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# Design and Manufacturing Of Brake Wear Indicator

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***Abstract—*** *Brake pad wear sensors are small metal tabs on the backing plate of a brake pad. They are designed to contact the brake rotor surface and send the alarming signal to the user. The Project work presented in this report is based on design and fabrication of mechanical brake wear indicator with low cost and reusable sensor.*

***Keywords— Brake wear indicator , brake pads , caliper , brake rotor , springs.***

## I. INTRODUCTION

The most common type of service required for brakes is changing the pads. Disc brake pads usually have a piece of metal on them called a wear indicator sometimes, deep scores get worn into brake rotors. This can happen if a worn-out brake pad is left on the car for too long. Brake rotors can also warp; that is, lose their flatness. If this happens, the brakes may shudder or vibrate when you stop.to Avoid all these problems we should required to joint brake wear indicator on brake pads.

When enough of the friction material is worn away, the wear indicator will send the alarming signal to user. This means it is time for new brake pads. A Brake wear indicator is used to warn the user and/or owner of a vehicle that the brake pad is in need of replacement.

### 1.1 Problem Definition

#### 1.1.1 Problem statement

Due to regular use of brakes while driving in various conditions such as traffic jams , poor road conditions etc. the user uses the brake frequently which leads to wearing of brake pads. Also in racing cars, heavy duty vehicles and trains the braking system should work properly. If the brake pads wear out beyond the permissible limit then braking system may not work properly this may lead to major problem to user. Due to rapid wearing of brake pads so in order to warn the driver we are adding a safety feature known as “Brake Wear Indicator System”.

## II. OBJECTIVES

Our aim is to manufacture mechanically working sensor which will works on mechanical spring force. this will add a safety feature in budget vehicles which can warn the user about the wear of brake pads which will be available at low cost and can be reused.

A .Currently the brake wear indicator is available only in luxury cars and the cost of the sensor system is very high so our main objective is to make a brake wear indicator which will be available at low cost.

B .The brake wear sensor available in market wear out with brake pads and cannot be reused. We are making a brake wear sensor which can be reused no of times.

C .In India the brake wear sensor is not available in budget vehicles. Our system can be implemented in budget vehicles.

## III. METHOD

### 3.1 Step 1- Design of components

Here we design the “BRAKE WEAR INDICATOR” to indicate the user about wear of brake pads. Which has following component:

- Metal body.
- Plunger.

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- Springs.
- Metallic plates.

### 3.2 Step 2- Selection of material

In this stage we select the appropriate material for the respective components considering various parameters like the forces and environment it is exposed to and also the cost and availability of the material. Therefore we select brass and carbon steel for fabrication.

### 3.3 Step 3- Solid modelling

In this stage we prepare a 3D model of the machine based on our design of our components and assemble it to get a rough idea about the size, fit and aesthetics of the machine.

### 3.4 Step 4- Fabrication

Here we manufacture the manually operated brake wear sensor which is not available as stock in the market. We have designed the indicator system as the design is complex and due to lack of resources, Fabrication will be done under the guidance of expert.

### 3.5 Step 5- Assembly of system

This is the final stage where we assemble every components in the system and check for the desired working and output of the indicator here we implemented the brake wear sensor on the brake calliper.

### 3.6 Step 6- Testing of System

After completion of the fabrication and assembly we will carry a test on the sensor which will be mounted on the calliper which is placed over the disc rotor and driving it by a motor through linkage and this by applying the brakes after certain time interval we will see the wear indicated through LED Lights. In this stage we select the appropriate material for the respective components considering various parameters like the forces and environment it is exposed to and also the cost and availability of the material. Therefore we select brass and carbon steel for fabrication.

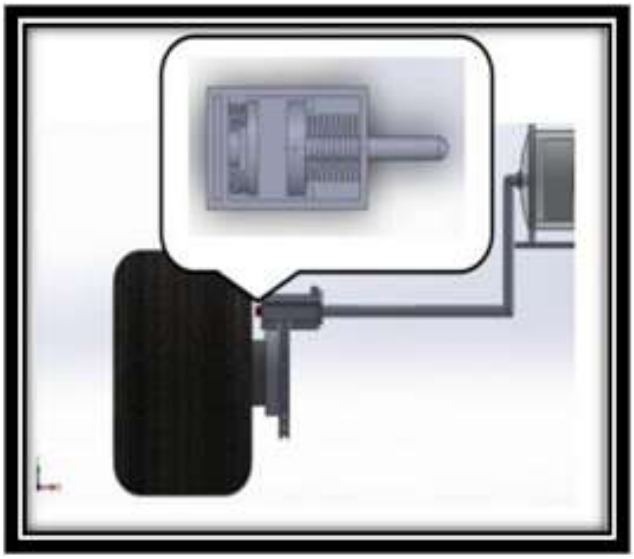

**Fig.3.1**

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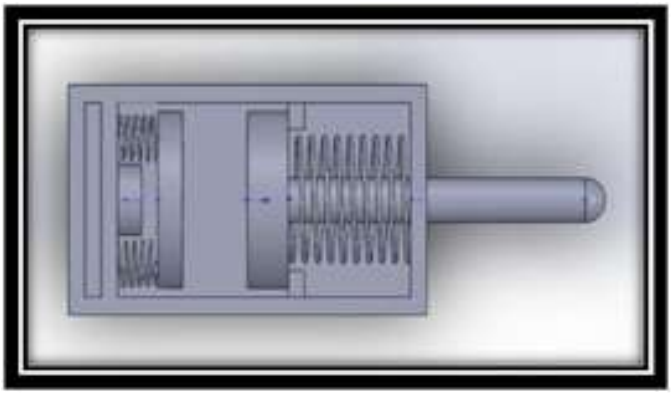

**Fig3.2**

## IV. CONSTRUCTION AND WORKING

The Brake Wear Sensor consist of following parts: Body, Plunger, Disc A, Disc B, Disc C, Springs etc. The sensor will be attached to the brake calliper and the plunger is inserted inside the brake pads. When driver applies the brake the Plunger will comes in contact with rotor disc. As the Brake pads wear gradually the disc A which is attached to the Plunger will move towards disc B. As soon as the pads wear below permissible limit that is 4mm, disc A touches the disc B and the first alert signal will be indicated .If driver does not change the brake pads within allowable time that is when brake pad thickness goes below 2mm, then disc B touches disc C and final warning will be displayed.

## V. CONCLUSION

Currently the brake wear indicator is available only in luxury cars and the cost of the sensor Low cost system is very high so our main objective is to make a brake wear indicator which will be available at low cost.

Can be reused: The brake wear sensor available in market wear out with brake pads and cannot be reused. We are making a brake wear sensor which can be reused no of times.

Available for all kind of budget vehicles : In India the brake wear sensor is not available in budget vehicles. Our system can be implemented in budget vehicles.

## REFERENCES

[1] Xing Ping Lin, Mark Baker , "Brake pad wear sensor" ,2018 ,pp.
[2] Manfred schoenauer, wolfgang pahle , markus bartel, "Method and system for analyzing the wear behavior of brake pads, 2018
[3] Masayuki Ueda , Isao Ishiguro, "disc brake pad and assembly",2018
[4] Craig Schaefer, "Proximity sensor for brake wear detection" ,2016
[5] Byron E. Cornett, "Heavy duty brake drum wear indicator",2015
[6] Darren Wong,Trevor Mariner, "brake sensor" , 2015
[7] Wayne-Ian Moore, "Brake pad assembly with wear indicator" ,2015
[8] Martin Stumpf, Wolfgang Falter,
"Brake lining wear indicator ,disc brake having such an indicator and brake shoes for such a disc brake,2015
[9] Douglas D. Moseley, "Brake temperature and wear indicator " , 1987
[10] Clark E. Quinn, Rochester, "Brake lining wear indicator by sensing adjustment link condition" ,1967