

## Traffic Volume Survey Analysis of the Road Connecting Career Point University

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**Abstract:** As the world's population is increasing day by day, the no. of vehicles used are also increasing respectively, which results in increasing huge traffic on the roads. Therefore, for maintaining the healthy traffic conditions on the road it is necessary that the roads should be provided with the sufficient space required by the vehicles to move easily on that road. For that we need to study the present traffic situation of that road to get the idea of traffic volume moving through it. More over from this study (survey) we would get to know that how much more space we should have to provide (if required) for making the healthy traffic scenario on that road. WE had collected some traffic data from the road connecting to my university which is actually the single lane national highway 12. From this data, we initially figured out the variation in PCU (Passenger Car Unit) with certain time and after analyzing the data I got to know the traffic volume of that road and the its LOS (Level of Service).

**Key Words:** PCU, LOS, DSV, Traffic Survey, Traffic Volume.

### INTRODUCTION:

The basic aim of traffic surveys is to capture data that accurately reflects the real-world traffic situation in the area. It may be counting the number of vehicles using a road or collecting traffic volume information, but there are many other types of data that traffic surveys collect. In the past this has involved having people standing by the side of roads and recording their observations on paper pads. In recent years, this approach has been largely replaced by recording traffic using video cameras, and then analyzing the video footage later in the office. Traffic surveys are generally required to transportation engineers for planning and designing traffic facilities, diagnosing given situations and finding appropriate solutions, studying the effectiveness of introduced schemes etc.

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

Before performing the traffic survey, we must have to know about certain terms: PCU (Passenger Car Unit) is a vehicle unit used for expressing highway capacity or volume. DSV is a designed service volume fixed for single lane or double lane road, decided by IRC.

General objectives for which traffic volume studies can be are as follows: -

#### 1. Design Purposes

It includes

- a) Structural and geometric design of pavements, bridge and other highway facilities.
- b) Intersection design including minimum turning path, channelization, flaring and traffic control devices.

c) Pedestrian volume study is useful for designing sidewalks, pedestrian crossing etc.

## 2. 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 road user.

## 3. Other purposes

Which includes estimation of highway usage, measurement of current demands of a facility provided etc.

Then if we talk about the scopes of traffic volume study, it simply includes design, planning, improvement, dynamic traffic management, estimating highway use, computing accident rates, and traffic stream. In this survey we to mainly count the vehicles passing through a particular time, but for we first need to know that what types of vehicles lies in which category. For this let's take a look on

### *Standard UK Vehicle Classification Schemes*

When recording the movements that hicleves make, the classes that are usually used are explained below.

#### **Car (Car/Taxi)**

Cars, taxis, 'people carriers' and other passenger vehicles (for example, minibuses motorhomes and camper vans), normally ones which have less than 16 seats. Three-wheeled cars, Land Rovers, Range Rovers and Jeeps and smaller ambulances with windows are included. Cars towing caravans or trailers are counted as one 'Car'.

#### **LGV (Light Goods Vehicle)**

All car type delivery vans and those of the next larger carrying capacity such as transit vans. Included here are small pickups, ambulances which look like vans without windows and milk floats. Most of this group are delivery vans of one type or another and goods vehicles (middle-sized trucks) with single rear wheels. Also includes LGVs towing a trailer or caravan as one 'LGV'. If a vehicle has sideguards fitted between axles, or four wheels on the rear axle it should NOT be included in this category.

#### **OGV 1 (Ordinary Goods Vehicle 1)**

All larger rigid vehicles with two or three axles including larger ambulances with double rear wheels, tractors (without trailers), road rollers for tarmac pressing, box vans, similar large vans and middle-sized trucks which have double rear wheels (if the rear wheels are single, the vehicle should be classified as LGV).

#### **OGV 2 (Ordinary Goods Vehicle 2)**

Includes all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 goods vehicles towing a caravan or trailer.

#### **PSV (Public Service Vehicle)**

Includes all public service vehicles and works buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats.

#### **MC (Motorcycle)**

Includes all types of motorcycles and also those with sidecars.

#### **PC (Pedal Cycle)**

Includes all types of pedal cycles and those carrying one or more passengers.

#### **Common Causes of Confusion:**

**Minibus (Car class) or Small Bus (PSV class)**

A minibus is a vehicle with less than 16 seats, and it should be recorded in the Car class. A small bus with 16 seats or more should be recorded as a PSV. Where it is difficult to quickly see which category should be used, it is normally best to use the Car class.

**Van/Middle-sized truck with Single Rear Wheels (LGV class) or Van/Middle-sized truck with Double Rear Wheels (OGV1 class)**

A van/middle-sized truck with single rear wheels should be classified as a **LGV**, but if it has two rear wheels on each side, it should be classified as an **OGV1**. Sometimes it is very hard to see whether there are double wheels at the back or not. If the van is large, it is more likely to have double wheels. If you cannot see well enough, please classify the vehicle as an **OGV1**.

**Ambulance**

Ambulances can be classified as Cars, LGV and OGV1 depending on the type of the ambulance. An ambulance is a **Car** when it looks like a small van with windows. It is a **LGV** when it looks like a small van without windows. It is an **OGV1** when it looks like a box-van/middle-sized truck with double rear wheels.

**RESEARCH METHODOLOGY:****1. Data Collection Site**

Just in front of the main entering gate of our University there is a single lane National Highway 12 from Kota to Jhalawar on which the survey is carried out. The data collection process carried out on normal working days on which the traffic flow is normal.

**2. Data Collection Methodology**

Discussing about the data collected at that road connecting our university, we collected the data for one hour from the above mentioned road during a regular day. We have divided the time in four slots of 15-15 minutes for getting the proper data. The first slot from 10:45-11:00AM, then 11:00-11:15AM, then 11:15-11:30AM and last slot 11:30-11:45. We surveyed that road connecting our university, and from this survey I got the number of vehicles which are being crossed at that time from that road.

**3. Data analysis and methodology**

From the data collected, we got to know the number of vehicles passed from that road at that particular time. After the collection of data, we had converted all these data in terms of PCU (Passenger Car Unit) by multiplying it with its corresponding PCU factor which is described in IRC-6.

Table 1. PCU factor for different vehicles types by IRC-6

S.NO.	VEHICLE TYPE	PCU
1.	Two wheeler bike or scooter etc.	0.5
2.	Three wheeler vehicle	1.2
3.	Car	1
4.	Jeep/van	1
5.	Mini Bus	1.4
6.	Bus	2.2
7.	Light Commercial Vehicle	1.4
8.	Truck	2.2
9.	Tractor	4
10.	Bicycle	0.5

#### 4. Final data analysis

I calculated the PCU of each type of vehicle and also collected the total number of vehicles passed through different time slots. Then we got to know the traffic volume of that road. DSV for this single lane road is 900 according to IRC (Indian Road Congress).

Then for the calculation of LOS (Level of Service) is done by applying

$$LOS = \frac{VOLUME (OBTAINED PRACTICALLY)}{DSV}$$

#### DATA AND ITS ANALYSIS:

Survey Site: Road Connecting Career Point University

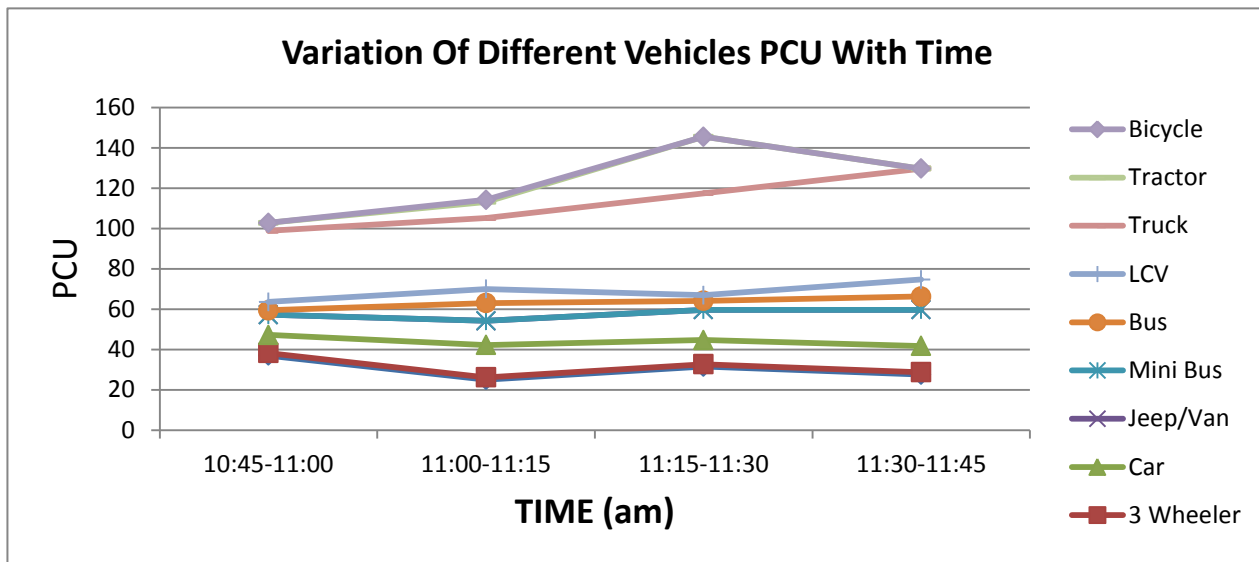
PCU = NO. OF VEHICLE X PCU FACTOR OF THAT VEHICLE TYPE

Table 2. PCU Calculation for Different Vehicles in Each Time Slot

Type of Vehicle	PCU (10:45-11:00AM)	PCU(11:00-11:15AM)	PCU(11:15-11:30AM)	PCU(11:30-11:45AM)
2 Wheeler	74X0.5=37	50X0.5=25	63X0.5=31.5	55X0.5=27.5
3 Wheeler	1X1.2=1.2	1X1.2=1.2	1X1.2=1.2	1X1.2=1.2
Car	9X1=9	16X1=16	12X1=12	13X1=13
Jeep/Van	10X1=10	12X1=12	15X1=15	18X1=18
Mini Bus	0X1.4=0	0X1.4=0	0X1.4=0	0X1.4=0
Bus	1X2.2=2.2	4X2.2=8.8	2X2.2=4.4	3X2.2=6.6
LCV	3X1.4=4.2	5X1.4=7	2X1.4=2.8	6X1.4=8.4
Truck	16X2.2=35.2	16X2.2=35.2	23X2.2=50.6	25X2.2=55
Tractor	1X4=4	2X4=8	7X4=28	0X4=0
Bicycle	0X0.5=0	2X0.5=1	0X0.5=0	0X0.5=0

Table 3. Tally Sheet for Traffic Survey of Road Connecting Career Point University

Time	2 Wheeler	3 Wheeler	Car	Jeep /Van	Mini Bus	Buses	LCV	Truck	Tractor	Bicycle	Total	Total PCU
10:45-11:00AM	74	1	9	10	0	1	3	16	1	0	115	
PCU	37	1.2	9	10	0	2.2	4.2	35.2	4	0		102.8
11:00-11:15AM	50	1	16	12	0	4	5	16	2	2	108	
PCU	25	1.2	16	12	0	8.8	7	35.2	8	1		114.2
11:15-11:30AM	63	1	12	15	0	2	2	23	7	0	125	
PCU	31.5	1.2	12	15	0	4.4	2.8	50.6	28	0		145.5
11:30-11:45AM	55	1	13	18	0	3	6	25	0	0	121	
PCU	27.5	1.2	13	18	0	6.6	8.4	55	0	0		129.7
<b>TOTAL</b>	<b>242</b>	<b>4</b>	<b>50</b>	<b>55</b>	<b>0</b>	<b>10</b>	<b>16</b>	<b>80</b>	<b>10</b>	<b>2</b>	<b>469</b>	
<b>TOTAL PCU</b>	<b>121</b>	<b>4.8</b>	<b>50</b>	<b>55</b>	<b>0</b>	<b>22</b>	<b>22.4</b>	<b>176</b>	<b>40</b>	<b>1</b>		<b>492.2</b>



Graph 1. Variation of Different Vehicle PCU wrt. Time slots

**Determination of Volume and LOS (Level of Service) of the Road connecting CPU:**

Volume Obtained from readings/data = 469 vehicles/hr. or 492 PCU/hr.

DSV (Designed Service Volume) for single lane road according to IRC = 900

Therefore,  $LOS = \text{Volume obtained} / \text{DSV}$

$$= 469 / 900$$

$$= 0.52$$

So, our Level of service for the road connecting career point university is comes out to be 0.52

Now, from our LOS value of our road we can figure out the grade of this road by the given below table of road grade of IRC.

Table 4. Table for finding Grade of the road from LOS Value

GRADE OF THE ROAD	LOS VALUE
A	0.3 – 0.39
B	0.4 – 0.49
C	0.5 – 0.59
D	0.6 – 0.69

**RESULT AND DISCUSSION:**

After performing the above survey I got to know the traffic volume flowing through this road connecting our university. And then from the Table 4, I got to know that this road is actually lies In C Grade Category. This road really requires maintenance because the traffic volume flowing through this road is actually much more then this road’s condition. Moreover the holes and imperfect alignment of this road leads to congestion of roads traffic. This problem is also cause of increasing road accident on this route. So, this should be extended and should be converted to a double lane National Highway to provide sufficient space for traffic flow. And there should be proper pedestrian area for convenience of pedestrian people. There should be proper roadside boundary to reducing the number of road accidents.

And moreover traffic volume counting should be automatic and most importantly contactless method as it is not clumsy.

## CONCLUSION:

Traffic Volume survey is no doubt not an easy task if you are doing it manually with a paper and pad in your hand. Traffic volume is the most delicate information to implement transportation planning, design and to start new transportation modes. Only because of this traffic volume survey we got to know the road condition. It helps our engineers to construct the road plan and the need of highways etc. That's the traffic volume is a basic necessity for any design, planning and construction of road, bridges, highways etc. The traffic volume study plays a very important role in improving safety at signalized and un-signalized intersections in both rural and urban areas. Moreover this traffic volume study is also economically beneficial for engineers and governments because it gives an accurate idea for designing and construction of roads, highways, bridges etc.

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