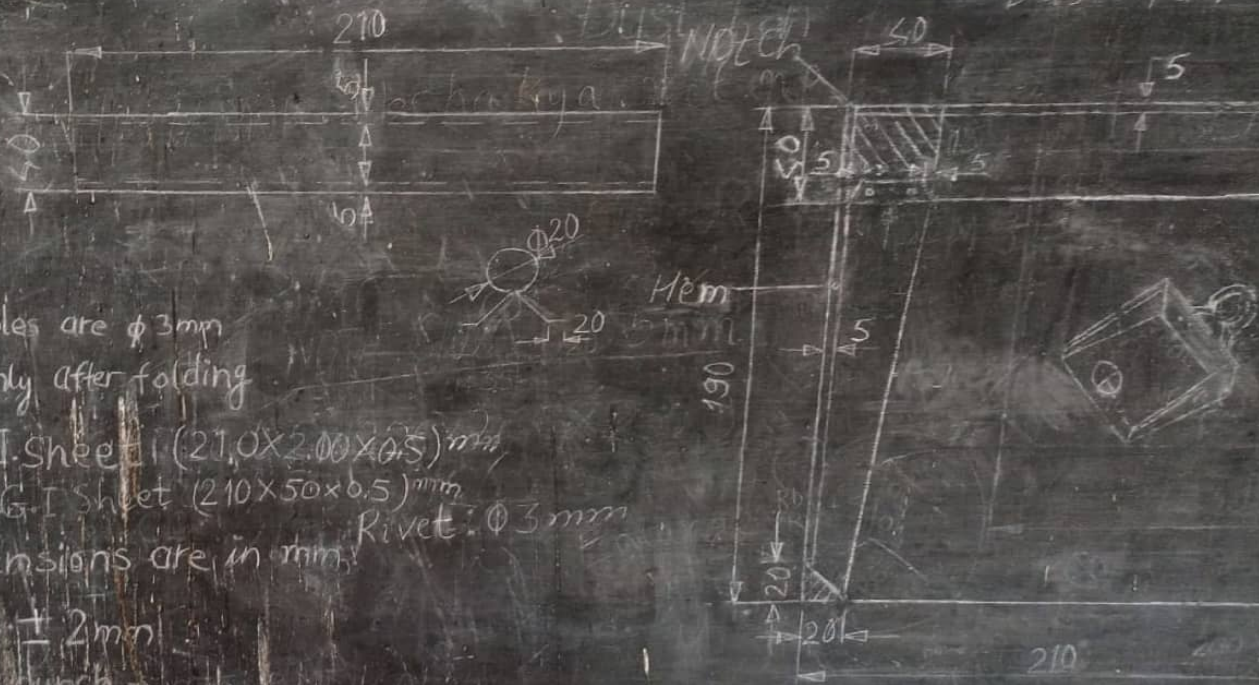
- All Small holes are $\phi 3\text{mm}$
- Drill holes only after folding
- Material: G.I. Sheet I (21.0X2.00X0.5)mm
- Material: G.I. Sheet (210X50x0.5)mm
- All dimensions are in mm. Rivet: $\phi 3\text{mm}$
- Tolerance $\pm 2\text{mm}$
- Roll punch →

Dust Pan Lay-out DRG



Effective Date \Rightarrow 08/08/05

Dust Pan



\Rightarrow All small holes are $\phi 3$ mm
 \Rightarrow drill holes only after folding

\Rightarrow Material: G.I. Sheet (21.0X2.00X0.5) mm

\Rightarrow Material: G.I. Sheet (210X50X0.5) mm

\Rightarrow All dimensions are in mm. Rivet: $\phi 3$ mm


\Rightarrow Tolerance ± 2 mm

\Rightarrow Roll punch \Rightarrow 075/01/01

I/I (Practical Project)

Full Marks - 40 Pass Marks - 16

Tools & Equipment

- 
1. Steel scale
 2. Marking Scriber
 3. Power Hacksaw
 4. Bench vice
 5. Centre punch
 6. Files
 7. Hand-Hacksaw + Blade
 8. Drilling Machine + Drill bit $\phi 7\text{mm}$
 9. Try square
 10. Tap & Tap-Wrench
 11. Hard Hammer

Process / operation

1. Measuring & Marking
2. Cutting
3. Filing (Plane & Smooth)
4. Drilling
5. Countersink
6. Threading (Internal)
7. Chamfering
8. Burr all sharp edges

Effective Date \Rightarrow 08/08/16

Cross pe

All dimensions are

in mm

(Mild steel)

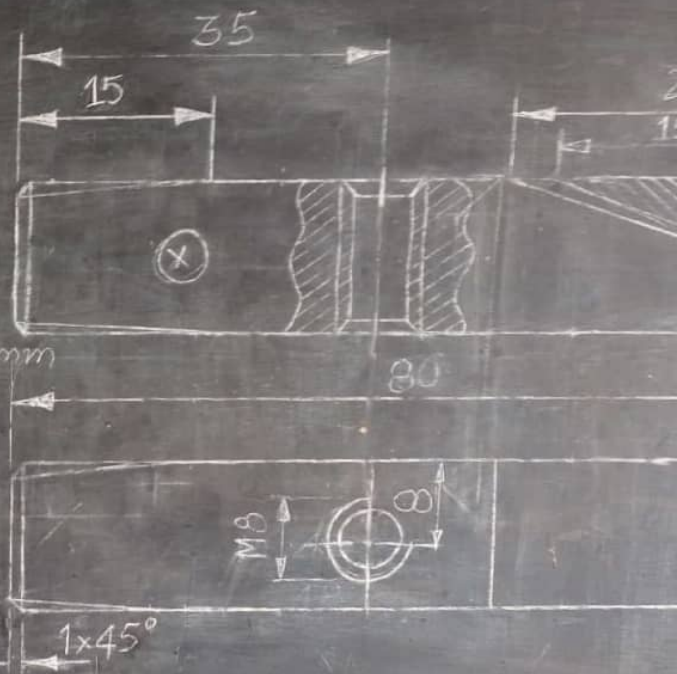
\Rightarrow Material: MS Square \Rightarrow (16 \times 16 \times 82) mm

\Rightarrow Tolerance: ± 0.3 mm

\Rightarrow Burr all sharp edges

\Rightarrow \otimes Roll punch

Drill Size ϕ 6.5 for M8 threading
 $\times 0.85$



Cross Peen Hammer