



Bangladesh University of Engineering and Technology

Course Number: IPE 432

Course Title: Machine Tools Sessional

Experiment Number: 1

Name of the experiment(s): **Study and Operation of Surface Grinding Machine**

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SUBMITTED BY:

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IPE 432 (Machine Tools Sessional)

Experiment No.:01 (Study and Operation of Surface Grinding Machine)

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Date of Submission:

Note: While answering the following questions, consider the Surface Grinding Machine studied in this experiment.

1. What is the objective of this experiment?

To study different operation that operates a surface grinding machine.

2. Write down the function of the machine studied in this experiment.

Providing mirror-finished surface of an workpiece with flat surface.

3. Write down the following specifications with respect to the machine studied.

a) Grinding Wheel: Type: High speed grinding wheel.

Grit Size:

Bonding

Material:

b) Main drive motor: Type: JDO₃ HP: 2.81 ~ 3.75 HP
RPM (max): 3000

c) Size of the table: 56.1 cm x 20 cm

d) Length of longitudinal and cross movement: 62.3 cm & 26 cm

e) Height of vertical movement: 21.5 cm

4. When should the low rpm and the high rpm of the wheel head be selected?

Low rpm of the wheel head is selected when we need poorer surface finish, and thus feed rate is high.

High rpm of the wheel is selected when we need smoother surface finish and thus feed rate is lower.

5. Explain the function of the mercury switch.

The mercury switch is used to indicate that the journal bearing has reached the full capacity of oil and when the bearing sump reaches certain oil level, extra oil is pumped back. The a circuit is closed in the mercury switch and a bulb is lifted up to indicate.

6. How are the longitudinal and the cross feed ranges adjusted?

There are stoppers in both longitudinal and cross feed to limit the movement. This is how the feed ranges are adjusted.

7. Explain the function of the wheel dresser.

Wheel dresser is used for truing. That means when some portion of the wheel ~~is~~ side is worned out, wheel dresser is used to ~~peel~~ peel off a layer to make the ~~side~~ periphery smooth again.

It also creates some porosity, which helps the cutting fluid to cool off the wheel.

8. Why should coolant be used in grinding operation?

Coolant should be used in grinding operation to cool off the workpiece and the wheel. When the grinding operation is performed at very high rpm, friction raises the temperature which may create crack. ~~So~~ Again it helps to remove chips from the workpiece.

9. List the different types of pumps found in the machine studied. Also write down their purposes.

① Centrifugal Pump:

To supply cutting wheel to the ~~work~~ cutting area.

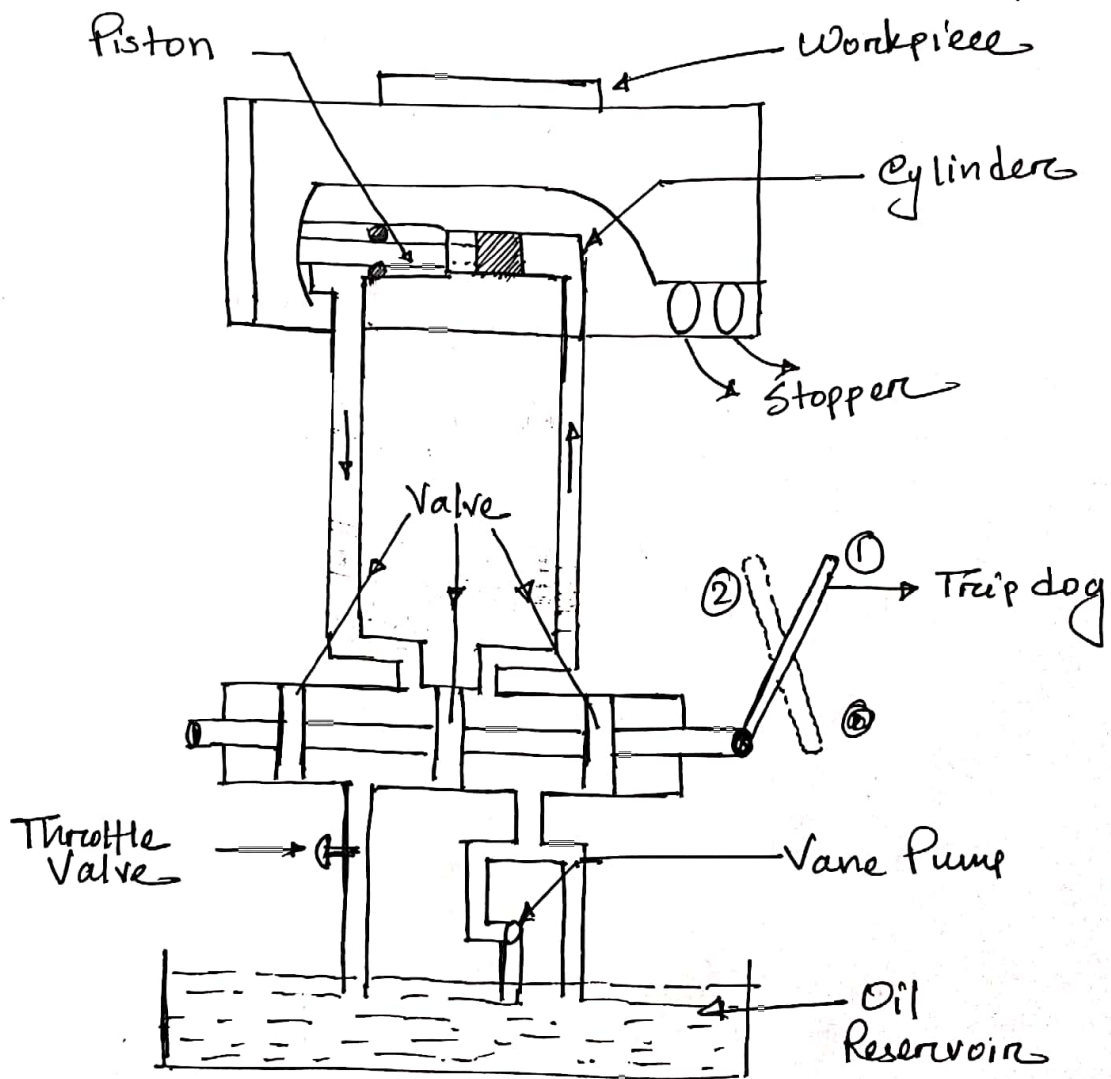
② Vane Pump:

To supply hydraulic oil that provides longitudinal feed to the table.

③ Twin Gear Pump:

To provide lubricant oil (SAE46) that is supplied as coolant to the journal bearing in the main drive motor.

10. With the help of a neat sketch, explain the hydraulic mechanism for longitudinal and cross movement of the machine studied.



With the help of the vane pump, oil is lifted up. As the trip dog is initially positioned at ①, the oil rises up through the right pipe and fills up the right space of the cylinders. The oil pushes the piston leftward and the longitudinal movement is started. As the piston and the workpiece moves left, the trip dog comes to position ②. Then the oil pumped by vane pump rises up through the left pipe and fills up the left space of the cylinder. So the cylinder moves rightwards. Thus the reciprocating motion is continued.