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# Developing a Dual-Braking Lever System: Design & Fabrication for Two-Wheelers

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### ABSTRACT

The main motive of our project is to fabricate and develop a braking system mechanically using single lever "FABRICATION OF DOUBLE BRAKING SYSTEM USING SINGLE LEVER" The main purpose of the project is to reduce the unwanted effort of the driver to optimize the accidents. Safety is the avoidance of automobile accidents or the minimization of harmful effects of accidents, in particular as pertaining to human life and health. Special safety features have been built into the car or bikes for years. It is a genuine project which is fully equipped and designed for automobile vehicles.

### **1. INTRODUCTION**

The braking system is an arrangement of mechanism which uses ethylene glycol as a brake fluid, which helps to transfer the pressure from control unit, which is placed near to the driver, to the brake mechanism that is placed near the wheel. The brake system used in the mechanism is a multiple piston system. In most operating automobiles the hydraulic brake system is connected from the master cylinder to the wheel cylinder

A linear hydraulic motor (Hydraulic cylinder) is a mechanical actuator which is used to exert a unidirectional force. These types of cylinders are used in automobiles, industries & civil applications.

## 2. LITERATURE SURVEY

The pressurized hydraulic fluid (oil) gives power to the hydraulic cylinders. The hydraulic cylinder consists of a barrel, which is connected to a piston rod which moves in a reciprocating motion (back & forth). One end of the barrel is closed and another end is kept open from where the piston rod comes out of the cylinder. Piston consists of rings and seals. Piston which is placed inside the cylinder divides it into two chambers, one end is cap end (bottom) and head end (piston rod side).

The common cylinder mountings are flanges and clevises. The mounting attachments are available for pistons to connect the object that is to pull or push.

The hydraulic cylinder acts as the actuator of the system. The hydraulic pump acts as the generator which pumps the regulated flow of oil into the cylinder which helps in the reciprocating motion of the cylinder. The piston pushes the oil back into the reservoir. If we assume that during the extension stroke the oil enters from the cap end and the oil pressure in rod end is zero, the force F on the piston rod is equal to the pressure P in the cylinder and piston area A

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### $\mathbf{F} = \mathbf{P} \cdot \mathbf{A}$

During the retraction stroke, the oil is pumped into the bottom end (rod end) of the cylinder and the remaining oil from the top end (cap end) flows back into reservoir without any pressure. The total fluid pressure is given by the ratio of fluid pressure in rod end to the (piston area - piston rod area)

Where P is the fluid pressure,  $F_{op}$  is the pulling force,  $A_p$  is the piston face area and  $A_R$  is the rod cross-section area.

### **3. DESCRIPTION OF EQUIPMENT**

#### **3.1. HYDRAULIC CYLINDER**

The hydraulic system transmits power from one place to another through the medium of incompressible fluid. These systems find applications in machine tool engineering. It eliminates the complicated linkages like gears, cam and levers and it is more compact in size. These systems do not require any lubrications and the wear and tear of components are reduced

$$P = \frac{F_p}{A_p - A_r}$$



Fig. 1. Hydraulic cylinder

The components of the system are connected by pipe lines. It provides flexibility. By adjusting the quantity of flow of oil by means of valves the step less speed can be easily obtained. The oil provides cushioning effect during shock loads. The life of the components is increased. In

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case of over loading the pressure is immediately relieved. Therefore, the components are protected from breakages.

The oil used is incompressible. The system is very sensitive. This system has an advantage over mechanical system in avoiding backlashes. This system requires very less maintenance. The heat generated in moving parts is carried by the oil. Therefore, it does not require any coolants. This system works on quick return mechanism. The idle time of operations are reduced





Fig. 2. Hydraulic system 3.3. RIME MOVER

The prime mover drives the pump. It is an electric motor directly coupled to the pump.

### **3.4. PIPE LINES AND VALVES**

The various components of the system are connected through pipe lines. Oil is transmitted through pipe lines. The function of valves is to control the pressure, quantity of the fluids.

## 4. DRAWING

The hydraulic disc brake for two-wheeler consists of the following components to full fill the requirements of complete operation of the machine.

- 1. Pedal
- 2. Spring
- 3. Hydraulic cylinder
- 4. Brake shoe
- 5. Oil inlet

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### 4.1. DRAWING OF HYDRAULIC DISC BRAKE FOR TWO WHEELERS



Fig. 3. Hydraulic disc brake

## **5.WORKING PRINCIPLE**

The main components of the system are,

- Frame
- Hydraulic cylinder
- Reciprocating hydraulic pump
- Wheel with braking arrangement

The reciprocating hydraulic cylinder is connected to the brake lever. While pressing the pedal the pressurized fuel goes into the hydraulic cylinder with the help of connectors. One of the cylinders is fitted at the front side of the vehicle and the other cylinder is placed at the rear side. The braking ratio is 7:3 for back and front wheel. According to this ratio the hydraulic cylinder is fixed to the wheel.

## **6.CONCLUSION**

This project is very useful for drivers. It is an innovative idea in the field of automobiles. It also reduces the cost of braking systems and the project is fabricated to perform the required task.

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