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A Review on inspection & testing in braking system

Varad Burkule[1], Vinod choudhari[2], Omkar choudhari[3]
[1,2,3]Third Year, Department of Mechanical Engineering, Deogiri Institute of Engineering and Management Studies, Aurangabad, Maharashtra, India.

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Abstract: *This paper proposes to the inspection and testing methodology in braking system of the vehicle which includes the determination of stopping time ,distance and declaration level, braking performance, various surfaces important factors which should considered while checking the overall system for the safety purpose*

Key words: *testing , inspection , braking system , vehicles , automobiles*

I.INTRODUCTION

One of The most important safety system in the vehicle or in automobile are the brakes. Which allow you to control the speed or to stop the vehicle instantly whenever it is needed. Which can help you to save your life in the event of major accident. And also there are some common issues of the braking system which should be examined or should be inspect or tested & get repaired to ensure the safety of the persons and vehicle as well. And as per the safety regulations and standards given by the government and its bodies it is mandatory to inspect the overall braking system over a particular period of time. various types are there to inspect and test the vehicle like visual inspection ,test drive, brake fluid analysis, Brake Hose and Line Inspection ,Undercarriage Inspection Wheel Component Inspection Assessment of Braking Components etc.

II.LITERATURE REVIEW

Authors 1. Xu, Z .2. Yang, [1] this paper concludes that Potential failure modes associated with the complete or partial loss of braking capability of **a** computer controlled brake system were identified using fault tree analysis. Three different fault detection schemes based on the residual error detection theory were proposed. Idea of closed loop system detection was introduced to increase the robustness of detection against parameter shifts and modelling inaccuracies. Finally, implementation of the detection algorithm on the brake system test bench proves the effectiveness of the proposed scheme.

Author 1. Vytenis Surblys 2.Edgar Sokolovskij [2] this paper conclude that after the analysis of dependence of the braking force in load carrying vehicle with the hydraulic braking system on pedal pressing force the following conclusions may be provided one if the dependence of the braking force variation on the pedal force is known the value of braking force when the mass of vehicle confirm the maximum possible mass maybe forecast rate second the dependence of braking force growing on the pedal pressing force is linear third on change of axial load the changes of the braking force depends on the pedal racing force are inconsiderable

Author 1.Santhiya Rajan, 2.R.Rameshwari, 3.Suresh Gunasekaran [3] this paper concludes that therefore, in this work we have presented deep learning object detection based automated brake inspection system for brake parts. Faster RCNN and SSD deep learning algorithms were utilized to detect the faulty regions on the surface of components. The developed system is found to deliver an accuracy of 95.64% with an error rate of 5.6 and the model takes approximately
0.42 seconds to process a single test image. Therefore, through this researchwork, inspection of brake components was automated using deep learning based algorithms.

Author 1.Bhau Kashinath Kumbhar 2. Satyajit Ramchandra Patil 3. Suresh Maruti Sawant [4] A Comparative Study on Automotive Brake Testing Standards this paper concludes that This article makes an effort to provide an overview of the automotive brake testing methodology followed in general. Along with the types of brake tests. It provides some details about the general requirements as well as the instrumentation required. The comparative study presented to help gain insights into the three brake testing standards, viz. IS, ECE and FMVSS. This comparative study, the authors believe, shall be useful for the policy makers,

Authors **xuebin liu*, chenbin ma, yu jiang, lingli zhang, yangang xue [5]** research on anti-lock braking system of electromechanical braking vehicle based on feature extraction abs system, as one of the important devices that affect the braking safety and driving safety of automobiles, requires not only highly reliable hardware design technology, but also reliable fault diagnosis capability. in the process of automobile running, abs control unit constantly monitors the wheel speed information sent from the wheel speed sensor, and processes and analyses it through the built-in control algorithm, electro-

mechanical braking system (EMB) is sensitive and efficient, and can achieve braking performance that conventional hydraulic braking system can't achieve, which is the development direction of vehicle braking system in the future.

III.INSPECTION & TESTING OF BRAKING SYSTEM

The inspection of the braking system is important aspect or factor which should be done on regular basis to ensure the safety of vehicle and to save yourself form major accident.

Inspection of the braking system includes various methods given following:

- **Methods of inspection & testing of brakes**

1. **Test drive:** The mechanic should drive the vehicle to notice the problems getting to driver. It will help to inspect the particular problems fluctuations, sounds, smell or any abnormal things. From this it will give us brief idea of the problem of the vehicle and what should be solution of the problem.

2. **Visual inspection :** The specialists can then pop the vehicle's hood to visually examine the brake cylinder, brake lines, power boosters, vacuum hose, and therefore the combination valve and appearance for any wear, damage, or leaks in these elements.

3. **Brake Pedal inspection**
   The brake pedal is checked for necessary things:

a) **Brake Pedal Height:** This refers to the measuring of the brake pedal to the vehicle's floor once at its end
b) **Brake Pedal Free Play:** this can be the gap of however so much a pedal moves before cylinder starts to use brake pressure to the brakes.
c) **Brake Pedal Reserve Distance:** The reserve distance is that the distance between the brake pedals to thevehicle's floor once the brakes get applied.

4. **Brake fluid analysis:** A brake fluid should checked by the expert with the help of test strip which deeped into the fluid to check the condition of the fluid .The test shows the condition of that fluid is good or not or there is need of refilling . Brake fluid is important because it applies the pressure onthe brake pads and active the brakes

5. **Brake hose and line inspection:** The technician have to also check the hoses and lines .there can be a leak in lines in the lines if the master cylinder is low .also check the moisture and cracks on thehose, line.

6. **Undercarriage inspection:** The under carriage wear, leaks or damages should be check by the inspector (technician) it should also include the mounting brackets, front brake hose and also include other abnormalities

7. **Wheel Component Inspection:** The technicians then lower the vehicle because it remains on. the wheel bearings for excess movements or hazards. They have to take away the wheels to examine the lug nut hules and therefore the hub for any damage the caliper assemblies must be checked to ensure there are not any leakage or rusted caliper slides. Brake motors also checked for physical damage.

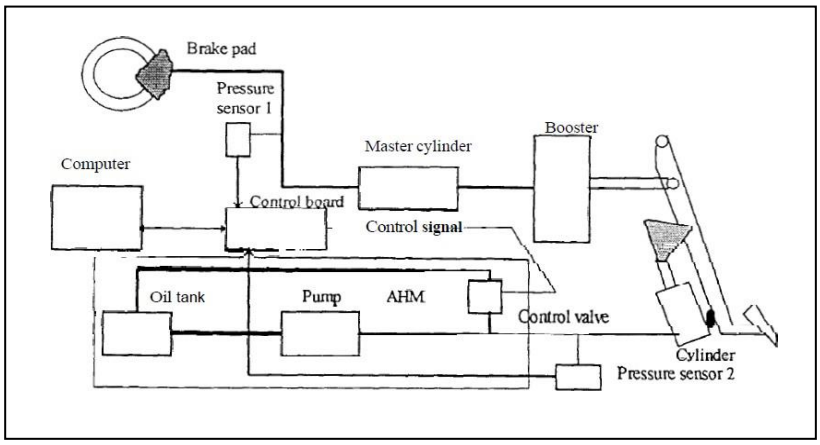

Fig. Schematic of brake test bench

A Brake system consists of a brake pedal, a hydraulic brake cylinder, a booster, a hydraulic cylinder, an impact valve unit, a pump, an electronic instrument panel, a computer, and a few pressure sensors. The hydraulic cylinder, control valve,

pump, electronic instrument panel, and laptop in conjunction with pressure sensors are the devices accustomed stick with it effort in automatic brake management. In braking mode, the pump keeps running, and pumps hydraulic fluid to the valve. Once the management valve is open, the hydraulic fluid is came to a reservoir tank. Once the valve is closed, the fluid goes into the cylinder wherever the hydraulic pressure is being designed up. The pressure will move the piston of the cylinder thus on push the operation rod of the booster. As a result, brake is applied. The longer the valve is closed, the upper the hydraulic pressure in the mechanism and also the braking pressure. If when a short time, the management valve is reopened, the pressure within the cylinder are going to be reduced. Force by springs (not shown within the figure), the piston and operation rod can move back; the braking pressure are going to be reduced. The hydraulic cylinder is connected to the pedal bar in such the way that manual brake management is always potential with none impact on the mechanism.

According to the on top of description, the braking pressure will be controlled by gap and closing the management valve. So within the automatic management mode, the management input of the brake-actuator system is that the opening/closing command to the valve; the output of the brake-actuator system is that the brake-line pressure. The controller (the pc and also the electronic management board) generates management signals (opening and shutting commands) that are sq. waves with fastened frequency and magnitude and adjustable wave dimension, and are called pulse dimension modulated (PWM) signals. Once the management signal is high, the valve is closed, and once the management signal is low or zero, the valve is open. The share of the wave dimension in an exceedingly wave amount is named duty cycle. The controller can control the braking pressure by ever-changing the duty cycle of sq. waves.

IV.CONCLUSION

This paper can be useful to the various automobile or automotive workshops to inspect and testing of the braking system and it is also useful to trainees and students .this paper includes some correct and proper methods, importance of the braking system in any vehicle. And the inspection and testing of the braking system.

References

1. *Authors 1. Xu, Z .2. Yang, [1] brake system analysis ,reliability testing and control using bench experiments California path program institute of transportation studies university of California, Berkeley*
2. *Author 1. Vytenis Surblys 2.Edgar Sokolovskij [2] research on vehicle break testing efficiency international scientific conference transbaltika 2015*
3. *Author 1.Santhiya Rajan, 2.R.Rameshwari, 3.Suresh Gunasekaran [3] Automotive Brake Part Inspection and Fault Localization using Deep Learning*
4. *Author 1.Bhau Kashinath Kumbhar 2. Satyajit Ramchandra Patil 3. Suresh Maruti Sawant [4] A Comparative Study on Automotive Brake Testing Standards*
5. *Authors xuebin liu*, chenbin ma, yu jiang, lingli zhang, yangang xue [5] research on anti-lock braking system of electromechanical braking vehicle*
6. *https://nubrakes.com/blog/brake-inspection/*