



AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA (ARAI)



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Your Partner in Development

Presentation Layout

- **Overview**
- **R&D Activities**
- **Testing & Homologation Activities**
- **Other Initiatives**



ARAI Overview

Establishment : 1966

Location : Pune, INDIA (150 km South-east of Mumbai)

Manpower : 540 +

Facilities : 10 divisions –

Engine Design, Emissions, Safety & Homologation,
Passive Safety, Vehicle Evaluation, Automotive Electronics,
NVH, Structural Dynamics, Materials, Calibration,
Post Graduate Academy

Accreditations : ISO 9001, 14001, OHSAS 18001 & NABL

What does ARAI do?

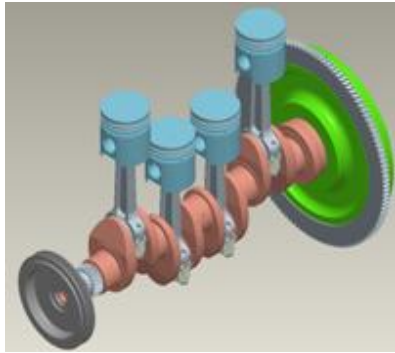
- **R&D**
 - Sponsored R&D work for the Automotive and Component industry
 - Self funded R&D Projects in futuristic areas
 - Government funded R&D Projects in areas of common interest to the Auto Industry
- **Homologation for OEMs and Component Manufacturers**
 - As per Indian national CMVR requirements
 - Export homologation as per ECE in association with TUV, VCA



R&D Activities

- **Engines & Transmission**
- **Structural Dynamics**
- **NVH**
- **CAE**
- **Automotive electronics**
- **Automotive Materials**

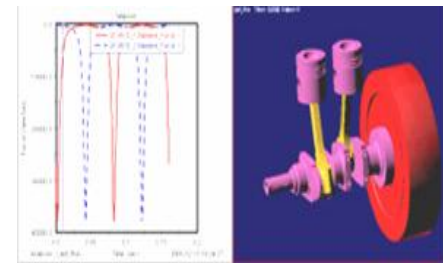
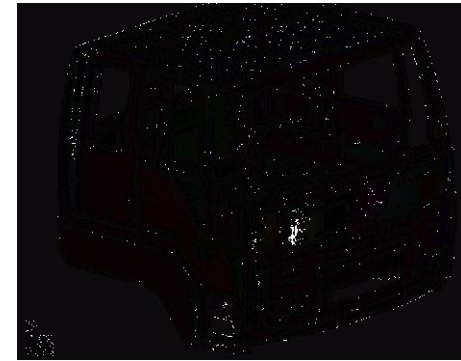
Core R&D Areas : Engine Development



- Concept design & detailed engineering
- Computational simulation
- Combustion optimization, port development
- Emission reduction to meet Euro, EPA and Indian norms
- Mechanical design of components, dynamic analysis of power train & valve train system
- Conversion of diesel & gasoline engines to CNG & LPG fuels
- Feasibility study
- Durability testing

Core R&D Areas : NVH & CAE

- Source identification & reduction of noise of vehicles, systems & components
- Torsional vibration analysis of engine & power train
- Acoustic material, characterization
- Design optimization of structures using static, thermal, dynamic and fatigue analysis techniques & experimental validation techniques
- Simulation & analysis of structures using multi-body dynamics
- Simulation of vehicle crash & evaluating crash-worthiness including occupant safety
- End-to-end solutions using multi-attributes optimization



Core R&D Areas : Structural Dynamics



- Fatigue / durability testing of automobile components / aggregates and vehicles
- Accelerated durability test using four poster and multi-axis simulation
- Experimental stress analysis and service load data acquisition, spectral and fatigue analysis of on & off road vehicles
- Material Characterization for Fatigue Properties

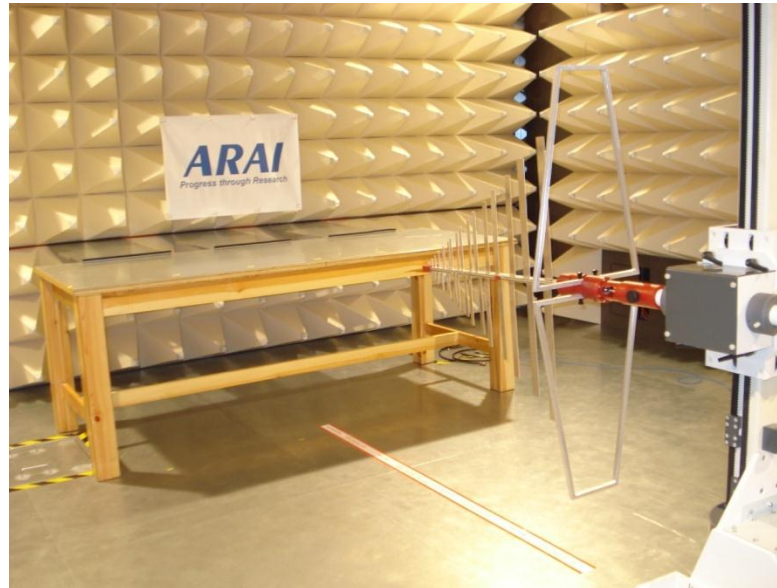


Guiding principles

- Compressing vehicle development cycle
- Bringing road to the laboratory

Core R&D Areas : Automotive Electronics

- EMI / EMC evaluation of automotive electronic components and systems
- Development of test equipment, chassis dynamometer controller, drivers aid, exhaust gas sample handling system etc.



Core R&D Areas : Automotive Materials



- Chemical analysis of materials
- Testing of fuels / oils / fluids / engine coolant
- Vehicle exhaust / air quality analysis
- Evaluation of physical, mechanical , electrical and thermal properties of materials
- Metallurgical failure analysis



ARAI has been identified under NATRiP for Centres of Excellence (CoE) in the following areas:

- **Powertrain**
- **Fatigue**
- **Materials**

Homologation & Testing

- **Emission Certification**
- **Safety**
- **Vehicle Evaluation**

ARAI Certification Capabilities

- Full Vehicle testing and approval
 - 2 wheelers/ 3 wheelers
 - Passenger cars
 - Commercial vehicles/ buses
 - Agricultural Tractors / Construction Equipment
 - Battery operated Vehicles
 - CNG/ LPG Retrofitment Vehicles
- Diesel/ Petrol/ CNG/ LPG engines for emission certification
- Diesel/ Petrol Gen-sets for emission and noise certification
- PUC equipment
- Safety Components

In India, major chunk of automotive homologation activities are carried out by ARAI

Homologation Services : Emission

- Emission testing of 2/3 wheelers, passenger cars, LCV & HCV
- Engine Certification for commercial vehicles, tractors, construction equipment and genset.
- Evaporative emission measurement in SHED facility
- Particulate Matter (PM) size measurement
- After-treatment device evaluation
- Mileage accumulation for emission performance deterioration determination
- Special projects like ambient air quality, emission inventory, source apportionment studies etc.



Homologation Services : Safety

- Full frontal crash
- Air bag deployment
- Side door intrusion
- Head restraint impact
- Helmet impact
- Safety glass impact
- Steering impact
- Mirrors

- Lighting & signaling devices
- Wind screen / wiper systems
- Automotive bulbs
- Speed limiting devices
- Wheel rim
- Horns
- CNG / LPG components
- Brake hoses



Homologation Services : Safety

- Safety belts and their anchorages
- Seats and their anchorages
- Interior fittings
- Rear and lateral under run protection devices
- Occupant survival space
- Strength of superstructure
- Front and rear bumpers
- Bus body



Homologation Services : Vehicle Evaluation

- Test and certification of all types of motor vehicles, as well as Construction Equipment Vehicles as per Indian Standards
- Homologation of vehicles for export as per International Standards viz. EEC/ECE/ADR, etc.
- Validation / Endurance tests under Indian road, load and climatic conditions
- Performance evaluation of all types of vehicles with respect to parameters like brakes / ABS, max. speed, Pass-by-Noise, fuel consumption, gradeability, etc.



Some Esteemed Clients



Thank you

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