



Road Safety & Various Causes of Accident : A Review

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Abstract : Road safety is one of the most important problems in our society. Every year 1.2 million of people are killed and between 20 and 50 million people are injured in road accidents. If current trends continue road traffic accidents are predicted to be third leading contributor to the global burden of Disease and injury by 2020(Torregrosa et al.,2012)

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The vehicle population has been steadily increasing because of change in the style of living of people. Increase in vehicle population with limited road space used by a large variety of vehicles has heightened the need and urgency for a well thought-out policy on the issue of road safety. In India the rate of accident is directly proportional to growth of vehicle population.

Road Safety is a multi-sectoral and multi-dimensional issue. It incorporates the development and management of road infrastructure, provision of safer vehicles, legislation and law enforcement, mobility planning, provision of health and hospital services, child safety, urban land use planning etc. In other words, its ambit spans engineering aspects of both, roads and vehicles on one hand and the provision of health and hospital services for trauma cases in post-crash scenario.

Introduction : Road traffic safety refers to methods and measures for reducing the risk of a person using the road network being killed or seriously injured. The users of a road include pedestrians, cyclists, motorists, their passengers, and passengers of on-road public transport, mainly buses and trams. Best practice road safety strategies focus upon the prevention of serious injury and death crashes in spite of human fallibility. Safe road design is now about providing a road environment which ensures vehicle speeds will be within the human tolerances for serious injury and death wherever conflict points exist.

The various causes of accidents may be due to three factors shown in fig 1.1

- (i) Driver
- (ii) Vehicle

(iii) Environment

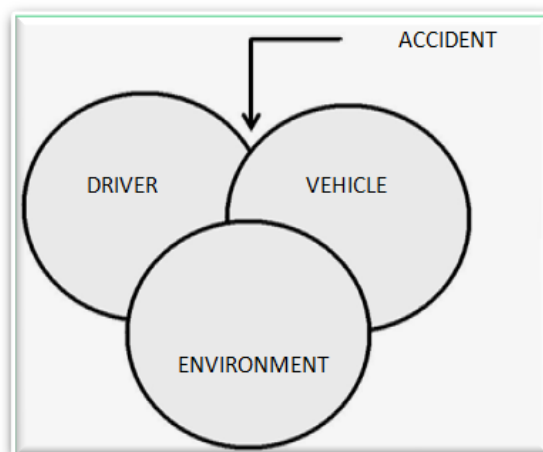


Fig1.1 Causes of Accident

The details of these factors are shown in Table 1.2 below

Table 1.2 Various Factors Related to Accident

Driver-Related

Alcohol and drugs	Sickness
Unsafe speed	Cell Phone Use
Drowsing or Fatigue	Distraction
Fatigue	Improper Passing or Turning
Disregard traffic controls	Non Use of Restraint
Vehicle-Related	
Over Loading	Steering defect
Brake defect	Tire failure
Light defect	Improper wheel alignment
Environmental- Related	
Road side hazard	Vision obstruction
Ruts	Improper traffic control
Debris or Garbage on the road	Road Side Hazard
smoke or fog	Fixed Objects
Glare	Water ponding
Improper/nonworking traffic controls	Shoulders defective



Driver-Related

Many factors may exhibit a measurable influence on driving behavior and traffic safety on two-lane highways . These include, but are not limited to,

- (i) Human factors such as improper judgment of road ahead and traffic, driving under the influence of alcohol or drugs, driver education and experience, young driver, age and sex.
- (ii) Traffic factors like speed, volume, density, capacity, traffic mix and variation.
- (iii) Vehicle deficiencies, such as defective brake, headlight, tyres, steering and vehicle condition
- (iv) Road condition like slippery or skidding road surface, ravel, pot hole, ruts etc.
- (v) Road design such as inadequate sight distances, shoulder width, no of lanes ,improper curve design, improper lighting and traffic control devices.
- (vi) Weather condition like fog, heavy rainfall, dust, snow etc.
- (vii) Other causes such as enforcement, incorrect sign and signals, service station, badly located advertisement, stray animals etc.

Speed

Driving speed is an important factor in road safety. Aarts and Schagen (2006) studied relationship between speed and risk of a crash. The conclusion was when speed increases crash increases.

Fatigue

Fatigue conclusion such as sleep is an important factor to road traffic collision.

Cell phones

Driving performance reduced by dialing hand held phone and speed decreased with hands free phone. Reaction time to warning sign at road side decreased for hand held phone user.

Vehicular characteristics

Vehicle plays an important role in a crash. This may be due to defective wheel alignment, tyre bursting, brake failure, overloading, one or two head light defect, back light defect, indicator defect, steering defect

Environment characteristics

Road Elements

Roadway design is one of the most significant factors that affect driving behavior and perceived safety. He studied combined effect of roadway design element such as shoulder width, guardrail and roadway geometry (curvature) by taking objective driving measures



(speed and lane position) and subjective measure(perceived safe driving speed and estimated road safety) into account. They found the shoulder width had a significant effect on actual speed and lane position but when a guard rail had a significant effect on perceived safe driving.

Signs and Signals

Traffic safety model using regression in New York city. The result shows that signal related countermeasure that are designed to reduce conflict are split phase, timing, signal installation, all pedestrian phase and increasing pedestrian crossing reduces crashes. Traffic calming measures including road diets are also found to be significant in safety benefits. Countermeasures that are designed to alert driver cognitive attention such as high visibility crosswalks and posted speed limit reduction signs appear to have lesser effect

Fog and Smoke

Studies on crash related to visibility obstruction due to fog and smoke in Florida were carried. It was found that fog smoke related crashes are more likely to occur at night without street lighting leading to more severe injuries. Head-on and Rear-end are common crashes in terms of crash risk and severity. These crashes are more prevalent on high speed road, undivided roads, roads with no sidewalks and two lane rural roads.

Conclusions:

The available literatures on accident analysis indicate that 77.5 percent of road accidents in India are caused due to driver's error.

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