

DOUBLE HEADED SHAPER WITH HYDRAULIC DRIVE

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Abstract:

Main objectives of the project work are. To develop the practical knowledge of the students to make them work in the relative field simultaneously To enhance the skills of the students in problem solving within the scope of the curriculum effectively. To develop the creativity among the students. To bring out the innovative power of the students. To create confidence towards producing new problems. As students face many problems during the execution of the Project. This will help them to develop problem solving techniques. To develop the skill of preparing reports.

Keywords: *Hydraulic drive, control valve, pump, fluid.*

1. Introduction

A hydraulic drive system is a drive or transmission system that uses pressurized hydraulic fluid to drive hydraulic machinery [1, 2]. The term hydrostatic refers to the transfer of energy from flow and pressure, not from the kinetic energy of the flow. A hydraulic drive system consists of three parts [3, 4]: The generator (e.g. a hydraulic pump), driven by an electric motor, a combustion engine or a windmill; valves, filters, piping etc. (to guide and control the system); the motor (e.g. a hydraulic motor or hydraulic cylinder) to drive the machinery.

Contents

1. Principle of a hydraulic drive
2. Hydraulic cylinder
3. Hydraulic motor
4. Hydraulic valves
5. Open and closed systems.

Pascal's law is the basis of hydraulic drive system .As the presence in the system is the same that the fluid gives to the surroundings is therefore equal to pressure X area. In such away ,a small piston feels a small force and a large piston feels a large force. The same principle applies for a hydraulic pump with a small swept volume that

asks for a small torque, combined with a hydraulic motor with a large swept volume that gives a large torque. [5] In such a way a transmission with a certain ratio can be built. Most hydraulic drive systems make use of hydraulic cylinders. Here the same principle is used a small torque can be transmitted in to a large force. By throttling the fluid between the generator part and the motor part, or by using hydraulic pumps and / or motors with adjustable swept volume, the ratio of the transmission can be changed easily In case throttling is used the efficiency of the transmission is limited In case adjustable pumps and motors are used the efficiency, however, is very large. In fact, up to around 1980, a hydraulic drive system had hardly any competition from other adjustable drive systems. Nowadays, electric drive systems using electric servo-motors can be controlled in an excellent way and can easily compete with rotating hydraulic drive systems Hydraulic cylinders are, in fact, without competition for linear forces. For these cylinders, hydraulic systems will remain of interest and if such a system is available, it is easy and logical to use

this system for the rotating drives of the cooling systems, also

Hydraulic cylinders (also called linear hydraulic motors) are mechanical actuators that are used to Maintaining a Hydraulic System give a linear force through a linear stroke. Hydraulic cylinders are able to give pushing and pulling forces of millions of metric tons with only a simple hydraulic system. Very simple hydraulic cylinders are used in presses, here, the cylinder consists of a volume in a piece of iron with a plunger pushed in it and sealed with a cover. By pumping hydraulic fluid in the volume, the plunger is pushed out with a force of plunger-area pressure. More sophisticated cylinders have a body with end cover, a piston rod, and a cylinder head. At one side the bottom is, for instance, connected to a single clevis, whereas at the other side, the piston rod is also foreseen with a single clevis. The cylinder shell normally has hydraulic connections at both sides: that is, a connection at the bottom side and a connection at the cylinder head side. If oil is pushed under the piston, the piston rod is pushed out and oil that was between the piston and the cylinder head is pushed back to the oil tank.

2. Methodology:

SELECTION OF THE PROJECT The selection of project was carried out by considering the following factors:

Economical Factor: It makes the manufacturing process more efficient It reduces the production cost comparitively. Products can be manufactured at a higher rate in a little span of time.

Human Factor: It reduces the fatigue of the worker. There is no special skill needed to operate the machine.

Technical Factor: Production is more. Time consumption is less. Workers needed is less.

TECHNICAL DATA Double acting Hydraulic cylinder:

Technical data:

Port size : 0.635×10^{-2}

m Pressure : 10 bar

Media : Oil

Quantity : 1

Connectors:

Technical data:

Max working pressure : 10 bar

Temperature : 0-100°C

Fluid media : oil

Material : Brass

Hoses:

Technical data:

Max pressure : 2 bar

Outer diameter : $6\text{mm} = 6 \times 10^{-3}\text{m}$

Inner diameter: $3.5\text{mm} = 3.5 \times 10^{-3}\text{m}$

FABRICATION OF DOUBLE HEADED SHAPER:-

Barrel or ram:

The barrel or ram is made out of mild steel. It acts as a hollow casing for the cylinder. It has a length of 130 mm and inner diameter of 36 mm. It is made in a curved form to locate the hydraulic

cylinder inside the ram. At the ends of the ram tool posts are mounted by means of welding.

Tool Head: Two tool heads are mounted at the ends of the ram. The tool head has a downward feed movement which is obtained by lead screw and box nut arrangement. The tool head has a clamping for the tool. It also consists of clapper box. So during the return stroke the tool wont get rubbed with the work piece.

Tool: This is made up of High Speed Steel, which is mounted on the tool head. Since dhe tool is more hardened it helps in easy removal of the material.

Vise: The vise is also made as per the procedures that are followed in building up the tool head. The horizontal movement of the vise is obtained by lead screw and box aut arrangement.

Base: Then the base for the machine is obtained by placing four legs at four ends of the barrel. Thus the legs are used for increasing the ground clearance.

ASSEMBLY: First the hydraulic cylinder is placed inside the barrel. Then one end of the piston is connected to one end of the barrel. So that when the piston moves barrel also starts to move along the direction of the piston. Then the tool head is welded at both the ends of the barrel. Then the vice is classped on the lead screw arrangement. Then the lead screw is welded to the base. Then the sole arrangement is placed over the legs. So that it keeps the ground clearance high

SPECIFICATION OF DOUBLE HEADED SHAPER:

1. Maximum length of the stroke : 100 mm

2. Maximum crosswise movement of the table : 25 mm

3. Type of driving mechanism : Hydraulic

4. Maximum pressure : 10 bar

5. Type of shaper : Plain.

6. Floor space : 30 x 20 cm

7. Nett weight : 8 kg

PERFORMANCE TEST: Four types of performance is carried out. They are, Performance test between Double headed shaper and Single headed shaper. Performance test between Hydraulic drive and other drives. Performance test between Double headed shaper and Single headed shaper by considering Power consumption. Performance Test between Double headed shaper and Single headed shaper by considering the required number of operators.

3. CONCLUSION

Project work forces the students to gain the experience in the field of design, material, cost, estimation, selection of material and purchasing. We also want to thank our institution for excellent facilities and which act as a training for us. So in conclusion we wish to thank the the Directorate of Technical Education for offering us an opportunity to gain a practical knowledge in the field of engineering by including the project work as a part of our curriculum. In selecting the project work we had to go more libraries and we need to refer more books. From that we got many ideas about our project. While designing our project we had to of problems and we solved them by referring several books. We felt it as a humble duty to thanks all those who guided in correct path for the successful completion of the project. While carrying out the

project work process we faced more problems regarding the design and fabrication. But as a team we solved the problems. Thus by doing project it helps in solving more problems by ourselves and also helps to develop self-confidence.

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