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**ARAI**  
Progress through Research

# PASSIVE SAFETY LABORATORY

Partner for Safer Mobility



THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA

India's first public domain Crash Test Facility

ISO 9000, ISO 45000, ISO 14000 & ISO 27000

20+ Full Vehicle Test Programs handled since inception

Design, Simulation and Crash Test Benchmarking Services

## State of Art Equipment and Facilities

### Offboard Systems

High speed cameras & Lighting system



### Offboard Systems

Miniature cameras & Lighting system



### Offboard Systems

Electric Vehicle – Fire Blankets  
EV Charging & Battery discharge facility Safety Enclosure



Multiple 3D CMM Blue light Scanner  
3D Dynamic Photogrammetry

### Ruggedized On board Data acquisition Systems

400+ DAQ channels Airbag & PT Timers, Event recorders, onboard batteries



Tested Vehicle Storage & inventory management

Separate 8 nos. of fully equipped preparation workshops

### Full range of crash sensors

Structural accelerometers, Strain gauges, current, voltage sensors, seat belt & steering column displacement & load cells, Airbag and door cavity Pressure and AV sensors



### Moving Barriers

ECE R95 & ECE R135 Crash Barriers FMVSS-214 – Crab Angle Barrier FMVSS-301 (Old & New)  
Rear Crash barrier AE-MDB crash barrier, RCAR – Rear Moving barrier

## Anthropometric Testing Devices & Calibration

### Hybrid III Family

Instrumented & Ballast Dummies  
5th%tile, 50th %tile 95%tile



Full Family of P and Q Series Child Dummies



Side impact Dummies  
ES-II, ESII re, SID IIs



World SID  
Dummy

Inhouse ATDs & Sensors Calibration Facility



ATD injury Analysis as per National & International Protocols

## Testing Services

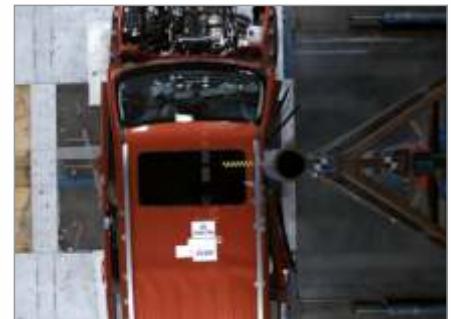
- Type approval testing as per AIS Standards
- Full Vehicle Crash Safety Developmental testing Supporting different FMVSS and ECE Protocols
- E type approval in association with various European Technical Services.
- Electric Vehicle Crash Safety Evaluation and E – call Simulations
- Testing and star rating evaluation as per various NCAP programs and BHARAT NCAP.



GNCAP Frontal ODB 64kph  
Crash: More than 80 tests



GNCAP Side MDB 50kph  
Crash: More than 50 tests



GNCAP Side Pole 29kph  
Crash: More than 15 tests

## Advance Deceleration Sled Test Facility

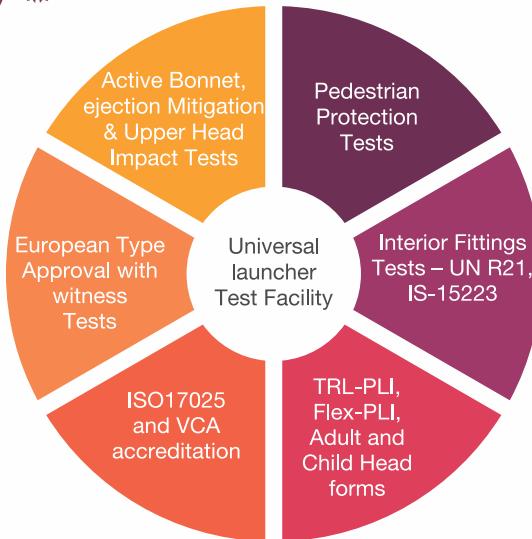


ADVANCED ACCELERATION SLED



## Pedestrian Protection & Occupant Protection Test Facility

(Universal Impactor Test System) 

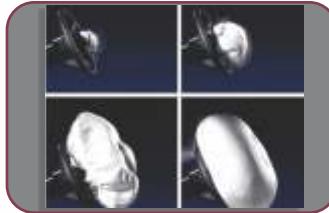


## Safety Belt Test Facility



- Full Fledged Facility for:
  - Type approval of Safety Belts as per IS15140 / AIS037
  - Homologation Testing as per ECE R16.
  - Developmental Testing of Safety belts as per Customer Specifications, /IS15140/ECE R16
- Test Facility for Rigid Part Testing, Performance and Durability Testing of Safety belts under one roof. Facilities available are: Safety Belt manufacturers
- Bungee Sled Facility with ECE R16 Manikin, Universal Testing Machine (UTM), Retractor durability, Buckle Durability, Dust Durability, G Lock testing, Retraction force measurement, Abrasion test machine for belt straps, Tilt Lock, Buckle opening force measurement and Belt Adjuster test machine.
- Renowned Test center for Conformity of Production (CoP) of Safety belts as per IS15140 and ECE R16
- Strong Experience of condition of more than 20000 Dynamic Tests of Safety Belts.
- Entire Safety Belt Certification has been accredited to ISO/IEC 17025 requirements.
- Facility is capable to take bulk COP requirements from Indian and International

## Airbag Deployment Test Facility



- Test facility for deployment testing of airbag modules as per SAE J1630 and customer specific test standards
- Facility equipped with 1m<sup>3</sup> climatic chamber, high speed cameras and measurement systems
- Proposed Facility upgradation with 8m<sup>3</sup> climatic chamber with infra-red heating system for testing of
  - Full size instrument panels & IP mounted airbags
  - Seat integrated side airbags
  - Curtain airbags
  - **Firing tests of airbags on half-cut BIWs**
  - Long duration ageing tests of instrument panels with sun load simulation

## Side Door Intrusion & Bumper Test Facility



- Quasi static side door intrusion testing (IS 12009, FMVSS 214)
- Testing of bumpers using moving barrier (AIS 006, IS 15901 & UN R42)



Facilities accredited for ISO/IEC 17025  
(Accredited by NABL, India)



Test facilities located at ARAI HTC Chakan



Test facilities located at ARAI FID Chakan

## Child Restraint System Test Facility



- Child Restraint System (CRS) test facility for type approval of CRS (AIS 072, UN R129)
- Universal category CRS Gabarit for installation testing & type approval (AIS072, ECE R16)
- ISOFIX Child Restraint Fixtures (CRF) for installation tests & homologation (UN R14, ECE R16)

## Commercial Vehicle Test Facility



- Test facility for
  - Frontal impact, roof strength & rear wall strength tests on cabins of Commercial Vehicles as per AIS029 and ECE R29.02
  - High energy Frontal Impact, A-Pillar Impact and Cantrail pre-impact tests for ECE R29.03
- Tilting platform test facility for
  - Rollover testing of fully built passenger buses / sections (AIS031, ECE R66)
  - Tilt stability of buses, trucks and SUVs
  - Measurement of center of gravity (CoG) of buses / commercial vehicles
- Facility for testing of under run protection devices
  - Lateral UPDs (IS 14682, ECR R73)
  - Rear UPDs (IS 14812, ECE R58)
  - Front UPDs (AIS069, ECE R93)
- Component fitment and installation tests (AIS023, AIS047, AIS052, AIS063)

## Anthropometry Database, Digital Benchmarking & Ergonomics Studies

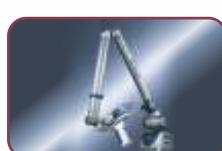


- Advanced 3-D Whole Body Scanner available for anthropometric studies
- SIZE INDIA Database – Anthropometry database of Indian driving population (5000+ volunteers)
- Benchmarking Services for measurement of motor vehicle dimensions viz. Interior dimensions, cargo area measurement and standardization as per SAE J1100
- Facilities for ergonomic evaluation and simulation of vehicles using
  - HPM-I for occupant packaging studies
  - Pressure mats, pedal force and gear shift force sensors
  - Software packages like CATIA integrated with RAMSIS
  - Full field 3-D scanner for vehicle digitization and digital benchmarking

## Dummy Certification & Renting

- Certification of Hybrid-III adult dummies, Eurosid-2, Eurosid-2re, SID-2s dummies, Q-family child dummies, WorldSID 50% tile dummy or simply - Certification of various types of Crash Test Dummies
- Calibration of all the sensors in the crash test dummies like Accelerometers, Load Cells, Potentiometers, IRTRACCs
- Renting out of dummies
- Training on dummy certification, assembly / dis-assembly and handling of dummies

## Onsite Testing - High Speed photography and Data Acquisition



- Professional high speed photography and multi-channel data acquisition services
- 2-D and 3-D image analysis from high speed photography and data analysis services using advanced software packages
- Onsite data acquisition & high speed photography projects executed for premier R & D organizations

