



PROJECT HIMANK



ENHANCING ROAD SAFETY IN MOUNTAINS

THE MOUNTAIN TAMERS



- **Fact File : Road Accidents in India**
- **Causes of Road Accidents**
- **Mitigation Measures**
- **Publicity & Awareness Campaigns**
- **Post Crash Response**



FACT FILE : ROAD ACCIDENTS IN INDIA



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Since 2006, India ranks 1st in number of road accidents & fatalities

11% of world share of road accidents

2019 : 4,49,002 accidents resulting in 1,51,113 fatalities & 4,51,361 injuries

69% of accident related deaths (ARD) in young adults (18-45 yrs)

86% males and 14% females involved in ARD



FACT FILE : ROAD ACCIDENTS IN INDIA



NH & SH (5% of road length) accounts for 61% ARD
ODR (95% of road length) accounts for 39% ARD

Over speeding accounts for 67% of ARD

Urban areas accounts for 33% of ARD
Rural areas accounts for 67% of ARD

Since 2016, max yearly accidents in Tamil Nadu (57,228) & max yearly deaths in Uttar Pradesh (22,655)

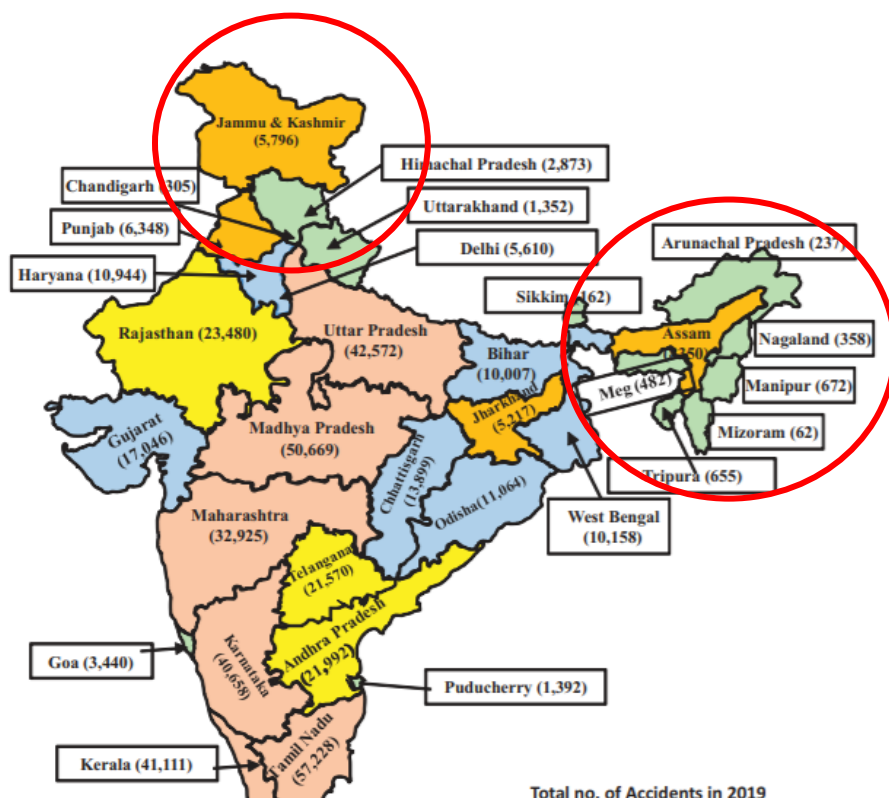
Top five RTA cases in million plus populated cities
Delhi - Jaipur - Chennai – Bengaluru - Kanpur



ROAD ACCIDENTS & DEATHS IN HILLY REGIONS

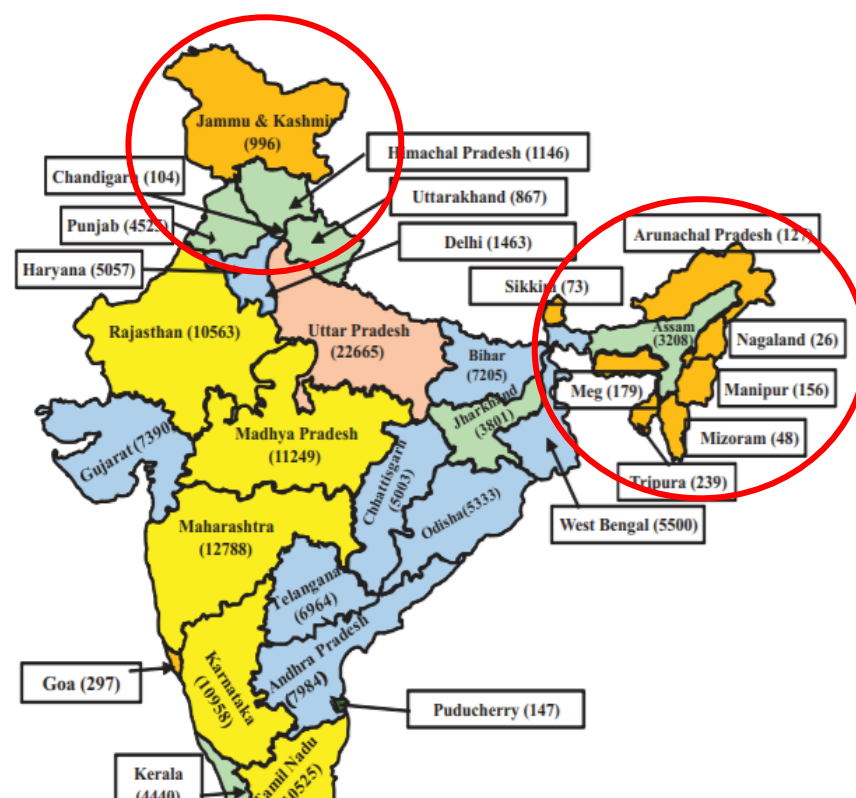


Map 1.1 Road Accidents in 2019 - State-Wise



Numbers & Percentage of Accidents
(J&K/HP/UK/NE States)
 $(10,420/4,49,002 = 2.32\%)$

Map 1.2 Persons Killed in Road Accidents in 2019 - State-Wise



Numbers & Percentage of Deaths
(J&K/HP/UK/NE States)
 $(3209/1,51,113 = 2.1\%)$



CAUSES OF ROAD ACCIDENTS



MAJOR CAUSES OF ROAD ACCIDENTS



Multi causal and interplay of various factors. Causes broadly categorised as

Road Environment

- **Geographical area (Residential, Commercial, Highway)**
- **Type of road features (Straight, Curved, Steep)**
- **Type of junction**
- **Weather condition**

Human Factors

- **Traffic rule violation**
- **Driving w/o licence**
- **Non use of safety devices (seat belt, helmet)**

Vehicle Condition

- **Overage**
- **Overload**
- **Poor maintenance**



MAJOR CAUSES OF ROAD ACCIDENTS IN MOUNTAINS



Trn Related

- Highly broken relief with differing elevation (Steep slope, deep gorges)
- Unstable hill slopes results in landslides, debris fall, rock fall
- Overloading of soil strata due to filling causes caving in steep cutting
- Climatic conditions (temp, precipitation, snow)

Road Design Related

- Defective design and construction
- Poorly designed curves & blind curves
- Insufficient visibility at curves
- Narrow shoulders
- Improper drainage
- Hill crests
- Poor maintenance (Potholes, non removal of debris, non maint of road signs & lights)

Weather Related

- Rain, fog, sleet, snow
- Poor visibility and control on veh
- Damages to road

Vehicle & Driver Related

- Poorly maint veh
- Overloading of veh
- Poor hill driving skills
- Non adherence of tfc rules
- Over speeding and lack of focus
- Drunken driving



MITIGATION MEASURES



TERRAIN AND ROAD DESIGN RELATED MEASURES TO MINIMIZE RTA IN MOUNTAINS



Success of hill roads is greatly dependant on proper fixing of alignment

- Offer comfortable driving experience with easy gradient
- Cause less wear and tear on vehs

River Valley route (Gentle, low construction & operating costs)

- Road bed above & away from max water level
- Properly designed hydrological structures

Adherence to road design and construction specifications

Avoid unstable slopes and landslide prone areas

A forestation to reduce landslides

Ensure slope stabilization and good drainage

Undertake periodic & preventive maintenance



MAINTENANCE OF HILL ROADS



Landslide Prevention

- Constr of retaining structures
- **Slope stabilization measures**
 - Use of Geotextile
 - Vegetation on slope
- Effective drainage to intercept & divert water

Drainage Structures

- Regular inspection, repair & cleaning of drains, culverts, catch pits

Snow Clearance

- Manually
- **Mechanically**
- Met warnings & advisory through media

Protective Works

- Repair of retaining, breast & parapet walls
- **Installation of crash barriers**
- Repair & additional provision of sign postings
- Redo road markings and use luminous paints



VEHICLE RELATED MEASURES **TO MINIMIZE RTA IN MOUNTAINS**



Regular inspection of veh for oils, tyres, brakes, bty, lights etc

Lower gear usage on steep slopes

Tap method braking

Anti Locking Braking & Electronic Stability Control systems

Seat belt reminders, Speed alert warning & Rear parking sensors

Automatic headlights on for 2 wheelers

Use of Helmets by 2 wheelers

INCORPORATION OF MODERN TECHNOLOGY IN VEHICLES

**Intelligent Speed Adaption
(Veh assess speed limit for
roads)**

**Alcohol Ignition Inter locking
System
(Detection of alcohol in breath
prevents veh to start)**

**Exploiting
Technology**

Speed Limiting Devices

Limiting Engine Power



PRECAUTIONS DURING BAD WEATHER



Low Visibility a Major Cause of Accidents in Hills

Use of headlights at dawn, dusk, rain, fog, snowy conditions

Use of daytime running lights

Use of reflectors

Use of hazard lights

High mounted stop lamps

Colourful clothing & reflective tapes



PRECAUTIONS BY DRIVERS **IN HILL DRIVING**



Stay alert and focussed

Avoid driver fatigue by taking regular breaks

Avoid alcohol consumption

Cautious driving and maintain safety distance

No use of cell phones

Use of seat belts

No overtaking on curves



ENFORCEMENT MEASURES TO MINIMIZE RTA



Enforce speed limits

- **Speed guns at random locations**
- **Speed cameras, CCTVs and ANPR cameras**

Use of alcohol detectors

E-challan

Vehicle documents and fitness checks

Enforce use of seat belts & helmet



MEASURES POST ROAD SAFETY AUDIT **IN HILL ROADS**



Identification and Rectification of Black Spots on Roads

Short Term Measures

- Rumble strips
- **Speed breakers**
- **Speed limit signs**
- Flashing of amber beacon
- **Convex mirror**
- **Solar lighting**

Long Term Measures

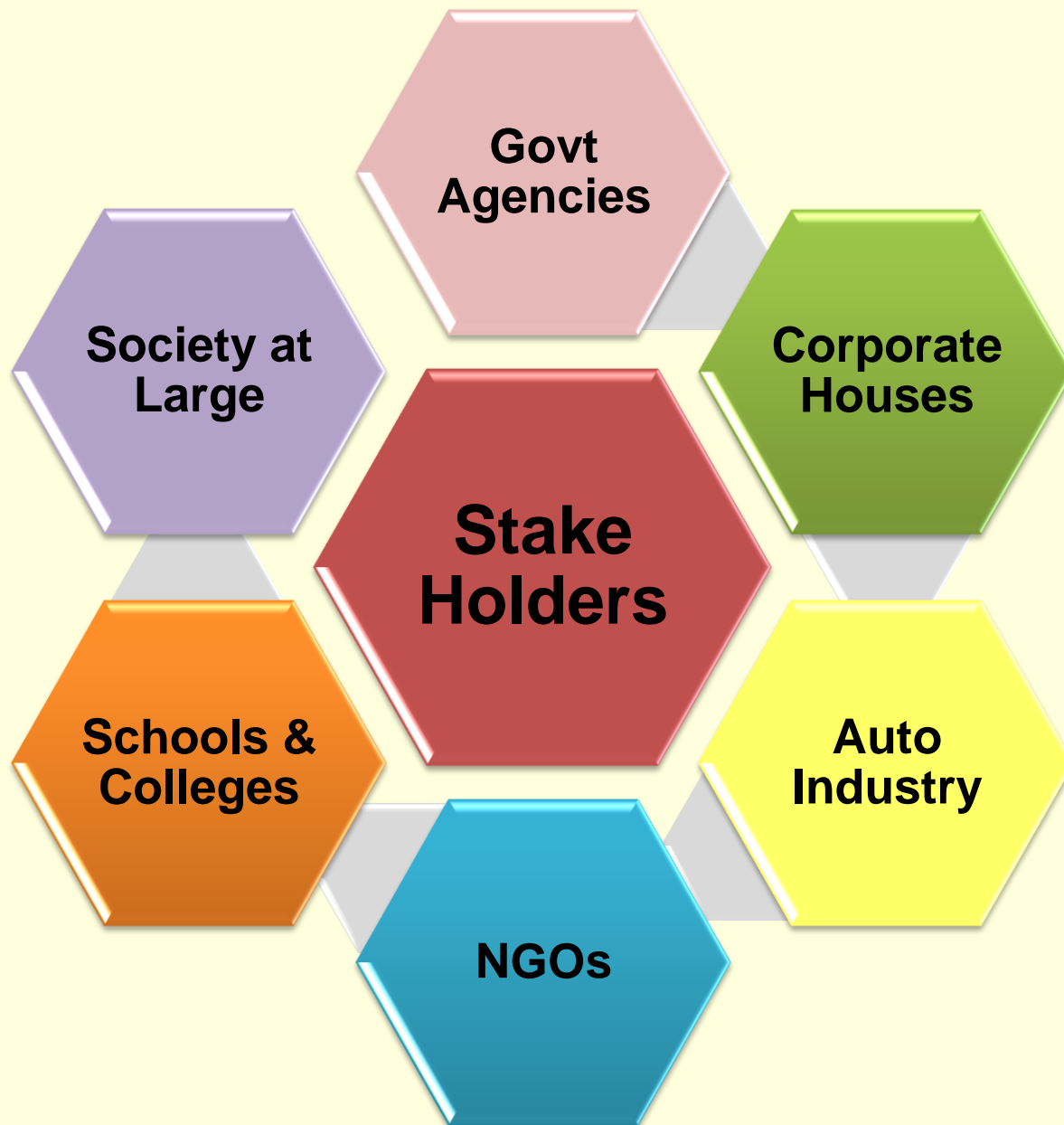
- Improve road design
- **Improve elevation**
- **Road widening & berm repair**
- Improve sight distance
- **Install crash barriers**



PUBLICITY AND AWARENESS CAMPAIGN & POST CRASH RESPONSE



PUBLICITY AND AWARENESS CAMPAIGN





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POST CRASH RESPONSE AND TRAUMA CARE



Ambulance & Crane at every 50-60 km on NH/SH in hills

Capacity building

- **Heliports & Heli evacuation**
- **Hospitals & blood banks**

Cashless treatment of RTA victims during Golden hour

Increase compensation of RTA victims

Protection of good samaritans



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