VALUE ADDITION IN TRAFFIC MANAGEMENT SYSTEM

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Abstract: In considering the capacity of road systems it should be remembered that increased capacity is defined as "the flow which produces the minimum acceptable average journey speed." A long-standing problem in traffic engineering is to optimize the flow of vehicles through a given road network. Improving the timing of the traffic signals at intersections in the network is generally the most powerful and cost-effective means of achieving this goal
This paper titled "Value Addition in Traffic Management System" involves discovering solutions to the traffic faced by students at college. The goal is to optimize the route for all the vehicles traveling to DayanandaSagar College, Bangalore junction. This has been done by observing that pedestrian and motorists face a problem everyday to reach their destination on time.

IndexTerms - optimize, Value Addition, traffic engineering, cost-effective

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1. INTRODUCTION

Rapid growth of India's urban population has put enormous strain on transport systems. The vehicle population in metropolitan cities is increasing tremendously in recent years leading to congestion in urban areas. Construction of public transport facilities, especially Metro rail, Monorail is under progress in many major cities such as Bangalore. Handling traffic in work zones is a challenge because the work activity presents an abnormal and often
A major component of traffic management for complex road systems is the timing strategy for the signalized intersections. This is an extremely challenging control problem for all systems (network). It is essential that the existing traffic flow pattern and change in pattern during construction period has to be studied in detail for better planning.
System control is the means for real-time (demand-responsive) adjustment of the timings of all signals in a traffic network to achieve a reduction in congestion consistent with the chosen system measure of effectiveness. This real-time control is responsive to instantaneous changes in traffic conditions, including changes due to accidents or other traffic incidents. Further, the timing should change automatically to adopt to long-term changes in the system. To achieve true system optimality, the timings at different signals will not generally have a predetermined relationship to one another

1.1 OBJECTIVE

The primary objective of this study is to:

- Review congestion issues in cities and urban areas.
- Demonstrate electiveness of value engineering approach to evaluate traffic management systems.
- To simulate traffic flow on the formulated and modelled scenarios and evaluate their time delay and traffic density.

2. CURRENT SCENARIO IN INDIA

Traffic congestion or traffic jam is a condition on transport networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, this results in some congestion. Traffic congestion occurs when a volume of traffic or modal split generates demand for space greater than the available road capacity; this point is commonly termed saturation. There are a number of specific circumstances, which cause or aggravate congestion; most of them reduce the capacity of a road at a given point or over a certain length, or increase the number of vehicles required for a given volume of people or goods. About half of the current traffic congestion is recurring, and is attributed to sheer weight of traffic; most of the rest is attributed to traffic incidents, roadwork and weather events.
Some traffic engineers have attempted to apply the rules of fluid dynamics to traffic flow, likening it to the flow of a fluid in a pipe. Congestion simulations and real-time observations have shown that in heavy but free flowing traffic, jams can arise spontaneously, triggered by minor events ("butterfly effects"), such as an abrupt steering maneuver by a single motorist. Traffic scientists liken such a situation to the sudden freezing of super cooled fluid.

3. CURRENT SCENARIO IN BANGALORE

The population in Bangalore Urban Region and Municipalities has increased from 30 lakhs to 101 lakhs over the past four decades. The increase from 41 lakhs in 1991 to a drastic increase of 96 lakhs in 2011 along with the increasing vehicular growth may be considered the trigger for increased traffic volume leading to delay congestion. Alongside the exponential growth rate for the year 2021 has also be projected

Unprecedented growth of Bangalore City, as a result of proliferations of educational institutions and IT/BT companies, creating immense job opportunities and globalization coupled with pleasant weather has put tremendous pressure on transportation and traffic management. In-adequate infrastructure and inter mode public transport system has further aggravated

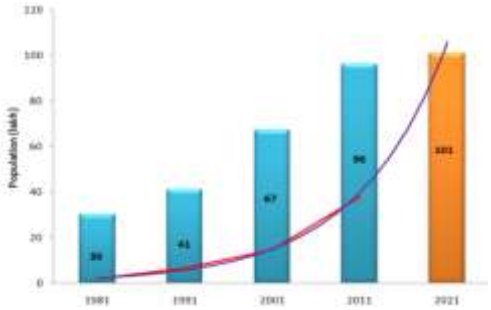


Fig. 3.1 represents the population versus vehicular growth over the past four decades.

4. METHODOLOGY

Scientific research or any project initiation involves a systematic process that focuses on being objective and gathering a multitude of information for analysis so that the project members can come to a conclusion. The scientific research process is a multiple-step process where the steps are interlinked with the other steps in the process. If changes are made in one step of the process, the researcher must review all the other steps to ensure that the changes are reflected throughout the process. The following steps of the project process or the methodology for the project and provides an example of each step for a sample research study.

Step 1: Identify the Problem

Step 2: Review the Literature

Step 3: Clarify the Problem

Step 4: Clearly Define Terms and Concepts

Step 5: Define the Population.

Step6: Develop the Instrumentation Plan

Step 7: Collect Data

Step 8: Analyze the Data

5. BENIFITS

Many benefits are obtained from the installation of an effective Urban Traffic Control system utilizing SCOOT, both reducing congestion and maximizing efficiency, which in turn is beneficial to the local environment and economy.

- World leading adaptive control system
- Customized congestion management
- Reductions in delay of over 20%
- Maximize network efficiency
- Flexible communications architecture
- Public transport priority
- Traffic management
- Incident detection
- Vehicle emissions estimation
- Comprehensive traffic information

Modern traffic management and control systems must account for all methods of transport in our urban areas and SCOOT provides effective priority for public transport without disadvantaging the normal traffic, allowing public transport vehicles to adhere to their schedule and hence provide a credible alternative mode of travel. SCOOT has been demonstrated in over 200 towns and cities in over 14 countries around the world given proven benefits in reduced congestion and delay. These have been demonstrated several times with detailed studies highlighting the effectives of SCOOT urban traffic control as a tool for management of traffic and congestion.

"Value Engineering Methodology" Amit Sharma, Dr. R.M.Belokar 2012. In this paper the case study discussed how the cost of a product is minimized by applying the Value Engineering Methodology. Various worksheets are developed and thorough analysis is done to attain a concrete solution. In future we can make the changes in the design so that the Value of the product can even be

enhanced. Value Engineering is the systematic application of recognized techniques by a multi-disciplined team which identifies the function of a product or services; establishes a worth for that function; generates alternatives through the use of creative thinking; and provides the needed functions to accomplish the original intent of the project, reliably and at the lowest life-cycle without sacrificing project requirements for safety, quality, operations, maintenance and environment

6. APPROACH

The value methodology is a systematic process that follows the Job Plan. The Job Plan consists of some phases. The recommended VE methodology (Job Plan) used by the VE team during the Workshop has five distinct phases. Briefly, these phases are:

a. InformationPhase:
b. Function and Creative Phase
c. Evaluation/Analytical Phase
d. Development/Recommendation Phase
e. Report Phase

7. CASE STUDY

The satellite-captured images of the college junction that is under high traffic density during peak hours is shown in Fig 6.1 and 6.2 The analyses of the above day were done once all the data was collected for 25 days similarly on every day of the week except on Sundays as the traffic leave was very low and there was no need for a survey for the same.

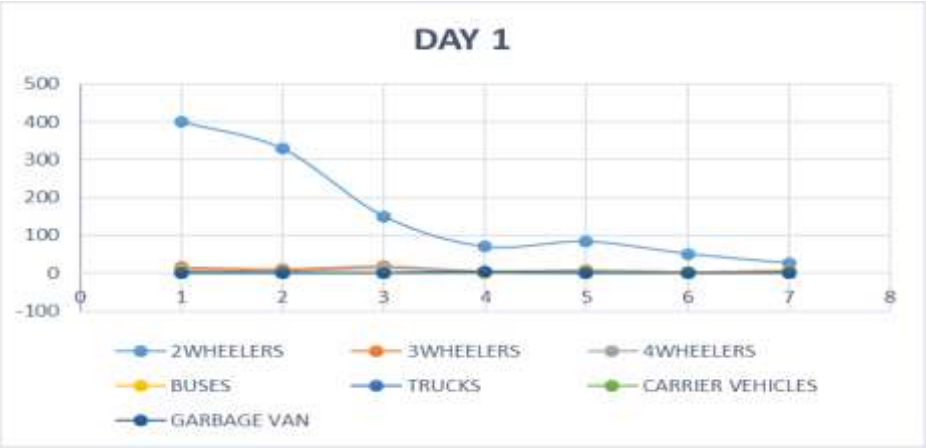
Fig6.1Satellite captured view of the problem area

Fig6.2Satellite captured view of the problem area

The following figureas illustrates in table 6.1and graph 6.1 the data we have accumulated for one-day survey from 9:00 am to 10:00 am

SL.NO	TIME	2WHEELERS	3WHEELERS	4WHEELERS	BUSES	TRUCKS	CARRIER VEHICLES	GARBAGE VAN
1	9:00-9:10	401	16	8	3	1	0	0
2	9:10-9:20	329	11	5	1	0	0	0
3	9:20-9:30	150	19	13	2	0	0	0
4	9:30-9:40	70	5	4	0	2	2	3
5	9:40-9:50	84	8	6	2	0	1	0
6	9:50-10:00	51	3	3	4	0	0	0
7	10:00-10:10	26	7	0	3	0	1	1

Table 6.1 Frequency of Vehicle traffic



Graph 6.1 Frequency of Vehicle traffic

The study aims at achieving sustainable transport, increased public transport, safe and comfortable walkways to college, find solutions for parking lot issues, determine different department timing by minimizing the traffic impact on the study area. Value engineering analysis Needs for sustainable intermodal transport management, Since the industrial revolution, the world population has been continuously urbanized as people migrate from rural areas to cities. About 80% of the current population in industrialized countries lives in densely populated cities and metropolitan areas occupying a very small fraction of the available land area. The developing countries are showing similar trends with 50% population in cities. Higher density of urban populated area scan relieves pressure on surrounding natural habitats and areas of biodiversity if sustainability goals are given priority in infrastructure asset management and transportation planning. The challenge in the next few decades for the future of society depends on learning how to exploit the economic and social benefit urbanization over without adverse impacts on the environment, which requires developing and implementing sustainable land use and transport management policies.

8. BASIC PRINCIPLES AND OVERVIEW

Value Engineering (VE) enables to evaluate a cost-effective management strategy by selecting alternative technologies and methods to achieve reduction in overall life cycle costs without compromising safety and functional performance. VE has been used to implement innovative materials and methods, reduce cost, and enhance efficiency by manufacturing and production engineering entities. Value Engineering is a function oriented, systematic team approach and study to provide value in a product, system or service. Often, this improvement is focused on cost reduction; however other important areas such as customer perceived quality and performance are also of paramount importance in the value equation. Value Engineering is a powerful methodology for solving problems and/or reducing costs while maintaining or improving performance and quality requirements.

Value Engineering can be defined as the systematic effort directed at analyzing the functional requirements of systems, equipment, facilities, procedures and supplies for the purpose of achieving the essential function at the lowest total cost, consistent with meeting needed performance, reliability, quality, maintainability, aesthetics, safety and fire resistance.

CONCLUSION

Value Engineering can be applied during any stage of a project's design development cycle. However, the greatest benefit and resource saving are typically achieved early in the development and conceptual design stages. VE may be applied more than once during the life of the project. Early application of VE helps to get the project started in the direction, and repeated application helps to filter the project's direction based on new or changing information. It is important to compare the available quality elements of the design with the owner's requirements. The application of Pareto Law 20/80 states that around 20 % of the functions constitute around 80% of the cost.

Los Angeles became the first city that implemented synchronized traffic signal(SCOOT) at every street that resulted in a 14% decrease in road congestion. Studies show that if 1% of the population of a city uses mass transit, the congestion reduces by 18%.

Hence, implementing any or all of the above discussed methods can result in drastic changes in road congestion and better air quality with minimum expenditure.

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