

Test Facilities available at Structural Dynamics Lab of ARAI for design/development of Axle and related components to meet the recent notification about safe axle weight for commercial vehicle

Structural Dynamics Lab (SDL) of ARAI is one of the R&D facility in the field of structural validation of components to vehicle under one roof. For last two decades, SDL is providing Engineering & Testing services to automotive industry and playing major role in in reducing the overall product development cycle by its innovative approach of accelerated testing. FMCE, Chakan is extension of SDL and having advance facilities. Both the labs are equipped with Servo-Hydraulic testing facilities and offering variety of testing solution from single axis to multi-axis environment.

Considering new government notification for increased safe axle weight, validation of axle & suspension system of commercial vehicle to the new load limit is become the critical part for OEM & suppliers. SDL being this field for last several years has developed various method to carry out the fatigue/durability test. Test facilities at SDL & FMCE can be utilized to carry out the testing in Single axis, bi-axial as well as in multi-axis using standard sinusoidal input or by acquired field data by simulation technique.



Data base available with SDL can be used to finalise the test specification in terms of load, direction & number of cycles for axle, suspension, chassis frame & related components immediately. Both the labs (SDL & FMCE) of ARAI are running 24 X 6 with multiple facilities can help customer in completing the durability in minimum time.

For validation of new design of axles, suspension etc against the customer usage duty cycle, SDL is having state-of-the-art instrumentation such as Wheel Force Transducers (WFT) from 12" to 22.5" wheel rim size and sensors such as Accelerometers, strain gauges, displacement sensors etc. Service Load Data Acquisition using required parameters can be carried out on torture track, public roads, mine site etc to get actual service loads. Extensive analysis of the data can then be carried out in terms of statistical, spectral, fatigue parameters by various techniques to arrive at the understanding of pattern and to figure out the test specification.



To summarize, SDL ARAI is having required test facilities & competencies to meet the need of commercial vehicle segment OEM's and suppliers in measurement & accelerated validation of the required components / vehicle under one roof. Below are the services, customer can obtain from SDL & FMCE:

- Instrumentation & Service Load Data Acquisition of commercial vehicle using range of Wheel Force Transducer (WFT) & traditional sensors
- Road profile data base & measurement
- Analysis of the data to validate & understand the actual field levels and to finalise the test specification for component level durability testing
- Front, Rear, Tag, Tandem Axle durability Test
 - In pure Vertical, Lateral or longitudinal direction
 - combination such as Vertical + Lateral, Vertical + Braking etc
- Testing of axle suspension brackets
- Leaf spring, bump stopper testing
- Rotary fatigue test with reversible torque for components such as axle shaft, drive shaft, propeller shaft etc
- Damper performance & durability test in ambient as well as controlled environment condition
- Durability testing of steering components

- Suspension link (V-link, radius rod, ARB) durability test
- Trunnion support bracket durability test
- Air suspension durability test in multi-axial environment using simulation technique
- Full Frame Fatigue test of chassis frame

