

# TO MAINTENANCE OF INDIA ROAD FOR TRAFFIC CONTROL AND SAFETY BY USING ROAD PATTERN

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**Abstract:** Indian roads needs an intelligent transportation system for this, which makes journey safer, time consuming, less accident and many more benefits. Road construction work is well documented in India through an extensive library of technical guidelines, manuals and specifications. As such, the quality standards of road works are well detailed and resulting in high quality outputs reflecting the functional objectives of such guidelines. Maintenance practices vary in different parts of the country. Equally, the environment and traffic patterns show a high level of diversity depending on the location. Finally, it is recognized that the organization of the road sector and its technical and managerial resources vary from one state to the other. It is therefore important to acknowledge that there is no standard solution to be applied in terms of reaching optimal arrangements. Still, there are key issues which apply everywhere and which need proper attention in order to secure adequate and timely maintenance of the rural road network.. The causes behind these accident are many more like drunken driving, over speeding, reckless driving, inflow traffic rules etc

**Keywords** – Data Collection, Road pattern, Vehicle Population, Methodology, and Driver Survey.

## I. INTRODUCTION

The highway maintenance is an important activity which helps in providing better facilities longer life and goods appearance of roads. There is always a close relationship between road design and method of road construction and the maintenance cost of highway. The situation in India is worsening and road traffic injuries have been increasing over the past twenty years. This may be partly due to the increase in number of vehicles on the road but mainly due to the absence of coordinated evidence-based policy to control the problem. These data show that the number of fatalities has continued to increase at about seven percent a year over the past decade except over the last couple of years. Preserving and maintaining the road structure road side facilities and all serviceable condition related to road in their original form and specification when it was constructed.

**Road patterns**-road pattern are very essential in the development of the settlements of a city. However recent development in cities does not give importance to the study of the road pattern that give rise to numerous roads that are not interconnected housing schemes and commercial developments built far away where roads are very distant from the centre of the town. The increasing distance between the residents and commercial hub of the city increases the dependency upon cars. The daily travel chores each household member makes frequently. The emergency response vehicles take to reach a certain pace.

### Types of road patterns

- Rectangular patterns
- Radial patterns

- Radial and block patterns
- Radial and circular patterns
- Radial and grid patterns
- Hexagonal pattern
- linear pattern

**Rectangular patterns**- the rectangular patterns is a plan where the streets and road are in the form of grid or block running particularly into each other thus forming a grid or block. The north nazimabad area of Karachi in Pakistan is a factual example of this type of pattern where the street and road run at an angle of ninety degree into each other. Usually in this type of pattern the streets and roads are far away from each other and it takes a long time to reach the centre of the area or city.

**Radial patterns**- in this type of patterns the network of roads is in the form of circle emanating from the centre of the area. The paradigm of radial pattern can be found at the federal B area of Karachi. This pattern may be further classified into two types depending on its layout.

**Radial and block patterns**- this type of patterns of network is a combination of radial and block pattern. A radial network of road radiate from the centre outwardly with block pattern network of roads in between the radial main streets.

**Radial and circular patterns**- in this type of road patterns the main roads radiate from the central point are connected together by concentric roads that are also that radiating outwardly.

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**Radial and grid patterns-** it is a combination of radial and grid pattern. A radial network of roads radiate from the centre outwardly. The main radial streets are then interconnected by providing grid pattern in between the main street.

**Hexagonal pattern-** this pattern is network of roads that grow in such a manner in various directions forming hexagons.

**Linear pattern-** in this type of pattern the road grow linearly in one direction possibly due to the presence of some natural force such as sea or ocean at one side of the city.

**Common causes of failures in road pavement-**the general causes of pavement failure in road pavement may be due to the the following reasons.

- Poor quality material
- Improper design of road structure
- Defects in construction method
- Improper quality control
- Inefficient drainage system
- Increase in the magnitude of traffic load
- Settlement of foundation or failure of sub grade
- Climatic condition
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**Common type of road failure of flexible pavement-**the common type of road failure occurring in flexible pavement are.

- Formation of pot holes
- Formation of cracks
- Formation of ruts
- Corrugation or wavy surface
- Localized depressions causing surface up heaval
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**Common type of road failure of rigid pavement-**the common type of road failure occurring in rigid pavement are.

- Crack filling or treatment of cracks
- Repair and maintenance of joints

## WHY IS MAINTENANCE IMPORTANT?

Roads are among the most important public assets in many countries. Road improvements bring immediate and sometimes dramatic benefits to road users through improved access to hospitals, schools, and markets; improved comfort, speed, and safety; and lower vehicle operating costs. For these benefits to be sustained, road improvements must be followed by a well-planned program of maintenance. Without regular maintenance, roads can rapidly fall into disrepair, preventing realization of the longer term impacts of road improvements on development, such as increased agricultural production and growth in school enrollment. Postponing road maintenance results in high direct and indirect costs. If road defects are repaired promptly, the cost is usually modest. If defects are neglected, an entire road section may fail completely, requiring full reconstruction at three times or more the cost, on average, of maintenance costs.

Countries need a core road network that carries about 80 percent of national traffic, including key roads in urban areas and roads providing sufficient access to rural areas. Some part of the overall road budget thus has to be spent on

construction and some part on maintaining the core network. But many countries have tended to favor new construction, rehabilitation, or reconstruction of roads over maintenance. This has led to a steady increase in the backlog of road repairs and a loss of development impact

## RESEARCH OBJECTIVES AND METHODOLOGY

The Indian Roads Congress defines road maintenance as “routine work performed to upkeep pavement, shoulders and other facilities provided for road users, as nearly as possible in their constructed conditions under normal conditions of traffic and forces of nature”. Maintenance is “essential to get optimum service from the pavement structure during its life period.”

Maintenance ensures that the road remains serviceable throughout its design life. Maintenance is important because it:

- reduces the rate of deterioration, thereby safeguarding previous investments in construction and rehabilitation,
- lowers the cost of operating vehicles on the road by providing a smooth running surface,
- improves the reliability of the road allowing it to remain open for traffic on a continuous basis and thus contributes to more reliable transport services, and
- sustains social and economic benefits of improved road access.

## MAINTENANCE

Road Maintenance operations are usually grouped according to planning, organisational and funding arrangements. They can normally be categorized as either Routine, Periodic or Emergence maintenance operations.

- **Routine maintenance**
- **Periodic maintenance**
- **Special maintenance**

• **Routine Maintenance** required continually on every road whatever its engineering characteristics or traffic volume. Routine maintenance activities are usually small-scale, widely dispersed, and often performed using manual labour. The need for routine maintenance can to a large degree be forecasted and is scheduled at fixed times during the year.

• **Periodic Maintenance** is carried out in addition to the routine maintenance and will need a more comprehensive overhaul of the road after a certain number of years. It involves more comprehensive and costly activities such as reshaping of the road surface, re-surfacing and major repair or reconstruction of cross-drainage structures and require more equipment and specialist skills. The periodic maintenance works would be scheduled at intervals of 3 to 7 years, depending on traffic levels, pavement type, geographical and weather conditions, quality of the road and the level of wear and tear.

- **Special Maintenance** responds to occasional, unforeseen events such as landslides, washouts, large trees or debris on the road and broken drainage structures. Emergency maintenance can be categorised into (i) temporary restoration works, re-opening safe passage on the road, and (ii) permanent restoration, securing the stability of the road and reinstating all its components to its former (or a better) condition.

#### Used some technical term for road safety.

- Road divider
- Inadequate visibility
- Road maintenance
- Speed of vehicle
- Character of vehicle
- Vehicle size and capacity
- Vehicle wear and tear
- Driver character
- Experience of driver
- Driver vision
- Physical fitness
- Public standard
- Traffic Rule and regulation

#### • DATA COLLECTION

##### Traffic Accidents

- A total of 4,96,762 'Traffic Accidents' were reported during the year which include 4,64,674(93.5%) 'Road Accidents', 2,669(0.5%) 'Railways Crossing Accidents' and 29,419 (5.9%) 'Railway Accidents'. The traffic accidents caused injuries to 4,86,567 persons and 1,77,423 deaths during 2015.
- The percentage share of deaths in traffic accidents due to 'Road Accidents', 'Railways Accidents' and 'Railway Crossing Accidents' was reported as 83.8% (1,48,707 deaths), 14.7% (26,066 deaths) and 1.5% (2,650 deaths) respectively during 2015.
- It observed that the rate of deaths per thousand vehicles has decreased from 1.0 in 2011 to 0.8 in 2015.
- Maximum number of traffic accidents occurred in the month of May (45,215) and as per time period wise analysis, maximum number of traffic accidents (80,113) were reported during 1500 hrs to 1800 hrs(day) of day.

##### Road Accidents

- 53 cases of road accidents took place every one hour during 2015, wherein 17 persons were killed.
- During 2015, a total of 4,64,674 cases of 'Road Accidents' were reported which rendered 4,82,389 persons injured and 1,48,707 deaths.
- Deaths due to 'Road Accidents' in the country have increased by 5.1% during 2015 (1,48,707) over 2014 (1,41,526).

- Tamil Nadu (69,059 cases), followed by Karnataka (44,011 cases), Maharashtra (42,250 cases), Madhya Pradesh (40,859 cases) and Kerala (39,014 cases) have reported the maximum number of road accidents accounting for 14.9%, 9.5%, 9.1%, 8.8% and 8.4% of such accidents in the country respectively.
- Maximum fatalities in road accidents were reported in Uttar Pradesh at 12.4% (18,407 out of 1,48,707) followed by Tamil Nadu (10.5%) and Maharashtra (9.2%) during 2015.
- 29.3% victims of road accidents were riders of 'Two Wheelers'. 'Trucks/Lorries', 'Cars' and 'Buses' have accounted for 19.4%, 12.4% and 8.3% of road accidental deaths respectively.
- The National Highways accounted for 28.2% of total road accidents, followed by State Highways (25.0%).
- Most of road accidents were due to over speeding accounting for 43.7% of total accidents which caused 60,969 deaths and 2,12,815 persons injured. Dangerous/careless driving or overtaking caused 1,46,059 road accidents which resulted in 48,093 deaths and 1,51,231 persons injured during 2015. Besides, 3.7% of road accidents were due to poor weather condition.
- A total of 262 accidental deaths were reported at unmanned railways crossing during 2015.
- A total of 2,54,878 cases and 2,09,796 cases of road accidents were reported in rural areas and urban areas, accounting for 54.9% and 45.1% of total road accidents in the country respectively during 2015. Most of the road accidents were reported at a place near to residential area (24.7% in rural areas and 24.5% in urban areas).

#### Driver survey

Driving in most cities in India is no less than negotiating a war zone. While the lack of proper infrastructure is one of the major causes for the chaos on our roads, our driving habits aren't exactly refined either. The problem though is that most Indian drivers consider themselves to be safe and that is where the gross overestimation of driving skills and underestimation of safety hazards springs from. In a recent survey commissioned by Ford in India that took inputs from over 1,000 drivers -- both male and female -- in New Delhi, Mumbai, Bangalore, Chennai, Chandigarh and Ahmedabad, 94% of the demographic asserted themselves as safe drivers but more than 70% of them also admitted to having some kind of unsafe driving habits. About 67% said they exceed the speed limit and talk on their mobile phones, while over 50% admitted to texting or accessing their emails or mobile apps. This brings to light the need for better education of safe driving practices in the country which needs to be brought about on a grassroots level. Indians are also open to adopting technology to make driving habits safer though as over 80% of those surveyed showed interest in voice-activated systems, parking sensors, collision prevention systems, seat belt reminders and automated driving vehicles in the future. While educating drivers on safer driving habits is of the

utmost importance, one cannot neglect the fact that having advanced technology in your car can help prevent accidents to a great extent as well.

#### **In the fast lane**

- Admit to dangerous driving behaviour **70+%**
- Exceed speed limit **67%**
- Talk on hand-held phone while driving **67%**
- Text while driving **55%**
- Access email/mobile apps on hand-held phone while driving **52%**
- Apply makeup while driving (female) **31%**

#### **PRACTICE POINTS**

**Some of the policy options are outlined below.**

##### **Pedestrian and bicyclist safety**

1. Reserving adequate space for non-motorized modes on all roads where they are present.
2. Free left turns must be banned at all signalized junctions. This will give a safe time for pedestrians and bicyclists to cross the road.
3. Speed control in urban areas: maximum speed limits of 50 km/h on arterial roads need to be enforced by road design and police monitoring, and 30 km/h in residential areas and by judicious use of speed-breakers, dead-end streets and mini roundabouts.
4. Increasing the conspicuousness of bicycles by fixing reflectors on all sides and wheels and painting them yellow, white or orange.

#### **CONCLUSION**

- Loss or damage of warning signs may lead to a serious trap for the traffic stream.
- The only effective way to get most motorists to use safety belts is with good laws requiring their use and
- The safety awareness and training to the public was given.
- Follow traffic control devices
- sustained enforcement.
- Checking un trained drivers

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