

# PASSIVE SAFETY LAB (PSL)







ICAT's Passive Safety Lab is dedicated to support automotive industry for their needs of Crash Testing (Regulatory as well as Developmental), Pedestrian Protection Testing, Sled Testing, Airbag Deployment Testing etc. The Passive Safety Lab has state of the art Test Facilities capable of conducting Crash Testing of vehicles as per Indian, International Regulations and NCAP's protocols.

Subsequent to notification of Crash Regulations in India w.e.f. 1st October 2017 (for new models), ICAT's Passive Safety Lab will play a crucial role to conduct Crash Testing for various OEMs. The lab has successfully completed Correlation activities with renowned OEMs. Therefore, this lab is capable of supporting OEMs for their Developmental Testing requirements also.

## CAPABILITIES

- ▲ Compliance and Verification of Occupant Protection
  - Full Frontal Crash
  - Offset Frontal Crash
  - Side Impact Crash
  - Rear Impact Crash
  - Side Pole Impact Crash
  - Post-Crash Fuel Leakage Evaluation
- ▲ Airbag ECU calibration/Validation Development Testing
- ▲ Pedestrian Protection Testing
- ▲ Seat Anchorage Strength Test
- ▲ Seat Belt Dynamic Strength Test
- ▲ Side Door Intrusion Strength test
- ▲ Door Latches & Hinges Test Pulse
- ▲ Body block test
- ▲ Airbag Deployment Testing
- ▲ Interior fitment evaluation & head form impact test
- ▲ Testing of Energy Dissipating Material & CRS installation
- ▲ Static Airbag Deployment Test with Environmental Conditions
- ▲ Proposed Bharat NCAP and other NCAP's Testing



## SPECIFIC CAPABILITIES

- ▲ Developmental Sled and Crash Test with multi-channel, multi-stage Airbag Firing.
- ▲ Sled Pulse Development as per Customer Requirement.
- ▲ Developmental Sled and Crash Test with different Dummies such as H-III 50th , 95th and 5th Female, Child, Side Impact Dummies etc.
- ▲ Out of Position Test (Airbag Deployment with Child Dummies).



# SPECIFICATIONS OF TEST EQUIPMENTS

ICAT commits to provide the customers with the best cutting-edge, high-precision sensor technology and Anthropomorphic Test Dummies (ATDs)

## CRASH FACILITY

### 🔗 Barriers

S. No.	Barrier	Specifications
1	Mobile Deformable Barrier Trolley	AIS : 099
2	Rear Impact Trolley	AIS : 101
3	Offset Deformable Barriers	AIS : 098
4	Mobile Deformable Barriers	AIS : 099
5	Pole Barrier and Side pole Trolley	Pole Dia : 254 mm

### 🔗 Data Acquisition System / Sensors

- ▲ Kistler Data Acquisition System: 32 channels \*9 units = 288 channels ( Analog )
- ▲ Kistler Digital Event Recorder: 16channels \*3 units = 48 digital events
- ▲ Airbag Timer with 12 firing programmable output
- ▲ 400+ Accelerometers up to 2000g capability
- ▲ Vehicle and Dummy Angular Velocity Sensors/Seat belt load cells/Pressure sensors
- ▲ 150+ Load Cells ( Crash test dummies )

### 🔗 Drive System

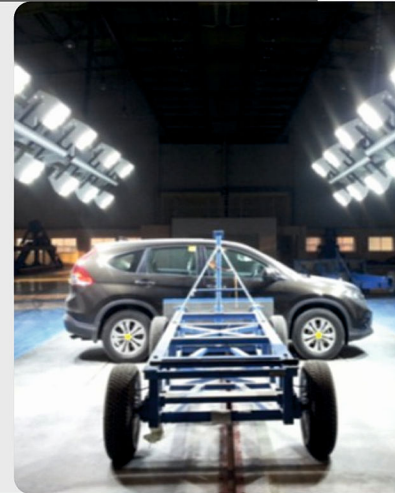
- ▲ 480 V AC variable frequency electric motor pulling, a continuous loop steel cable
- ▲ Impact Speed (Max): 85 km/h @ 3500 kg
- ▲ Speed Accuracy: + 0.25 km/h
- ▲ Track Length: 110m
- ▲ Acceleration Range: 0.1g to 0.5g

### 🔗 High Speed Cameras

- ▲ Off-Board Cameras: 14 Nos. (Min. 1280 X 800 resolution @ 1000 fps)
- ▲ On-Board Cameras: 6 Nos. (Min. 1280 X 800 resolution @ 1000 fps)

### 🔗 Underbody Camera Pits

- ▲ Deep photo pits (6m X 3m X 3m) for capturing under body view for frontal & side crashes



### 🔗 High Speed Lights

- ▲ KHS (8 KW @ 200%), 150,000 lux: 20 Nos (On-frame Movable Lights) & 8 Nos Off board lights
- ▲ On-Board Lights :- HMI Lights (0.25 KW): 4 Nos and LED (28,000 lumens): 4 Nos

### 🔗 Static Rollover

- ▲ Post-test fuel leakage Evaluation

### 🔗 3D Dummy Positioning System & 3D Coordinate Measurement Machine

- ▲ Used for Dummy positioning system inside the vehicle
- ▲ Pre and Post Test CMM for Deformation Measurement

## SLED FACILITY

### 🔗 Sled Trolley and Decelerator Unit Specification

S. No.	Parameter	Specifications
1	SLED SIZE	2m(w) x 3m(l) Large enough to accommodate large BIWs
2	PEAK FORCE	1000KN (225,000 lb)
3	STROKE	1.9m (74 in)
4	PEAK g	90g
5	MAXIMUM VELOCITY	85 kmph
6	MAXIMUM PAYLOAD	1200kg (2640 lbs)
7	MAXIMUM JERK RATE	3.0g/msec (rise) 2.0g/msec (decay)
8	Accuracy from predicted to acquired pulse	+3%



### High Speed Lights

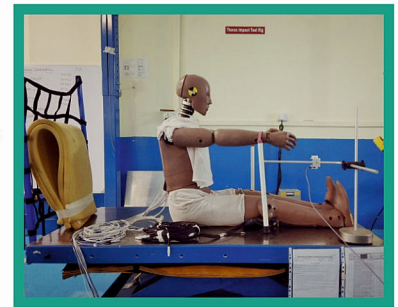
- ▲ KHS On-frame Movable Lights (8 KW @ 200%), 150,000 lux: 8 Nos
- ▲ On-Board Lights: - HMI Lights (0.25 KW): 4 Nos and LED (28,000 lumens): 4 Nos

### High Speed Cameras

- ▲ Off-Board Cameras: 3 Nos. (Min. 1280 X 800 resolution @ 1000 fps)

### Data Acquisition System

- ▲ Kistler Data Acquisition System: 32 channels \*3 units = 96 channels



## PEDESTRIAN PROTECTION TEST FACILITY

- ▲ Maximum Vehicle Dimension for Test:
  - Width: 2.8m, Height up to windscreen: 2.5m
  - Height up to front bonnet: 1.25m, Weight: 3500 kg
  - Including all M1 Category Vehicles & N1 Category derived from N1)
- ▲ Maximum Impact Speed: 54 km/h (40kmph is regulatory/NCAP test speed)
- ▲ Impactor Calibration Facility /3D Measurement equipment in built
- ▲ Impactors Available at lab-
  - Adult Head form WG17(4.8kg)/Adult Head form ISO(4.5kg)/Child Head form WG17/ISO(3.5kg)
  - Body Block /Guided Head form/ ECE R21 Pendulum



## STATIC AIRBAG DEPLOYMENT TEST FACILITY

- ▲ Dual Stage Capability
- ▲ 10 to 100 ms delay between two stages
- ▲ Temperature range: -40°C - 110°C
- ▲ Output Current and Voltage Range: 0.5A to 5A, upto 30 V
- ▲ Resistance Measurement/Programmable Squib Pulse
- ▲ Firing Accuracy: less than 1ms

## SIDE DOOR INTRUSION STRENGTH TESTING

- ▲ Capacity : 100 kN
- ▲ Maximum Actuator Stroke : 750 mm

## CRASH TEST DUMMIES WITH CALIBRATION LAB

FRONTAL IMPACT DUMMIES	SIDE IMPACT DUMMIES	REAR IMPACT DUMMY	CHILD DUMMY	R16 MANIKIN (SEAT BELT DYNAMIC TEST DUMMY)
▲ Hybrid III AM 50 - 4 Nos. ▲ Hybrid III AF 5 - 1 No. ▲ Hybrid III AM 95 - 1 No.	▲ ES II - 2 Nos. ▲ ES II-Re - 1 No. ▲ SID-IIs - 1 No.	▲ BioRID-II - 1 No	▲ Family Q: Q0, Q3/4, Q1.5, Q3, Q6, Q10 - 1 Set ▲ P3 - 1 No.	▲ ECE R16 Manikin - 5 No.

## KEY PROJECTS

- ▲ Correlation Crash activity with all major Indian and Overseas OEMs is completed
- ▲ Developmental Crash Testing as per Indian Regulation and NCAP Regulation for major OEMs
- ▲ Hybrid Vehicle Crash Test started
- ▲ Pedestrian testing done for export as Pedestrian Protection Testing Projects for Indian & export homologation
- ▲ Knee Impactor Fabrication and its development testing
- ▲ Seat belt DoE test using H-III Am50
- ▲ Developmental Dynamic Testing of Safety Belts

## STANDARDS/ REGULATIONS (NATIONAL AND INTERNATIONAL)

- ▲ Full Frontal Crash Test (IS 11939, AIS 96, ECE R12, FMVSS 208)
- ▲ 40% Offset Frontal Crash Test (AIS 98, ECE R94, Euro NCAP)
- ▲ Side Impact Test (AIS 99, ECE R95, FMVSS214, Euro NCAP)
- ▲ Side Pole Impact Test (FMVSS 214, Euro NCAP) / Rear Impact Test (AIS 101, ECE R32)
- ▲ Pedestrian Safety Test (AIS 100, ECE R78, EuroNCAP, GTR9)
- ▲ Dynamic Rollover Test (capability of expansion in current facility)
- ▲ Static Rollover Test (FMVSS 301) / Whiplash Test (Euro NCAP)
- ▲ Child Restraint System Test (AIS :072, ECE R44) /Seat and Seat Anchorage Test (AIS 23, ECE R17)



## COMPLIANCE/ LAB ACCREDITATION

- ▲ MoRTH Notification S.O. 1139 (E)
- ▲ VCA UK Accreditation
- ▲ ISO17025/ NABL Accreditation



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