

Safe and Intelligent Transport Systems

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Abstract :- Transportation is one of the basic and most important sectors to be considered in development of a country. India as an evident developing nation totally depends upon its transportation system. Over 40% of the passenger transport is done by the railways, 38% by the roadways and remaining 22% by airways. As this huge amount of people travel through the railways, safety becomes an important issue. Road and railway accidents have considerably increased as per the survey carried out in tenure of 6 years from 2009 to 2015. 47% of the rail accidents in India mainly take place due to derailment. Fire safety is also an important concern. Many innovative ideas need to be implemented in case for safe and intelligent transports. Not only passenger safety is important but safety in goods transport also counts for the same. The construction and introduction of new ideas in building railway tracks and airplane is extremely important. The exclusive idea which deals with the aviation safety is the main highlight. Which is really an important topic as the number of increasing airplane crashes are considered.

Keywords: - Transportation system, Railways, Roadways, Airplane crashes, Intelligent Transports, aviation safety

I. INTRODUCTION

The Inspiration of topic "Safe And Intelligent Transport Systems" came by observing day to day scenarios or the events occurring around us. Events can be in the form of Rail Accidents, Airplane crashes or Road Accidents. Considering the Safety of the human life has now become important to think on some smart approaches to avoid and to survive from such events. Such Scenarios endangering the Human Life can be solved by making minor changes in our traditional Constructions approaches or Techniques. Thus in following topic we will discuss on some of such techniques that came be implemented in real world to tackle with accidental events like Derailing or Airplane Crashes. Our Prime focus will be on Railway Safety then Followed by Aviation Safety.

II. TRADITIONAL METHODOLOGIES

Traditional Methods Construction and Safety of Railway Tracks

There are three distinct methods of construction of railway track.

These are:

- A. Telescopic Method**
- B. Tramline Method**
- C. Mechanical Method**

A. Telescopic Method of Construction of Railway Track

In this method, rails, sleepers and fastenings are unloaded from the material train as close to the rail head as possible. The sleepers are carried by carts or men along the adjoining service road and spread on the ballast. The rails are then carried on pairs to the end of last pair of connected rails and linked.

To carry rails manually over a long distance is a tedious job. So certain carriers called Anderson rail. Carriers are used to carry rails to the ends of the rail head.

It can also take rails up to a head last pair linked with the help of temporary track consisting of 3" x 3" angle irons of the same length as rails and fastened to the sleepers.

A further consignment of the material is deposited at the advances rails head and the procedure is repeated.

B. Tramline Method Railway Track Construction

This method is used where tram carrier are installed for carrying earthwork or in rainy season due to difficulty in movement of cart. Some tramline is established on with a gauge of 2'-2'-6". The basic difference between this and telescopic method lies in the conveyance and spreading of the sleepers.

The track can be assembled at more than one point simultaneously, which is the great advantage of this method. Sometimes an additional track is laid on the side of existing track for which this method is best.

C. Mechanical Method Railway Track Construction

This method is extensively used in Britain and America by using special track laying machine. There are two types of machines available. In first type of machine, the track material carried by the material. Train is delivered at the rail head and laid in the required position by means of projecting arm or mounted on the truck nearest to the rail head. The material train moves forward on the assembled track and operation is repeated.

In the second type of machines a long cantilevered arm projecting beyond. The wagon on which is fitted. A panel of assembled track consists of pair of rail with appropriate number of sleepers on the ballast layer. This panel is conveyed by special trolley running over the wagons of material train to the jibs. It is lowered by the jib in the required position and connected to the previous panel. The track laying machine then moves forward and operation is repeated.

Traditional Method Adopted for Aviation Safety

Traditionally aviation safety designed for the sake of protecting the aircraft from bad weather. Weather radars and sensors are used to detect the bad weather and take some preventive measures for it. Passenger safety is also taken into consideration by providing seat belts, oxygen masks and all necessary medical aids.

The Air Traffic Control (ATC) ensures the safe and smooth running of flights. But there is still much more scope for improvement in air transport regarding hijacking, engine failures and lot more technical calamities.

Traditional Method Adopted for Road Safety

Road safety traditionally is deals with providing dividers or increasing the lanes of highway. Traffic signals also help in smooth running of road transport. But considering the number of accidents that take place it is very important and crucial to seek attention in case of road safety. Road safety techniques also need to be modernized on large scale for better transport.

III. PROPOSED IDEAS

Following are some Sectors where Safety Place Important role,

A. Railway Safety

B. Aviation Safety

C. Road Way Safety

Following are details about above Ideas.

A. Railway Safety

Railway safety is really very important topic to be taken into consideration. Almost 40% of passenger transport is carried out by trains. According to the survey taken by the government authorities in the tenure of 6 years from 2009 to 2015 the number of rail accidents has increased considerably. Amongst which 47% of accidents take place due to derailments. So rail safety has become an important issue. It is very important to modernize the safety techniques that are in use currently.

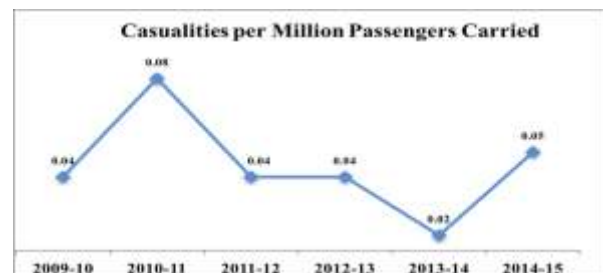


Fig - Casualties per Million Passenger carried

Following are some modern approaches that can prevent rail accidents due to derailment

- The railway tracks must be inspected every month for any cracks or loose joints. A single crack can lead to a huge disaster. It is very important in order to prevent rail accidents.
- Automatic Crack Detecting Machines are very modern and accurate instruments that can be used for detection of the cracks instead of infusing a large amount of manual staff.
- The provision of alarming signs in areas whose terrain is likely to lose its stability in case of natural calamities.
- Tracks and sleepers should be constructed on firm base in order to prevent the shocks experienced when train passes over them.
- The coupling in the tracks should be checked very often.
- The expansion of metal takes place when temperature increases and sudden decrease in the temperature gives rise to cracks. In order to prevent these thermally stable conditions should be maintained at the level of tracks.

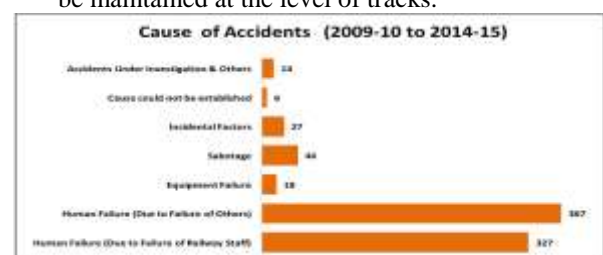


Fig:- Graph Showing Causes Of Road Accident From 2010-2015

B. Aviation Safety

Aviation safety is main concern now days. For better treatment and safety of passengers innovative safety techniques are to be used. One of such is mentioned below:

The construction of planes has become more modernized these days but still it needs some improvement. The idea deals with the construction of cockpit and passenger compartments separately. As the passenger compartment is constructed separately it will be constructed in more precise manner. The dimensions of different parts of airplane while constructing it are known to engineers.

This will help in providing safety equipment on it. The parachutes with strings of high tensile strength will be provided at the center of gravity of the passenger compartment and at equal distance from it on either side for better stability. In case the engine failure occurs and plane starts falling down there would be the provision of remote controlled system as manual approach and sensors will be provided for most modern technique for operating the parachute system. This will open the parachutes situated at their respective places.

This provision of parachutes will lift the plane and decrease the falling speed considerably. In case the plane was flying above an water body that can be a river, an ocean or a sea the tube will be provided at the bottom of the plane covering the whole span of passenger compartment. This will ensure the safe landing even in water. Now for pilot and copilot which are present in cockpit compartment. As there is provision of eject system in fighter planes same can be provided for pilots in cockpit of a passenger plane. This can definitely save numerous lives and make air transport even safer.

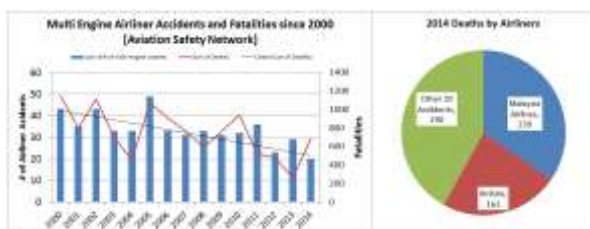


Fig: Aviation Accidents Graph (2000- 2014)

C. Road Way Safety

Road transport is another important transport way besides railway transport. About 38% passenger transport is done by means of roadways. So road safety is also an important concern. The casualties due to road accidents are very high. The death rate has

increased since high speed vehicles have come into picture.

There are no strict rules for preventing road accidents. The road safety has to be looked upon again for betterment in it.

Following are some techniques that can help in reducing road accidents considerably:

There should be speed limit for every road according to what function it plays and area alongside road.

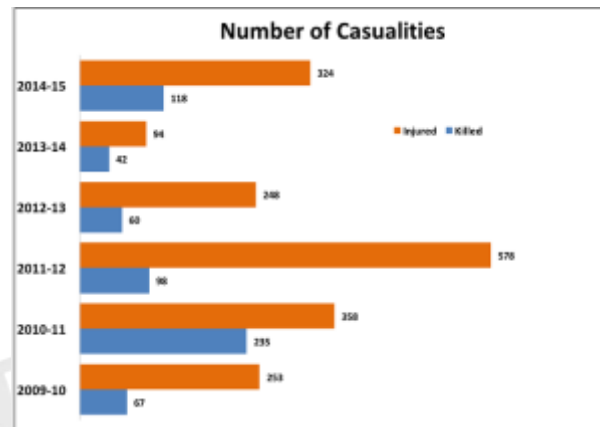


Fig: Number Of Casualties In Road Accidents (2009-14)

For example;

- If the road is passing through the town or nearby a place where population is more there the speed limit should be less i.e. 30 to 40 km/hr
- Using seat belts while driving will help reduce the chances of injury by 30%.
- Using baby seats while driving will help in handling small children so that one can concentrate on driving and avoid accidents.
- Increasing network of traffic signals instead of manual control and also providing CCTV cameras for preventing any malpractices.
- The construction of roads must be proper in order to ensure smooth transport. The maintenance roads must be checked regularly for proper running of traffic.
- The awareness and information must be spread widely among the people in order to educate them about road safety rules and regulations.

IV. CONCLUSION

As India is totally dependent on its transport system the safety in transport was really important concern. The transport safety in Railways, airways and roadways has been addressed in this paper. The safety

measures introduced will definitely help in improving the transport system and will lead to more safe and efficient transport.

Safety of people which is the first priority of any government has been addressed with help of innovative and modern ways in this paper. After all a safer nation leads to a developed nation.

REFERENCES

- [1] https://www.allianz.com/en/about_us/open-knowledge/topics/mobility/articles/130221-ten-ways-to-improve-road-safety.html/
- [2] <https://m.phys.org/news/2010-03-high-strength-lightweight-nacre-mimetic-material-applicable.html>
- [3] <https://www.engineeringarticles.org/construction-of-railway-track-methods/>

