Innovation • Service • Excellence

FATIGUE TEST LAB (FTL)

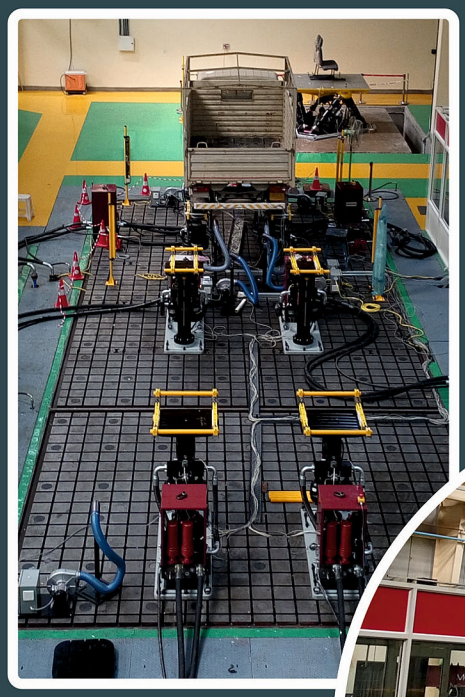
INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

Fatigue Test Lab at ICAT is modern, state-of-the-art testing facility supporting automakers and suppliers for development and validation of various Structural Components, Sub-assemblies and vehicles. To ascertain the life of the product, lab is having expertise in the collection of road load data as per real world usage pattern, designing test specifications for accelerated duty cycle and execution of tests for customer correlation.

CAPABILITIES

In order to ascertain the life of the product, below are the capabilities of Fatigue Lab:

- Durability and Integrity assessment of vehicles, systems and subsystems under various driving and environmental conditions using linear & rotary servo-hydraulic actuators and environmental chambers
- Fatigue testing of engine parts using resonance fatigue pulsator
- Road load data acquisition like strain, displacement, acceleration, force and torque etc. and its analysis using N-Code-Glyph Works software
- 4 Poster for bringing road inputs to lab
- Multi-Axis Simulation Tables with 6-DoF under various temperature and humidity conditions
- BSR test system designed to test automotive chassis, Body in White and assembly modules
- Vibration shakers with environmental chambers
- Flywheel burst testing
- Residual stress measurement
- In house fixture designing capabilities
- HVAC Performance evaluation under various temperature and humidity conditions
- 'Gesa L1-certified' 2-experts in strain gauging activity



SPECIFICATIONS OF TEST EQUIPMENTS

A UNIVERSAL TEST BENCHES:

Linear Servo-Hydraulic Actuators

- Linear Servo Hydraulic Actuators with a capacity up to 750kN testing loads and a stroke of up to 320 mm.

Electrical Actuator:

- The Linear Electrical Actuator with a stroke of up to 300 mm.

Servo Hydraulic Rotary Actuator:

- The Rotary Servo Hydraulic Actuators is utilized for performing Rotary Tests. It has a capacity of Torque up to ± 10 kNm with Angular displacement of ± 60° with torque cells of ± 10 kNm & ± 500 Nm.

B MAST – MULTI AXIS SIMULATION TABLE:

MAST for Component (100Hz) with Climatic Chamber

MAST for Component is available with 2 m * 2.2 m table size for working 100 Hz with 600 kg payload. The MAST is a modern, state-of-the-art, 6- DoF vibration test facility with Climatic Chamber from -40˚ C to 80˚C with 95% RH..

HF MAST (200Hz) with Climatic Chamber

High Frequency Multi Axis Simulation Table is available with 2 m * 2.3 m table size for working upto 200 Hz for 6- DoF vibration simulation & BSR testing.

Climatic Chamber with Solar Simulation

Climatic chamber with Solar Simulation is designed to test automotive components, Body in White and aggregate assembly modules in controlled climate to simulate real world climatic conditions. Climatic Chamber is available with size of 8m * 6m * 5 m. The temperature range is from -40˚ C to 80˚C with 95% RH. Solar Simulation is also available with variable Intensity up to 1200 W/m^2 and Temperature from 0˚C to 70˚C.

C X-POSTER:

X-Poster is a structural durability test system for 2W, 3W, Passenger cars & Heavy Commercial Vehicles. The system is designed to accelerate the durability test with strong correlation with real world usage pattern. This help in reduction of product development timelines. There are two types of X-Poster systems:-

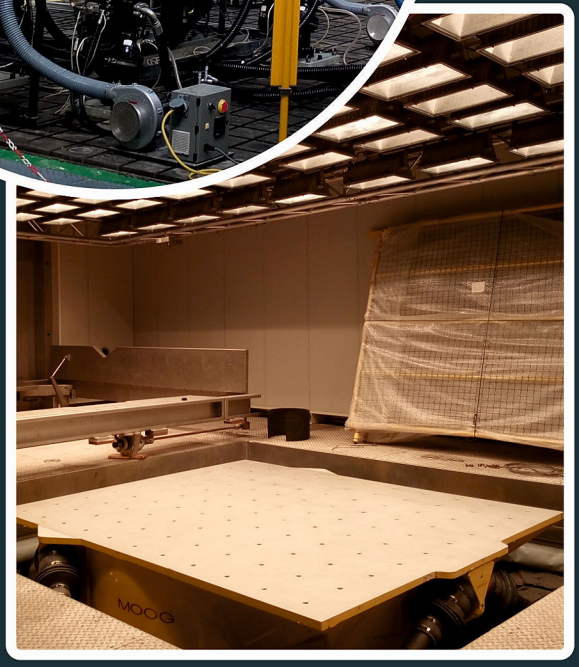
- **Passenger Car 4-Poster (3.5 tons)**
- **Heavy Duty 4-Poster (17 tons)**

D VIBRATION TEST FACILITY (6 T) WITH ENVIRONMENTAL CHAMBERS

The Vibration test facility with environmental chambers is designed for various structural durability tests of various Components and Subassemblies for Resonance detection, Random Vibrations and Durability testing. The Electrodynamics Shakersare having capacity up to 6000kgf integrated with Climatic Chamber from -60˚ C to 180˚C with 95% RH.

E ROAD LOAD DATA ACQUISITION AND SIMULATION

At ICAT we have experienced team specialise in all aspects of vehicle instrumentation, Road Load data collection, data analysis, Durability Analysis, Customer Data Analysis, Data Verification and Failure Analysis . Typical facility includes:



- High Speed Data Acquisition for 120+ synchronous channels
- Vehicle / Component level Duty Cycle measurement sensors & systems
- Sensors like Pressure, Thermocouples, Flow meter etc
- Sensors like Accelerometers, LVDT, String Pots, microphones etc
- Wheel Force Transducers (WFT)
- Strain Gauging & measurements
- Telemetry Systems for Wireless Data
- Rain flow cycle counting
- Fatigue Life & Damage Estimation
- Customer Correlation
- Ride Comfort analysis
- Duty Cycle Analysis
- Block Cycle Creation
- Failure & durability analysis
- Route mapping w.r.t duty cycle
- 2D Road Profile Database

STANDARDS/ REGULATIONS (NATIONAL AND INTERNATIONAL)

- ROPS testing as per IS/ISO 3471 : 2008 & FOPS testing as per IS/ISO 3449 : 2005
- RUPD as per IS 14812 : 2005 & SUPD as per IS 14682 : 2004
- 4-Poster as per IS 15901: 2010 for bumper fitment evaluation

SPECIFIC CAPABILITIES

- Fatigue/Endurance testing of Automotive & Non-Automotive Parts
- Vehicle level & Aggregate level test specifications development for Fatigue
- Generation of S-N Curve with Load based durability testing
- RLDA and Strain gauging services with Field failure analysis
- Ride -Comfort analysis and tuning
- Customer usage profile mapping & power train durability analysis
- Fatigue and Damage correlation with proving grounds

KEY PROJECTS

A Validation/Evaluation of:

- Linkages and other structural parts of Tractor & CEV
- Passenger & Agriculture Seats
- Compressor/Engine Mounting Bracket/ Door Hinges
- Brake Pedals/Clutch Pedal Evaluation
- BiW – Validation for Torsional& Bending Stiffness, Denting & Buckling
- Axle Durability testing for Fatigue Failure
- Bi-Axial Durability (Rotary & Linear) of Suspension Bushes by block programming
- Flywheel Burst Testing (> 100 Nos)
- Gear Tooth Bending Fatigue Test as per SAE standards
- Fuel Tank Slosh Tests
- Structural Evaluation of ROPS & FOPS
- Structural Evaluation of RUPD & SUPD
- Door Slam Testing

B Vibration Evaluation of:

- Chassis Mounted components like Dash Board/Bumper/Fuel Tank/Damper etc.
- Test samples for Indian Railways/Metros, Indian Navy & DRDO
- Road Load Data Acquisition and Simulation of Engine Mount Acceleration on MAST
- Validation of Engine Hood/Instrument Panel on MAST

C Heating, Ventilation & Air Condition (HVAC) Performance Evaluation with environmental conditions

LAB ACCREDITATION UNDER NABL

- Endurance testing of Leaf Spring assemblies for Automobiles as per IS 1135:1995
- 4-Poster as per IS 15901: 2010 for bumper fitment evaluation
- Vibration testing as JIS 1601 on ED Shaker and MAST.

BENCHMARKING CORRELATION INFORMATION

- BiW – Benchmarking for Torsional & Bending Stiffness, Denting & Buckling
- Correlation of Field Strain Data of Engine mounts on MAST & Chassis mounted components on 2/4-Poster

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