

**CROSS/
ROADS**
LINKING MOBILITY SOLUTIONS



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Frame working Road Safety by Safe System Approach on SHs and NHs in India and Assessment with iRAP

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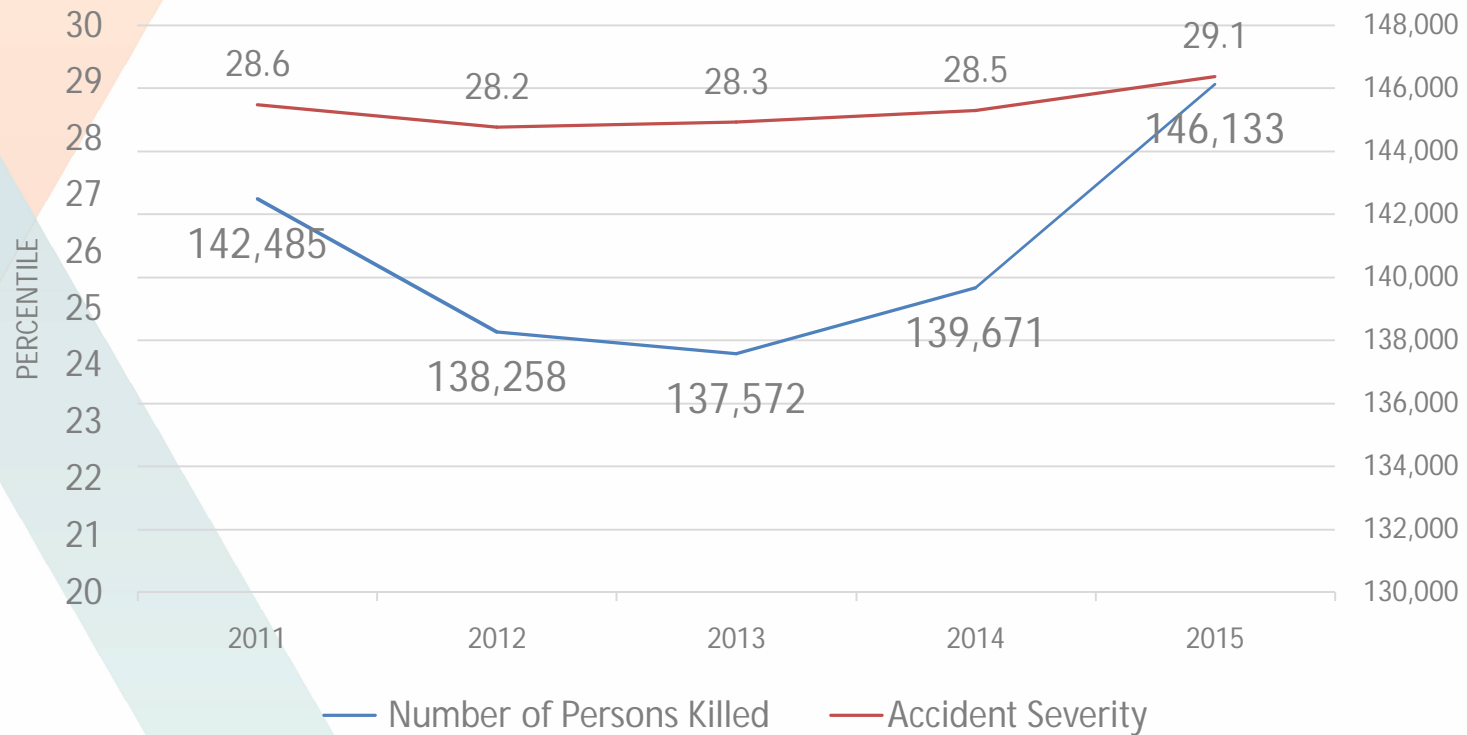
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Accident Stats in India

Road Accident Stats in India from 2011-2015



Some stats about road accidents

- About 1.25 million people die each year as a result of road traffic crashes
- Road traffic injuries are the leading cause of death among young people, aged 15–29 years
- 90% of the world's fatalities on the roads occur in low- and middle-income countries

Some stats about road accidents

In India –

- India has a road network of about 4.7 million kms, which is the second largest in the world
- About .15 million people died in Road Accident 2015
- NHs and SHs constitutes only for 5% of total road length but they account for about 63% of the total road accidents
- Vulnerable road users share about 44% of the total road accidental death
- Yearly it consumes a total share of 3% of the country's Gross Domestic product (GDP)

Why road accidents are Neglected –

- Based on Safe System principles
- People underestimate the road accident deaths
- They underestimate the likelihood of a familiar accident and overestimate the frequency of unfamiliar accidents happening to them

Road Safety Initiatives by the Government of India

- National Road Safety Policy
 - Raise awareness about issues related to road safety
 - Establishing road safety information data base
 - Encouraging safer road infrastructure including application of intelligent transport
 - Enforcement of safety laws etc
 - Emergency Medical Amenities for Accidents on the Road
 - **'HRD and Research for Road Safety'**

Problem Statement

- Road safety measures must be aimed at the benefits of people, vehicles, the road, and its environment and in the analysis process, all these elements should be considered
- For the analysis an ethical and philosophical approach must be considered which will gain a prominent place in transport policy and decision-making processes
- A vision that is practical and easy to use at regional and local level must impended upon.



Treatment with help of iRAP

Risk Maps

Star Ratings

Safer Roads Investment Plan

- motor vehicles, motorcyclists, pedestrians and bicyclists

Advantages of iRAP

- Can assess more roads as compared to road safety Auditing for a time frame
- Comparison of road with international level of standard
- Easy storage and access of data in one platform
- Uniformity in assessing the road with unique attributes for road sections
- Countermeasure production


Disadvantages of iRAP

- Not suitable for urban conditions as road attributes change frequently
- **Night time road influencing factors are not considered**
- **Night time accidents scenario assumed as overall accidents**

Meta-Analysis of Contributing Risk Factors

The meta-analysis of night time accidents and major causes were carried out and its influencing factors which have not been accounted for generating the risk factors in iRAP were discussed.

Study of various research paper have been conducted and recommends risk factors for generating Star Rating Score.



Following are some of major factors influencing Night Time accidents:

- Road Type
- Road delineation
- **Illuminance Level**
- **Annual Rainfall index**
- Operating Speed
- Land use pattern
- Pedestrian facilities
- **Road Marking and Width of edge line**
- Vulnerable road users and presence of Junction
- Vegetation near road side

Major inferences of the meta-analysis are presented

Following are some of the critical factors which affect the night time accidents and is been discussed

Illuminance Level

Elvik, et al. (1995) conducted a meta-analysis of 37 published studies, reported from 1948 to 1989 in 11 different countries found that roughly a 65% reduction in night time fatal accidents for both intersections and roadway segments on rural, urban, and freeway facilities when lighting was installed.

Road Accidents according to the Time of Occurrence for 2015

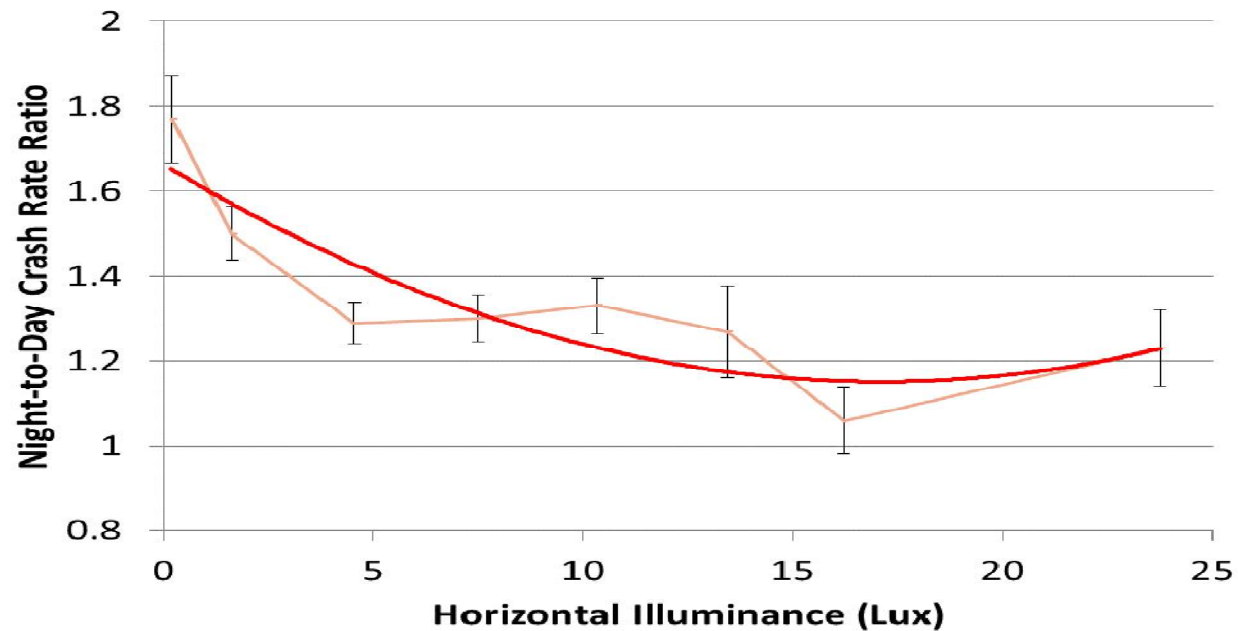
Sl No.	Time	Number of Accidents	Per cent Share in total Accidents
1	06:00 - 09:00 hrs (Day)	55,518	11.1
2	09:00 - 12:00 hrs (Day)	81,964	16.3
3	12:00 - 15:00 hrs (Day)	79,616	15.9
4	15:00 - 18:00 hrs (Day)	87,819	17.5
5	18:00 - 21:00 hrs (Night)	86,836	17.3
6	21:00 - 24:00 hrs (Night)	51,425	10.3
7	00:00 - 03:00 hrs (Night)	27,954	5.6
8	03:00 - 06:00 hrs (Night)	30,291	6
	Total 24 hrs	5,01,423	100

[Source: MoRTH's Annual Report TRW India]

Based on the above analysis risk factor for the road attribute Illuminance Level for different road users were suggested.

Recommendation

Under minimum availability of Illuminance levels it can be checked with Night-to-Day Crash rate ratio



Relationship between mean horizontal illuminance level and weighted night-to-day crash rate ratio

Meta-Analysis of Contributing Risk Factors Contd..

Road Marking

In the absence of street lighting, most of the drivers find road marking as useful for identifying the road edge during night.

Analysis found that road markings at junctions can reduce accidents by 15%.

Meta-Analysis of Contributing Risk Factors Contd...

Annual Rainfall index

Analysis found that for light rains and drizzles the accident rate increases.

Conclusion

- The severity of road accidents, measured in terms of persons killed per 100 accidents has increased from 21.6 in 2005 to 29.1 in 2015.
- Road deaths in National Highways and State Highways account for nearly 63% of the total deaths but shares only 5% of the total road lengths.
- Provision of adequate street lighting must conform to the recommended minimum illuminance level.

Take Forward –

- Amending Road Safety Policy in India with integration of iRAP in auditing the roads
- Assessment of night time accident need to be incorporated for the analysis while generating risk factor for iRAP methodology considering various contributing factors.
- Extending research work in developing risk factors for Indian conditions.

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Thank You