

Prolong Brake Indicator System

Nilkanth Velhal¹, Devendra Sabale²

¹Shraddha Engineering Works, Satara, Maharashtra, India

²C-DAK, Pirangut, Pune, Maharashtra, India

Abstract

In India, the number of two wheelers is far more than the number of four wheelers. As the cost of the two wheelers is less and they are easy to maneuver in traffic, the number of these vehicles is going to increase with the time. So it is important to focus our attention equally on the two wheelers as it is focused on four wheelers. The quantity of these two wheelers can make all difference. Even a small improvement in the field of performance of two wheelers will have a great impact on the economy. So the performance these vehicles should be high such that they will give the optimum results.

Keywords: Brake pad wear, Prolong Brake indicator, indicator with delay.

1. Introduction

If we consider the Pune district, the household survey depicts that the percentage of two-wheelers in Pune district is 48.8% means families in every second house own a two wheeler in Pune district. So with such a large number of two wheelers, even a small error will have a big impact as a whole.

Now we will consider the two wheelers only. Nowadays the traffic in the cities is getting worse. The driver has to apply brakes very frequently. Much of energy is wasted because of braking, but it is essential to stop the vehicle. But by facing regular traffics, drivers find it tedious to apply brakes and then release them. They involuntarily keep applying the brakes. They forge to release the brake. This happens many a times in case of rear brakes when it has to be applied by the right foot. People use the brake pedal as a stand to keep their foot. This leads to the continuous application of the brake. This also happens when the brakes are in hand. This continuous application of brakes leads to the faster wear out of brake pads. The brakes do not perform efficiently and more force is needed to apply the brake. So a new system has to be developed so that the driver will become aware that he is applying the brakes longer than required.

2. Prolong Brake Indicator System

The prolong brake indicator system will alert the driver when brakes are applied for longer duration than required. In this system, a small indicator will be provided in the vehicle's dashboard. The system will light red light emitting diode when brakes are applied more than predefined time period. This predefined time period will be just higher than the normal time required for application of the brakes. For an example it can be considered as five seconds. If driver applies the brakes for more than five seconds, the red light will be on and the driver will get notified. This will avoid unnecessary braking actions and thus will improve the overall performance of the vehicle.

2.1 Working of Normal Brake Indicator System

The working of this system is very simple. It is generally present on the rear side of the two wheelers. When a driver applies brake, the rear light gets on so that the preceding driver will know that the front vehicle is slowing down. This helps to maintain a safe distance between two vehicles.

2.2 Parking Brake Indicator System

The indicator system is also observed in all four wheel vehicles. It is provided for the parking brake notification. Generally while turning off the vehicle, drivers apply parking brake. But while turning on, it has to be released. So if driver turns on the vehicle, the notification of parking brake will appear on the vehicle's dashboard. The notification indicates that the parking brake is applied and need to be released before moving the vehicle. If vehicle is drove with keeping parking brake on, it will result into overheating and premature wear of the brakes. The same arrangement can be used in Prolong Brake indicator system with some minor changes.



Fig.1.Parking Brake Indicator

2.3 Working of Prolong Brake Indicator System

In Prolong Brake indicator system, the driver has to be get notified after fixed amount of time. So a timer has to be present in the system, for an example with a delay of five seconds. So when the brakes are applied continuously for five seconds, then only the indicator present on the dashboard will turn on. This will act as an indicator as well as a warning to the driver. The driver will come to know that he has applied the brakes for longer duration than required.

3. Details of Prolong Brake Indicator System

The Brake Indicator is a system which will notify the rider when he has continuously applied the brakes for longer duration than required. The system will turn on the indicator only when the rider applies the brake continuously more than the predefined time.

For example, if a rider applies the brake continuously for 8 seconds and still is pressing the brake liver. The vehicle is equipped with the Prolong Brake Indicator System with predefined time period of 5 seconds. So after the time duration of 5 seconds, the rider will get notified by an indicator that he is applying the brake longer than required.

So this will avoid the unnecessary braking action and will have the optimum braking. This will also ensure that premature wearing of brake does not take place.

The needless braking also turns on the rear brake light indicator, which can confuse the following riders about the progression of the vehicle. The following rider always remains in dilemma whether the vehicle is stopping or is continuing its course. This system will ensure that proper

braking practices are followed so that following rider will not have any dilemma about the progression of the vehicle.

This indicator will be located on dashboard. Generally all other indicators and buttons are located at dashboard. So it is convenient for a rider to get all information from dashboard at a glance. Thus the most convenient place for Brake System Indicator is dashboard.



Fig.2. Normal two wheeler dashboard



Fig.3. Proposed Prolong Brake Indicator

3.1 Use of Red light in an indicator

Red is the colour which is easily noticeable. It has been used as an indicator of danger or warning. So in Prolong Brake Indicator System it is better to use red colour as an indicator to grab the attention of rider. As the red indicator will blink, the rider will get the message that he has been applying the brake longer than the optimum duration.

4. Normal Two Wheeler Brake System

4.1 Approximate life of a brake pad

Drum brakes are generally preferred because they are cheaper as compare to Disk brakes in case of 2 wheel vehicles. It contains rotating drum mounted on the wheel and two semicircular brake shoes attached on stationary back plate. The pressing of brake shoes on rotating drum causes friction resulting in braking. Average life of brake shoes in case of drum brake is 10000 kilometer for accurate braking system.

Disc brakes are used in most of bikes which are with engine capacity above 150 cc as they are more efficient. Disc brake consists of a rotating brake disc mounted on wheel and two friction plates are positioned on either side of the disc. The pressing of the stationary brake pads on the revolving disc causes friction resulting in braking. Average life of friction plates in case of Disc brake is 15000 kilometer for accurate braking system.

4.2 Cost analysis of Brake system

Cost of a new brake shoe and a drum is approximate 250 INR and 1100 INR respectively. Some of the bikes don't have separate assembly of drum; it is directly attached with alloy wheel. In such case if drum is worn out due to improper braking practices, it is quite expensive as its cost is 2500 to 3000 INR respectively.

4.3 Effects of bad Braking habits

- Generation of irritating sound during braking.
- Pulling to one side, or "grabbing".
- Loss of brake pedal.
- Judder of the brake pedal during braking.
- Clicking noises during braking.
- Excessive drag during acceleration.
- Excess heat generation before application of brake.
- Continuous wear of drum.

5. Positive effects of Prolong Brake Indicator System

- Optimum braking at most of the times.
- Excessive wear out of brake pad is avoided resulting into grater life span.

- Increases the effectiveness of the brake system.
- Rider is indirectly trained for idle braking practices.
- Energy lost in friction is saved resulting into lesser consumption of fuel.
- Less friction results into less generation of heat energy. This helps to increase the life of drum or brake disc.

6. Conclusion

The Prolong Brake Indicator system is aimed at reducing the energy wastage occurring during excessive braking practices followed by the riders. It will eventually reduce the excess braking practices and will also make the riders indirectly habitual for proper braking practices. This system is mainly aimed for two wheelers because such system is already present in four wheelers for parking brake.

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