

ANALYSIS ON ACCIDENTS RELATED TO BAD TYRE

Padamati Varma babu¹ | Patnala Chetan¹ | Maradugula Vignesh¹ | Tushar Priyadarshi¹

¹Automobile Engineering, Godavari Institute of Engineering & Technology, Rajahmundry, Andhra Pradesh, India

To Cite this Article

Padamati Varma babu 1, Patnala chetan 2, Maradugula Vignesh 3, Tushar Priyadarshi 4, Guide : Manoj Kumar Roy

“BAD TYRE ACCIDENTS” *bad tyre accidents*, Vol. 09, Issue SI02, March 2023, pp.-140-144.

ABSTRACT

They are the only point of contact between our vehicle and the road and are critical to vehicle handling and braking. defective tyres can cause devastating accidents. a tyre failure may ensure your car goes out of control and cause a car accident with injuries or deaths. according to the national highway traffic safety administration, 2% of all vehicle crashes are thought to be caused by the vehicle itself, with 35% of these accidents involving tyre issues. consider this: in India, there are 15,000 auto accidents caused by problems with the vehicles' tires each year. Is if accident investigation reveals that a defective tyre contributed to or made their accident worse, users may be able to bring a defective products claim against the distributor, manufacturer, or retailer of the tyre. according to the ministry of road transport & highways, bad tires cause around 11,000 accidents each year. moreover, two of the most frequent reasons for vehicle collisions are unsafe driving conditions brought on by winter weather and driving on worn tyres. it is crucial for fleet operators to check that the tyres on their fleet vehicles are neither worn out or underinflated. however even with routine inspections, it might still happen due to regular driving habits. fleet drivers travel around 25,000+ miles per year on average, as compared to non-professional drivers who travel about 12,000 miles per year. hence, their likelihood of tyre wear and tear is higher. it's a dangerous combination when driving in winter weather is added. the main major problem in any vehicle is bad tyres. the tyre must be properly maintained and replaced if the tread wears out.

The main objective of this report is to prevent crash risk and retain the tyres properly.

KEYWORDS: *Various ways of research 1, Accidental analysis 2, Tyre material 3, Tyre pattern 4, Basic maintenance 5*

Copyright © 2023 International Journal for Modern Trends in Science and Technology

All rights reserved.

1. INTRODUCTION

The vehicle loses control on the road as a result of having defective tyres, which leads to accidents. All of this is the result of defective tyres and poor tyre care. As everyone is aware, India's roads are in poor condition, and having worn-out or defective tyres can increase the likelihood of an accident. Worn tyres are especially prone to collision damage and punctures, which could cause a blowout, loss of vehicle control, and a dangerous accident. Yet each year, accidents are caused by worn-out and damaged tyres, which in turn create overheating, a higher danger of punctures, longer stopping distances, or aquaplaning. Other vehicles nearby may also be involved in serious accidents and

inflict further damage to public property in addition to the vehicle with the defective tyre.

The bad tyre can be found out by different ways:

- 1- Tyre age
- 2- Tyre material
- 3- Tyre pattern
- 4- Tyre tread reading

The tyres not only affect the car, but also the people within. In this case, in addition to the passengers feeling more vibrations, discomfort, and weariness, the driver of the car or bike will become exhausted and cause the accident.

2 Tyre age:

Regardless of look, mileage, or actual wear, tyres should be replaced every 10 years. But, before they reach ten years, the majority of tyres will need to be replaced. Their "date of birth" is inscribed on the sidewall of the tyre. Track down a four-digit code. The first two numbers are the manufacturing week (from 1 to 52), and the next two numbers are the manufacturing year.

Tyres develop sidewall cracks as they get older. This occurs when the rubber becomes oxidised by UV rays and dries out. Although anti-oxidizing substances are present in tyres to slow this process down, these substances only function when the tyres are in motion. Your car's tyres will age more quickly if they aren't utilised frequently or if they are kept in storage for an extended period of time. year.



2. Tyre material:

Depending on the season and environment, we use various tyres. These variations could be plain to see, such in the tread depth. In other places, though, they could be more difficult to see or even go unreported. Consider the rubber compound used in tyres: While it might be challenging to tell one compound from another, differing compounds significantly affect the characteristics of tyres

3. Rubber:

The primary elements of an automobile tyre are rubber, both natural and synthetic (also known as polymer). These materials offer a high level of slip resistance and, following processing, the desired flexibility, depending on the variety. In addition, rubber has a short lifespan, is temperature sensitive, and can either become soft or hard depending on the temperature. Natural rubber is harvested from rubber trees on large plantations. The tree's bark is cut throughout the operation, and the milky sap is gathered. The milky sap may

also be referred to as latex. The benefit of synthetic rubber, however, is that its characteristics may be changed. When choosing materials, we, the manufacturer, can make sure that your tyres will keep you safe in any conditions. The majority of materials used to make tyres are rubber.

4. Fillers:

Fillers are typically added to the rubber. Chalk, carbon black, silica, or carbon are examples of these fillers. Since rubber can crumble on its own, especially as a result of breaking, they bond the rubber and increase its resistance to wear. To mitigate this impact and extend the life of your tyres, we employ fillers. Nonetheless, this can somewhat harden the rubber composition.

The colour of tyres is also a result of fillers. The first filler employed, carbon black, gave the tyres their colour. Even after additional fillers and thus other colours entered the picture later, coloured tyres never managed to break through. Tyres are still black because of this.

Unlike the early days, we now use silica in the compound while making tyres. The silicic acid salt is known as silica. This chemical links the rubber and sulphur especially well, which is necessary for the later vulcanization of the tyres. During this procedure, heat is applied to the tyre material to join the chemical bonds of the various constituents and produce elastic rubber. This enables us to offer good mileage without compromising other assets.

5. Accidental analysis:

Reference taken from: - www.tirereview.com

Between 250 and 315 people perish in automobile accidents each day in India. The following issue is brought up by a recent Apollo Tyres survey: How many are the result of the incorrect tyre pressure used by 75% of Indian drivers? -

This year, Nokian Tires has introduced 276 new part numbers as part of Standard Motor Products' bracket-style pothole challenge.

It is challenging to determine exactly how many accidents on Indian roads are caused by inappropriate tyre pressure because under- or over-inflated tyres on passenger cars are

widespread, but the association is probably quite significant, the study found. Tyres that are overinflated are less capable of stopping and more likely to blow at high speeds, which can result in collisions. The handling of a vehicle is impacted by deflated or underinflated tyres, which can result in accidents.



Satish Sharma, Apollo's director of India Operations, stated that the results of the company's most recent assessment of all of India were "very alarming" when it came to something as basic as tyre pressure. It's possible that the level of disregard and ignorance among Indian drivers is the main cause of the accidents on our roads. Due to the alarming statistics, we are required to release this information. Moving ahead, we will provide comparable data, and to further raise awareness, we are stepping up our efforts under the Apollo Safe Driving programme.

6. Tyre pattern:



Apollo Safe Drive was established in 2006 with the goal of educating and increasing awareness among drivers of passenger cars and commercial vehicles about the benefits of proper tyre maintenance. The programme has so far executed 626 campaigns with about 85000 clients in India.

Similar to how an SUV and a racing car each have a unique driving objective, each vehicle's tyres are designed to accomplish a particular goal. The performance of a tyre is significantly influenced by its tread pattern. The variations in design are intended to accommodate various driving habits and road conditions. Some tyres are meant to boost road traction, others to flush out small stones swallowed during driving, still others are made to prevent aquaplaning, and so forth. Overall, the tread pattern imprinted on the tyres is not just a "design," but rather is carefully constructed. Let's investigate the several intriguing tread designs used by tyre manufacturers.

A six-month investigation of 36,000 tyres on 9,000 passenger cars in India's 50 largest cities reveals:

- Only 22% of the cars in the survey had their tyres inflated to OE standards.
- About 44% of autos had underinflated tyres.
- The remaining 34% were underinflated.

This data was acquired from a cross-section of the general population who drive their own cars in housing societies, petrol stations, office buildings, and on the roadways in the morning or the evening when the tyres are cold and thus show the correct inflation. The Transportation Research & Injury Prevention Program at IIT-Delhi estimates that the number of fatal road accidents in India is increasing by 8% year and costs the nation's economy 3% of its GDP.

7. Directional Tyre Tread:

The tread of directional or unidirectional tyres features thick voids or ribs/grooves between tread blocks and a very noticeable broad V-shaped pattern. Here, the grooves' primary function is to increase hydroplaning resistance and transport water through the tread more effectively, especially while your car is moving at a fast speed.

The unidirectional tread tyres, as their name implies, are made to rotate in just one way, and to indicate that direction, an arrow is visible on the sidewall of the tyre. They must be rotated from front to back and from back to front because of the directional configuration of the tyres.

Excellent when it comes to handling snowy conditions and sporty driving is the directional tyre tread specialty.

8. Symmetrical Tyre Tread:

The symmetrical tread pattern, in contrast to directional tyres, has a repeating pattern of grooves across the whole face of the tyre.

Compact/passenger cars that only operate inside city boundaries and are quite durable are the most likely to exhibit this less technical sort of tyre wear pattern. Yet, because they are not normally "go-anywhere" tyres, it is never certain how well they can handle wet surfaces. But their versatility makes them more versatile than any other, and they are also lighter on the pockets.

Specialties of symmetrical tyre treads: cost-effectiveness and road holding.

9. Asymmetrical tyre thread:

This style of tyre design pattern is the antithesis of symmetrical tread, as the name suggests, and is regarded as the best of both worlds. Reason? Asymmetrical tyres have an innovative design that is intended to provide higher traction on flat surfaces while also allowing for upright cornering and handling both dry and wet surfaces. Sports cars typically use these kinds of tyres.

Fundamentally, the design is built so that the inside half has little tread blocks that assist it handle winter or wet roads while the outside layer has a broad tread pattern to handle dry surfaces. The tyre rotation is constrained here. The "outside" and "inside" marks on their profiles typically aid in determining which side of the tyre should be facing the ground.

Specialized asymmetrical tyre treads work best in all kinds of weather.

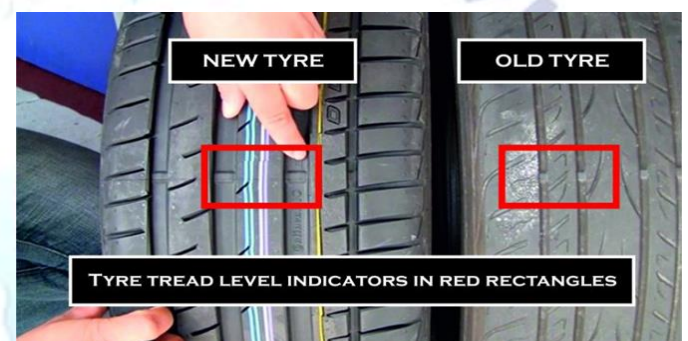
10. Tyre thread reading:

When the tread wear indicators in the main groove are reached, the tyre has worn to the legal limit of 1.6mm; at this point, the tyre needs to be replaced. Do not forget to check the tread depth on all four tyres. - Inspect the inside, exterior, and centre.

The tread depth of new tyres is 8 to 9 mm. The 1.6mm legal minimum tread depth. For summer and all-season tyres, we recommend 3mm at the

very least. For winter tyres, 4mm is the minimum. In 32nds of an inch, the tyre tread depth gauge measures. A good tyre should have tread depth of 6/32 or more. You should start considering replacing your tyres and obtaining new ones if the depth reaches 4/32. You should immediately change your tyres if they are 2/32 or less.

The thread of the tyre is crucial for road wheels. The tyre needs to have more friction, so many companies develop various tyre treads according to the circumstances of the roads in various nations. When it snows during the winter, the road surface will be less frictional, necessitating different types of treading on tyres, both on Indian roads and in foreign countries.



By looking at the level of the rubber, we can determine the tyre threading. Every tyre will have one, and it will allow you to see when the threading on the tyre has worn out. If the thread size is correctly read, we may either change the tyre or recall that it was worn out and proceed with caution when driving.

11. Basic maintenance for a tyre that we can do:

1. All tyres have sufficient air pressure
- 2- The tyre wears
- 3- The threading is obstructed by sharp objects and stones.
- 4- Correctly tighten the wheel nut.
- 5 Use tyres correctly for the conditions of the road.
- 6- We should determine whether the tyre can support the load that is applied to it.

12. Conclusion:

If the tyres are properly maintained, we can be able to prevent road accidents brought on by defective tyres. Bad tyres will bring about accidents and do significant damage to the car. So that they last

longer, we must use high-quality company tyres. There are numerous firms that produce high-quality tyres, including MRF, Apollo, JK, CEAT, Michelin, Bridgestone, Goodyear, etc. New technology also tells us about the tyre presser and everything in the car screen. Hence, if we take care of these things, we can reduce the number of accidents that are the result of defective tyres.

13. References:

- 1.U.S. Department of Labor, Tire and Rim Safety Awareness Program, in Instruction Guide Series, MSHA IG 60. 1996, U.S. Department of Labor, Mine Safety and Health Administration National Mine Health and Safety Academy.
2. Worksafe BC, Tire explodes when truck contacts overhead powerline, WorkSafe British Columbia.
3. United States Department of Labor Mine Safety and Health Administration, Metal and Nonmetal Mine Safety and Health Accident
- 4.Highway Safety Foundation (1972). A second study of relationships between tire tread depth and the likelihood of accident involvement. Mansfield Ohio
- 5.Highways Agency (2002). Safer Road Surfaces – a forward look at skid resistance policy. Leaflet. London: Highways Agency.
- 6.Highways Agency (2003). Design Manual for Roads and Bridges. London: The Stationery Office