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TRAFFIC VOLUME STUDIES AND SIGNAL DESIGN IN PENDHURTHI JUNCTION BY USING WEBSTER'S METHOD

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ABSTRACT

The aim of the project is to minimize the delay time and to decrease the conflict points at the specified intersection. This can be achieved by study of traffic behavior before and after installing the signal. Traffic signal can be designed by taking lane measurements at the specified intersection. By using manual counting method traffic volume studies have been carried out to know the volume of vehicles, volume of pedestrians, extensions of roads resulting in road users paying more attention and increasing the speed of the vehicle at the intersection. To overcome the problems occurs due to delay of traffic and conflicts at the intersection, we adopted a remedial measure to provide a single phase traffic signal at Pendruthi 4-road intersection, circumferential area needed to be enlarged. Hence it is felt necessary to improve the knowledge about the traffic counts by manual methods. In this project, the attempts have been made to design a signal at a Pendruthi intersection.

Keywords: Traffic signal, Traffic intersection, delay time, conflict points.

1. INTRODUCTION

TRAFFIC ENGINEERING is a branch of civil engineering that uses engineering techniques to achieve the safe and efficient movement of people and goods on roadways. It focuses mainly on research for safe and efficient traffic flow, such as road geometry, sidewalks and crosswalks ,cycling infrastructure, traffic signs, road surface markings and traffic lights.

Traffic engineering deals with the functional part of transportation system, except the infrastructures provided.

Typical traffic engineering projects involve designing traffic control device installations and modifications, including traffic signals, signs, and pavement markings. However, traffic engineers also consider traffic safety by investigating locations with high crash rates and developing countermeasures to reduce crashes. This project involves traffic volumes study of the important route in city of Visakhapatnam. The after all the surveys and observations solutions and suggestions are provided for better traffic conditions and convenience of the users.

Traffic engineering is a branch of engineering which deals with the improvement of traffic performance of road terminals and networks. Institute of traffic engineers, U.S.A defines "Traffic engineering is that phase of engineering which deals with planning and geometric design of streets, highways, abutting lands, and which operation, there on as their use is related to the safe, convenient and economic transportation of persons and goods".

❖ The study of traffic engineering may be divided into 6 major sections i.e.,
- Traffic characteristics
- Traffic studies and analysis
- Traffic operation, control and regulation
- Planning and analysis
- Geometric design
- Administration and management

1.1 TRAFFIC CHARACTERISTICS:
The study of traffic characteristics is the most essential prerequisite for any improvement of traffic facilities.
The traffic characteristics are quite complex with various types of road users in the roads moving with different motives.
The human psychology is to be given particular attention.

1.2 TRAFFIC STUDIES AND ANALYSIS:
The study of vehicle characters tics is an essential part . apart from these the various studies to be carried out on the actual traffic includes speed, volume, capacity, traffic patterns, origin and destination, traffic flow characteristics', parking and accident studies.

1.3 TRAFFIC OPERATION, CONTROL AND REGULATION:

The various aspects that are covered under traffic operations are regulations, control and the warrants for application of controls.

The regulations may be in the form of ordinances or other traffic regulatory measures such as speed limit, etc.

Installation of traffic control devices like signs, signals and islands are most common means to regulate and control the traffic.

- Actual adoption of traffic management measures, such as traffic regulations and control need adequate attention.

1.4 PLANNING AND ANALYSIS

- Traffic planning is a separate phase for major like express-ways, arterial roads, mass transit facilities, and parking facilities.
- All the aspects such as cross section and surface intersections and parking facilities are to be suitably designed for better performance.

1.5 SURVEY LOACATION:

During the past few years, the traffic in the Visakhapatnam city has been increasing rapidly. As a result lot of traffic jams, pollution, accidents are taking place. It is found that intersections are the major potential areas for all these problems and there are lot of conflict points at the intersection.

So it is required to design a traffic signal at intersection for smooth flow of traffic to guide and to warn the road user.

We have selected intersection at pendurthi junction in Visakhapatnam district for traffic volume study and to design the traffic signal.
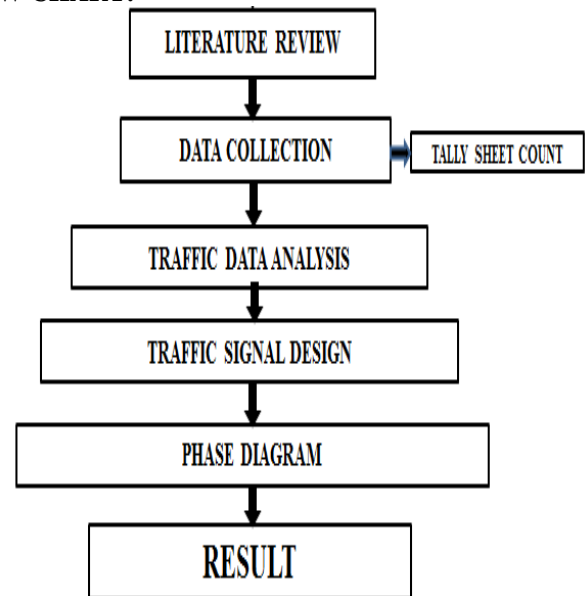
2. METHODOLOGY

2.1 GENERAL:

The analysis of the Principles of methods, rules, and postulates employed by a discipline. The Systematic study of methods that are, can be or have been applied within a discipline. The study or description of methods.

2.2 FLOW CHART:

3. DATA COLLECTION AND ANALYSIS

A batch of seven members divided into four groups, each group consisting of two members. Each group is assigned to count several of vehicles in a particular flow direction during peak hour and off peak hours. Traffic volume data was collected from Monday to Saturday, because during remaining day the flow may be ir-regular. The traffic volume data is collected at the pendurthi junction

From 4.1 to 4.1.6 table represent traffic data collection for each days.

Analyzing the graph it represent total volume is individual directions, and used to identify peak hour and off peak hour.

By analyzing the bar chart it is used to identify the peak hour traffic volume for the different type of vehicles.
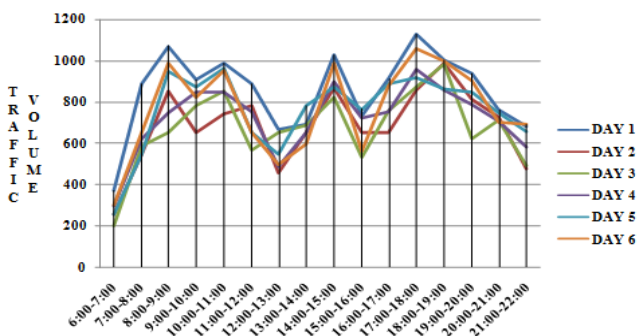
4. TRAFFIC DATA ANALYSIS:

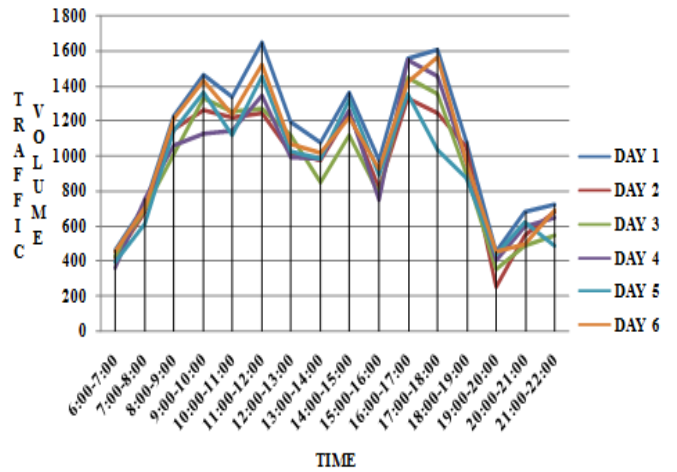### TRAFFIC FLOW VARIATION FROM MONDAY TO EVENING IN SOUTH DIRECTION
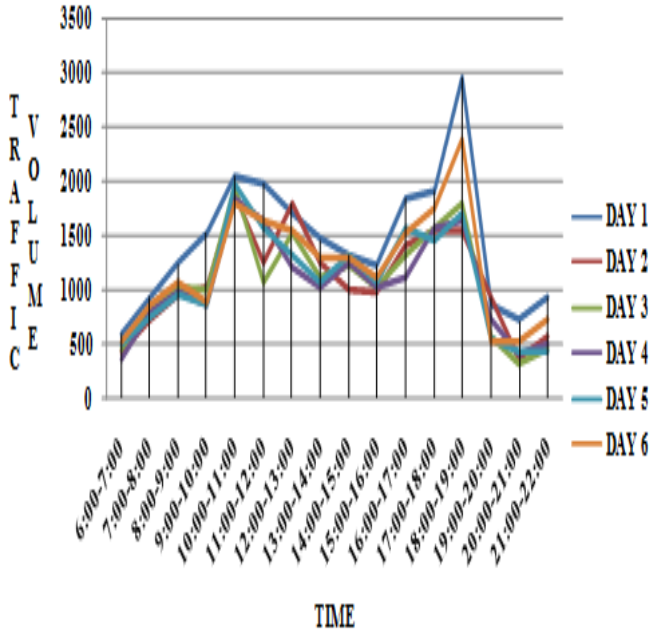
- Analyzing the traffic variation at peak hour and off peak hour through out the day in south direction.
- From the above graph it is clear that the traffic volume in the peak hour is in evening period.
- Except the peak hour remaining are off peak hour.

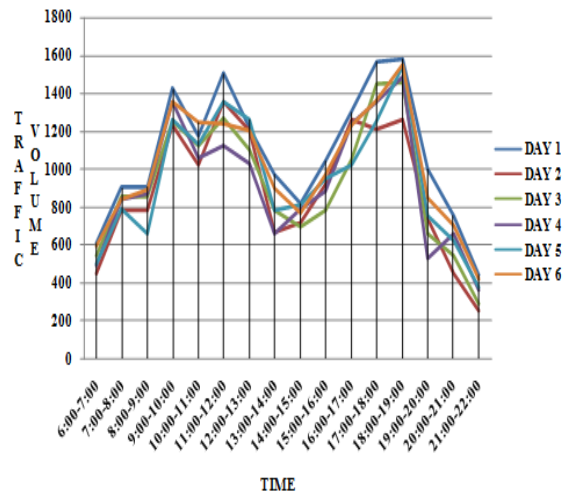### TRAFFIC FLOW VARATION FROM MONDAY TO SATURDAY IN WEST   DIRECTION

- Analyzing the traffic variation at peak hour and off peak hour throughout the day in west direction.
- From the above graph it is clear that the traffic volume in the peak hour is in evening period.
- Except the peak hour remaining are off peak hour

TRAFFIC FLOW VARATION FROM MONDAY TO SATURDAY IN EAST DIRECTION

- Analyzing the traffic variation at peak hour and off peak hour throughout the day in east direction.
- From the above graph it is clear that the traffic volume in the peak hour is in evening period.
- Except the peak hour remaining are off peak hour.

TRAFFIC FLOW VARIATION FROM MONDAY TO SATURDAY IN NORTH DIRECTION

- Analyzing the traffic variation at peak hour and off peak hour throughout the day in north direction.
- From the above graph it is clear that the traffic volume in the peak hour is in evening period.
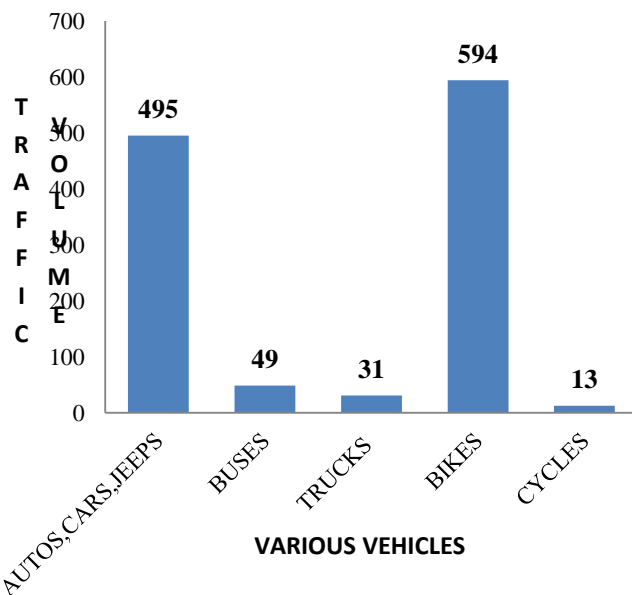- Except the peak hour remaining are off peak hour

4.3.1 PEAK HOUR DATA ANALYSIS:

VARIOUS VEHICLES VOLUME AT PEAK HOURS IN SOUTH DIRECTION
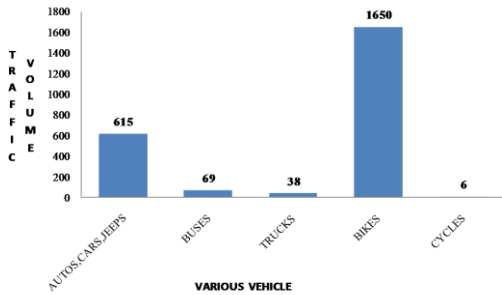
- From above graph chart we had analysis that the day -1 as maximum traffic volume compared with remaining days.
- so peak hour in the day -1 is in evening session and it is represent with the bar charts with various vehicles traffic volume in SOUTH DIRECTION.
- In the peak hour the traffic volume of bikes flow is more from PENDURTHI JUNCTION to KOTHAVALASA.

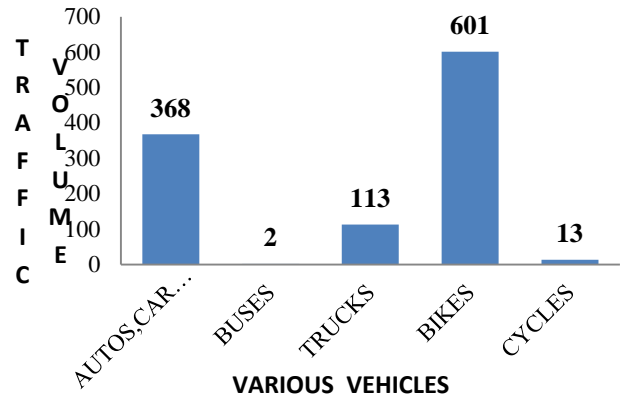### VARIOUS VEHICLES VOLUME AT PEAK HOURS IN NORTH DIRECTION

- From above graph chart we had analysis that the day -1 as maximum traffic volume compared with remaining days.
- so peak hour in the day -1 is in evening session and it is represent with the bar charts with various vehicles traffic volume in NORTH DIRECTION.
- In the peak hour the traffic volume of bikes and auto and jeeps is more from PENDURTHI JUNCTION to NAD.

VARIOUS VEHICLES VOLUME AT PEAK HOURS IN WEST DIRECTION
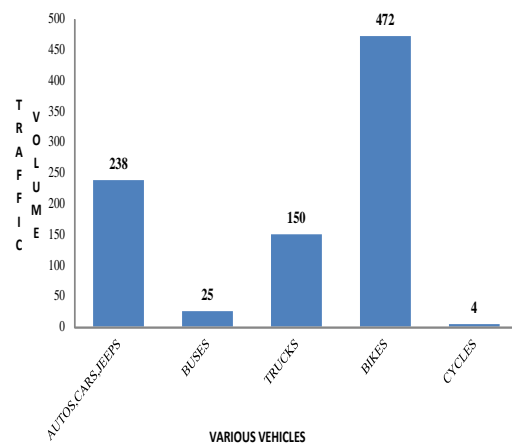

- From above graph chart we had analysis that the day -1 as maximum traffic volume compared with remaining days.
- so peak hour in the day -1 is in evening session and it is represent with the bar charts with various vehicles traffic volume in WEST DIRECTION.

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- In the peak hour the traffic volume of bikes and trucks is more from PENDURTHI JUNCTION to ANADHAPURAM.
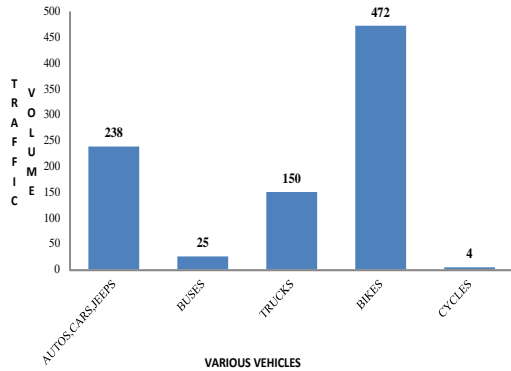
VARIOUS VEHICLES VOLUME AT PEAK HOURS IN EAST DIRECTION

- From above graph chart we had analysis that the day -1 as maximum traffic volume compared with remaining days.
- so peak hour in the day -1 is in evening session and it is represent with the bar charts with various vehicles traffic volume in DIRECTION.
- In the peak hour the traffic volume of bikes and trucks is more from PENDURTHI JUNCTION to PINAGADI.

SUMMARY:

In this project we have collected traffic volumes in each direction at PENDURTHI JUNCTION by manual counting method. To the safe and efficient movement of traffic in the Pendurthi intersection without any conflicts it is required to provide a traffic signal at the intersection. From this data we have calculated peak hour flows and off peak hours in each direction at intersections. Bar charts are also drawn for each intersection which shows the percentage of various types of vehicles crossing the intersection. Peak hour flows for each phase has been calculated for the design of traffic signal. Approach widths of the roads are taken for the calculation of saturation flow for each road. From the collected data the ratio of peak hour flow to the saturation flow are calculated and the optimum cycle time is worked out accordingly as per Webster's method. Effective green times and actual green times for each phase has been calculated with and without considering all red period. Finally timing diagrams are drawn for each intersection showing all the details.

CONCLUSION:

The calculated optimum cycle time and actual green times for traffic signals at PENDURTHI INTERSECTION as follows

Pendruthi intersection:
Case a) WITHOUT CONSIDERING ALL RED TIME:
1. The optimum cycle length (C_o) = 120sec

2. The actual green time for phase – 1, G1 = 43sec
3. The actual green time for phase – 2, G2 = 27sec
4. The actual green time for phase – 3, G3 = 17sec
5. The actual green time for phase – 4, G4 = 21sec

Case b) WITH CONSIDERING ALL RED TIME:
1. The optimum cycle length (C_o) = 120sec
2. The actual green time for phase – 1, G1 = 41sec
3. The actual green time for phase – 2, G2 = 26sec
4. The actual green time for phase – 3, G3 = 15sec
5. The actual green time for phase – 4, G4 = 20sec

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