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DESIGN AND FABRICATION OF PIPE HONING MACHINE

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Abstract - *The pipes are normally manufactured using centrifugal casting or extrusion process. The pipe particularly from inside should have good surface finish but due to the shape of pipe and its dimensions it is very difficult for internal grinding or surface finishing smoothly and uniformly over the entire length of pipe. In this project this limitation is overcome.*

Key Words: Pipe honing machine, surface finish, honing tool, eccentric mechanism.

1. INTRODUCTION

Manufacturing processes are the steps through which raw materials are transformed into a product. The manufacturing processes can be broadly classified into three categories viz. shaping, joining and finishing processes as shown schematically in Figure 1.1. The selection of a particular process from a wide range of choices for a given application requires a hierarchical classification of the processes. For example, the shaping family can be expanded in different classes such as casting, deformation, moulding, composite and powder processing, and prototyping. Next, moulding as a class can be enlarged into a number of member processes such as compression, rotational, transfer, injection moulding, etc. Lastly, each member process can be identified with a number of attributes, which would facilitate the selection of a member process for a given material, dimension, level of requisite tolerances and so on. Figure 1.2 shows a brief description of the three broad categories of the manufacturing processes and the corresponding classifications are outlined in the following. Figure 1.3 depicts how the casting family can be expanded in different classes and actual processes.

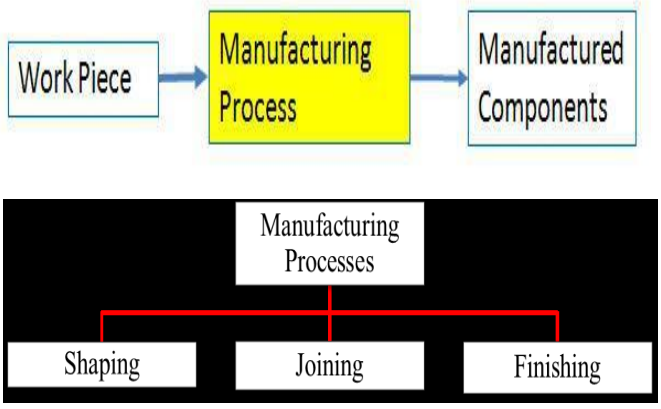


Fig 1.1[1] Manufacturing Process Types and Flow Diagram

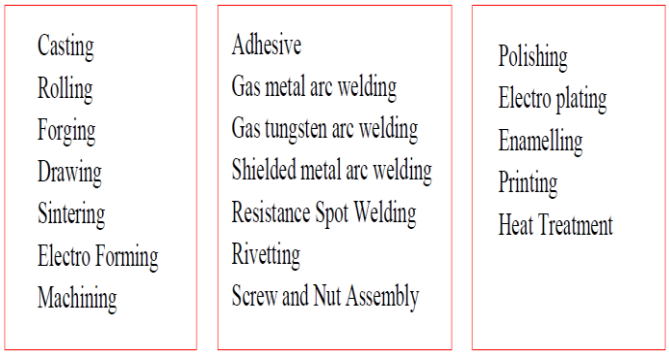


Figure 1.2[1] Different classes of manufacturing processes

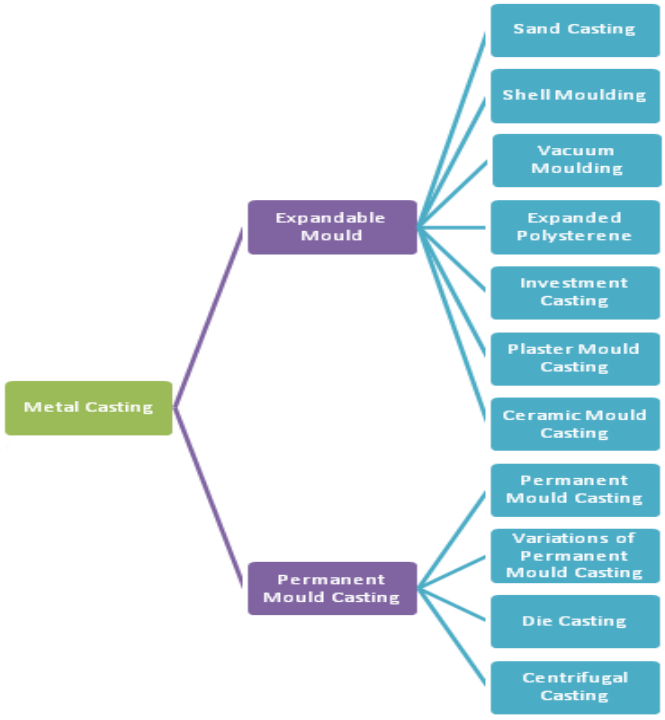


Figure 1.3[1] Different classes of manufacturing processes

Honing

Honing is a finishing process, in which a tool called hone carries out a combined rotary and reciprocating motion while the workpiece does not perform any working motion. Most honing is done on internal cylindrical surface, such as automobile cylindrical walls. The honing stones are held against the workpiece with controlled light pressure. The

honing head is not guided externally but, instead, floats in the hole, being guided by the work surface (Fig. 30.9).

It is desired that

1. honing stones should not leave the work surface

2. stroke length must cover the entire work length.

In honing rotary and oscillatory motions are combined to produce a cross hatched lay pattern as illustrated in Fig.

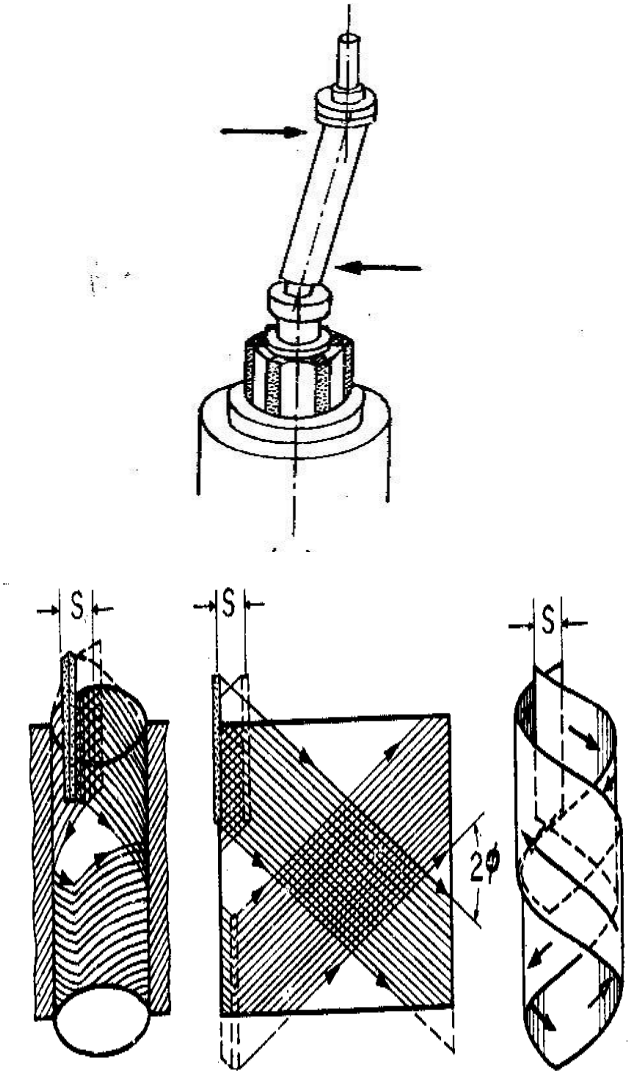


Fig. 1.4[1] Honing Process

The honing stones are given a complex motion so as to prevent every single grit from repeating its path over the work surface.

The critical process parameters are:

1. Rotation speed

2. Oscillation speed

3. length and position of the stroke

4. honing stick pressure

Fig 1.5 Honing Tool

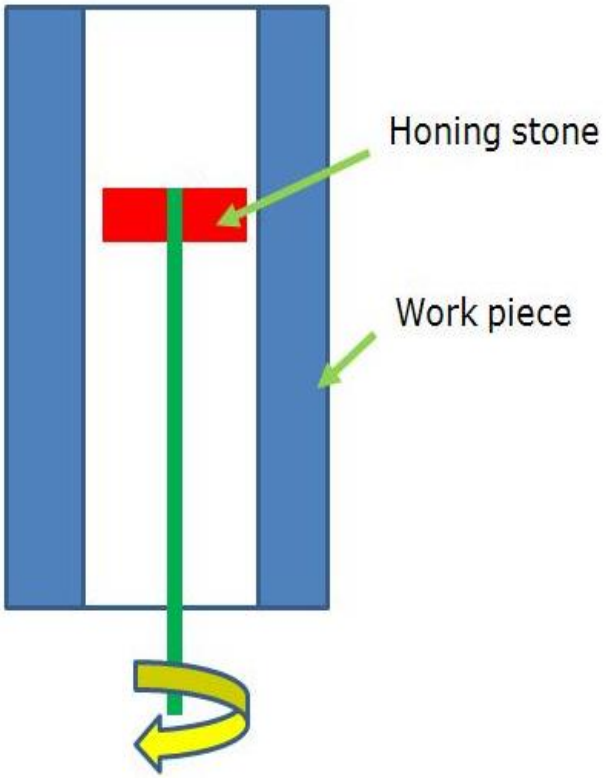
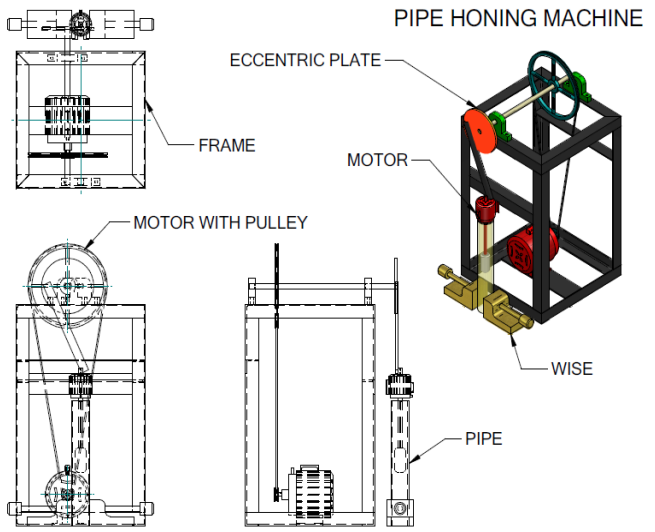


Fig 1.6 Motion of Honing Tool

2. METHODOLOGY



In the present work the power will transfer of 0.5 h.p motor to eccentric mechanism through v belt drive and at the end of eccentric mechanism motor is attached which consists of honing tool so due to motor and eccentric mechanism tool will rotate as well as reciprocate in the pipe fitted in the wise.

3. CONSTRUCTIONAL DETAIL

In this work in the first phase the frame of 2 feet X 2 feet X 3 feet is fabricated using argon welding. Thereafter wards the motor is placed at the center of frame in the bottom portion and accordingly 12"-3" combine pulley is connected with the pulley of 2" of motor. The combine pulley is belted 18" pulley and then the 18" pulley is fabricated with eccentric mechanism. At the bottom of eccentric mechanism the 12 V DC motor with 60 rpm speed and the shaft of motor is connected with honing tool.

Fig 3.1 Actual set up of pipe honing machine

Table 3.1 Specification of Set up

Sr No	Name of Part	Specification	Quantity
	Frame	MS 50 X 50 X 5 mm	-
	V Belt	85 cm and 60 cm B section	1 each
	Pulley	18 'B section	1
	Pulley	2' B section	1
	Honing Tool	Wood cutter/metal cutter	1
	Bench vise	-	1
	Electric Motor	1-Φ, 230 V, 05 HP	1
	Plummer Block Bearing	Φ25 mm	4
	Shaft	Φ25 mm	2

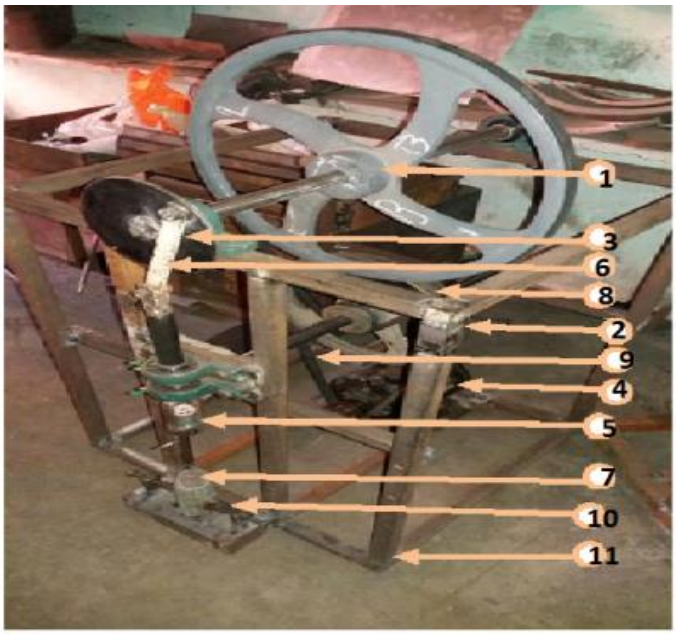


Fig 3.2 Pipe Honing Machine parts:

(1) Pulley1, (2) Pulley2, (3) Eccentric Disc, (4) Motor1, (5) Motor2, (6) Shaft, (7) Honing Tool, (8) Belt1, (9) Belt2, (10) Pipe Holder, (11) Fame

4. WORKING

With the help of electric supply the motor will start and then power will transfer from combine pulley to 18" pulley and finally eccentric mechanism which will reciprocate 12 V DC motor and with the help of reciprocating and rotary motion honing in the pipe become possible

5. CONCLUSION

By this experiment we have reduced motor speed for a better performance of the internal surface finish to entire length of pipe

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