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Braking mechanisms of the two position drive

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The braking system is the most important system in vehicle. If your brakes fail, the result can be disastrous. Brakes are actually energy conversion devices, which convert the kinetic energy (momentum) of your vehicle into thermal energy (heat). When you step on the brakes, you command a stopping force ten times as powerful as the force that puts the car in motion. All newer cars have dual systems, with two wheels' brakes operated by each subsystem [1].

The function of the braking system is to retard the speed of the moving vehicle or bring it to rest in a shortest possible distance whenever required.

The brakes must be capable of decelerating a vehicle at a faster rate than the engine is able to accelerate it. Normally brakes have to absorb three times the amount of engine horsepower energy in its equivalent form.

The amount of energy that can be absorbed by the brakes depends upon the coefficient of friction of the brake materials, brake diameter, brake surface area, shoe geometry, and the pressure used to actuate the brake. Stopping a vehicle suddenly means very high friction, resulting in high brake temperature.

In recent years, braking system in automobiles has come a long way. Along with the introduction of different brake parts made of carbon fiber, steel, aluminum etc., the adoption of antilock brake systems has really provided better stopping performance in comparison with traditional one.

Generally the brake systems discharge the following functions:

- reduce the vehicle speed
- bring a moveable vehicle to a stop
- keep it stopped when stationary.

This means that brake systems play a vital role in making motor vehicles suitable for practical application. They are essential for ensuring highway safety, which is why brake systems are subject to strict official regulations.

Over the past few years the interest in the problem has been due to the fact of the increased number of vehicles. The number of cars on the roads is increasing every year, and the safety of passengers is becoming one of the important issues in vehicle design.

The safety of traffic vehicles moving at high speeds is determined by the efficiency of the brakes. Small brake forces are often the reason of road accidents, and non-simultaneous braking causes the car to skid on a slippery road. If dirt gets between brake drums and pads, in case of breakage and weak action of springs of brake pads, the brakes get jammed. When air enters the brake system, pedal springs and rests against the floor, and to ensure braking, you need to press the pedal two or three times. All of these malfunctions affect the safety of a vehicle and should be removed before using the car [2].

The brakes should be constructed in such a way as to make it possible to rapidly reduce the speed of the vehicle and stop it in different driving conditions.

After learning all structures and requirements for hydraulic brake systems, we decided to improve it. To fulfill all the requirements and to obtain the best result, in the hydraulic brake system of a loader we installed the braking valve. Two-stack braking valve was installed to the system to increase the reliability of the vehicle.

Braking valve is one of the main devices in hydraulic brake system. It is necessary for the smooth operation of the braking system. If one of circuits fails, the brake valve automatically switches the flow of brake fluid in serviceable circuit, and thereby the car stops pressing the brake pedal.

We have designed a hydraulic braking valve with the required characteristics for proper operation of the braking system. After that we tested this device, and its advantages were revealed. The braking system was improved by establishing a braking valve into the system. In comparison with the old system the new one has the following advantages:

- the increased reliability of the braking system;
- the reduced cost of maintenance work;
- the increased operation speed of the system;
- the reduced breaking length of a vehicle;
- the increased driver safety during the movement of a vehicle.

Efficient and reliable breaking system can increase export sales of the vehicles produced in our country. The improved braking system can also increase safety of a driver and passengers which always remains one of the most important criteria in the use of a vehicle.

References:

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