# Study Of Automated Highway Engineering

Deepti Satranj
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M.Tech Highway
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**ABSTRACT**

*Highway construction is an important part of any area's infrastructure growth, and these days, the highway construction process is carried out in a variety of ways. The newly developed concept of the Automated Highway System, abbreviated as AHS, uses various sensors and microprocessors for the automatic design process. Innovative methods for the construction of highway systems are the management and control of traffic systems using roadside controllers and intelligent vehicles. The Automated Highway System is the philosophy of design implemented to increase protection, performance and many other highway vehicles as well as user characteristics. For the enhanced architectural structure of highway construction, this idea has been implemented and has also helped to reduce the environmental impact of automobiles driving on the highways. Automated Highway System (AHS), which promises to improve the ability of traffic. A four-layer hierarchical control architecture is the cornerstone of this protocol for achieving a fully automated highway system.*

***Key Words**: AHS Functional Evolution, Incremental Deployment, Reducing Accident Rate, Smart Highway.*

## Introduction

The Automated Highway System (AHS) is a long-term transportation system with potential priorities and several future advantages technology for AHS. A new partnership between the means of transport and road networks is developing. It is a driver-less technology that uses an automatic vehicle driving control system ,various methods related to concepts for computing, The architecture of an automated highway system uses microelectronics, different sensors and advanced civil engineering techniques. In the automated highway system the main components of any mechanically driven vehicle i.e. the throttle, steering and braking, are automatically operated. The key criteria for any traffic facility, such as organized movement of vehicles, elimination of traffic facilities, An automated highway system easily provides barriers, improvised traffic structures and protection. The newly introduced methods of intelligence are It is commonly used to link the highway system and the vehicles operating on the road networks.

## Procedure

The basic idea used to develop the automated highway system is to increase the ability of vehicles running on the road with a fully managed traffic system. Compared to the behavior of human drivers, the imaginative meaning of In maintaining the transportation network in developed cities, the automated highway system has played a crucial role.

1. **Component and function of automated highway system.**

**1.1 Lateral Motion Handling**

There are a variety of distinct roles in the lateral (side-to-side) movement of the car, from vehicle-centric maneuvers such as lane keeping to those involving heavy traffic merging. First if the vehicle is to remain in the lane, it needs to know where the lane should be located.

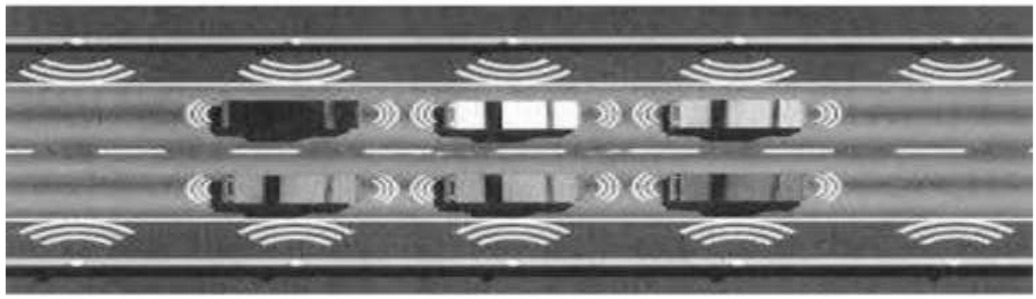

**Fig -1**: Sensor for lateral motion

**1.2 Longitudinal Motion Handling**

The vehicle's longitudinal (front-to-back) movement also has a number of functions that vary from simple handling of cars to tactical driving in a congested traffic scene. Under this group, speed keeping is the most basic feature, requiring the maintaining of a constant travel speed. It is used extensively in the context of from "cruise control."

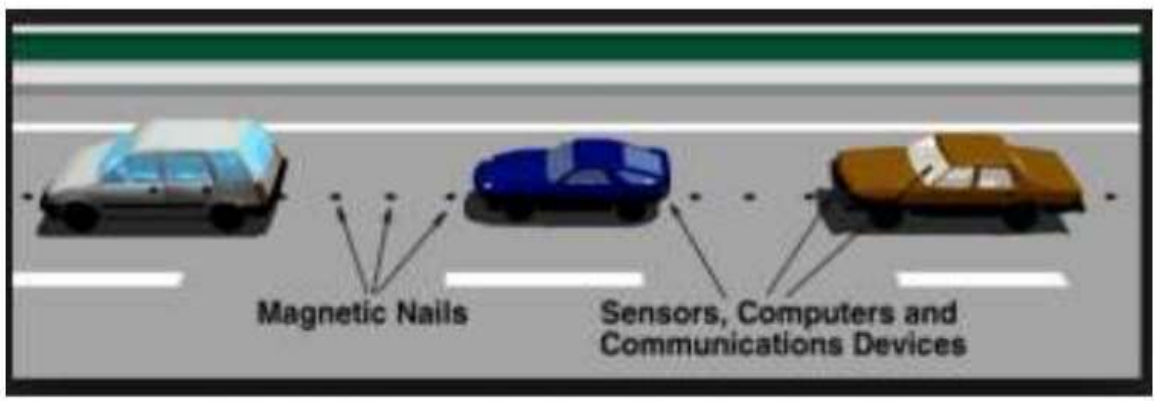


**Fig -2**: Sensor for longitudinal motion

**1.3 Obstacle Handling**

Obstacle avoidance capabilities minimize or remove the safety risks of the automated highway system triggered by obstacles. This involves rocks, vegetation, pieces of fallen cars, vehicles and animals that are disabled. Due to the technological difficulties of detecting obstacles and determining whether those obstacles present a danger, obstacle detection and threat determination is a far more demanding activity than vehicle detection.


**Fig -3**: Sensor for obstacle motion

## 2 Methodology and Data

### 2.1 Classified Traffic Volume Count

The objective of conducting a Classified Traffic Volume Count is to understand the traffic flow pattern including modal split on a roadway. The Classified Traffic Volume Count survey has been provided by concessionaire of project highway from actual traffic data gathered at toll plaza locations based on monthly data.

**Table -1:** Vehicle Classification System

| **Vehicle Type** | |
|---|---|
| Auto Rickshaw | |
| Passenger Car | Car, Jeep, Taxi & Van (Old / new technology) |
| Bus | Mini Bus |
| | Standard Bus |
| Truck | Light Goods Vehicle (LCV) |
| | 2 – Axle Truck |
| | 3 Axle Truck (HCV) |
| | Multi Axle Truck (4-6 Axle) |
| | Oversized Vehicles (7 or more axles) |
| Other Vehicles | Agriculture Tractor, Tractor & Trailer |

### 2.2 Traffic Characteristics

Toll revenue of the highway does not solely depend on traffic volume. There are certain characteristics of traffic which have significant potential to affect toll revenue. Component of local traffic, component of passenger and commercial traffic, portion of return journey traffic,
portion of monthly pass traffic are some such characteristics of traffic.

### 2.3 Traffic Data

The highway is currently under toll operation, the data collected is corresponding to category of toll able vehicles.

**Table -2:** Traffic Data

| Sr. no. | Type of Vehicle | Annual Average Daily Traffic For 2015-16 | Annual Average Daily Traffic For 2016-17 | Annual Average Daily Traffic For 2017-18 |
|---|---|---|---|---|
| 1 | Car | 5105 | 5770 | 5918 |
| 2 | Mini Bus / LCV | 1253 | 1333 | 1421 |
| 3 | Truck / Bus | 1238 | 1244 | 1426 |
| 4 | Multi Axel | 1742 | 1808 | 2031 |
| 5 | Oversized Vehicles | 2 | 1 | 2 |
| | **Total** | 9337 | 10156 | 10798 |

### 2.4 Analysis of traffic count

Understanding the character of existing traffic forms the basis of traffic forecast. The various vehicle types having different sizes and characteristics can be converted into a single unit called Passenger Car Unit (PCU). Passenger Car equivalents for various vehicles are adopted based on recommendations of Indian Road Congress prescribed in
"IRC-64-1990: Guidelines for Capacity of Roads in Rural areas".

## CONCLUSION

In this paper, we research volume of traffic, capacity, road function, surface properties on highway road accident rate. Highway deficiencies and the average rate of monthly incidents on the chosen highway. Survey and documentation of automated highway systems and road safety systems for drivers and passengers. There is still a long way to go for effective intelligent driver assistance systems and safety warning systems. We are studying to remove more than 90% of traffic collisions caused by human mistakes, such as misjudgments and in-attention.

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