NRC·CNRC

Rail Vehicle Impact Facility

Whether in the yard or along the line, rail vehicles are subject to massive strains and impacts every day. Forces can measure in the hundreds of thousands of pounds. Testing of vehicles, lading and containment systems is essential to ensure they can withstand the stresses of rail transportation and avoid cargo damage. NRC offers a fully instrumented rail vehicle impact ramp to test, certify, and improve performance of rail vehicles, lading and containment systems.

This facility consists of a 30m (100') incline ramp with a tow-cable, and 350ft of tangent track. The test vehicle is pulled up the incline to a height that will enable the car to reach the predetermined speed at impact. The test vehicle is released and collides with a consist of stationary anvil cars.

Features

- Accredited by Association of American Railways (AAR) for certification of rolling stock and prototypes;
- Reproduces impacts for a variety of certification specifications;
- Unique in Canada;
- Controlled conditions ensure repeatable, accurate impact testing
- 6 programmable MTS electro-hydraulic actuators and controllers;
- Precise field-measured data to replicate actual accelerations, displacements.

Specifications

- Maximum test car speed: >16mph (25km/h)
- Maximum deceleration: > 4G
- Maximum anvil car consist weight: > 1.4 Million lb (635,000Kg)

Applications and benefits

- Assures compliance with AAR, Transport Canada, American Bureau of Shipping, Bureau Veritas and MIL-STD standards;
- Tests lading containment devices and load securement devices;
- Verifies design specifications;
- Capable of performing dynamic (rolling) squeeze tests;
- Obtain critical data input to vehicle dynamics models.

Some recent uses

- Impact and dynamic squeeze tests of freight cars for a variety of railways and railway car manufacturers;
- Impact tests of ISO tank containers for a variety of manufacturers;
- Impact tests of military cargo and containment systems;
- Certification testing of multimodal container cars and tri-level automobile carriers;
- Used with Finite Element Analysis modeling and multi-body dynamics programs for mapping of dynamic peak load stress in railway tank cars.

Instrumentation and data acquisition

- Up to 512 channel data logging system; simultaneously sampled data
- In-house expertise in strain gauge application;
- Transducers available include accelerometers, precision velocity sensors, dynamometer couplers, load cells, displacement and pressure sensors, strain measurement;
- HD and high speed video recording plus real-time webcam transmission available for out of town clients/ stakeholders. Technology evaluation and integration

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NR16-168/2017E
ISBN 978-0-660-23814-2 PRINT
ISBN 978-0-660-23813-5 PDF

November 2017
Également disponible en français