

# International Journal of Innovative Research in Science, Engineering and Technology

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## Application of It's in Delay and Material Supply Chain Management

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**ABSTRACT:** The main aim of this project is to determine the delay time for the delivery of construction materials from the industry to the construction site because of the traffic congestion. Time management is an important factor in the Project Management especially when it comes to Construction Projects. Time Management is a deciding factor of which whether the project is quality worth or not. There are various factors that affects the time management. Some of them are Delay in contracts, Delay in purchasing equipments and materials, Shortage of money, Accidents, Union strike, Poor cash flow, Delay in material delivery, Poor inventory control etc. Of that, delay in material delivery can be happen if there is Poor inventory control, Unavailability of raw materials, Delay in material transportation etc.

In this project, delay in material transportation from the industry to the construction site will be calculated with respect to the present and future Traffic Volume values and those values will be compared. The final output are presented in the form of graph by using MAT LAB. Also this paper suggests the methods to reduce the traffic congestion and therefore rate of fatalities can be get reduced. To calculate the traffic volume six highly populated places in the Nagercoil Town are selected. They are Kottar, Chettikulam, Derik Junction, Vadasery, Ozhuginasery and Parvathipuram. The volume of vehicles were analysed by using Intelligent Transport System such as sensors.

### I. INTRODUCTION

#### 1.1 GENERAL

Population and economic growth has given boost to rapid outgrowth of vehicles on the streets of urban areas throughout India. India has experienced tremendous increase in the number of registered vehicles from about 0.3 million in 1951 to about 142 million in 2011 with Compound Annual Growth Rate (CAGR) of 9.9% between 2001 and 2011. Apart from economy, rural to urban migration has amplified the demand for vehicular travel and ultimately the demand for vehicles and transportation infrastructure. However the Indian urban areas are not capable enough to tackle this upsurge of vehicular growth and have resulted into higher traffic congestion levels on the roads, posing a massive challenge for urban authorities and decision makers.

Intelligent Transport System (ITS) is a well known method to simplify or minimize traffic problems. The ITS aims at achieving traffic efficiency, reducing environmental degradation, energy conservation, reduction in travel time and enhancing comfort and safety of the user with the help of information and communication technologies. The overall application of ITS consists of data collection, analysis and using the results of the analysis in the operation, control and research concepts for traffic management. ITS shrouds the components like means of transportation, physical function setup, communication and operations of any transportation forms including air travel, inland and ocean waterways, road and rail transportation.

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## II. LITERATURE REVIEW

### 2.1 Road safety in Greece

This paper analyse the road safety in Greece and confirmed that the drivers of young age and two wheeler riders at high risk of danger. This is a study paper which suggests the present road condition of Greece and it has made a risk evaluation from which they confirmed that in overall, drivers account for 66%, passengers account for 20% and pedestrians accounts for around 14% of dangers which leads to fatalities.

### 2.2 Creative approaches to organization and safety of road traffic

The main aim of this paper is to improve the safety at the intersection of main road and streets. For the purpose of safety improvements this paper has suggests various recommendations such as

- a) Solid line marking and dashed line marking for the purpose of orientation of driving.
- b) By introducing the transverse lines across the roads so as to reduce the speed of vehicles.
- c) By using effective lighting system and sensor system for signaling

By implementing above techniques in the accident prone area the chances of getting accidents may be reduced to some extent. In this paper they have used sensors for improvement of safety.

### 2.3 Tools for road infrastructure safety management

The purpose of this article is to ensure that the risk on roads can be identified, assessed, eliminated and controlled when the roads are planned, designed, built and used. This paper involves with the risk management in highway engineering that deals with the assessment of possibility of risks and the response that have to be taken when the assessed risks are supposed to happen.

Risk response includes various methods such as road safety impact assessment method, road safety audit, road safety ranking, road safety inspection.

Road safety assessment: Road safety assessment is made at the earlier stage when the planning is done. In this stage the stuffs that do not match with the road safety standards must have been rejected.

### 2.4 Method of assessment and prediction of temperature conditions of roadway surfacing as a factor of the road safety

The main objective of this article is the determinate the temperature conditions of road surface and thus make a solution to reduce socio economic losses caused due to road accidents. The conclusion of this paper can be made by analyzing average temperature which are required to calculate the factors of roadway surfacing. Variations in temperature in the roadway surfacing structure are one of the important determining factors in its characteristics changes during operation.

### 2.5 Investigating road safety issues through a micro simulation model

In this paper they have used a micro simulation model to fix the road safety issues. Here they have used a micro simulation model namely TRITONE which is capable of controlling the speed of vehicles and also can identify the vehicle location. TRITONE can also provide the safety performance measures such as Deceleration rate to avoid a crash, Time to Collision, Crash Potential Index, Post Encroachment Time, Proportion of stopping distance.

### 2.6 The use of smart phone to assess the feasibility of a cooperative ITS based on surrogate measures of safety

The main aim of this paper is to analyse the intersection between the vehicles and the unsafe traffic environment by using smart phone sensors. By using these sensors speed and coordinates of vehicle can be determined. Accuracy of the device is high and thus it can be used world wide. The proposed arrangements consists of multiple client devices that is driver's mobile and a central computer through which signals can be transmitted. The original set up is to receive incoming signals from various sources, process them and retransmit the output to the same device.

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## 2.7 Traffic safety analysis of intersections between the residential entrance and urban road

The main aim of this paper is to ensure the safety parameters in the intersections between urban road and residential area entrance, which is an accident prone area. This paper provides preventive and protective measure from the aspects such as Entrance design, Driving management, Parking management, Design of traffic signs, Consummation of laws and regulation etc.

## 2.8 Speed management for local and regional rural roads

The main aim of this paper is to control the speed of the vehicle in order to reduce the probability of getting accident. The experiment was carried out by following a vehicle with a video VBox device. The device equipped with an external antenna and video recorder allows for the determination of speed of vehicle and coordinates of vehicle. The accuracy of the device will be higher even if the signal is temporarily lost.

### III. DATA COLLECTION

#### 3.1 Traffic volume

Traffic volume is defined as the number of vehicles crossing a section of road per unit time at any selected period.

**Table 1.1 Volume of traffic in Nagercoil Town**

PLACES	FROM THE TOWN			TOWARDS THE TOWN		
	TWO WHEELER	FOUR WHEELER	HEAVY	TWO WHEELER	FOUR WHEELER	HEAVY
KOTTAR	1758	192	162	630	498	276
CHETTIKULAM	420	132	54	564	120	66
DERIK JUNCTION	900	492	108	990	492	108
VADASERY	360	318	186	504	258	36
OZHUGINASERY	240	144	144	378	186	78
PARVATHIPURAM	1020	456	198	774	402	126

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### 3.2 Traffic delay

Traffic delay is defined as the additional travel time experienced by a driver, passenger or pedestrian due to circumstances that impede the desirable movement of traffic. It is measured as the time difference between actual travel time and free flow travel time. It can be calculated by using the following formula.

$$D_z = L [(1/V_z) - (1/V_f)]$$

where

$D_z$  = Delay

$L$  = Length of traffic congested area

$V_z$  = Speed in the traffic congested area

$V_f$  = Freeway speed

Site 1:  $L = 0.7, V_z = 1, V_f = 40$ , Therefore,  $D_z = 40.95$

Site 2:  $L = 0.6, V_z = 1, V_f = 35$ , Therefore,  $D_z = 34.971$

Site 3:  $L = 0.5, V_z = 1, V_f = 45$ , Therefore,  $D_z = 29.33$

Site 4:  $L = 0.3, V_z = 1, V_f = 30$ , Therefore,  $D_z = 17.4$

Site 5:  $L = 0.4, V_z = 1, V_f = 35$ , Therefore,  $D_z = 23.314$

Site 6:  $L = 0.6, V_z = 1, V_f = 35$ , Therefore,  $D_z = 34.971$

Site 7:  $L = 0.4, V_z = 1, V_f = 40$ , Therefore,  $D_z = 23.4$

Site 8:  $L = 0.5, V_z = 1, V_f = 40$ , Therefore,  $D_z = 29.25$

Site 9:  $L = 0.4, V_z = 1, V_f = 30$ , Therefore,  $D_z = 23.2$

Site 10:  $L = 0.6, V_z = 1, V_f = 35$ , Therefore,  $D_z = 34.971$

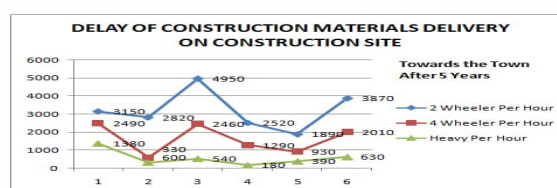
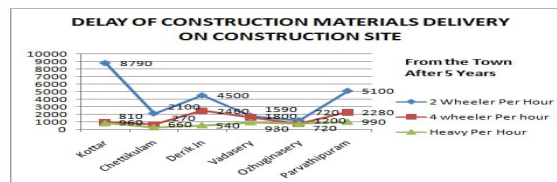
$$\text{Average delay time} = (40.95 + 34.971 + 29.33 + 17.4 + 23.314 + 34.971 + 23.4 + 29.25 + 23.2 + 34.971) / 10 = 29.18 \text{ minutes}$$

### 3.3 List of accidents

YEAR	NUMBER OF ACCIDENTS	NUMBER OF DEATHS
2013	154	47
2014	153	39
2015	149	42
2016	136	45
2017	136	36
2018	108	37

## IV. DATA PROCESSING

### 4.1 Future prediction of traffic volume



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## 4.2 Future delay calculation

Total number of present traffic volume = 13770

Total number of future traffic volume = 68850

Delay time in material delivery with respect to present traffic volume = 29.18 min

Therefore delay time in material delivery with respect to future traffic volume

$$= (29.18/13770) \times 68850$$

$$= 145.900 \text{ minutes}$$

## 4.3 Comparing the values

Future delay time is approximately five times higher when compared to the present delay time. Therefore it should be reduced in order to carry out the construction project a successful one without any delay.

## V. CONCLUSION

Day to day increase in traffic volume makes our life more complicated in one or another way. This project has analysed the probability of getting delay in delivery of materials in construction site due to heavy traffic volume after 5 years. This type of delay which caused due to heavy traffic congestion can be resolved by reducing the traffic volume. By implementing the above mentioned methods the traffic volume can be get reduced to some extent and thus the conflicts arise in the construction site due to late material delivery can be fixed. And the main benefit of reducing the traffic volume is that the probability of occurring accident can be minimized and thus the number of fatalities can be reduced. By valuing the human lives the most and in order to get minimize the accident rate it is must to reduce the traffic volumes.

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