COMPARATIVE ANALYSIS OF TRAFFIC VOLUME STUDY SELECTED LOCATIONS- PALBARI TO NEW MARKET BUS STAND AND NEW MARKET BUS STAND TO PALBARI

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A thesis submitted to the Department of Civil Engineering in partial fulfillment for the degree of Bachelor of Science in Civil Engineering.



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147/1, Green Road, Dhaka-1215, Bangladesh
Section: 23E
Fall – 2024

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Fall – 2024

BOARD OF EXAMINERS

The thesis titled “Comparative analysis of traffic volume study selected locations -Palbari to New market bus stand and New market bus stand to Palbari ” submitted by Md Ripon Ali, Md Shamim, Md altaf Hossain, Md Mahfujur Rahman and Md Ratan Mia has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Bachelor of Science in Civil Engineering on 17 January, 2025.

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DECLARATION

It is hereby declared that this thesis/project or any part of it has not been submitted elsewhere for the award of any degree or diploma.

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Dedicated

to

"Our Honorable Teachers

&

Parents"

ACKNOWLEDGEMENT

Firstly, all praise is due to the Almighty, the most merciful and the most beneficent.

I would like to express their deepest gratitude to Monirul Islam, Lecturer, Department of Civil Engineering, SU, for their continuous guidance and affectionate encouragement during the course, starting from the development of the basics till writing of this report. Their careful reading of the draft, valuable comments, criticism, and constructive suggestions immensely contributed to the improvement of the report.

I would also like to thank my lab partners and all the persons who have provided their valuable efforts by assisting me in racking, piloting.

ABSTRACT

From the definition of transportation planning we find that "Transportation planning is the field involved with transportation facilities (generally streets, highways, sidewalks, bike lanes and public transport lines)." Under this field traffic volume survey plays a vital role to determine the existing condition and to forecast the future condition of traffic volume. Traffic volume studies are conducted to determine the number, movements, and classifications of roadway vehicles at a given location. These data can help identify critical flow time periods, determine the influence of large vehicles or pedestrians on vehicular traffic flow, or document traffic volume trends. It also creates scopes for Flow fluctuation on different approaches at a junction, Proportions of vehicles in traffic stream, Effectiveness of a traffic control measure, Planning traffic operation and control of existing facility, Designing intersection, signal timings, channelization, Structural design of pavements, geometric design and road way capacity.

The current work studies traffic characteristics in the District of Jashore at one selected priority junction. In this work emphasis was given on traffic volume and the analysis was carried out through primary traffic flow surveys at Palbari to New market Bus Stand in Jashore District. Traffic flow is studied by manual methods.

With the help of the data collection, an attempt had been made to understand the traffic patterns during different time periods. Traffic control at that junction is also dependent on the traffic flow characteristics. Hence the results from the present study are helpful in controlling the traffic at the intersection and also in suggesting some of the remedial measures to improve the traffic safety in the region. Remedial measures such as widening the road or by providing more public transport can be recommended based on the outcomes of the work.

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CHAPTER 1

INTRODUCTION

1.1 Background:

The level of connectivity, accessibility, and mobility inside a country is directly proportional to that country's overall growth and economic development. A country's progress is accelerated when its transportation system is well-planned. The transportation systems of different countries face a variety of concern and problems, and these issues and problems are being dealt with in a manner that is appropriate to the country's resources. Before creating a network, effective and efficient planning is essential. The primary need for transportation system design, development, and operation is volume. Simply put, volume is the number of cars that pass through a given segment of the road at any given time. Traffic volume cannot be expressed as the number of vehicles per unit time that pass a particular piece of road or lane of traffic when a large range of vehicle types with vastly differing static and dynamic characteristics are present in the traffic. Passenger Car Unit (PCU) per hour has been used to measure the amount of traffic in a heterogeneous environment since it is a unit of measure that can be used for all types of vehicles. The interplay of moving cars in such a diverse traffic environment is quite challenging. This time around, the volume isn't static either. It gets better with time, as it always has. Since the transportation system relies on a continuous technique of volume calculation, this is essential. There is a risk that the country's economy may suffer if traffic volume data is not available on a regular basis

1.2 Objective of the study

The objectives of the study can be divided into two categories. The general objective addresses how this study can be used to enhance roadways. Specific goals are linked to the analysis to be performed on the survey data.

1.2.1 General objective of the study

The general objectives of the study are as follows:

- To identify existing problems
- To measure traffic (vehicular traffic) volume
- To assess the operating situation of the roadway.
- To identify possible solutions for improvement
- To aid transportation planning

1.3 Scope of the study:

These statistics are mostly utilized for road and roadway network design, planning, and improvement. This data is sometimes utilized by social scientists to undertake various social research

1.4 Scope in design:

The information gleaned from these investigations is employed in the structural and geometric design of the pavement. The structural design necessitates the repetition of wheel load. To determine design wheel repetition, AADT must be combined with traffic growth rate. To avoid congestion, the geometric design is based on peak hour volume. The volumetric data of traffic also influence the design of intersections, roundabouts, footpaths, street lights, signs and markings, and traffic signals.

1.5 Organization of the thesis

Chapter 1: Introduction and Objective. This chapter provides the background and motivations of the research. The overall objectives and expected outcomes are also described in this chapter.

Chapter 2: Literature Review. This chapter reviews the related works in the comparative analysis of traffic volume study field with a special focus on Peak Hour Factor (PHF) .

Chapter 3: Methodology. This chapter describes the methodology adopted to carry out the research.

Chapter 4: Results and Discussion. This chapter describes the results of Traffic volume study of palbari to New Market and New Market to Palbari .

Chapter 5: Conclusions and Future Work. This chapter summarizes the conclusions and major contributions of this study and provides recommendations for future studies.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction:

Traffic volume studies are conducted to determine the number, movements, and classifications of roadway vehicles at a given location. These data can help identify critical flow time periods, determine the influence of large vehicles or pedestrians on vehicular traffic flow, or document traffic volume trends. The traffic engineer must acquire general knowledge of traffic volume characteristics in order to measure and understand the magnitude, composition and time and route distribution of volume for each area under his jurisdiction.

2.2 Previous work on Traffic Volume Study:

The present study is essentially about the importance of traffic volume in traffic engineering of urban and suburban road links, in particular the literature on effect of traffic volume, speed- flow relationships, passenger car equivalents, peak hour factor, flow variations and traffic capacity and level of serviceability (LOS), But there are lot of studies which help to develop and modify the present study. Some of those are mentioned below in brief:

Satyanarayana (2012) studied the effect of traffic volume, its composition and stream speed on passenger car equivalents. Method proposed by Chandra is used for developing the PCU factors and found that For two axle trucks PCU values are found to increase with an increase in compositional share of respective vehicle types in the traffic stream. The PCU of two wheelers practically remains unaffected by its compositional share in the traffic stream. Compositional share of 2W at different locations were observed in the range of 31.69% to 34.23% whereas increase in PCU values are 1.1% only and it may be attributed due to high maneuverability. In slow moving traffic PCU values of bullock carts are increasing in the compositional share in the stream.

Arkatkar (2011) studied the effect of variation of traffic volume, road width, magnitude of upgrade and its length on PCU value; by using traffic-flow simulation model HETEROSIM. Field data collected on traffic flow characteristics are used in calibration and validation of the simulation model. The validated simulation model is then used to derive PCU values for different types of vehicles and it indicate that the model is capable of replicating the heterogeneous traffic flow on mid-block sections of intercity roads, for different roadway conditions, to a satisfactory extent.

Basu D, Maitra S.R (2006) studied the effect of traffic volume and its composition on Passenger Car Equivalency (PCE). Taking the stream speed as Measure of Equivalence (MOE) a methodology is demonstrated for the estimation of PCE. The reduction in stream speed caused by marginal increment in traffic volume by a vehicle type is compared with that of caused by an old technology car, which is taken as the reference vehicle for the estimation of PCE. The study reveals that PCE is affected by traffic volume and its composition. For all vehicle types, PCE values are found to increase with an increase in traffic volume, but the effect is predominant for heavy vehicles. The PCE of two wheelers practically remains unaffected by its compositional share in the traffic stream.

2.3 Definition:

Volume/flow:

The total number of vehicles that pass over a given point or section of a lane or roadway during a given time interval is called volume. It is the actual number of vehicle observed or predicted to passing a point during a given interval.

Rate of flow:

The equivalent hourly rate at which vehicles pass over a given point or section of a lane or roadway during a time interval less than 1 hr . usually 15 min.

Average Daily Traffic (ADT):

The volume during a given time period divided by the number of days in that time period and expressed in terms of vpd.

Average Annual Daily Traffic (AADT):

It is the total yearly volume divided by the number of days in a year and expressed in terms of vpd.

Average Weekly Traffic (AWT):

Average 24-hour traffic volume occurring on weekdays for some period less than one year.

Annual Weekday Traffic (AAWT):

AAWT is the average 24-hour traffic volume occurring on weekdays over a full year, AAWT is computed by dividing the total weekday volume for the whole year by 260. The relationship between AAWT and AWT is analogous to that between AADT and ADT. It should be mentioned here that these four volumes are often used in transportation planning and shown in social or economic statistics.

Design Hourly Volume:

It is the economic It is the economic hourly flow of future year, which is used for designing geometric features roadway. It is chosen in such a way that during the design norind it should not he avreaded too often or too much.

Peak hour factor:

Traffic engineers focus on the peak-hour traffic volume in evaluating capacity and other parameter because it represents the most critical time period. And, as any motorist who travels during the morning or evening rush hours knows, it's the period during which traffic volume is at its highest. The analysis of level of service is based on peak rates of flow occurring within the peak hour because substantial short-term fluctuations typically occur during an hour. Common practice is to use a peak 15-minute rate of flow. Flow rates are usually expressed in vehicles per hour, not vehicles per 15 minutes.

$$PHF = \frac{Hourly\ volume}{\text{Peak rate of flow within the hour}}$$

Daily variation factor (DF):

It is defined as ratio of AADT over yearly average volume for particular day of week

(Sunday, Tuesday etc.)

Monthly variation factor (MF):

It is defined as ratio of AADT over ADT for particular month of the year.

PCU (or PCE):

Passenger Car Unit (Passenger Car Equivalent) is defined as the number of passenger cars displaced by one truck, bus, or RV (recreational vehicle) in a given traffic stream. in order to reflect the different impact or intensity on the roadway due to the different vehicles in terms of size, operating characteristics, passenger car unit (passenger car equivalent) is applied in the estimation of traffic volume.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The collecting of traffic data is an important aspect of the traffic volume study since it gives raw data from the field. The correctness of the data collection technique reveals the accuracy of the volume study. This survey can be carried out in a variety of ways. This chapter addresses the present volume counting systems, as well as their benefits and drawbacks. It also discusses the method employed for this particular study and the reasons for its.

3.2 Methods for volume survey:

There are two major methods of counting vehicle for volume survey. They are-

I. Manual Counting Method.
II. Automatic counting method.

3.2.1 **Manual Counting Method:**

This method employs a field team to record traffic volume on the prescribed record sheets. By this method it is possible to obtain data which is not be collected by mechanical counters, such as vehicle classification, turning movements and counts where the loading condition or number of occupants are required. But it is not practicable to have manual count for all the 24 hours of the day. Hence it is necessary to resort to statically sampling techniques in order to cut down the manual hours involved in talking complete counts, First the fluctuation of traffic volume during the hours of day and the daily variations are observed. Then by selecting typical short count period, the traffic volume study is made by manual counting. Then by statistical analysis the peak hourly traffic volumes as well as the average daily traffic volumes are calculated.

There are two methods of manual counting:

i) ***Direct Method:***

Data is counted by using hand tally and manual counters/enumerators.

- **Advantages**: By this method traffic volume as well as vehicle classification and turning proportions can be obtained. Data can be used immediately after collection.
- **Disadvantages:** This method is not practicable for long duration count and when flow is high. Error is common especially when volume is high. Count cannot be cross checked Count cannot be done in bad weather.

ii) ***Indirect Method:***

In this method, data is collected using video camera. Video is captured for long time and data is collected later by rewinding.

- **Advantages:** Besides traffic volume, several traffic parameters can be obtained from recorded film. Data can be cross checked and quality can be ensured. This method is applicable when volume is high. It is suitable for non-lane based traffic operation.
- **Disadvantages:** A suitable elevated place is required for filming operation. Data cannot be used immediately after collection. Data must be manually transcript of recorded film. This process is time consuming and tedious. Because of limitation of capacity of film, it is not suitable for long duration counts. Quality of video recorded on film is dependent on intensity of light and this method is not suitable in overcast days.

:

TRAFFIC SURVEY Date…… Day……... Start Time……...… End Time… Total survey time..... Location…….……. Weather…… Surveyor ……		
Traffic	Tally	Total
Bi-cycle		
Motorcycle		
Car		
Van/Pickup		
Bus		
Truck		
other		

Table 3.1: Hand Tally



Fig 3.2: Manual Counter/Enumerator

3.2.2 Automatic counting method:

In this method, vehicles are counted automatically without any human involvement. The automatic count method provides a means for gathering large amounts of traffic data. Automatic counts are usually taken in 1-hour intervals for each 24-hour period. The counts may extend for a week, month, or year. When the counts are recorded for each 24-hour time period, the peak flow period can be identified.

The most commonly used detector types are:

1) ***Pneumatic tubes:***

These are tubes placed on the top of road surfaces at locations where traffic counting is required. As vehicles pass over the tube, the resulting compression sends a burst of air to an air switch, which can be installed in any type of traffic counting devices.



Fig 3.3: Pneumatic Tube

II) ***Inductive loops:***

Inductive loop detector consists of embedded turned wire from which it gets its name. It includes an oscillator, and a cable, which allows signals to pass from the loop to the traffic counting device. The counting device is activated by the change in the magnetic field when a vehicle passes over the loop. Inductive loops are cheap, almost maintenance free and are currently the most widely used equipment for vehicle counting and detection.

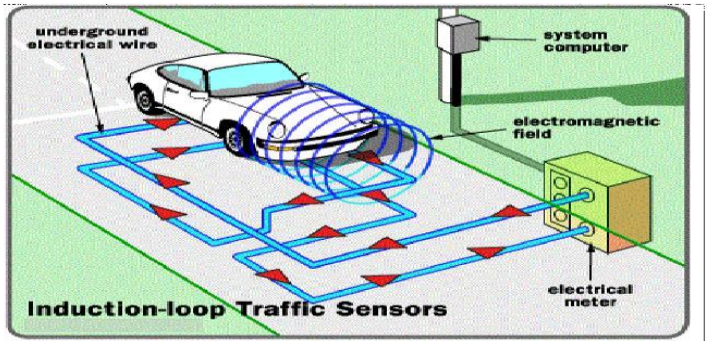


Fig3.4: Inductive Loop traffic sensor

III) ***Weigh-in-Motion Sensor types:***

A variety of traffic sensors and loops are used world-wide to count, weigh and classify vehicles. while in motion, and these are collectively known as Weigh in Motion (WIM) sensor systems. Whereas sensor pads can be used on their own traffic speed and axle weighing equipment, they are trigged by "leading" inductive loops placed before them on the roadbed. This scenario is adopted where axles speed and statistical data are required.

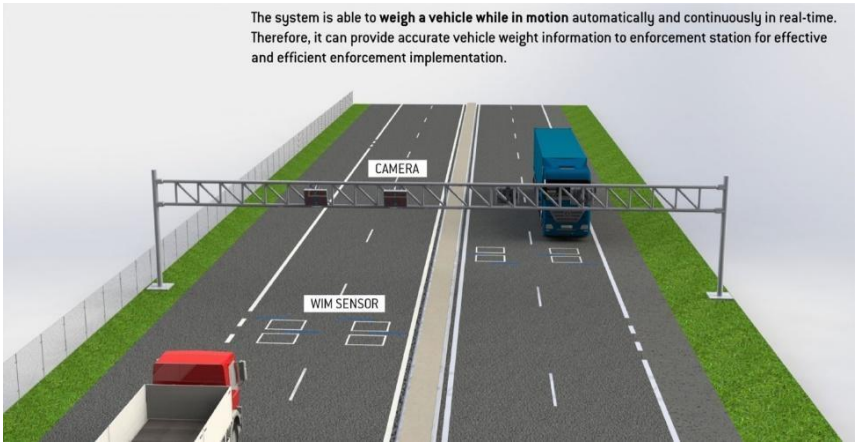


Fig 3.5 : High speed weigh in motion sensor

IV) ***Micro-millimeter wave Radar detectors***:

Radar detectors actively emit radioactive signals at frequencies ranging from the ultrahigh frequencies (UHF) of 100 MHz, to 100 GHz, and can register vehicular presence and speed depending upon signals returned upon reflection from the vehicle. They are also used to determine vehicular volumes and classifications in both traffic directions. Radar detectors are very little susceptible to adverse weather conditions, and can operate day and night. However, they require comparatively high levels of computing power to analyze the quality of signals.

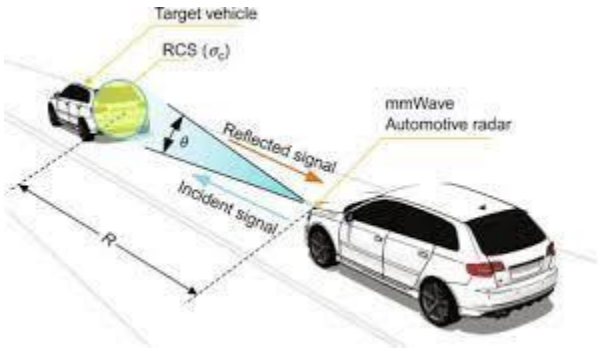


Fig 3.6: ***Micro-millimeter wave Radar detector***

v) ***Video Camera:***

Video image processing systems utilize machine vision technology to detect vehicles and capture details about individual vehicles when necessary. A video processing system usually monitors multiple lanes simultaneously, and therefore it requires high level of computing power. Typically, the operator can interactively set the desired traffic detection points anywhere within the systems view area.

- **Advantages:** This method is suitable for long duration or continuous count. It is used as permanent counting station. It does not need manpower and is free from human error. Data is obtained in usable format. It is less expensive as manpower is not needed. Count is not affected by bad weather condition.
- **Disadvantages:** It requires strict lane discipline. Non-motorized vehicles are hard to detect by this method. Detailed classification of vehicle is not possible. Accuracy is less than manual method. Installation cost is high.



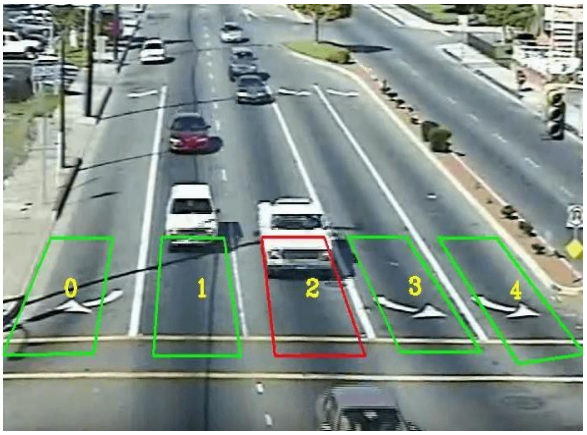


Fig 3.7: ***Video Camera***

3.3 Methods we have selected

We have selected **<u>Direct manual counting method.</u>**

Reasons:

- ❖ Unavailability of instruments.
- ❖ Simplest among all study.

3.4 Counting periods:

Vehicles can be counted for any duration. Duration of count depends on the objective of data collection. For traffic control and management or operational studies short duration count at peak period is conducted. For planning and design purpose, long duration count is conducted. For our study purpose we collected volume data for 10 minutes.

3.5 Survey procedure

3.5.1 Reconnaissance:

Reconnaissance is the military term for exploring beyond the area occupied by friendly forces to gain vital information about enemy forces or features of the environment for later analysis and/or dissemination, In the spot, we looked around to get the information of how many types of vehicles on the spot and following this, we decided to distribute our job.

3.5.2 Survey Design/piloting:

Before starting survey we have made a guideline to how we will perform the work. This is called survey design.

3.5.3 Trial Survey:

Before starting the main survey we have made some trial survey. We checked our manual counters whether it works properly or not and fortunately everything was all right.

3.5.4 Adjustment in to survey design:

From trial survey we have to adjust the errors with the main survey.

3.5.5 Final Survey:

After all above this process we have to continue the final study.

CHAPTER 4

DATA COLLECTION AND ANALYSIS

4.1 Introduction:

This chapter depicts the history of data collecting, the survey technique in detail and the tabular data acquired. The information we gathered is presented in-depth, while the information from other parties is summarized.

4.2 Data collection Location:

The survey is done on the link road located between Palbari to New market bus Stand in jashore which is shown in the next figure.

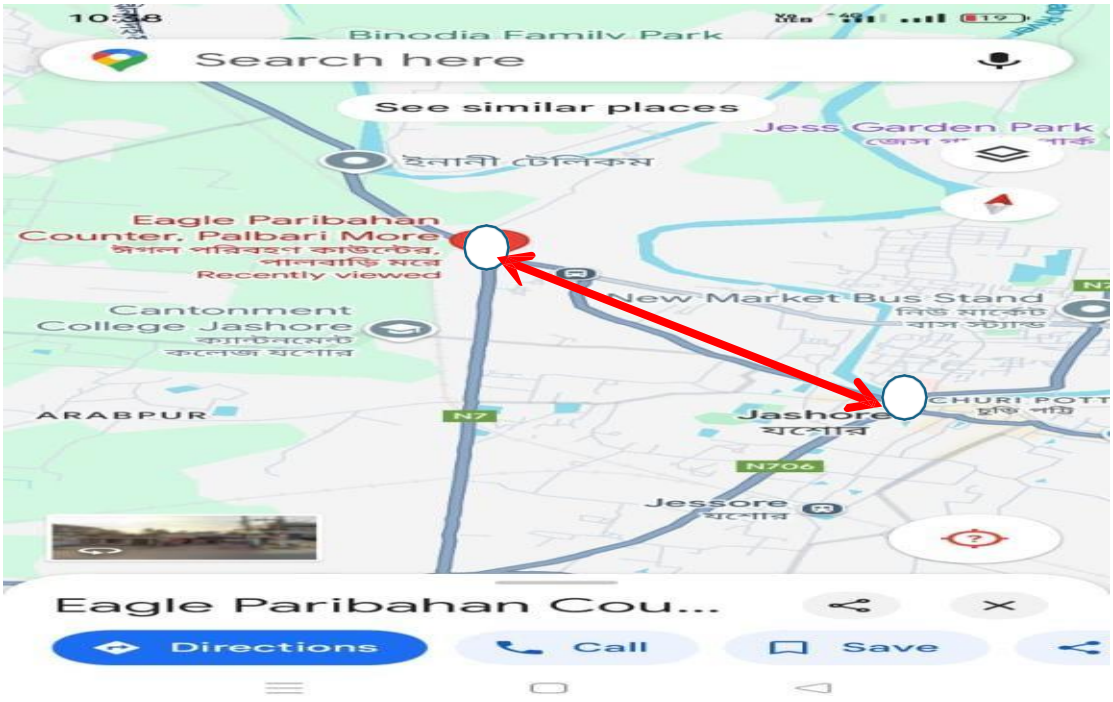


Fig 4.1: Survey location (Source: Google Map)

4.3 Counting Period:

Date is collected 01 December 2024- 05 December 2024 short count data is taken over 30 min. and converted to hourly volume. Data collection time of different groups are shown in the following table.

Table 4.1: Time Count

Time /Direction	Counting Time	Counting Time
	8:00- 8:30 am	9:00 -9:30 am
West to East (Palbari to New market)	Group-1	Group-2
Time /Direction	Counting Time	Counting Time
	10:00- 10:30 am	11:00 11:30 am
East to wast (New market to palbari)	Group-1	Group-2

4.4 Weather Condition:

The weather condition was favorable for volume study. The day was very shiny and the sky was clear.

4.5 Data Collection Procedure:

Whole surveying procedure can be subdivided into three categories:

- Reconnaissance survey
- Piloting & Final survey

4.5.1 Reconnaissance survey:

The main goal of a reconnaissance survey is to eliminate routes or sites that are difficult or impracticable and to discover routes or areas that are more promising. After arriving at the survey site, a reconnaissance survey was conducted for around 10 minutes. During this time, some observations were conducted in order to determine how to correctly collect data. To begin, an appropriate area was chosen approximately 20 meters away from the intersection. After then, a visual assessment of the vehicle's composition was carried out. This aided in determining the number of persons required to count each vehicle class. Then five members of the group were given the task of counting six different types of cars, while other member was recording video to ensure the correct vehicle count.

4.5.2 Piloting

After all of the judgments had been made, another five minutes of piloting was performed to see if there was any sort of problem that had gone unnoticed during the reconnaissance step.

4.6 Final Survey

Following the completion of the preceding steps, the final survey began. For 30 minutes, 2 members recorded data in 5-minute intervals on a tally sheet. The data was then put together for additional analysis.

Collected Data

The collected data is shown in the following tables

Vehicle Classification

Table 4.2: Vehicles were classified as follows:

1	Bus(B)	All Types of buses
2	Truck(T)	All types of tracks
3	Light vehicle(V)	Passenger Car, taxi,micro ,jeep, pajero, utility vehicle,pickup, ambulance etc
4	Auto Rickshaw(AR)	Baby taxi, Mis hook, CNG
5	Motor cycle(MC)	All Types of motorized two-wheelers

Volume data were recorded by five groups according to the above table.

● **Data collected by group -1**

Data collected by group -1 according to vehicle classification as mentioned in 4.6.1 are presented below

Table 4.3: Vehicle Composition

SL	Vehicle Composition						
	Vehicle Type	**Interval (Min)**					**Total**
		0 to 5	**6 to 10**	**11 to 15**	**16 t 20**	**21 to 25**	**26 to 30**	
1	Bus	9	3	4	7	4	0	27
2	Truck	0	1	2	2	1	1	7
3	Light Vehicle	11	25	16	10	27	18	107
4	Auto Rickshaw(AR)	13	31	15	17	20	11	107
5	Motor cycle	07	22	10	36	15	9	149
Total vehicle (no)								397

Summary of collected data by others groups

Total number of vehicle of five others group are presented below.

Table -4.4

Vehicle Type	Direction			
	Palbari to New market		New market to Palbari	
	Group No			
	G1	G2	G1	G2
	Time			
	8:00- 8:30 am	9:00 -9:30 am	10:00- 10:30 am	11:00 11:30 am
Bus	27	9	11	17
Truck	7	4	8	7
Light Vehicle	107	325	183	212
Auto Rickshaw(AR)	107	142	246	253
Motor cycle	149	190	210	332
Total	397	670	658	821

4.7 DATA ANALYSIS

4.7.1 Vehicle composition in the traffic stream:

Vehicle Composition (%) Palbari to New market

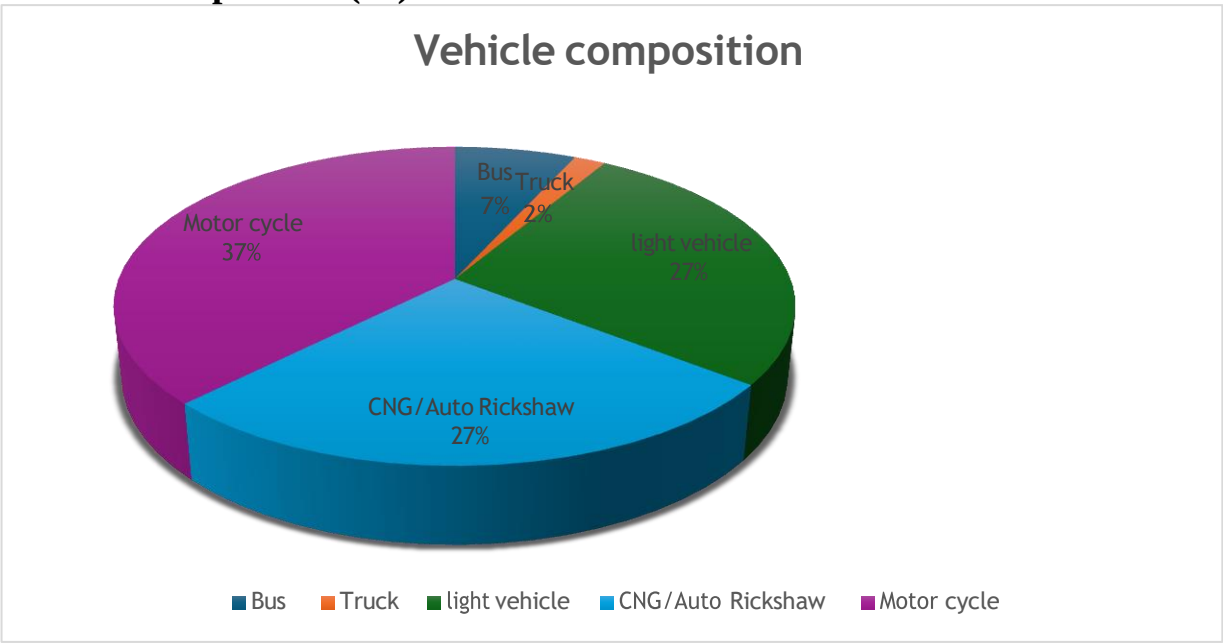


Fig4.2: Pie Chart of vehicle composition (Group-1) **Palbari to New market**

Counted vehicle Palbari to New market

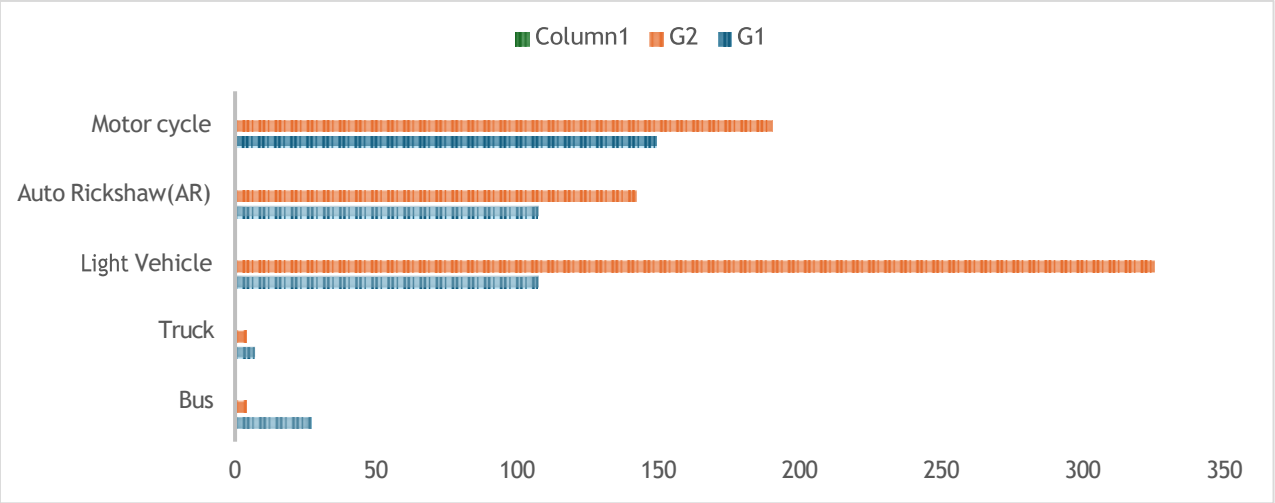


Fig4.3: Bar diagram of Counted vehicle Palbari to New market

Again, The following pie chart and Bar diagram Group -2 ; New market to palbari.

✠Vehicle Composition (%) New market to palbari

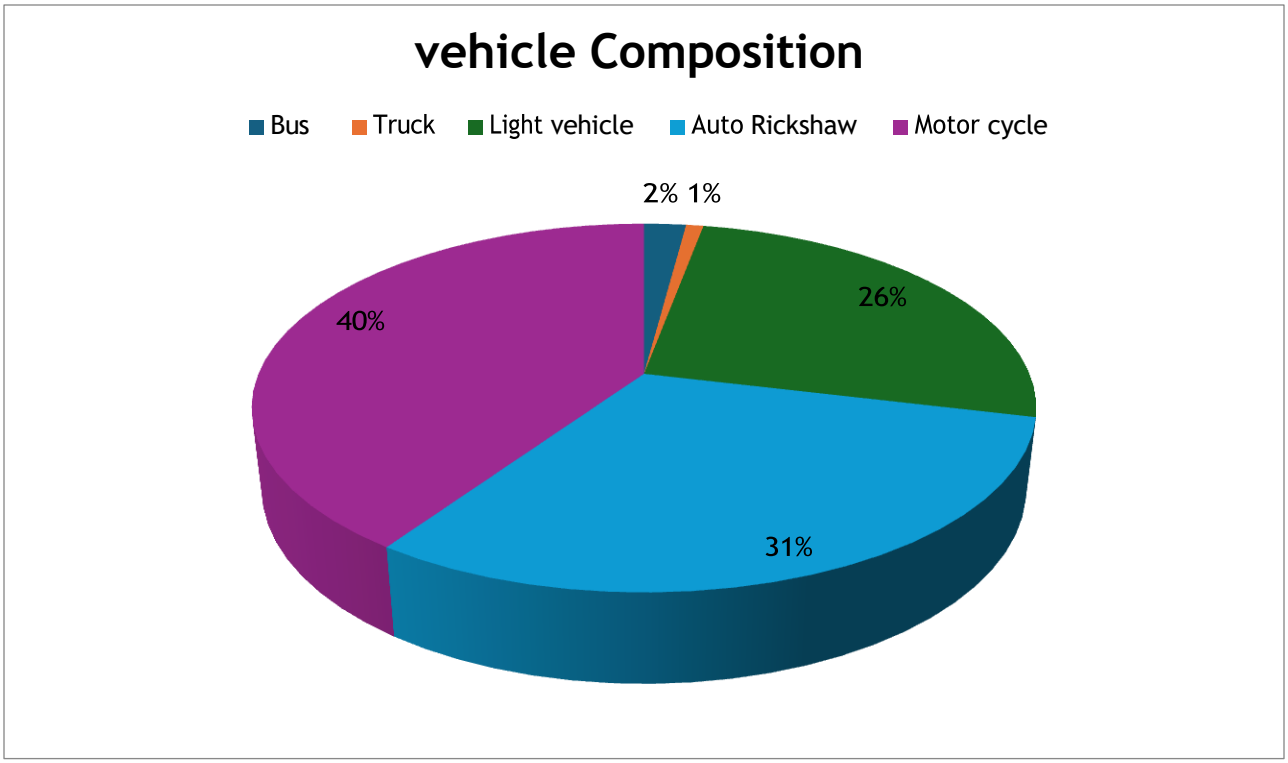


Fig4.4 : Pie Chart of vehicle composition (group-1) New market to palbari

✠Counted vehicle New market to palbari

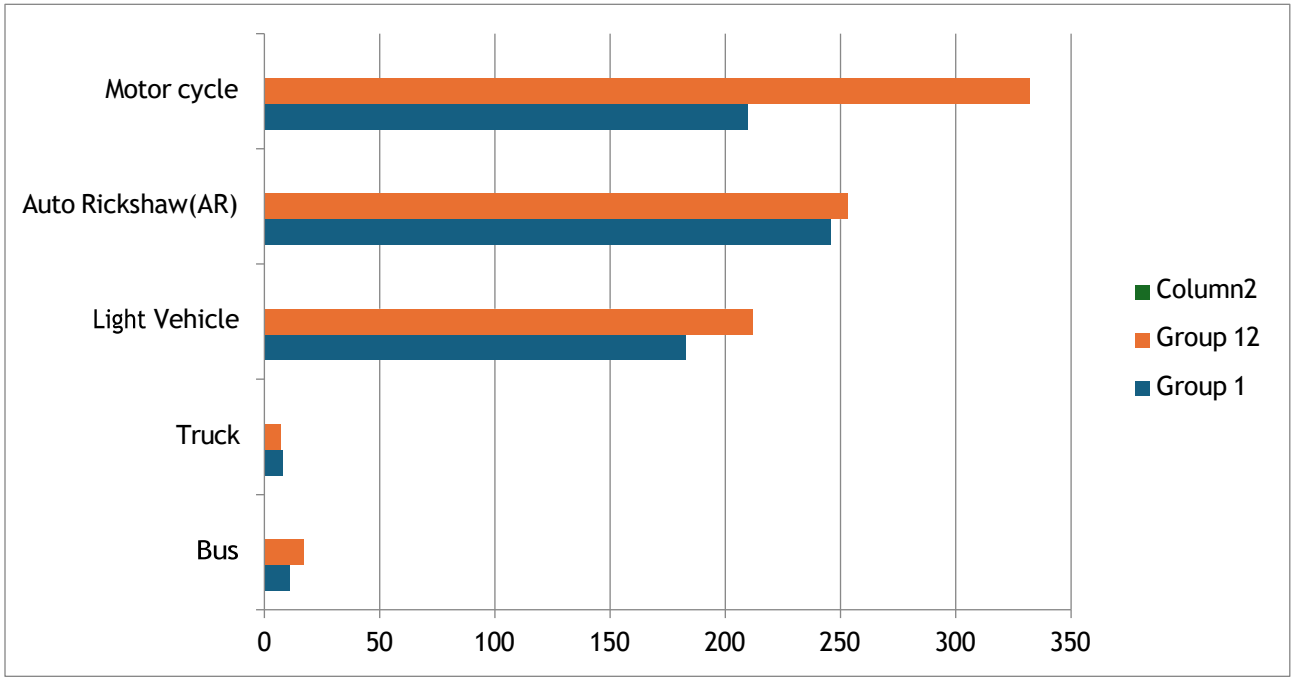


Fig4.5: Bar diagram of Counted vehicle New market to Palbari

4.7.2 Service Flow Rate (PCU unit) of Group 1

As per geometric design standard RHD, version 4 (appendix), service flow rate from Palbari to New Market (Group-1) is presented in the following table:

Table 4.5: Service flow rate from Palbari to New Market (Group -1)

Vehicle	Total vehicle (30 Min)	PCU Factor	Total PCU (30 Min)	PCU/hour
Bus	27	2	54	108
Truck	7	2	14	28
Light Vehicle	107	1	107	214
Auto Rickshaw(AR)	107	0.75	80.25	160.5
Motor cycle	149	0.75	111.75	223.5
others	0	N/A	0	0
Total			367	734

4.7.3 Service flow Rate (PCU) of All Groups

Table 4.6: Service Flow Rate of West to East (Palbari to New market)

Vehicle Type	PCU/hour	
	Group-1	Group-2
Bus	108	36
Truck	28	16
Light Vehicle	214	650
Auto Rickshaw (AR)	160.5	213
Motor cycle	223.5	285
others	0	0
Total	734	1200

Table4.7: Service Flow Rate of East to west (New market to Palbari)

Vehicle Type	PCU/hour	
	Group-1	Group-2
Bus	44	68
Truck	32	28
Light Vehicle	566	624
Auto Rickshaw(AR)	219	229.5
Motor cycle	315	498
others	0	0
Total	1176	1447.5

4.7.4 Directional Distribution

The percentage ratio of the service flow of both directions (section 4.7.3) helps to find the directional distributions

Table 4.8: Directional Distribution (%)

Time	Direction	Group	Service Flow Rate (PCU/hour	Total	Directional Distribution (%)
8:00- 8:30	Palbari to New market	1	734	1910	33.82
10:00- 10:30	New market to palbari	1	1176		66.18
9:00- 9:30	Palbari to New market	2	1200	2647.5	38.04
11:00- 11:30	New market to palbari	2	1447.5		61.96

4.7.5 Peak Hour Factor (PHF)

The peak hour factor (PIF) is the hourly volume during the maximum-volume hour of the day divided by the peak 15-minute flow rate within the peak hour. Details calculation is shown below:

Group 2: New market to Palbari has the highest flow rate which is 1447.5 PCU/hr.

Table4.9: Data for PHF determination

Vehicle Type	Interval (minutes)						
	0-5	5-10	10-15	15-20	20-25	25-30	
Bus	3	2	5	3	2	2	
Truck	1	1	1	1	2	1	
Light Vehicle	46	73	61	43	33	56	
Auto Rickshaw(AR)	29	17	27	43	15	22	
Motor cycle	59	43	55	63	75	37	
Total PCU	138	136	149	153	127	118	

$$PHF = \frac{1447.5}{4(153 + 149 + 138)} = 0.853$$

Observation:

PHF measures traffic demand fluctuations within the peak hour. It generally varies between 0.85 to 0.95. Our value agrees with it.

From short count data, the actual (design) flow rate can be calculated by dividing the peak hour volume by the PHF, or by multiplying the peak 15 minutes volume by four.

4.7.6 Estimate ADT and AADT

Details calculation of ADT and AADT are given below. Expansion factors used here are known as Mohib's JMB Factors. Details chart of this factor is given in appendix A. Data of flow rate used here are taken from sub-section 5.3.2.

Here Palbari to New market

MEF =0.948 for June (Appendix A: Table 1)

DEF =7.012 for Thursday (Appendix A. Table 2)

HEF =22.05 (Time: 8:00 AM-8:30 AM) (Group 1) (Appendix A: Table 3)

18.8 (Time: 9:00 AM-9:30 AM) (Group 2) (Appendix A: Table 3)

Estimated 24-hour volume for Thursday (**Palbari to New market**), using HEF
= (734 x 22.05+1200 x 18.8)/2
=**39075 PCU**
From 24-hour volume for Thursday estimated volume for the week using DEF, Total 7 days volume = 39075 x 7.012 = 273994 PCU
Average 24 hours volume (on average daily traffic, ADT)
=273994/7
=**39142 PCU** (Palbari to New market) (Group-1, 2)
Since the data were collected in December, using the MEF for December, obtained AADT is AADT
=39142 x 0.948
=37107 PC
Now, From New market to Palbari,
HEF = 18.8 (Time: 9:00 AM-9:30 AM) (Group 1) (Appendix A: Table 3)
=17.11 (Time: 10:00 AM-10:30 AM) (Group 2)
Now.
Estimated 24-hour volume for Thursday (New market to Palbari), using HEF
= (1176 x 18.8+1447.5 x 17.11)/2
=23437.8 PCU
=23438 PCU
From 24-hour volume for Thursday estimated volume for the week using DEF Total 7 days volume
=23438 x 7.012
=164347.25 PCU
=164348 PCU
Average 24 hours volume (on average daily traffic, ADT)
= 164348/7
=23479 PCU (New market to Palbari) (Group-1,2)
Since the data were collected in December, using the MEF for December obtained AADT is AADT = 23479 x 0.948 = 22258 PCU.

Chapter 5

Conclusion and Recommendation

With each passing day, theater confronted with increasing congestion. The roads are clogged with vehicles, but the view isn't getting any better. We did a survey on the New Market Bus stand at Jashore on 01 December 2024. Though the data acquired from this study was inaccurate due to the fact that it was to manual Thursday: does reveal some of the primary reasons why most of jashore's roadways are often.

The chapter will provide of our presentation here too well offer advice that provides a clear picture of what might the expected from upcoming studies on this tropics.

5.1 Discussion on vehicle composition

The chapter will provide of our presentation here too well offer advice that provides a clear picture of what might the expected from upcoming studies on this tropics. Summary of the result in this above discussion in this clear that, our almost maximum traffic flow rate found in Sunday. The maximum number of Auto Rickshaw found in Sunday at morning period average volume 498. The maximum number of Motorcycle 678. Then also found out the different vehicle class in workdays and off-days with their percentages. Then discuss about passenger car, PCU, PCU rate in different vehicle class with reference table. Using the reference table for calculate the PCU in different vehicle in workdays and off-days, also found the peak value and percentages of different vehicle class. Then analysis traffic volume, then stated some sort of problem and reason. Then give some solution and planning for that Technical Junction. In Last portion stated that, justify the suitable highway intersection for Technical Junction.

5.2 Recommendation-

A proper law should be implemented to limit the use of passenger cars, More rewards should be provided to encourage more people to use public transportation, Random vehicle parking should be prohibited and heavily penalized;

No NMV should be permitted.

Cross bridges when pedestrian crossing is required.

Illegal hawker stands should be shut down.

Pedestrian mobility should be limited so that they do not take up too much space on the road. To avoid traffic congestion, hospitals, schools, buildings, and other market, areas near that region should have dedicated parking facilities.

The signal should be properly visualized.

5.3 Limitation:

Now a day's automatic counting method based on Video image processing is more reliable. But due to resource constraint it was not possible

The major limitation of this volume study was the survey was conducted for 25 minutes only, whereas for proper results the survey should be conducted for at least 1 hours

As it was a manual survey, the results are erroneous though every member of the group worked very hard and Attentively.Due to lack of time, we could not do the survey in the prescribed manner Recommendation for future work

For more reliable data automatic data collection process should be used. Different and new methods of volume study can be used instead of manual survey so that more precise understanding can be gained from the results. Funding should be increased And safety measurement should be iner.

5.4 Recommendation for future work:

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APPENDIX

APPENDIX A

Table 1: Monthly Expansion Factors for a Rural Primary Road

Month of the Year	MEF	Month of Year	MEF
January	1.756	July	0.578
February	1.976	August	0.521
March	1.635	September	0.632
April	1.482	October	0.948
May	1.395	November	1.186
June	0.948	December	1.35

Table 2: Daily Expansion Factors for a Rural Primary Road

Days of Week	DEF
Sunday	9.515
Monday	7.012
Tuesday	7.727
Wednesday	6.582
Thursday	7.012
Friday	5.724
Saturday	6.51

Table 3: Hourly Expansion Factors for a Rural Primary Road

Hour	HEF	Hour	HEF
6:00-7:00 am.	42.01	6:00-7:00 am.	16.6
7:00-8:00 a.m.	28.99	7:00-8:00 a.m.	17.5
8:00-9:00 am.	22.05	8:00-9:00 am.	20.4
9:00-10:00 am.	18.8	9:00-10:00 am.	25.3
10:00-11:00 am.	17.11	10:00-11:00 am.	31.2
11:00-12:00 p.m.	18.52	11:00-12:00 p.m.	34.2
12:00-1:00 p.m.	18.71	12:00-1:00 p.m.	51.2
1:00-2:00p.m. 2:00-3:00 pm.	16.71 14.84	1:00-2:00p.m. 2:00-3:00 pm.	82.3 124
3:00-4:00 p.m.	4.77	3:00-4:00 p.m.	137
4:00-5:00 p.m.	12.85	4:00-5:00 p.m.	144
5:00-6:00p.m.	13.85	5:00-6:00p.m.	90.2

Table 1: Data of Group 1

Vehicle Composition								Service Flow Rate		
	Interval								T.PCU (30 min.)	PCU/Hour
V.type	0-5	6-10	11-15	16-20	21-25	26-30	Total vehicle	PCU Factor		
Bus	9	3	4	7	4	0	27	2	54	108
Truck	0	1	2	2	1	1	7	2	14	28
Light Vehicle	11	25	16	10	27	18	107	1	107	
Auto Rickshaw(AR)	13	31	15	17	20	11	107	.75	80.25	160.5
Motor cycle	07	22	10	36	15	9	149	.75	111.75	223.5
								Total=	367	734

Table 2: Data of Group 2

Vehicle Composition								Service Flow Rate		
	Interval								T.PCU (30 min.)	PCU/Hour
V.type	0-5	6-10	11-15	16-20	21-25	26-30	Total vehicle	PCU Factor		
Bus	3	2	2	1	1	0	9	2	18	36
Truck	1	1	1	1	0	0	4	2	8	16
Light Vehicle	54	66	45	56	39	64	325	1	325	650
Auto Rickshaw(AR)	20	17	22	16	18	12	142	.75	106.5	213
Motor cycle	22	26	16	18	28	26	190	.75	142.5	285
								Total=	600	1200

Table 3: Data of Group 1

Vehicle Composition								Service Flow Rate		
	Interval								T.PCU (30 min.)	PCU/Hour
V.type	0-5	6-10	11-15	16-20	21-25	26-30	Total vehicle	PCU Factor		
Bus	3	2	2	1	1	2	11			
Truck	1	1	1	3	2	0	8	2	16	32
Light Vehicle	39	63	22	56	39	64	283	1	283	566
Auto Rickshaw(AR)	29	17	27	43	18	12	146	0.75	109.5	219
Motor cycle	52	46	27	31	28	26	210	0.75	157.5	315
								Total=	588	1176

Table 4: Data of Group 2

Vehicle Composition								Service Flow Rate		
V.type	Interval								T.PCU (30 min.)	PCU/Hour
	0-5	6-10	11-15	16-20	21-25	26-30	Total vehicle	PCU Factor		
Bus	3	2	5	3	2	2	17	2	34	68
Truck	1	1	1	1	2	1	7	2	14	28
Light Vehicle	46	73	61	43	33	56	312	1	312	624
Auto Rickshaw(AR)	29	17	27	43	15	22	153	0.75	114.75	229.5
Motor cycle	59	43	55	63	75	37	332	0.75	249	498
								Total=	723.75	1447.5

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