



Brake Defects in Mechanical Brakes.

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Abstract –

Safety of technical systems and importance of applying this technique is highlighted. Failure analysis is notably necessary for systems whose failures result in the endangerment of individuals safety, such as, for instance, the braking system of motorized vehicles. For the failure analysis of the thought-about device, it's necessary to grasp the structure, functioning, operating conditions and all factors that have a bigger or less influence on its responsibility. By formation of the fault tree of drum brakes in braking systems of economic vehicles, it had been established a causative relation between the various events that result in a discount in performance or complete failure of the braking system determination of the criticality degree of drum brake's components on the reliable and safe operation of the braking system is performed

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Keywords- Motorized Vehicles, emissions, established.

1. INTRODUCTION

Leaking hydraulic lines, brakes that overheat, discs that don't seem to be properly put in, and calipers that crack area unit simply some potential brakes defects.

When a brakes fails, you'll lose all braking power and be unable to prevent or prevent the vehicle. Brakes will become “mushy,” providing you with partial braking power however failing to slow or stop the vehicle quickly enough to avoid Associate in Nursing accident. Brakes will grab, inflicting the vehicle to suddenly jerk to a stop unexpectedly. Defective brakes may also pull to at least one aspect, inflicting you to travel off the road, into oncoming traffic, or in some cases, inflicting a change accident.

1.1 Literature Survey

Serial number	Title of paper	Author and year
1	Defective braking system	Jacoby & Mayers law office
2	Brake Failure and its Effect on Road Traffic Accident in Kumasi Metropolis, Ghana	Seth Daniel Oduro Design and Technology Department 2012
3	Causes of Vehicle Brake Failure	Shaojun, Hao, Xiaomeng. 2017
4	Common Problem with Brake drum	Chetana Khandar and Sharda Kosankar.2014
5	Braking System	Johnson 2016

2.2 Mechanical Brake defects.

Mechanical brakes all act by generating frictional forces as two surfaces rub against each other. The stopping power or capacity of a brake depends largely on the surface area of frictional surfaces as well as on the actuation force applied. The friction and wear encountered by the working surfaces are severe. Thus, the durability of a brake or service life between maintenance depends heavily on the type of material used to line the shoe or pad.

Brake failure in an automobile can be serious, and each year leads to hundreds of car accidents. Some of these accidents result in serious injury or death and in all likelihood could have been avoided if the driver had noticed the signs of brake failure.



Fig No 1 Brake Caliper

3. Causes of Brake defect in Mechanical brakes.

1. Owner Neglect

The most common cause of brake failure is owner neglect. Brakes, like many other parts of an automobile, have a limited lifespan and should be occasionally inspected for wear. Although many brands of brake pads and shoes boast a long life, this estimate is based on standard driving patterns. If you find yourself constantly stopping and going in cities or neighborhoods, the life of the brake pads and shoes will be greatly reduced.

Brake Pads

Brake pads can overheat due to excessive use and become hard or brittle. This hardening decreases the ability of the pads to properly grip the wheel rotor disk, increasing the distance necessary to stop the car.

3. Damaged Rotor Disks

Damaged or “scored” rotor disks on the wheel can decrease the life of your brake pads, making stopping more difficult. Have your rotor disks smoothed or “turned” by a trained mechanic when your brake pads are replaced.

4. Leaking Hydraulic Fluid

Oil or other hydraulic fluid can leak from your car’s engine or brake lines. If you find stopping has become difficult, have your brakes inspected to rule out any contamination from a leaking hydraulic line.

5. Driving Through Mud or Water

Driving through mud or water will naturally “lubricate” your brake pads and rotor disks. Gently tapping the brakes can help remove excess water and re-establish the proper friction between your car’s brake pads and rotor disks. As always, use caution when driving in wet conditions, especially when your car’s wheels are partially submerged in water.

6. Loss of Hydraulic Brake Fluid Pressure

Loss of hydraulic brake fluid pressure will decrease your ability to stop quickly. If you find your brakes do not seem to work at all or are working only modestly, tap the brakes several times to help force fluid throughout the brake system. Though effective in helping stop your car, this technique should not be used unless absolutely necessary. Have a certified brake specialist check your brake system for any leaks and refill the reservoir with brake fluid.

7. Overloading Your Automobile

Overloading any automobile will change its ability to stop and can potentially damage the braking system. Only load your car as suggested by the owner’s manual..

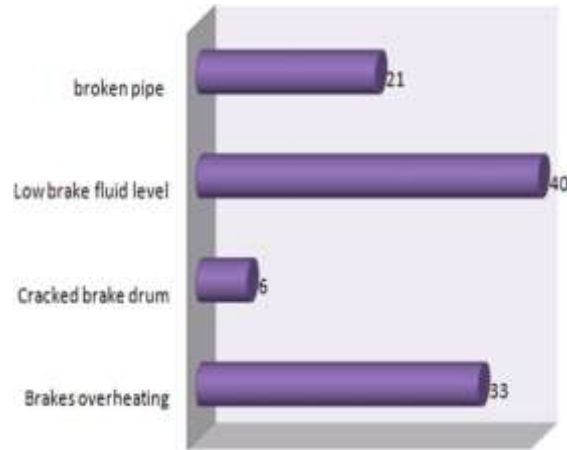


Fig No 2 Causes of Brake Failure

Rotor Trouble

The discs in a disc braking system are also called rotors and these parts can warp over time. When you step on the brakes, the brake system's master cylinder pushes brake fluid through to the calipers which, in turn, shove the brake pads up against the rotors. Rotors can warp due to the constant pressure from the pads. They can also overheat, as the friction caused by the pads is unbelievably hot.

Pad Trouble

The brake pads do not come out of this deal without their own sets of problems. The friction caused by the pads wears down the pad surface and constant friction glazes the pads. Brake pads are made from steel backs with pad material on top of it. The material wears down and the pads must be replaced once the material is nearly gone. It can also overheat if you're riding your brakes, i.e. glaze.

Caliper Trouble

As mentioned above, the calipers use brake fluid to press the brake pads into the rotors and stop the car, truck, or SUV. The calipers are made up of moving parts, including pistons, and if a piston seizes, the caliper will fail. Calipers can also get road debris stuck in them, which might cause your vehicle to pull to the right or left when you apply the brakes. Finally, calipers can warp just as rotors can.

Fluid Trouble

Finally, brake fluid is the blood of your automobile's braking system and it can leak or overheat. Both scenarios equal danger. Fluid leaks are generally caused by a problem with the master cylinder or brake lines, and a brake system low in fluid makes stopping your vehicle difficult. Overheated brake fluid will cause your brakes to fail, so pay attention to any burning smells while you drive and stop.



Fig No 3 Car Accident due to Brake Failure

Causes of Brake ineffectiveness:-

Invariably, 195 of the respondents representing 40% suggest that the major causes of brake ineffectiveness is the presence of air in the braking system. Hesiler (2001) who conducted study on the hydraulic braking system concluded that, the presence of air in the hydraulic braking system makes the system become ineffective because much of the drivers' effort will be used to compress the air leaving very little to pressurize the brake fluid thereby causing brake failure. Again, 111 (23%) of the respondents indicate that vehicle overloading could possibly make the brake become ineffective. According to Mudd (1972), under normal load condition, when brakes are applied about 60% of the vehicle weight are transferred to the front wheels so when the vehicle exceed its normal load (overloading) the possibility of excessive load being transferred to the front wheels could force the vehicle to move forward even

though the brakes are fully applied. However, only 22(5%) of the respondents suggested that automatic brake adjuster malfunction could cause brake ineffectiveness.

Causes of brake ineffectiveness	Number of respondents	Number of respondents
Air in the braking system	195	40
Grease or brake fluid on lining	45	9
Incorrect brake adjustment	60	12
Uneven tyre pressure	52	11
Automatic brake adjuster not working	22	5
Vehicle overloading	111	23
Total	485	100

4. Brake Failure Result In Accident

The drivers were asked whether brake failure could result in accident. The summary of their response are presented in Fig

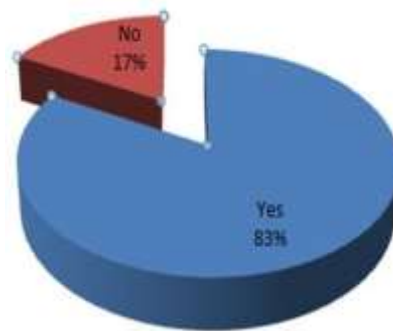


Fig No 4 Brake Failure Result in Accident

From the result of the study, 402 (83%) agreed that brake failure could possible result in accident and proper precaution needs to be taken to avoid such situation. However, 83(17%) of the respondents did disagreed and said brake failure could be handling without necessary causing accident. Mudd (1972) stated that brake failure is a fault where the brake fails to response effectively during brake application and this fault makes the vehicle very difficult to handle.

Frequent brake defects	Number of respondents	Percentage (%)
Brake pedal hard Back plate loose or broken	190	39
Excessive brake pedal travel	35	7
Brake pedal soft Brake drag	102	21
	133	28
Total	25	5
	485	100

5. Recommendation and Conclusions

In conclusion, motor vehicle accident can be fetal and constitute a high economic burden. Accident also imposed high intangible cost (i.e. pain, grief and suffering). The study recommends that law enforcing agencies should ensure vehicle users maintained their vehicles most especially the brakes. Also, the National Road Safety Commission (NRSC) and the Driver and Vehicle Licensing Authority (DVLA) should intensify their campaign on regular brake servicing checks in the country. Additionally, the Motor Traffic and Transport Union (MTTU) division of the Ghana Police Service should introduce brake servicing cards which qualified workshops should be given to drivers after servicing their brake and this law should be enforced by the police.

6. Acknowledge

We would like to thank Deogiri engineering college of Aurangabad India that provided the support to conduct this research. We would also like to thank Prof. V.V. chahare Sir for guidance. Our vision expressed in this paper.

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