

TRAFFIC VOLUME STUDIES

PRESENTATION LAYOUT

- ❑ Introduction
- ❑ General Objectives of Traffic Volume study
- ❑ Study Site
- ❑ Methodology
- ❑ Survey procedure
- ❑ Data Collection
- ❑ Analysis of collected data
- ❑ Conclusion
- ❑ Recommendations
- ❑ Limitations of the Study



Traffic Survey

- ❖ Traffic surveys are required to transportation engineers for :
 - ❑ planning and designing traffic facilities
 - ❑ determining the need for traffic control devices
 - ❑ studying the effectiveness of introduced schemes;
 - ❑ diagnosing given situations and finding appropriate solutions;
 - ❑ forecasting the effects of projected strategies;
 - ❑ calibrating and validating traffic models etc.



Classification of Traffic Survey

- ❑ Traffic Stream characteristics – volume, speeds, density, and occupancy studies etc.
- ❑ Axle load survey
- ❑ Capacity studies of streets and intersections
- ❑ Travel demand – Home interview survey
- ❑ Studies of road users cost
- ❑ Parking supply and demand studies
- ❑ Inventories of road-traffic physical features
- ❑ Traffic accident studies
- ❑ Environmental impact studies of transport
- ❑ System usage studies

Objectives of Study

Vehicle Composition

Traffic Stream Properties

Average Daily Traffic

Directional Distribution

Flow Fluctuation



Introduction

- ❑ Traffic volume studies are conducted to determine the volume of traffic moving on the roads and classifications of roadway vehicles at a particular section during a particular time.
- ❑ Volumes of a day or an hour can vary greatly, depending on the different day of the week or different time period of a day.
- ❑ Traffic Volume survey is the determination of the number, movement and classifications of roadway vehicles at a given location.



General Objectives

- Design purposes
- Dynamic Traffic Management Purposes
- Other Purposes



Design Purposes

- ❑ Structural and geometric design of pavements, bridge, and other highway facilities.
- ❑ Intersection design including minimum turning path, channelization, flaring, and traffic control devices.
- ❑ Pedestrian volume study is useful for designing side-walks, pedestrian crossing etc.



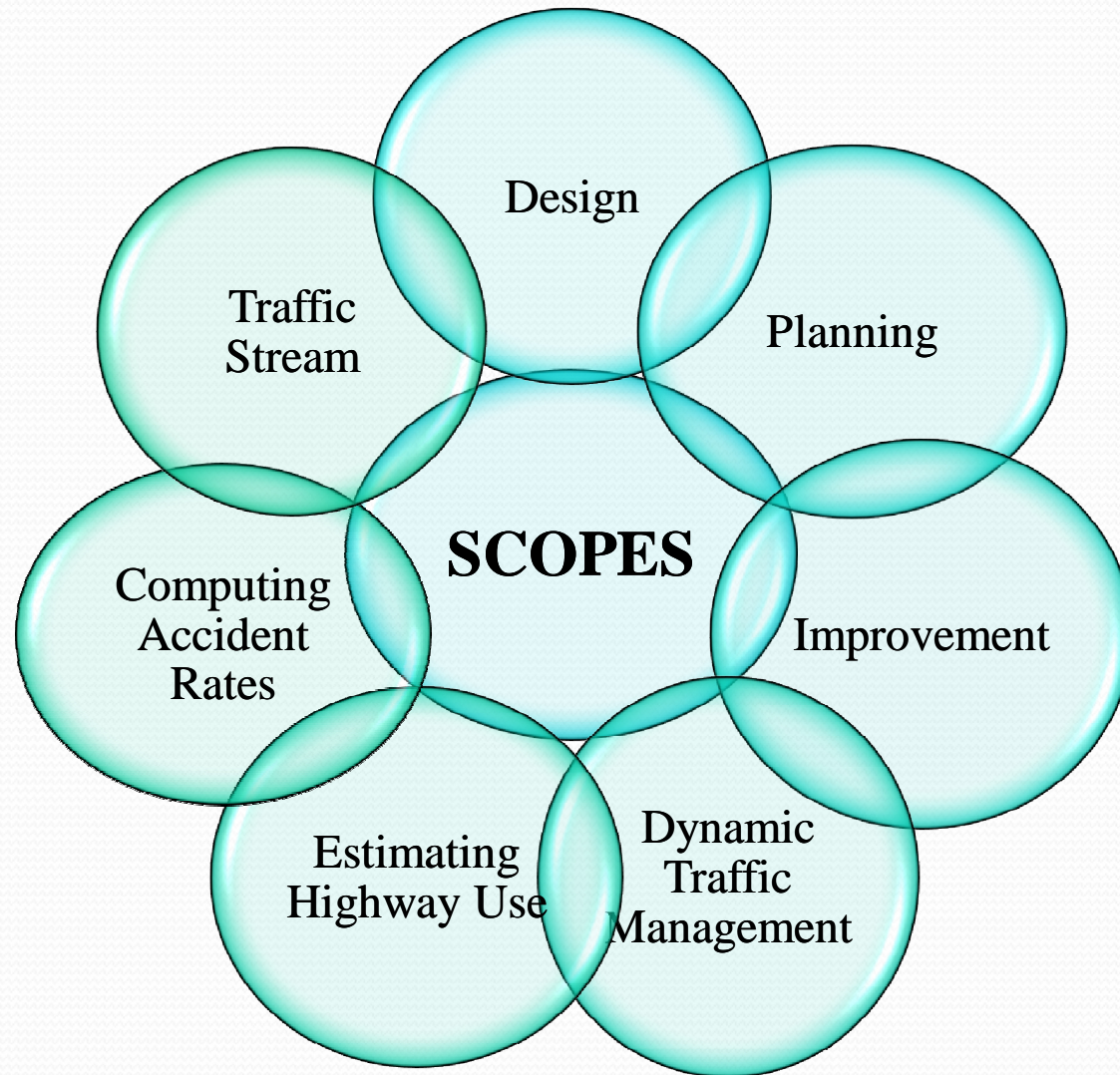
Dynamic Traffic Management Purposes

Up to date and continuous flow/congestion information is essential for optimizing - Traffic signal design and thereby improving junction performance and Network productivity by providing information to the road user.

Other Purposes

- Estimation of highway usage
- Measurement of current demand of a facility
- Estimation of trends
- Economic feasibility evaluation

Scopes of Volume Study





Keywords Related To Volume Study

Volume/flow

Rate of flow

Average Daily Traffic (ADT)

Average Annual Daily Traffic (AADT)

Design Hourly Volume

Service flow rate

Directional Distribution

Methods of Counting

Manual methods


Combination of manual and mechanical methods

Automatic devices

Moving observer method

Photographic method






Manual Count Recording Method

Tally Sheets

Intersection Volume Count

Cars- passenger cars, stationwagons, motorcycles, and pick-up trucks
Trucks- other trucks and buses. (Record school buses with SB.)

N/S Street 7th Street Date 0700 to 0715
E/W Street Delaware Avenue Weather Clear
Intersection Control None Observer John Doe

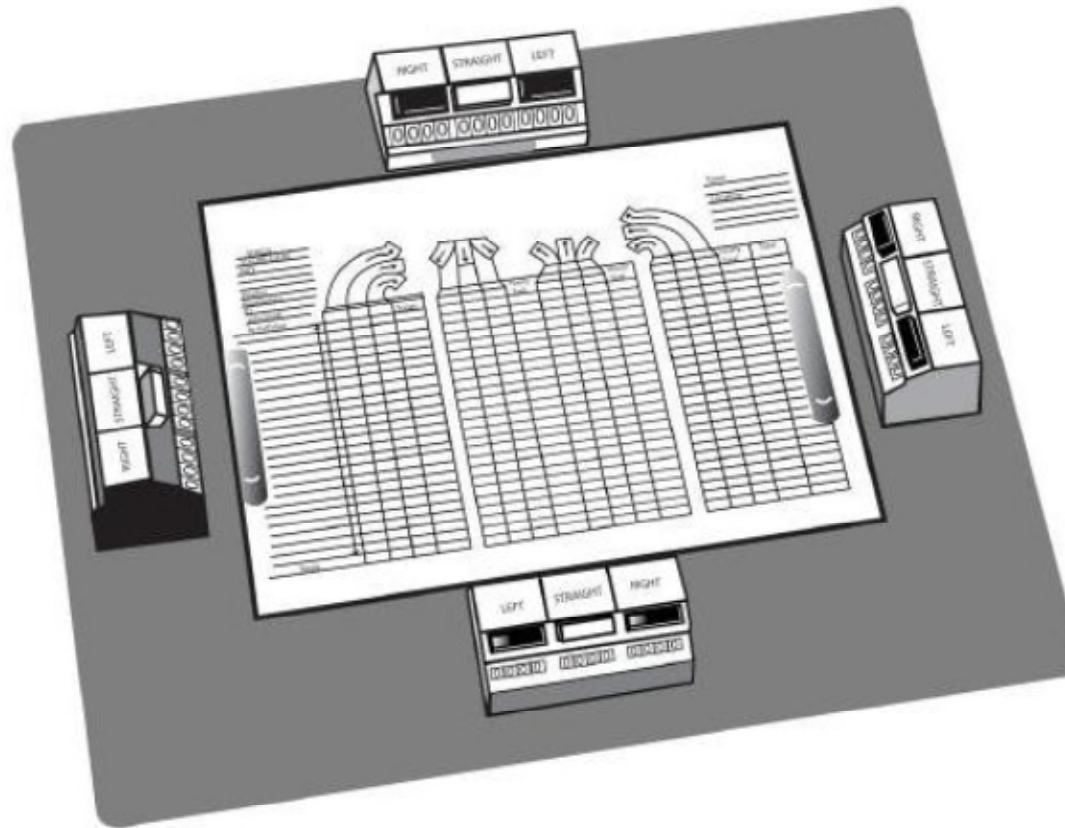
North 

Approach	Trucks	Cars
North	II	THL THL THL II
South	III	THL I
East	SB I	THL THL THL II
West	SB	THL

Percentages on arrows:
 North to South: 17 - 42.5%
 South to North: 15 - 21%
 East to West: 8 - 8%
 West to East: 32 - 48%
 North to East: 21 - 52.5%
 East to North: 19 - 27%
 South to West: 3 - 30%
 West to South: 8 - 9%

Mechanical Counting Boards

Mechanical count boards consist of counters mounted on a board that record each direction of travel.



Electronic Counting Boards

- Electronic counting boards are battery-operated, hand-held devices used in collecting traffic count data.



Steps to a manual traffic volume count

- **Prepare :**

- Determine the type of equipment to use, the field procedures to follow, and the number of observers required.
- Label and organize tally sheets

- **Select observer location(s) :**

Observers (data collectors) should be positioned where they have a clear view of traffic and are safely away from the edge of the roadway.

- **Record observations on site.**

Automatic Counting Methods

- ❑ An automatic survey involves placing a tube or loop across a road which is connected to a box containing the means for storing the information.
- ❑ In this method, vehicles are counted automatically without any human involvement.
- ❑ There are two techniques of automatic counting: a) Contact system based on pneumatic, mechanical, magnetic or piezo-electric method and b) Contactless system based on electrical/optical, ultrasound/infrared radar, micro wave, CCTV/video image processing method etc.



Automatic Counting Method

Bending plate

- A weight pad attached to a metal plate embedded in the road to measure axel weight and speed. It is an expensive device and requires alteration to the road bed



Pneumatic road tube



Figure : Pneumatic Road Tube

Piezo-electric sensor



- **Figure : Piezo-electric Sensor**



Data Collection

Survey Location





Data Collection

- ❖ Date : 29.01.14
- ❖ Counting Period : 20 minute (Short Count)
- ❖ Group No. : 6
- ❖ Survey Location : Green Road Signal
- ❖ Observation : Classified Vehicle Count
- ❖ Method : Manual Method (Direct)
- ❖ Equipments: Data Sheet, Stop Watch

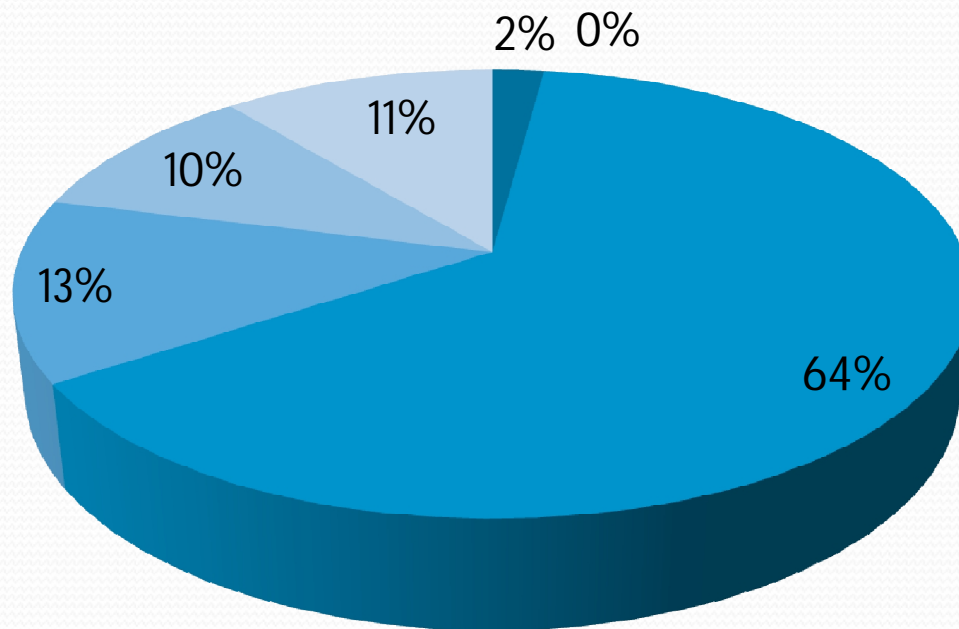
Traffic Volume Count Data

Vehicle Classification	Observation in 20min	Hourly Volume	Vehicle %	PCU	Hourly PCU
Bus (B)	7	21	2.08333333 3	3	63
Truck (T)	0	0	0	0.75	0
Light Vehicle (LV)	214	642	63.690476 2	1	642
Auto Rickshaw (AR)	44	132	13.095238 1	0.5	66
Motorcycle (MC)	34	102	10.119047 6	0.1	10.2
NMV	37	111	11.011904 8	0.5	55.5
Total =	336	1008	100		836.7

Vehicle Composition

Vehicle Composition Of Traffic Stream

- Bus (B)
- Trcuk (T)
- Light Vehicle (LV)
- Auto Rickshaw (AR)
- Motorcycle (MC)
- NMV



Vehicle Composition

Findings

- ❑ Predominant vehicle type:
Personalized vehicle
(Private Car, Jeep, Micro-bus etc)
- ❑ Negligible amount of public
transport
- ❑ Relatively high percentage of Non-
motorized vehicle

Recommendations

- ❑ More public transport facility
should be introduced
- ❑ Non-motorized vehicle movement
should be restricted
- ❑ Necessary measures have to be
adopted to control personalized
vehicle movement

Service Flow Rate

Types of Vehicles	Number	PCE	Converted Number
Bus	7	3	21
Truck	0	0.75	0
Light Vehicles	214	1	214
Auto Rickshaw	44	0.5	22
Motorcycle	34	0.1	3.4
NMV	37	0.8	18.5
Total			278.9

Traffic Flow (9:40 am - 10:00 am) 278.9 PCU

Service Flow Rate (10.00am-11.00am) 836.7 PCU/hr

Level of Service

LOS	Service Flow Rate (PCU/hr)
A	600
B	700
C	900
D	1200
E	1400
F	>1400

From the table we can observe that Level of Service of that particular road is “C”.



Directional Distribution (DD)

Directional Distribution

- The directional Distribution is defined as the percentage of heavier volume over the total highway volume.

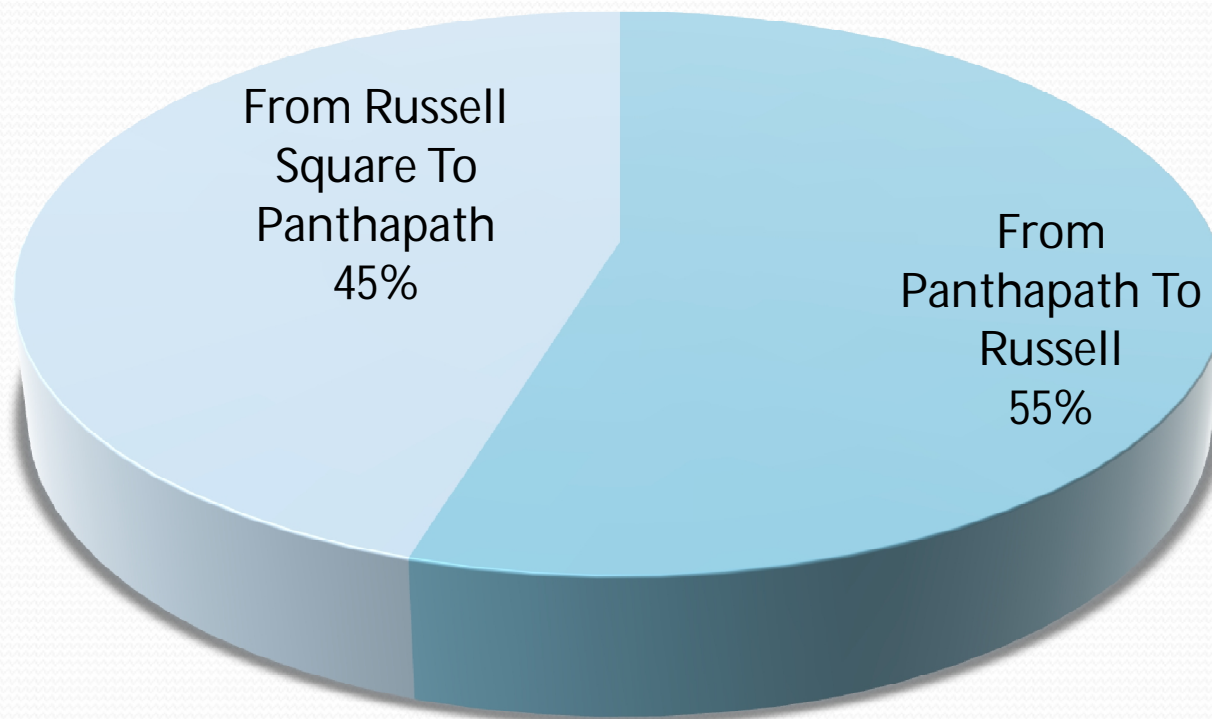
Importance of Directional Distribution

- Accounts for the directional distribution of traffic
- Used to convert average daily traffic to directional peak hour traffic

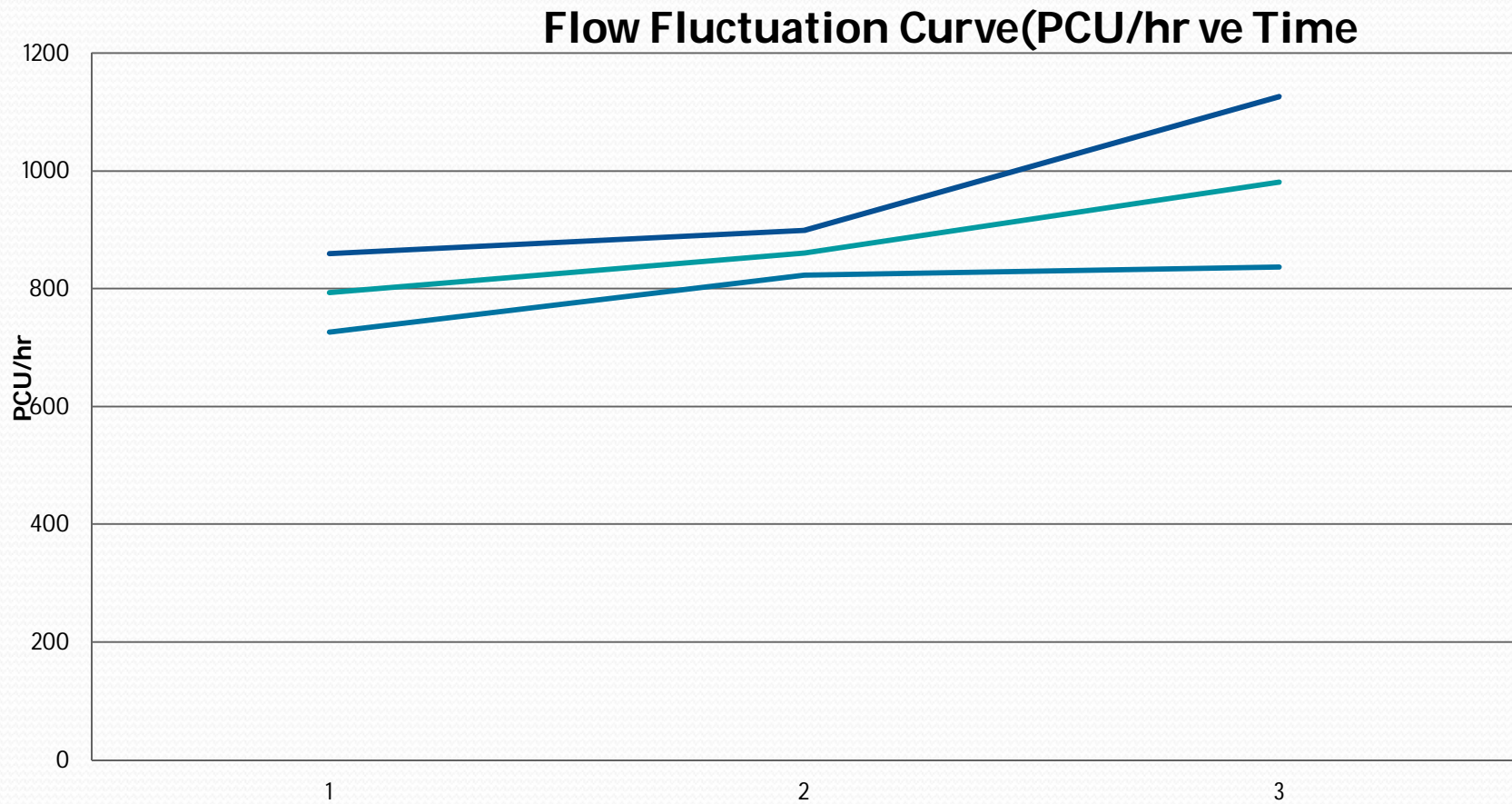
Directional Distribution

Direction	Time	PCU/hr	Avg. PCU/hr	Directional Distribution
From <u>Panthapath</u> To Russell Square	9:00AM- 10:00AM	859.5	961.3	54.72192179
	10:00AM- 11:00AM	898.8		
	11:00AM- 12:00AM	1125.6		
From <u>Russell</u> Square To <u>Panthapath</u>	9:00AM- 10:00AM	726.6	795.4	45.27807821
	10:00AM- 11:00AM	822.9		
	10:00AM- 11:00AM	836.7		

Directional Distribution



Flow Fluctuation Curve





Discussion on Flow Fluctuation

- To draw flow fluctuation curve, it was assumed that volume for three continuous hours were counted, although all vehicles were counted within one hour. Each group counted vehicles for 20 minutes in each direction. Flow rates were calculated from that short count data and plotted. The flow fluctuation curve shows a peak at 10:00-11:00 hrs.
- Knowing the flow characteristics, we can determine whether Panthapath to Russell square section of the road at 10:20-10:40 AM is handling traffic much above its capacity; the traffic is heavy so that the road suffers from congestion with consequent loss of journey speeds

Limitations

- There were a limited number of enumerators. So there was possibility of error.
- In the study location no suitable vantage location was found. So simultaneous bus counting is a problematic task.
- Due to time constraints short count was taken. For better result long count has no alternative.
- For Flow Fluctuation Curve weekly 24 hours is needed. But due to time and manpower constraint it was not possible.
- In the modern age automatic counting method based on CCTV/Video image processing is most popular method. But due to resource constraint it was not possible.



Recommendations

Traffic volume is the most delicate information to implement transportation planning, design and to start new transportation modes. The data collection and collector both should be good and sound. Recommendations are as follows:

- Traffic volume counting should be automatic and most importantly contactless method as it is not clumsy.
- Before final survey reconnaissance survey or pilot survey is necessary.
- Choose a vantage point; if don't have then select a reference station.
- In case of manually counting try to keep a hand counting machine.
- Always try to be in safety.
- Wear retro-refractive dresses