Automotive Industry: Regulations Scenario in India

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Presentation Outline

- About ARAI
- India Automotive Industry
- Overview of Vehicle Type Approval system
- Environmental Regulations
- Decade of Road Safety
About ARAI
<table>
<thead>
<tr>
<th>Establishment</th>
<th>: 1966</th>
</tr>
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<tbody>
<tr>
<td>Location</td>
<td>: Pune, India</td>
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<tr>
<td>Manpower</td>
<td>: 500+</td>
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<tr>
<td>Post Graduate Academy</td>
<td></td>
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<tr>
<td>Forging Industry Division</td>
<td></td>
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<tr>
<td>Our Offices</td>
<td>: China, Korea and Chennai</td>
</tr>
<tr>
<td>Accreditations</td>
<td>: ISO 9001, ISO 14001, OHSAS 18001 &amp; NABL (ISO 17025)</td>
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</table>
Roles of ARAI

- Government approved test agency to carry out mandatory/certification testing
- Research Association and service provider to carry out sponsored R&D work and development testing
- Also engaged in
  - preparation & harmonization of standards
  - Deliberation of policy matters affecting auto R&D
  - Creation of facilities and building up competence by undertaking forward looking research & technology demonstration projects
- National institution to disseminate information and create forum for knowledge sharing in association with industry/academia
Services Offered

R&D
• Engine Development,
• Alternate Fuels
• NVH & CAE
• Structural Dynamics,
• Automotive Electronics

Testing, Certification & Homologation
• Vehicle Evaluation
• Emission
• Safety Systems
• Materials
• EMI/EMC

Other Services
• Technology Demonstration Projects
• Turnkey Consultancy
• Calibration

• Assistance in formulation of Automotive Standards
• Secretariat for WP29 (Harmonization of standards)

• Specialized Training Programs
• Post-Graduate course in Automotive Engineering
Automotive Electronics

  - Design solution using model based design – rapid prototyping for proof of concept.
  - Design to product level solutions.
  - Evaluation services and design solutions for EMI/EMC/Environmental.

Engine

• New Engine Development: Concept – to – Prototype
• Alternate fuels – CNG, LPG, Ethanol, Bio – Diesel, Hydrogen blend, etc.
• Transmissions design, matching.
• CFD, Thermodynamic simulation of engine processes.
• Durability tests and Bench Marking

NVH Refinement of Vehicles and subsystems & CAE

• Benchmarking and Target setting.
  - Pass – by – noise Measurement
  - Interior NVH Assessment
• Development of Acoustic Material Modal Analysis.
• NVH mapping of tyres, brakes, power train etc.
• Durability Analysis Using Virtual Road Load Data Acquisition & Virtual Simulation of entire vehicle

Vehicle Dynamics, Structures and Materials

• Vehicle design / development for durability/reliability/comfort.
• Service load data acquisition on Indian roads.
• Compressing vehicle development time.
• Laboratory/virtual simulation.
• Correlation of Indian roads to proving tracks.
• Design and development of suspension using hardware – in loop technology.
Indian Automotive Industry
Facts

- World’s largest tractor and 3 wheeler manufacturer
- 2nd largest 2 wheeler manufacturer
- 5th largest commercial vehicle manufacturer
- 6th largest vehicle manufacturer
- 7th largest car manufacturer

Source: SIAM, EY Estimates
Levels of standardization

- National Level
- International Level
- Industry Level

Innovation versus Standardization

- Standards shape Technology and are a prerequisite for growth in international trade
- Innovation brings in new product, standardization makes it compatible at the minimum cost
- There is something “static” in standardization. However, standards have a strong positive influence on the growth and commercialization of inventions
Standards leading technology:

Emission norms have led the innovation in power train technology

Standards lagging technology:

Advance lighting systems were introduced first on vehicles. Standards followed later

#### Conventional Engines
- BS II

#### Exhaust After-treatment
- BS III

#### Electronic Controlled Engines
- BS IV
- Fuel Cells/ EVs/ Hybrids

#### BS V

#### Incandescent Bulbs
- Performance
- Endurance
- Environment

#### Xenon lamps
- Photometry
- Anti-glare

#### LED sources
- Electronic Controls
Growth of Electronic content in vehicles

2005-06
EMI, ABS, Anti-theft devices

2006-07
CNG/ LPG
Advanced lighting devices, Truck & Bus safety

2008-10
BS IV,
Airbags, LEDs, Fire protection, occupant safety
Overview of Vehicle Type Approval system
Features of Type Approval System

- 3rd Party Type Approval (TA) system is similar to UN-ECE
- Implemented in year 1991
- TA administration Agencies
  - Notifying agencies: MoRTH, MoEF, etc.
  - Standards and other requirements are notified under CMVR
  - Testing & Approving agencies: ARAI and others
  - TA & CoP certificates are mandatory
- TA standards
  - Bureau of Indian Standards (BIS) prepares IS standards
  - AISC Technical committee prepares AIS standards as an interim step
  - Standing Committee on Emission (SCOE) prepares Emission Standards (TAP 115/116)
- Roadmap of Regulations
  - Agreed by industry, test agencies and government
  - National Policy is to align with ECE regulations to the extent possible
## Central Motor Vehicle Rules (CMVR)

### Mandatory requirements for vehicle TA

<table>
<thead>
<tr>
<th>Level</th>
<th>Requirements</th>
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<tbody>
<tr>
<td>General</td>
<td>• e.g. Anti-theft, masses &amp; Dimensions, etc</td>
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<tr>
<td>Vehicle Level</td>
<td>• e.g. Mass emission, noise, brake, etc.</td>
</tr>
<tr>
<td>System Level</td>
<td>• e.g. Seats, anchorage, under run protection, forward vision</td>
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<tr>
<td>Component level</td>
<td>• e.g. Horn, mirror, safety glass, etc.</td>
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Vehicles Covered under Mandatory Type Approval

Indian Automobile Industry

- Light Pass. Vehicles
  - PCs / MUVs / SUVs
- Commercial Vehicles
  - LCV’s / M&HCVs / Buses
- Tractors
  - Farm / Earthmoving & Construction Equipments
- Two Wheelers
  - Motorcycles / Scooters / Mopeds
- Three Wheelers
  - Passenger Carriers / Goods Carriers
Global Market: Driving Force for Regulations

- National Regulations provide level ground for domestic and global players

- Export of components and vehicle is increasing

- There is a requirement for mutual exchange of approvals

- Our national standards are being updated for alignment with UN-ECE regulations or Global Technical Regulations (GTRs)

- Globally Electronics will cover 40% of vehicle cost by 2015
Challenges and focus for future regulations

• Limiting GHG emissions

• Improving Road Safety

• Reduce transport related noise & congestion and improve traffic flow
Environmental Regulations
Addressing the Challenges

Emission reduction requires initiatives in ...

- Improving Energy efficiency
- Fuel and Emission Standards
- Inspection, Certification and Maintenance
- Retrofitment
- Alternative fuels
- Vehicle technology for more eco-friendly vehicles
- Infrastructure & logistics for better traffic management
- Driver behaviour
Future Emission Standards

- BS IV - Country-wide?
- Uniform Fuel Specifications?
- BS V - ?
- CEVs - Next stage norms?
### Implementation Dates India Vs. Europe for < 3.5Ton GVW Vehicles

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<th>Tier</th>
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<tbody>
<tr>
<td>BS 1</td>
<td>2000</td>
<td>Euro 1</td>
<td>1992</td>
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<tr>
<td>BS II</td>
<td>2000 in Metros &amp; 2005 throughout India</td>
<td>EURO II</td>
<td>1996</td>
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<tr>
<td>BS III</td>
<td>2005 in metros &amp; 2010 throughout India</td>
<td>Euro 3</td>
<td>2000</td>
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<tr>
<td>BS-IV</td>
<td>2010 in Metros</td>
<td>Euro 4</td>
<td>2005</td>
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<tr>
<td>BS V</td>
<td>Awaiting Fuel Road Map ??</td>
<td>Euro 5</td>
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<td>Euro 6</td>
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Decade of Road Safety
Increasing Road Safety requires initiatives in...

ARAI has submitted Action Plan on 4 “E”s of Road Safety

- Improve Road Engineering
- Road Safety Monitoring
- Increasing Road User Education and Awareness
- Controlling Behavioural changes
- Legislations and its enforcement
Safety Standards in Near Future

2 wheelers
- Electromagnetic compatibility (EMC)
- Spray suppression
- Day time running lamps?
- Vehicle Alarm system
- ABS?

3 wheelers
- Electromagnetic compatibility (EMC)
- Driver safety
- Passenger safety

4 wheelers: M1 Category
- Advanced Braking System
- Head on, offset frontal and side crash
- Head restraints with controlled back-set
- Electromagnetic compatibility (EMC)
- Child Restraint
- Vehicle alarm system & protection against unauthorized use
- Hybrid vehicles
Safety Standards in Near Future

**4 Wheelers - Buses**
- Bus construction
- School bus
- Sleeper coaches
- Protection against unauthorized use
- Electromagnetic compatibility (EMC)
- Hybrid vehicles
- Fire protection
- Advanced Braking Systems
- Navigation/Fleet management

**4 Wheelers - Goods vehicles**
- Truck construction
- Automotive trailer code
- Conspicuity markings
- Protection against unauthorized use
- Electromagnetic compatibility (EMC)
- Close coupling and mechanical coupling devices
- Advanced Braking System
- Navigation/Fleet management

**Agriculture Tractors**
- Agriculture Trailer Code
- Rear vision
- Field of vision
- Attendant/passenger seat
- Ballast mass
- ROPS
- Mechanical couplings
Regulation in pipeline:

- Fitment of RFID for Toll collection
Thank you!