



STUDY AND ANALYSIS ON EMERGING TRENDS IN SMART ROADS

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ABSTRACT

In last few decades, the use of roadways have increased considerably, thereby it is immediately required that the advancement and improvement of the roadways must be done. In order to meet the requirements many new technologies have been used. The paper discussed about the various new measures that can be taken for the betterment of the roads in an economical manner.

I. INTRODUCTION

Roadways are the important medium of transportation. Its improvement and advancement helps in the growth of the nation. With the advancement in the field of technology there is an advancement and improvement in the roads and road networks taking place. This advancement and improvement in roadways help in various fields.

II. ROADS

The roads are the pathway well constructed for the vehicle to move and hence connect various areas.

III. BASIC ELEMENTS OF ROADS

- 1.Carriage Way:-The width of road on which the vehicle move and no physical barrier or separation is there known as the carriageway. The contain number of traffic lanes in which we exclude the shoulders.
- 2.Shoulders:-Shoulder is an emergency stopping lane by the verge of the road on the driving side or on both the sides of the road.
- 3.Median:-The median strip is the reserved area that separates opposing lanes of the traffic on divided roadways, such as divided highways, dual carriage ways, freeways and motorways.

IV. TYPES OF ROADS

The roads of many types divided in various categories:-

1. **On the basis of Pavements**, the roads can be classified as flexible pavement roads and rigid pavement roads.
2. **On the basis of no. of lanes**, the roads can be classified as single lane road, double lane roads, multiple lane roads and so on.
3. **On the basis of speed**, the roads can be classified as highways with speed greater than 120kmph, 80kmph, 60kmph and so on.

V. FEATURES OF ROAD

1. Markings:- **Solid white lines** at the corners of the road shows the separation between the carriageway and shoulders. **Broken white lines**, shows the separation of lanes on the same carriageway. **Yellow lines**, mark the center of the two way road traffic.
2. Symbols:- Left turn ahead, No parking, U-turn ahead, Pedestrian crossings ahead, railway crossing ahead, speed breakers ahead etc. are the few road symbols.
3. Lightings:- Street light or street lamp are placed on the edge of the roads so that the road is clearly visible to the approaching vehicles.
4. Drainage:- The road drainage system removes the water from the road and its surroundings.

VI. TRANSFORMATION OF ROADS

As per the comparison of the current scenario with the olden days, the roads and highways now-a-days are provided with better drainage system. We are moving from flexible pavement to rigid pavement due to the factors such as service life, fuel consumption, maintenance cost etc. Even street lights are evolved. The markings and symbols in present time are provided with such colors such that are visible in night. With the development of the country, the transportation is increased so the roads are now designed for greater load bearing capacity. In order to save time the highways are designed with respect to the speed.

VII. SMART ROADS

Roads, which are incorporated with various latest technologies for the comfort of passengers, are termed as smart roads.

Smart roads are provided with better drainage, constructed with proper compaction for the minimum undulations.

Following are the various aspects of Smart roads:-

1. Structural health Monitoring -

Structural health monitoring system is important for the maintenance of the road and its various facilities. Monitoring of roads helps in its time to time repairing and decrease probability of accidents.

2. Photovoltaic Pavements -

Photovoltaic pavements can help in self generation of electricity, for the lumination of street lights. It uses solar energy for the production of electricity.

3. Frost protection -

In the areas where there is snow fall or Glaze, the roads constructed should be free from action of frost.

4. Vehicle monitoring system-

Vehicle monitoring system can be used for the count of vehicle passing through the road so that the fatigue of the road can be determined.

RFID or radio frequency identification comes under new emerging technologies. RFID helps in identification without visual contact and also for monitoring of speed. The monitoring of vehicles also helps in saving vehicles from thieves. Vehicle monitoring system also helps in calculating any damage loss in case if it happens.

5. Intelligent Transportation System -

Intelligent transportation system are advanced applications related to traffic management. Intelligent transportation system helps in safe and more coordinated management of traffic.

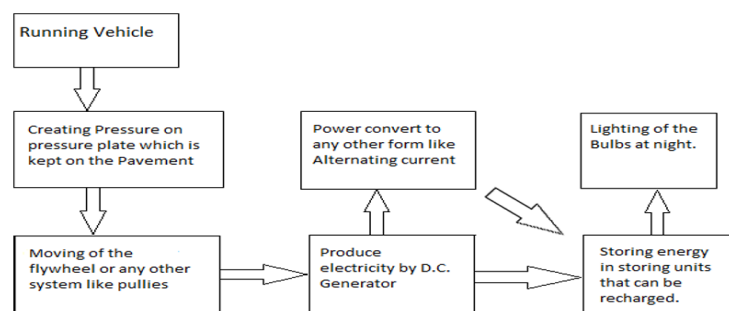
VIII. FURTHER UP GRADATION IN SMART ROADS**8.1 Pressure plate lighting -**

A pressure plate is a plate that can be used to detect pressure exerted by various items. A pressure plate can be made of wood, stone, iron etc. A wooden pressure plate can be used because of its greater signal strength or range. Stone pressure plate can be used because it can be placed with the pavement.

The concept of Pressure plate lighting can be used in street lights. Pressure plates can be placed on the pavement so that whenever any vehicle approaches that area at the night time and comes in contact with the pressure plate the street lights ahead within range of at least 250m - 300m automatically glow up and close after 3-4 min. soon after vehicle leave the track.

Pressure Plate lighting works on the principle of conversion of pressure energy to electrical energy.

Mechanism of the Pressure plate lighting is given below:

**8.2 Illusionary speed Breakers -**

When a vehicle moves over the speed breaker, there are possibilities that the vehicle can be damaged, the travelers sitting inside can face discomfort and also there are chances of accidents. So an illusion of speed breaker can also be used with the help of markings with white lines. This will give driver a perception of speed breaker and he will stop his vehicle.

IX. CONCLUSION

Smart roads are the requirement of the modern world and can be provided in an economical manner. These road also reduces the probability of accidents and various losses.

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