

To Study The Various Methods Of Traffic Flow Measurement

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Abstract – Traffic analysis is basically the process of intercepting and examining the number of vehicles on the road and deducing the pattern of traffic movement. Manual method of counting was used with the help of video recording uses engineering methods and techniques to achieve the safe and time efficient movement of people and goods on roadways. The safe and time efficient movement of the people and goods is dependent on Traffic flow, which is directly, connected to the traffic characteristics. The three main parameters of a traffic flow are volume, speed and density. For better understanding of the present status of traffic flow at the junction, traffic survey is conducted. Calculation of Passenger Car Units (PCU's) for different vehicle types was provided by our respected course co-coordinators of the course CE452.

were used. Passenger Car Unit (PCU) is a metric used in Transportation Engineering, to assess traffic-flow rate on a highway. A Passenger Car Unit is a measure of the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single standard passenger. The method devised by S. Chandra uses two factors: namely, velocity of vehicle type and its projected rectangular area to calculate the PCU value.

$$(PCU)_i = (V_c / V_i) / (A_c / A_i)$$

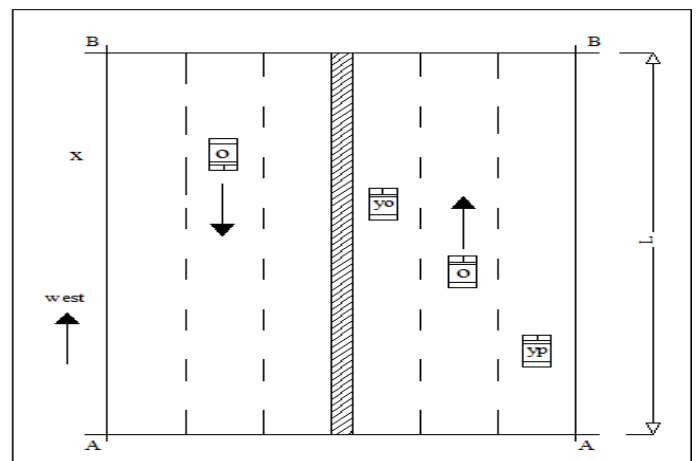
Where, V_c and V_i are mean speeds of car and vehicle of type i respectively and A_c and A_i are their respective projected rectangular area (length x width) on the road.

2.2 Moving Observer Method

Key Words: Analysis of traffic flow on various plains.

1.INTRODUCTION

Traffic is generally defined as the movement of people, goods or vehicles between spatially separated points, and thus includes pedestrians and all types of vehicles mechanized, motorized or none motorized. Traffic analysis is fundamental to planning of roads and flyovers. It also provides the basis for determining the no of traffic lanes to be provided for different road sections having regards to volume, composition and other parameters of traffic. Alternatively, for an existing road network traffic analysis provides a means of assessing the traffic conditions. Traffic analysis can therefore help further in the evaluation of investment needed for the future road constructions and improvements. Such traffic surveys are a valuable source of data for planning of highways, flyovers, roads etc. As such, these should be a regular feature in all the traffic departments. Nagpur, being a developing metro, has got a traffic density which is growing at a rapid pace.



The original “moving observer method” was proposed by War drop and Charles worth (1954) as a way of estimating the average flow and journey time of traffic travelling in either direction over a road link solely from measurements made from a moving vehicle. Observers in a test car are required to travel along the road in the direction of the stream considered, counting the number n_f of slower vehicles overtaken and the number n_s of faster vehicles which overtake them, and recording their journey time T_i . A run is then made in the opposite direction, counting the number n , of (opposing) vehicles met and again recording the journey time T_a . On the assumption that the traffic consists of a number of sub-streams, in each of which the vehicles move with constant, uniform spacing and speed, War drop and Charles worth showed that the average flow Q and journey time T of the traffic stream are respectively given by

$$Q = (n_i + n_a) / (T_i + T_a)$$

2 VARIOUS METHODS OF TRAFFIC FLOW MEASUREMENT

2.1 Standing Observer Method

In standing observer method, the readings were taken on required ground with recording the no of vehicles. Manual counts are recorded using one of three methods: tally sheets, mechanical counting boards, or electronic counting boards. Recording data on tally sheets was the simplest means of conducting manual counts. For analysis of traffic flow office preparation were needed. Some standard formulae and units

$$T = (n_a T_i - n_i T_a) / (n_i + n_a)$$

Where the quantity $n_i = n_f - n_s$ is often called the "tally count".

2.2 Advantages of the moving observer method recognized by War drop & Charles worth (1954):

- I) Information on flow & speed can be collected at the same time.
- II) It is economical when a number of person hours required to achieve a desired level of accuracy is smaller for the MOM than for stationary counts.
- III) Vehicles can be classified & flow rate found for different classification.
- IV) Additional information (such as locations & causes of delay) can be recorded if required.

2.3 The disadvantages of the method as stated O'Flaherty & Simons (1970) are:

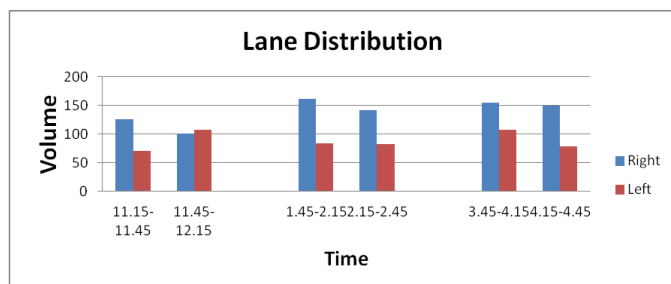
- I) the method is very sensitive to the amount of traffic side streets joining the flow on the main route.
- II) The accuracy of the method is very sensitive to fluctuations in the traffic stream.
- III) For low traffic flow a large number of test runs is required to achieve a given degree of accuracy & this may prove impractical. Consider the case when the observer is moving within the stream.

2.4 Moving Observer Method

Moving observer method used for different terrain like flat ground, upgrade, downgrade with manually operations.

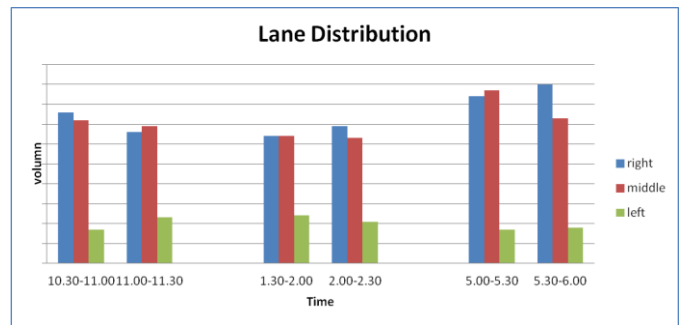
2.4.1 Moving Observer Method: - Flat Terrain

For flat terrain, at a speed of 40,50,60,70 the traffic flow were recorded .The following graph shows the variation of traffic flow



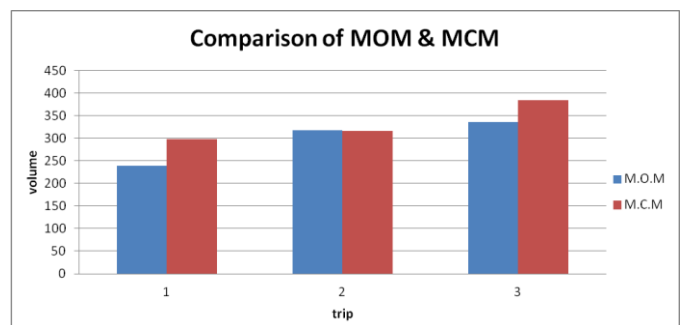
2.4.2 Moving Observer Method: - Upgrade

For upgrade, at a speed of 40,50,60,70 the traffic flow were recorded .the following graph shows the variation of traffic flow

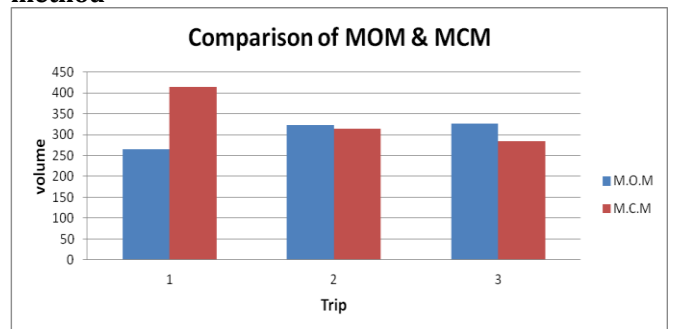


2.4.3 Moving observer method : - downgrade

For downgrade, at a speed of 40,50,60,70 the traffic flow were recorded .the following graph shows the variation of traffic flow

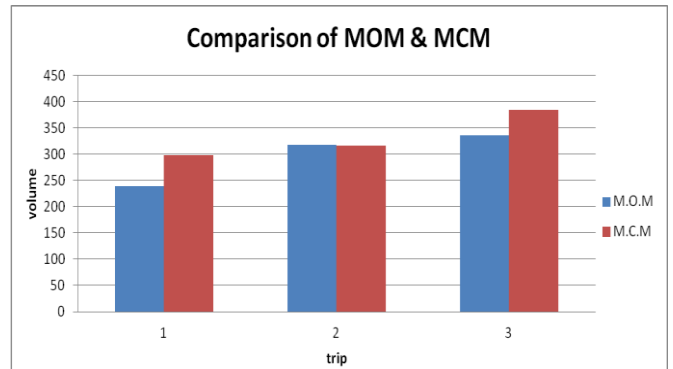


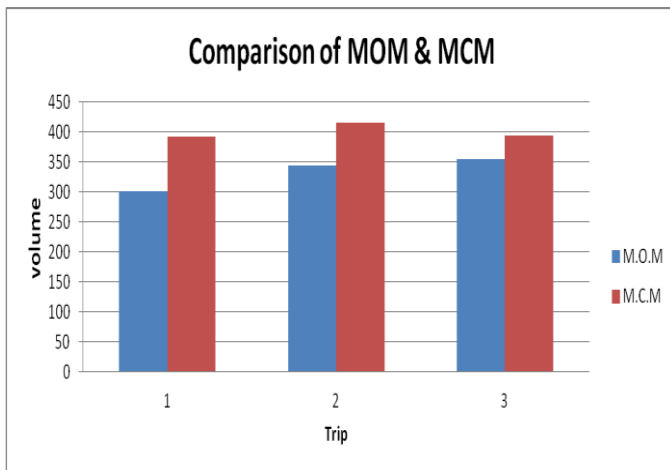
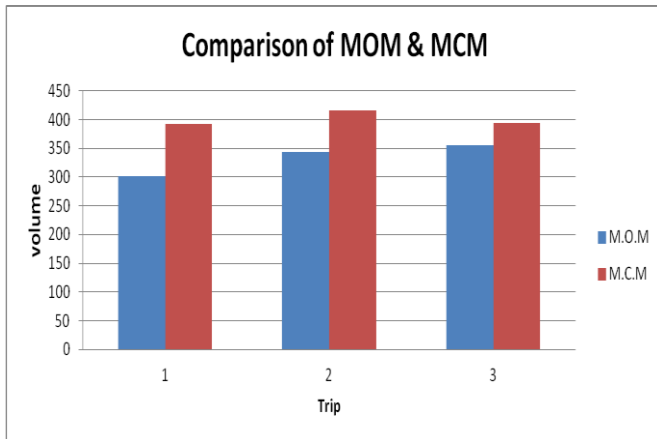
Comparison of Moving observer method and Manual counting method



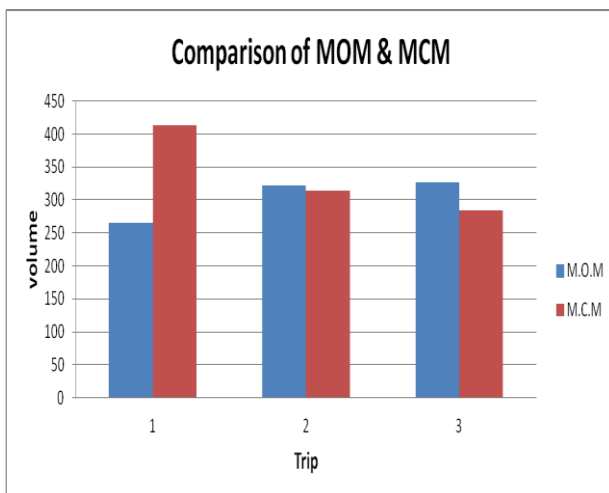
Plane

Terrain:





Belgaum to Pune Hilly Terrain



Belgaum to Pune (Downgrade)

It is observed that volume obtained by moving observer method was frequently reduced as compare with manual counting method. Hence error can be minimized by applying correction factor.

3.CONCLUSIONS

1. PCU factor values mentioned in IRC 106 used for conversion of traffic volume in PCU. The PCU values on upgrade are more than plain terrain and downgrade terrain.

2. Classified count is same for all type of vehicle groups for both carriage ways but the percentage of volume contributed by two wheelers and cars is approximately same that of the commercial vehicles so while designing the pavement all type of vehicles should be considered.

3. Vehicles mostly prefer the right lane of carriage way, but according to IRC 75% of vehicles prefer the left lane hence this factor should be considered while designing the pavement.

4. Moving observer method can be also applicable for National highways.

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