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## A Comparative Assessment on Pavement Conditions of Rural and Urban Roads

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### ABSTRACT

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Maintenance plays an essential and integral part in the life of a pavement. The pavement maintenance management system is a systematic method for inspection and rating the pavement condition in a given area. According to the international research the report concluded that availability of suitable materials that can support the development of long-life surface layers for road pavements. This project aims to assess the pavement conditions, fuel consumption and speed of the vehicle for the study area. The data has been collected through the some of the traffic surveys to assess the fuel consumption, undulations, vehicle speed etc. and some possible suggestions have been given which will improve the life span of the pavement.

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Keywords: Traffic Volume, Fuel consumption, Undulation, Speed and Pavement Condition

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### 1. Introduction

Transportation plays major role in our life. In this stage of production, transportation is required for carrying raw materials like seeds, coal, steel, etc., in the distribution stages; transportation is required from the production centers. The country of the inadequate transportation facilities retard by the process socio-economic development. The transportation system helps for the economic and social development of country. Various traffic survey methods are available to analyze the pavement condition.

Moving observer method has the advantage of obtaining the speed and number of vehicles on the road. With the flow and nothing done the journey time, the number of vehicles met with from the opposite direction, number of vehicles overtaking the test vehicle. A method of estimating the average flow and travel time of traffic moving in one or the other direction on a road segment by propose of the original “moving observer method”. The observer travelled in a test car in the direction of the stream considered with the flow while counting the number of vehicle overtaken and the number of vehicle passed. Travel is also made against the flow in the other direction, to record the number of opposing vehicle faced in the opposite direction (direction of interest) during the trip. Several runs are conducted to increase the accuracy.

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### 2. Literature Review

Jay N. Meegoda, et.al (2013) explained in the paper titled on “Pavement texture from high-speed laser for pavement management system”, The locked-wheel skid trailer is used to estimate the skid resistance of pavements in the United States. This method is very expensive so, a correlation was developed

between skid resistance values obtained using skid tester and the mean profile depth (MPD). This paper narrates two field tests performed to verify the above-mentioned Skid Resistance versus mean profile depth correction and also to develop a rapid screening methodology for skid resistance of a network of pavements.

*Ibrahim H. Hashim, et.al* explained in the paper titled on “Impact of Pavement Condition on Speed Change for Different Vehicle Classes”, Traffic safety, operating speed, maneuverability, driver comfort and service volume are influenced by pavement surface conditions. Therefore from the overall researches, the paper concludes that pavement conditions as an impact on vehicle speed.

*Dr. Rakesh Gupta, et.al (2017)* explained in the paper titled on “study of defects in flexible pavement and its maintenance”, inadequate maintenance of roads accounts to an act of disinvestment and sacrifice of past investment in roads. This paper describes that for efficient pavement maintenance, the deficiency in the existing highway system must be clearly understood.

*Mohammad M Hamed, et.al (1995)* explained in the paper titled on “Short-term prediction of traffic volume in urban arterials”, the attempts were made to develop time-series models for forecasting traffic volume in urban arterials. The box-Jenkins approach is used to estimate the times-series models. The developed model is easy to understand and computationally tractable, only requires the storage of the last forecasted error and current traffic observation.

### 3. Methodology

#### 3.1 Methodology

The proper prior observations have been made to select an appropriate study area to investigate. To achieve reliable results from survey proper manual observation has been carried out. The moving observer survey is an approach that includes the use of a probe vehicle within a traffic stream for measuring vehicles travel time, flow rate, space mean speed, delay in a roadway section. In this method, the speed and flow can be obtained by travelling in a car against and with the flow, noting down the journey time, the number of vehicles met with from the opposite direction and the number of vehicles overtaken the test vehicle. The methodology of the study has been given in the fig 1.

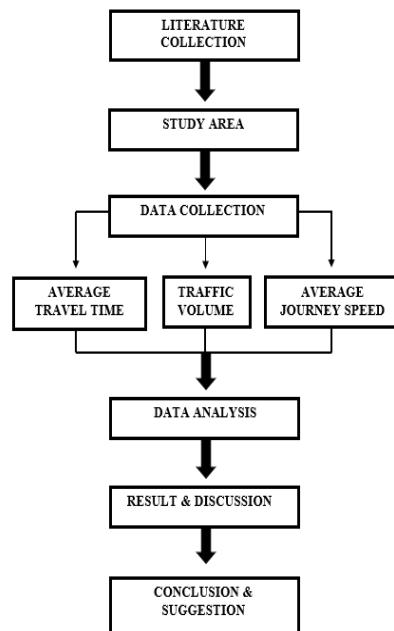


Fig 1. Methodology Flow chart

### 4. Data Collection

#### 4.1 Study area

The following areas have been chosen for the study and they are listed below.

- Villianur to Madagadipet

- Madagadipet to Villupuram

#### 4.2 Types of survey

These are the surveys conducted on each study area study:

- Inventory survey
- Moving observer survey

##### 4.2.1 Inventory survey

- *Villianur to Madagadipet*, as per observation this road doesn't have much undulations or damage, hence considered as smooth road.
- *Madagadipet to Villupuram* as per data collected from inventory survey this road has some undulations and patching works. Hence considered as damaged road.

##### 4.2.2 Moving observer survey

In this experiment car has been used as a test vehicle and two trials on different days were conducted for each of the study area. On each trial the data were collected for A to B and B to A for each and every study area to determine average journey speed, traffic volume, average travel time. The collected data has been tabulated in Table 1 & 2.

**Table 1 - Data collected from Villianur to Madagadipet stretch**

PARTICULARS	A to B	B to A
Time travelled (seconds)	1391 sec	1091 sec
No of vehicles from opposite direction	1003	391
No of vehicles that overtaken the test vehicle	117	24
No of vehicles overtaken by the test vehicle	93	51

**Table 2 – Data collected from Madagadipet to Villupuram stretch**

PARTICULARS	A to B	B to A
Time travelled( seconds)	2238 sec	1929sec
No of vehicles from opposite direction	1756	986
No of vehicles that overtaken the test vehicle	130	95
No of vehicles overtaken by the test vehicle	124	112

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## 5. Conclusion

The determinations of pavement maintenance has been performed at both damaged and smooth road, based on analysis performed by different type of traffic survey the conclusion has been obtained. The information gathered may be used to modify the pavement maintenance method and also may reduce the maintenance cost. Primarily based on information obtained from the survey, maintenance process will be carried on by the engineers. The result of this type of study assists in determining traffic volume, average journey, and average travel time variations along each stretch. According to the observations obtained from moving observer survey, inventory survey conducted on each stretch, we conclude that the damaged stretches had consumed

more travel time with less speed compared to the smooth stretches. The conclusion also indicates that no proper provision for sign board, road median, shoulder, speed bump has been provided.

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