

Honing

Objectives: At the end of this lesson you shall be able to

- define honing
- state the principle of honing
- name the various applications of honing
- state the methods of honing
- compare the features of the honing tools used in manual and power stroking
- name the different honing stones(abrasive) and state their uses
- list the cutting fluid used in honing.

Honing

Honing is a super finishing process carried out using abrasive sticks for the removal of stock from metallic and non-metallic surfaces.

This process:

- produces high surface finish
- corrects the profiles of cylindrical surfaces
- removes taper.

Working principle

The honing tool with abrasives mounted on it is held on the spindle of a machine which can be rotated in its axis.

As the spindle rotates, a reciprocating motion is also given to the tool. The surface produced will have a cross hatched pattern. (Figs 1 & 2) This pattern of the surface texture provides better lubrication in cylindrical bores.

Application

Honing is used for finishing of bores in ferrous and non-ferrous materials.

Honing can be done in hardened or un-hardened state.

Bores of any size, length, blind or through, tandem or interrupted surfaces can also be honed.

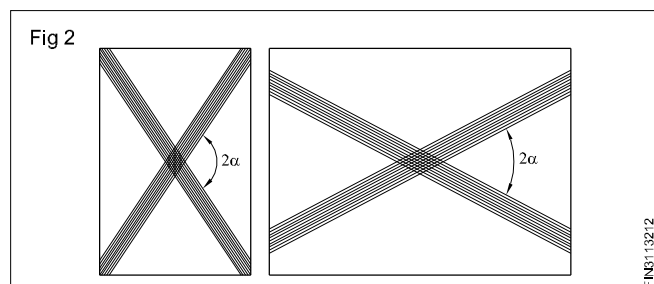
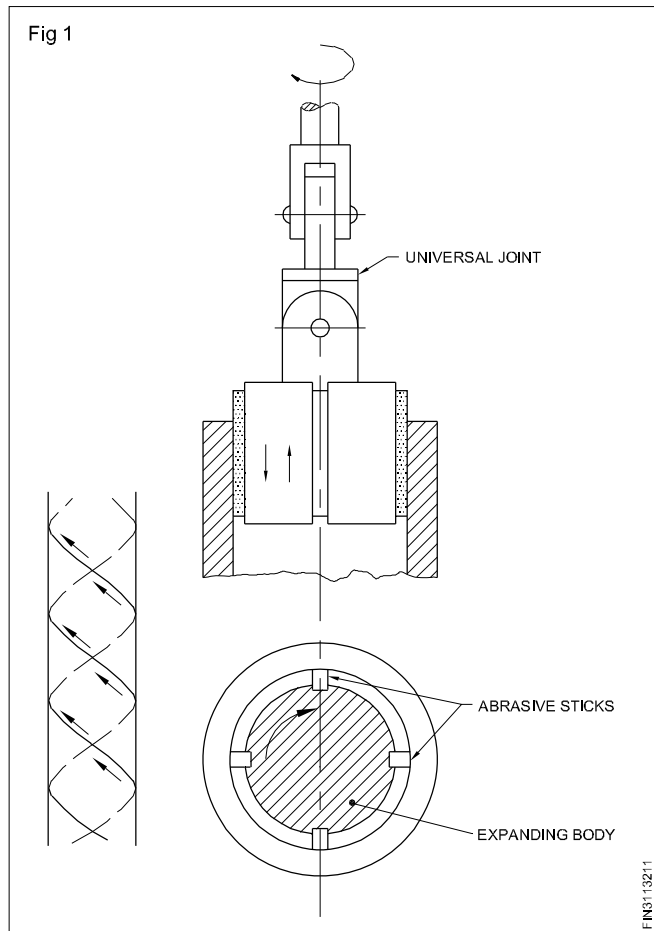
Honing can be carried out on drilling or other machines which have arrangement for rotary and reciprocating motion simultaneously.

A rotary motion can be given by the spindle and the reciprocating motion can be either manual or by power depending on the type of machine used.

For mass production special honing machines are used.

Methods of honing

Manual stroking/Power stroking



Manual stroking is preferred for large quantities when tolerances are extremely close.

Many operators prefer this because of the flexibility in operation.

This eliminates the use of expensive fixtures to hold the work.

Jobs can be quickly changed from one type to another.

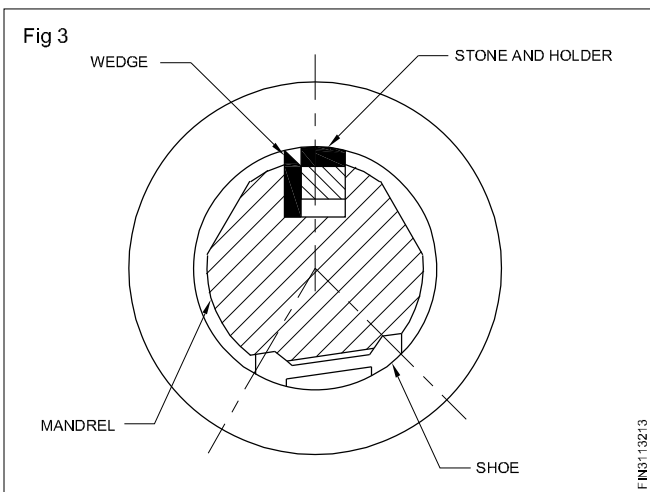
Jobs can be reversed from end to end for accurate honing and correction. The stroke length can be altered depending on the actual requirement of the individual workpiece.

Power stroking is used for honing all types of workpieces. Power stroking may prove to be economical particularly in the case of small parts.

Note

Sometimes for final finishing, manual stroking is employed after power stroking.

The tools used for manual stroking consist of a mandrel, an abrasive stone with holder and a pair of shoes made of wear resistant material with respect to workpiece materials. (Fig 3)



The wedge controls the feeding of the abrasive stone. The shoes stabilize and guide the tool in the workpiece.

Power stroke tools will have abrasive stones at equal distance all around the circumference of the tool. For feeding the abrasive stones, expanding cones are provided. The tools are usually of a self-aligning type with a double universal joint.

Honing stones

Honing stones consist of particles of aluminium oxide, silicon carbide or diamond bonded together with vitrified clay, cork, carbon or metal. The honing stones have a

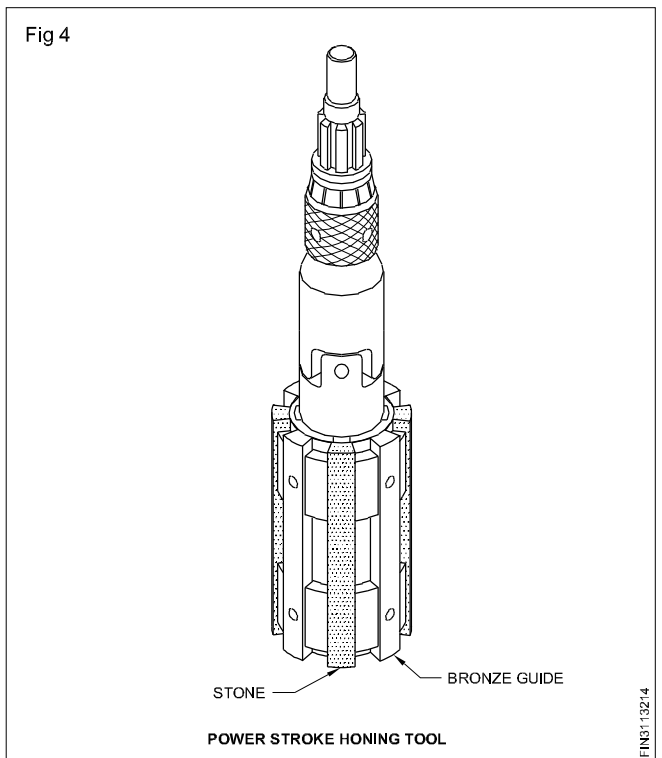
porous structure and this helps for chip clearance.

The grit size of abrasives used ranges from 36 to 600 but the most commonly used sizes are 120 to 320.

Uses of different abrasives

Aluminium oxide	Steel
Silicon carbide	Cast iron & non-ferrous metals
Diamond	Tungsten, ceramics etc.

Power stroke honing tool shown in Fig 4.



Cutting fluids

Cutting fluids are used while honing. The mineral oil commonly used in machining operations is diluted in proportion of one part of oil with four parts of kerosene before it is used for honing.

Frosting

Objectives : At the end of this lesson you shall be able to

- define frosting
- state the aim of frosting
- describe the method of frosting.

Frosting

Frosting is a process in which scraped metal surface is decorated with the use of hand scraper.

Frosting can also be called as flaking

When a patterned finish is formed on a polished or scraped flat surface

Why frosting is used

Frosting used as a way of increasing oil retention on scraped or polished surfaces.

This is important with machine parts in order to keep them lubricated and moving smoothly instead sticky and jerky movement.

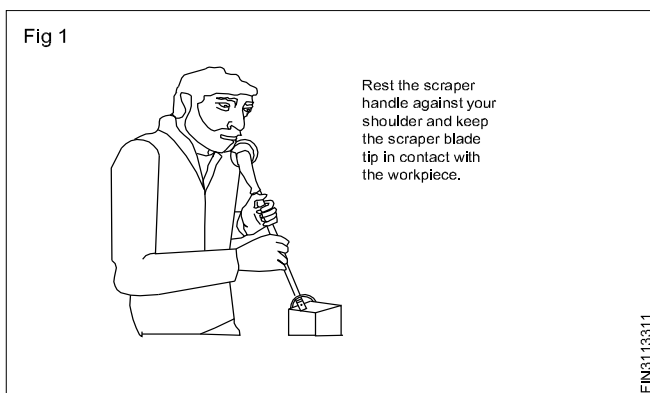
Without the frosting, the oil would runway, leaving just the two metal surfaces in contact with each other, which is likely to cause seizure of the machine.

How to carry out frosting or flaking with an engineer's scraper

Engineer's scraper frosting technique

Step 1 - Stand comfortably

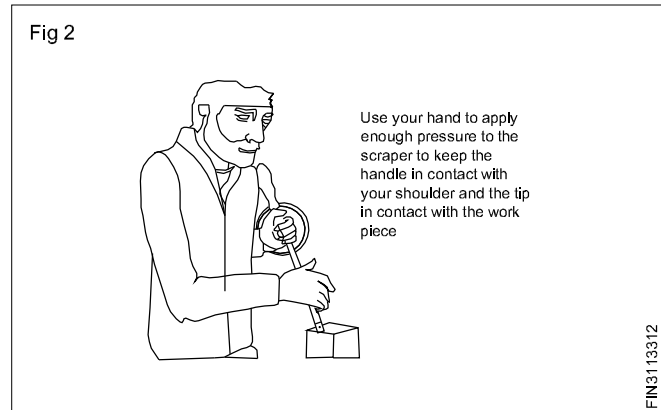
Stand with the end of the scraper handle resting just beneath your shoulder, and contact with the workpiece.



Step 2 - Position your hands

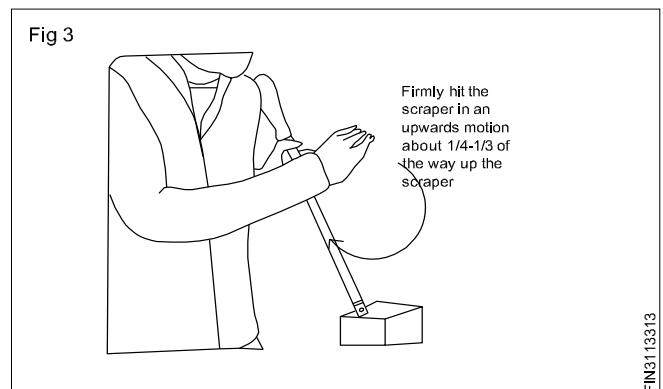
Use your non-dominant hand to hold the scraper about 1/2 - 3/4 of the way up the scraper and apply enough pressure to keep the handle in contact with your body and the tip in contact with workpiece.

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Step 3 - Hit scraper

Using an upwards motion with your dominant hand, firmly hit the scraper towards you, striking the scraper at between 1/4 - 1/3 of the way up the scraper.



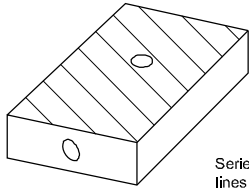
Step 4 - Repeat hitting motion

Repeat step 3 to produce a straight, frosted line across the workpiece at an angle of approximately 45 degree of the edge of the workpiece. Then repeat this to produce a series of parallel frosted lines across the workpiece.

Step 5 - Repeat at right angles

Repeat step 4 at a right angle to your original frosted lines.

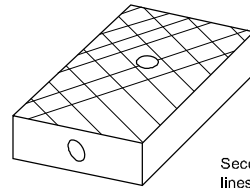
Fig 4



Series of parallel frosted lines at 45° to the edge of the workpiece

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Fig 5



Second set of frosting lines at right angle to first

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