Presentation to
National Road Safety Council

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Chairman- Working Group on Engineering (Vehicles)

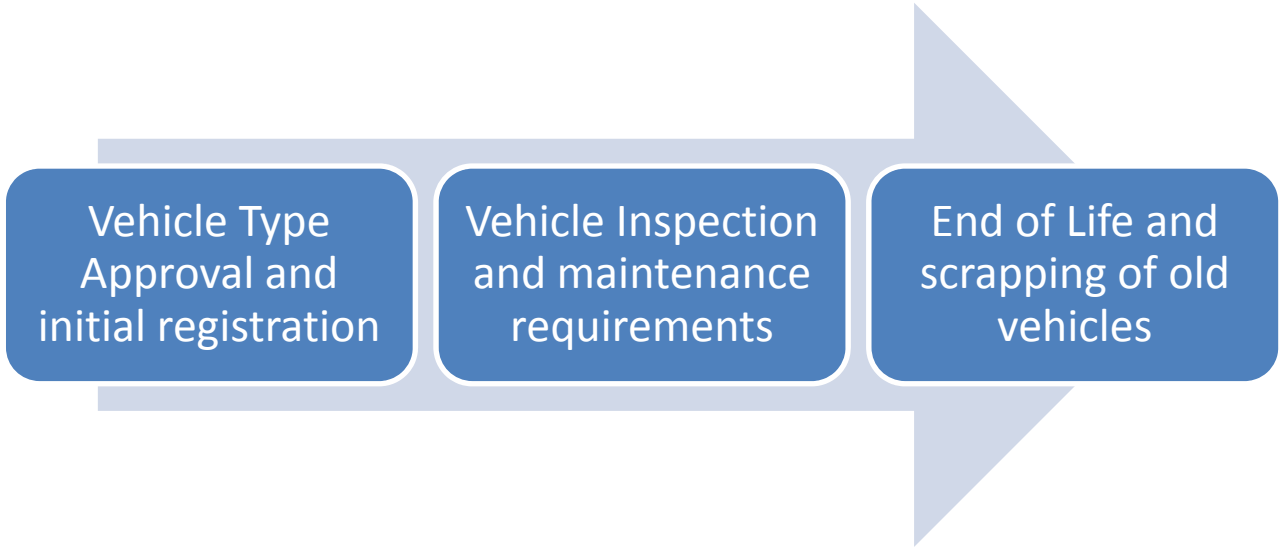
Group Composition and Terms of Reference

- **Group Composition**
  - Shrikant Marathe, ARAI — Chairman
  - Shri Vishnu Mathur, SIAM — Member
  - Shri U Sudhakar Rao, ASRTU — Member
  - Shri Dinesh Tyagi, iCAT — Member
  - Shri Vijay Khullar, UICBA — Member
  - Mrs. Rashmi Urdhwareshe, ARAI — Convenor

- **TOR**
  - Define the problematic areas and layout the macro and micro dimension with potential solution
  - Suggest strategic steps for immediate implementation
  - To identify critical issues
  - To fix targets and goals (short term and long term)
  - To suggest best practices followed by others (India and abroad)
  - Cross linkage with other working groups

Outline of Work

- **Safety rules for vehicle construction and its approval (present and future)**
- **Vehicle Technology for sustainable mobility**
- **Establishing close link of**
  - **Type Approval data with vehicle registration, inspection and end of life**
  - **Accident data, analysis and its link to regulations**
  - **International harmonization of safety regulations**
- **Safety aspects during complete life cycle of vehicle**

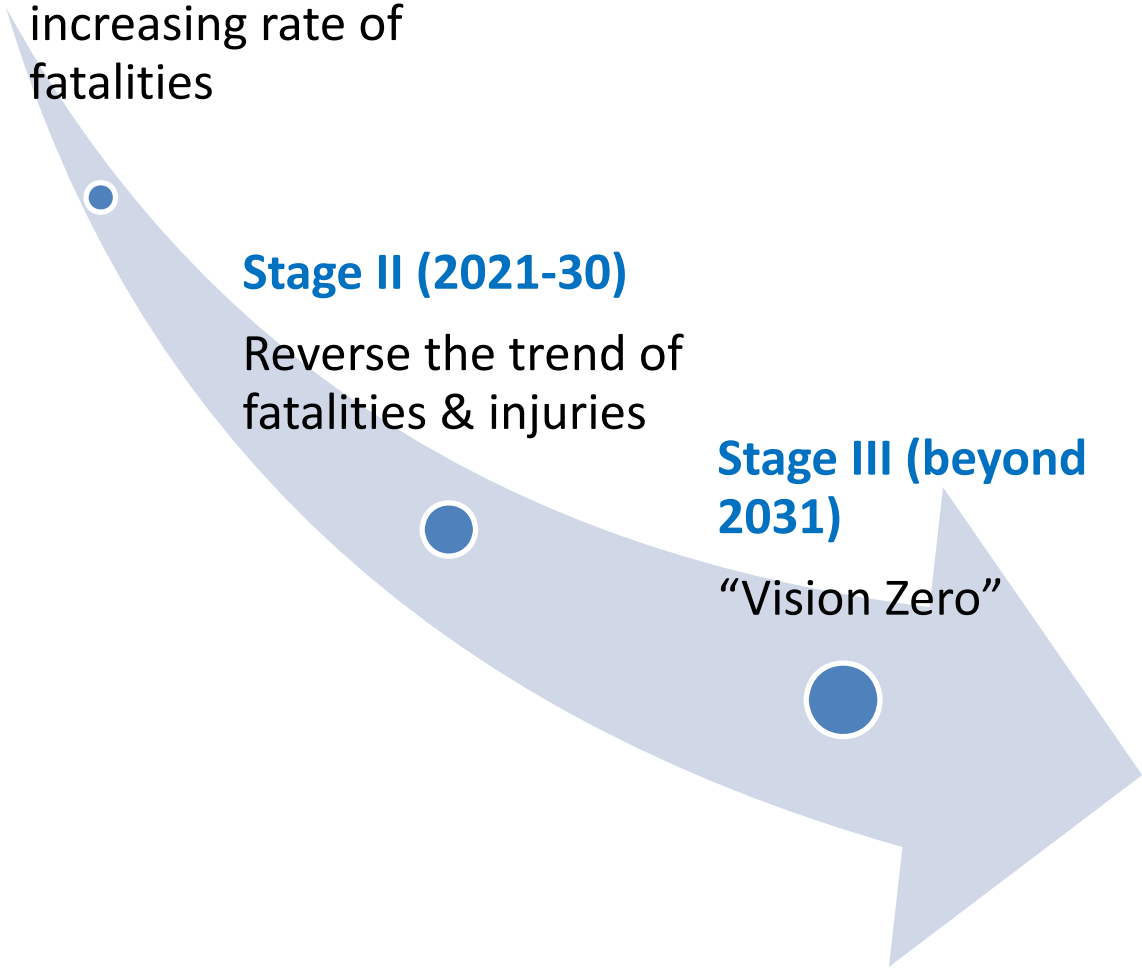


Proposed Safety Vision and Goals

Safety Vision

To reduce the fatalities and injuries due to Road Traffic Accidents by 4E

- Engineering
- Enforcement
- Education and
- Emergency (Medical Services)



Engineering Solutions and enabling technologies towards better safety: Short Term (3-5 years)

Passive Safety	Active Safety & General Safety
Two wheelers •Mandatory use of crash helmets, rider gear •Light and ventilated helmets **Three wheelers** •Improved seats •Occupant safety and comfort **Passenger cars & Utility Vehicles** •Safety Belts for all occupants , Safety Belt Reminders •Crashworthy vehicle structures •Occupant protection: Frontal and side impact •Occupant restraints : Airbags, Air-curtains and Head Restraint with controlled backset **Commercial Vehicles** •Retrofitting Under Run Devices for in-use HCVs •Bus Code •Mandatory use of Tachographs	**Visibility & Conspicuity of Vehicles** •Night Vision •Visibility Enhancement by use of cameras •Daytime running lights •Use of reflective tyres •High-mounted stop lamps in cars •Improving the visibility of non-motorized vehicles •Improving visibility for 3 wheelers •Conspicuity of Pedestrian and Vulnerable Road users •LED technology with less power consumption **Stability & Braking** •Anti-Skid braking (ABS) •Tire Pressure Monitoring **Use of Speed Limiting Devices and Functions** •Setting and enforcing speed limits •Speed enforcement on rural roads
•Fire Protection in buses **All categories** •Component Type Approval, CoP and marking	•Speed limiters in heavy goods and public transport vehicles **Electro-magnetic Compatibility (EMC)**

Engineering Solutions and enabling technologies towards better safety: Intermediate (5-10 years)

Passive Safety	Active Safety and General Safety
Pedestrian Safety •Safer car fronts to protect pedestrians and cyclists •Safer bus and truck fronts **Child Restraint Systems** •Safer Child Seats for all age groups **Commercial Vehicles** •Truck Code implementation •Trailer Code implementation **Agricultural Tractors and Construction Equipment Vehicles** •Rollover Protective Structure along with Safety Belts for tractors •Falling object protective structures with enclosed cabin. •To enhance safety requirements for Construction Equipment Vehicles and Off Road Vehicles under CMVR certification.	**Use of Speed Limiting Devices and Functions** •Speed Gun •Speed cameras **Crash Avoidance Systems** •Collision Avoidance Techniques like lane departure warning, Adaptive Cruise Control, Adaptive Front Lighting •Advanced Vehicle Stability Control technologies like Electronic Stability Control (ESC) **General requirements** •Alcohol interlocks •Safety against displaced luggage

Engineering Solutions and enabling technologies towards better safety: Long term (>10 years)

Passive Safety	Active Safety and General Safety
Vehicle Compatibility Design of the vehicle structure for colliding partners' safety **Advanced Restraint Systems** Adaptive Head Restraint Smart Restraint Systems sensitive to occupancy and its Anthropometry **Vehicles to Road Furniture Interaction** Protection against roadside objects like Poles, Trees and narrow objects Development of Road Restraint Systems **Indian NCAP System– beyond regulations** Introduction of Indian NCAP for evaluation and overall safety rating of vehicles	**Driver Assistance Systems** Drowsiness Alarm Vehicle to Vehicle Communication Intelligent Transport Systems for better traffic management

Safety Roadmap for mandatory standards

2000-05	2005-10	2010-15	2015-20
• Lighting and signalling • Seat Belts and Anchorages • Seat Anchorages • Steering impact • Safety Critical components installation • Rear View Mirrors • Tyres • RUPD/ SUPD • Safety Glazing	• EMI • ABS • FUPD • Roll over for buses • Survival space for trucks • CoP of safety critical items • Conspicuity tapes • Anti-theft devices for 2/ 3 wheelers • Wind screen wiping • Pass-by noise • Spray suppression • Interior noise	• Offset frontal crash • Side Crash • Head restraint • Child restraint systems • Airbags • Bus Code • Truch Code • Trailer Code • Tractor Code • Protection from fire hazard • EMC • LED technology • Anti-theft devices and vehicle alarm • Defrost and de-mist	• OBD Embedded Technology • Collision avoidance • AFS • Night Vision • Intelligent traffic system interface • Lane departure • Blind spot correction • Drowsiness detection • Road Infrastructure • Hinges/ latches- GTR 1 • Pedestrian safety- GTR 9 • Safety Glazing- GTR 10 • Whole vehicle CoP • Advanced fire detection and control

Similar Roadmap should be established for

CEVs, Special Purpose vehicles, ITS and Inspection & Maintenance

Key Recommendations for I&C Regime

Significant investments, improvements in regulatory and management practices, increased capacity and capability would be prerequisites for the effectiveness for such a regime. A phased approach would be necessary to inspect all vehicles on safety and emissions performance.

Phase 1 (up to Year 2015)

- In the first phase, cities (Metros)with significant transport vehicles should introduce a modern Inspection and Certification regime
- In these cities, a modern inspection regime should be first introduced for commercial vehicles
- And then it must be extended to rest of India for commercial vehicle category

Phase 2 (2015-2020)

- Introduce the I & M regime to private vehicles including 2 wheelers
- Start initially with older vehicles (more than 9 years old)

Phase 3 (Year 2020 onwards)

- And then extend the regime to newer fleet in private vehicles category (3-9 year old)

Key Recommendations for I&C Regime (Conti..)

Vehicle Types	Age / Frequency		
Phase - I Commercial vehicles	All Vintage		
Frequency	Annually -(After initial 2 years)		
Phase - II			
Private Vehicles Four Wheelers	<3 Years	3-9 Years	>9 Years
Frequency	NA	Biennially	Annually
Motorcycles & Scooters	<3 years	3-9 Years	>9 years
Frequency	NA	Biennially	Annually

- **For those cities and vehicle categories which are not covered in I&C, existing PUC should be strengthened**
- **Entire country and all categories should be covered in the long run (by 2020) under I&C**
- **End of Life requirements should be established**

Suggested ELV (End of Life) Program

Establish Regulatory Requirements

- Define targets for material recovery or re-use rates
- Prepare IS standards based on EU Directives for certification
- Define ELV for 2, 3, 4 wheelers, tractors, CEVs

Define Recycling mechanism

- Usage of various recyclable materials
- Disposal of Non-recyclable, hazardous, toxic materials
- Prepare National Guideline for Substances of Concern (SoC) and Restriction on Hazardous Substances (RoHS)

Enforce Mandatory Regulations

- Define players, responsibilities and authorization in waste management/ re-cycling
- Establish procedure for de-registration of vehicle
- Define cost bearing system, fiscal incentives to promote recyclability

Accident Investigation

Proposed Actions to address the need for accident investigation system:

- Development of a comprehensive road accident data system to be integrated into national road safety plans.
- Establish strategic alliance with one or more of the International organizations
- Comprehensive resource plan to be formulated.
- A National Accident Research Centre to be established at an early date.
- The Accident Data should be made available to all stake holders for collective efforts to reverse the trend of fatality in the years to come.
- Some of the MNC OEs have volunteered to do accident data measurement
- Accident data is collected for various purposes and various levels for addressing specific functions. Table summarizes these levels that can be achieved over a period of time:

Timeline	Level	Source of Data	Functions / Level of Data Collection
SHORT TERM (3-5yrs)	Base	o National Accident Data	o Priorities o Trends o Progress of targets
INTERMEDIATE (5-10yrs)	Intermediate	o Specialist police o Reports o Insurance Reports	o Identification of Cause o Reconstruction of pre-crash events
LONG TERM (>10yrs)	In-depth	o Special Investigations	o Accident Causation & Injury Causation o Basic Research o Engineering feedback o Technical Standards
	Specialist	o Research Studies	o Specific Research Questions

Intelligent Transport System (ITS) Priority Recommendations

ITS Application	Safety Rating	Cost Rating	Priority
Real-time Traffic Information Provision	****	*	I
Roadside Weather Information Systems	****	*****	I
Electronic Toll Collection (ETC)	***	***	I
Real-time Status Information for Public Transit System (e.g. Bus, Subway, Rail)	****	****	I
Dynamic Message Signs (or “Variable” Message Signs)	****	*****	I
Adaptive Traffic Signal Control	****	**	I
Ramp Metering	***	***	I
Congestion Pricing/Electronic Road Pricing (ERP)	***	***	I
Parking Information	***	*****	I
Automatic Vehicle Location (AVL)	***	***	I
Incidence Management	****	**	I
Route Guidance/Navigation Systems	**	**	II
Traffic Operations Centers (TOCs)	***	*	II
Vehicle-Miles Traveled (VMT) Usage Fees	**	*	II
Variable Parking Fees	*	****	II
Electronic Fare Payment (for example Smart Cards)	*	***	II
Intersection Collision Avoidance System	****	*	III
Intelligent Speed Adaptation (ISA)	****	*	III
Automated Speed Enforcement	****	*	III
Freight and Fleet Management e.g. Tow-Bar System	*	**	III
Lane Keeping	**	**	III

Summary of Recommendations

1. Establish Safety Vision and Goals (3 stages are recommended)

2. Implement Vehicle Engineering solutions through mandatory safety rules (Roadmap is suggested. Also cover other sectors like CEVs, Special purpose vehicles, etc)

3. Establish effective mechanism for control of in-use vehicles. Also establish requirements for ELV

4. Establish Comprehensive Road Accident data analysis in scientific manner

5. Effective use of IT and Electronics for vehicle-road interfaces and transport management. One should not wait for market forces to decide the technology.

6. Support research activity in vehicle engineering and regulations by undertaking specialized projects to address Indian requirements

Thank you

for Kind Attention!

Thanks to the

Members of Working Group