



## Structural dynamics laboratory for rail vehicles

Structural testing is a critical aspect of vehicle design and improvement. A proven design is the cornerstone of a reliable product and a satisfied client. Failure to ensure reliability could lead to expensive maintenance, warranty claims, safety issues, liability concerns or worse.

The National Research Council of Canada's Structural Dynamics Laboratory for Rail Vehicles offers the ability to replicate in-service track environments under controlled, repeatable laboratory settings. Product wear is accelerated within a reduced time frame to enable the identification of design flaws and potential problems before committing to mass production.

The facility is capable of exciting rail vehicles using up to 6 programmable actuators, and is equipped to ensure that field measurements of vehicle responses can be accurately duplicated in the laboratory. Controlled

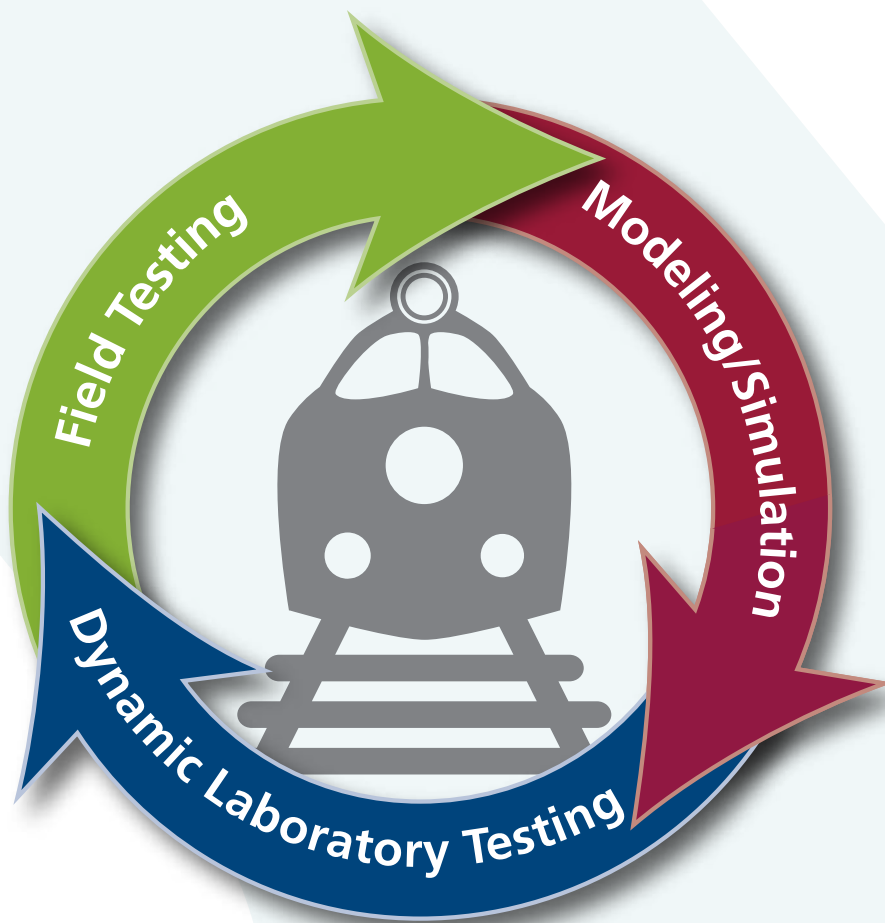
investigations and accelerated product life test programs can be conducted for a variety of products, from small-scale individual product components to full size rail cars.

### Features

- › 6 programmable MTS electro-hydraulic actuators and controllers;
- › Maximum load per actuator: +/- 156KN (35,000 lbf);
- › Actuator stroke: 155 mm;
- › Max actuator velocity: 700 mm/s;
- › Maximum Frequency: 225 Hz;

- › Precise field-measurement data to replicate actual accelerations/displacements.





### Applications and benefits

- › Test product life and wear limits in days or weeks instead of years to facilitate problem diagnosis;
- › Identify and measure design limitations and accelerate corrective development;
- › Test multiple product design alternatives simultaneously under identical controlled conditions;
- › Replicate actual track conditions under repeatable laboratory settings;
- › Obtain critical data input to vehicle dynamics models.

### Closed-loop engineering

The NRC closed-loop engineering process combines the collection of over-the-road rail vehicle response data with design, modeling, simulation and laboratory dynamics testing to facilitate problem diagnosis, accelerate corrective development and verify design improvements before committing to production.

Vehicle dynamics testing is an important part of the closed-loop process. When testing vehicle or component design, over-the-road vehicle response data is invaluable, however the rail environment can pose limitations in the amount and type of instrumentation that can be used to collect this information.

Using a greater amount of instrumentation on the vehicle than an in-service rail environment permits, the NRC Structural Dynamics Laboratory offers a much more detailed picture of the forces that act on vehicle components, and the resulting reaction, than is possible when only testing in the field. Field data input can then be multiplied or increased in severity to promote accelerated product life/ fatigue in a compressed timeframe.

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