



Vehicle Crash Lab (VCL)



Frontal Impact Test



Seat Strength (H1-H2) Test



Rollover Protective Structure (ROPS) Test



Falling Object Protective Structure (FOPS) Test

Vehicle Crash Lab (VCL)

- Vehicle crash laboratory is equipped with state-of-art facilities for undertaking structural strength of trucks, buses, construction & mining equipments, agricultural tractor as per various national and international standards.
- CIRT has established VCL lab with R&D Cess funds provided by the DHI.
- VCL has issued several Type Approval Test Reports & Development Test Reports to almost all the reputed Vehicle manufacturers across India.
- VCL has achieved new milestone by establishing Virtual Simulation Lab (FEA Lab) in CIRT
- VSL Lab utilises recent advances in computational technology for the purpose of analysing, studying, and testing the full vehicle as well engineering components, assemblies, and structures.

Main tests which can be performed,

1. Rollover Protective Structure (ROPS) of Agricultural & Forestry Tractors, Construction Equipment Vehicles (CEV) & Mining Equipment



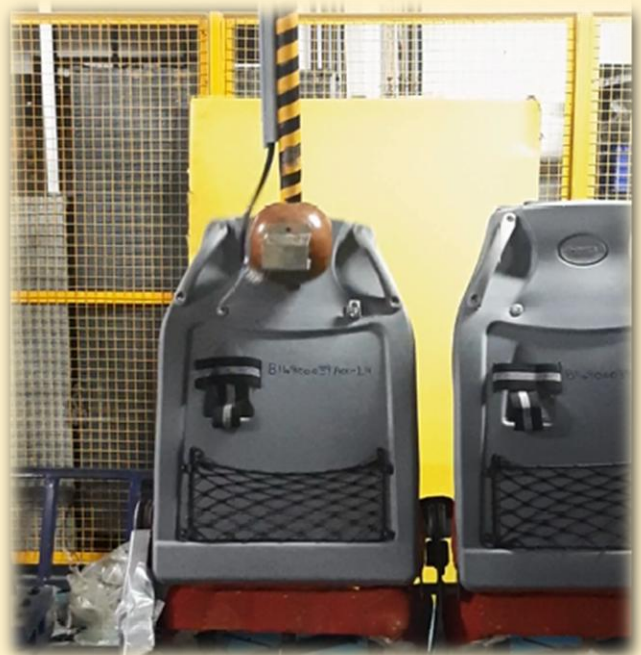
2. Falling Object Protective Structure (FOPS) Testing of Construction & Mining Equipment Vehicle (CEV) & Tractors

3. Frontal Impact, Roof Strength & Rear Wall Strength Test of Cabin of Commercial Vehicle (Truck)



4. Rollover (Strength of Superstructure) & Stability Test of Passenger Bus, Tractors, Industrial Equipment, Etc.

5. Bus Passenger Seat, Driver & Co-driver Seat, SBS/HRP, Seat Anchorage Test



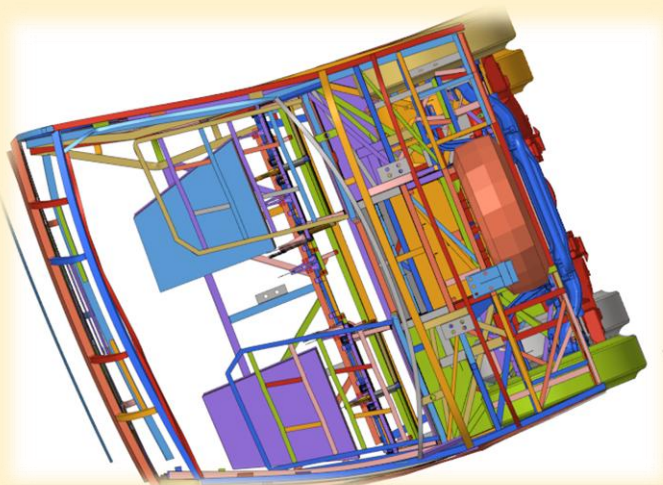


6. Water Proofing/Rain/Shower Test of Automotive Vehicles & Utility Vehicles or Systems

7. Cold Start ability of Engine, Wiping Test System, Demist/Defrost Humid Soak/Corrosion Testing, Climate Ageing Test



8. Computer Aided Engineering (CAE) or Finite Element Analysis (FEA) of Bus Rollover, Stability, Lateral Protection (Side Guards), Natural Frequency, UBS-II, Frontal Impact, Rear Wall Strength, Roof Strength of Truck Cabin, Load body Strength, Fatigue Analysis of Propeller Shaft and R&D component level testing



KEY TEST FACILITIES UNDER THE ROOF OF VEHICLE CRASH LAB (VCL)



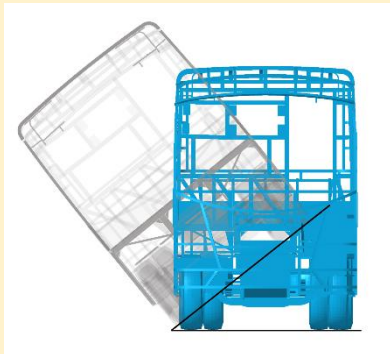
Sr. No	Test Item	Relevant Specification	Test Facility	Test Parameter and Range
1	Rollover Protective Structure (ROPS) of agricultural Tractors, Forestry Tractors and Cabin of Construction Equipment vehicle (CEV)	IS-11821 (Part 2):2012, EU-1322/2014, OECD Code-4/6/7, ISO-3471:2008, OSHA Standard 1928 Subpart C	Rear Wall & Roof Strength Test Rig	Force-0 to 250 kN, Stroke-500 mm
2	Falling Object Protective Structures (FOPS) of Construction Equipment Vehicle (CEV), Agricultural or Forestry Tractor	ISO-3449, OECD Code-10	Level I & II Impact object	Level I Impact Object-46.66 kg, Level II Impact Object-234.50 kg
3	Cab of Truck/ Commercial Vehicle	AIS-029	Frontal Impact Test Rig, Roof Strength Test Rig, Rear Wall Strength Test Rig	0-6000 kgfm
4	Strength of Super Structure of Bus (Roll Over Test) , Stability Test of Bus, Tractors, Industrial Machines etc, Center of Gravity (CoG) Measurement of Bus	AIS-031, AIS-052 and national/ international Standards	Rollover/ Tilt Platform	Lift Angle-Max. 60 Degrees Length-15m, Load Bearing capacity-25T
5	Bus Passenger Seat and Seat Anchorage	AIS-023:2005	Seat Strength (H1-H2) test Rig	H1 Actuator: Load-5kN, Stroke-600mm H2 Actuator: Load-15 kN, Stroke-600 mm
6	Water Proofing test /Rain Test/Shower Test Automotive Vehicles, Electrical or electronic Components	IS-11685, Military Standard MIL Std.810 F	Water Proofing test Facility	Type of Nozzles: Full cone solid spray having spray angle of 60 deg. Flow rate of Nozzle: 15 ± 0.5 LPM. Max. Pressure-3 bar
7	Environmental Testing of Automotive Vehicles, Electrical or Electronic Components	National/ International Regulations	Walk in chamber (Length-7m xWidth-3.5m X Height-3.5m)	Temperature: -15 ° C to 100 ° C, Relative Humidity-upto 95%
8	Finite Element Analyses of all the Tests for Buses/Trucks like Roll Over Test/Stability Test Natural Frequency, UBS-II, Rear Wall & Roof Strength Test , Truck Load Body Strength of etc.	AIS-031, AIS-052, AIS-029, MOUD UBS-II, AIS:093 & Other National/ International Regulations	Virtual Simulation Lab (VSL)	CAD- SolidWorks, Altair HyperWorks, LS-Dyna

TESTING EQUIPMENT DETAILS OF VEHICLE CRASH LAB (VCL)

Testing Machine/Rig Name	Machine Specification	Pictorial Details
Frontal Impact Test Rig	<ul style="list-style-type: none"> i. IMPACT ENERGY RANGE: 0 TO 6000 kgfm ii. Impact resistance of commercial vehicle iii. Evaluation of Survival Space for the protection of Occupant in the event of frontal collision iv. Relevant Standard/Specification – AIS:029 & ECE R29 	 <p>A photograph of a large industrial testing rig in a warehouse. It features a blue steel frame with a yellow horizontal beam and a yellow impactor suspended from it. The rig is designed for frontal impact tests on vehicles.</p>
Rear Wall Strength Test Rig	<ul style="list-style-type: none"> i. FORCE/LOAD RANGE: 0 TO 250 KN (0 TO 25000 Kgs) Displacement Range : 0 to 500 mm ii. Evaluation of strength of Rear Walls of cab of commercial vehicles by simulation load moment to establish the compliance of vehicle as per AIS 029 & ECE R 029 Rear Walls Strength Test as per AIS:029 and ECE R 29. iii. Testing of Rollover Protective Structure (ROPS) of Agricultural & Forestry Tractors as per IS:11821 (Part-2):2018, EU-13221 2014, OECD Code-4/6/7 iv. Testing of ROPS of Construction Equipment Vehicle (CEV) as per ISO-3471:2018 	 <p>A photograph of a testing rig for rear wall strength. It shows a blue steel frame with a yellow impactor and a red base. A vehicle's rear wall is being tested against the impactor. The rig is used to simulate load moments on the rear walls of commercial vehicles.</p>
Roof Strength Test Rig	<ul style="list-style-type: none"> i. FORCE/LOAD RANGE: 0 TO 250 KN (0 TO 25000 Kgs) ii. Displacement Range: 0 to 500 mm iii. Evaluation of Roof Strength of Cabin of Commercial Vehicle As per AIS-029 or ECE R 29 for availment of Survival Space for the protection of occupants in the event of Rollover iv. Evaluation of roof strength of Cabins, ROPS of Agricultural Forestry Tractors 	 <p>A photograph of a testing rig for roof strength. It features a blue steel frame with a yellow horizontal beam and a yellow impactor suspended from it. The rig is used to evaluate the roof strength of commercial vehicle cabins and ROPS of agricultural forestry tractors.</p>

TESTING EQUIPMENT DETAILS OF VEHICLE CRASH LAB (VCL)

Testing Machine/Rig Name	Machine Specification	Pictorial Details
Roll Over Test Rig	<ul style="list-style-type: none"> i. Hydraulic operated tilting platform to control the tilting precisely by 1 degree with a capacity of tilting from to 60° ii. Length - 15 meter, Width - 4 meter iii. Load carrying capacity of tilting platform - 25 Tons iv. Standard- AIS:031, AIS:119, AIS:052, ECE R66 	
Seat Strength (H1-H2) Test	<ul style="list-style-type: none"> i. Evaluation of passenger bus seats (1 seater, 2 seater, 3 seater etc.), school bus seats as per AIS-023:2004 ii. Evaluation of seat strength 	
Walk In Chamber (Climatic Chamber)	<ul style="list-style-type: none"> i. Size of chamber: 7 Metres Long X 3.5 Metres Wide X 3.5 Metres Height ii. Capacity/Range: Temperature: -20 to +100 degree centigrade iii. Humidity: 30% to 95% iv. Weight: Upto 5000 Kgs. v. Evaluation of performance of automobile vehicles, components or systems for cold-start ability, head ageing, demist or defogging test 	
Water Proofing Test Facility	<ul style="list-style-type: none"> i. Size of the Rain area: Length- 14 m X Width Adjustable from 3m to 5mXHeight 5m. ii. Distance between Nozzles:400 mm iii. Total No. of Nozzles:1296 iv. Evaluation of performance of automotive vehicles to check leakage/ wetness as per IS:11865 or MIL Std 810F or military equipment/ systems 	

Energy Dissipation Test (EDP) Rig	i. Size - Length 2100mm x Width 2065mm x Height 5200mm ii. Pendulum weight - 6 kg iii. Evaluation of Seats & their head restraints for energy dissipation test (EDP) in the event of head collision as per AIS-023, IS:15546	
Seat Back Strength (SBS)/Head Restraint Performance (HRP) Test	i. Size - 2100mm x 2065mm x 5200mm ii. Servo Electric Actuators iii. Stroke Length: 700 mm and 400 mm iv. 2.5 KN for 700 mm Stroke Length & 5.0 KN for 400 mm Stroke Length v. Accuracy: 0.1 mm vi. Std- AIS-023, IS-15546 (AIS-016) & ECE R 17	
Finite Element Analysis Lab Tests	Rollover, Stability, Lateral Protection (Side Guards), Natural Frequency, UBS-II, Frontal Impact, Rear Wall Strength, Roof Strength of Truck Cabin, Load body Strength, Fatigue Analysis of Propeller Shaft and R&D component level testing	

Upcoming Facilities

AIS-153 (Noise & Vibration Test) Facility

Seat Belt Anchorage (SBA) Test



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