**INTRODUCTION**

The Track and Bed Fatigue Test System is used to simulate and study the rail-bed interaction as a result of dynamic loads coming from multiple train passes. The degradation of the rail, sleepers and the ballast system can be simulated and analyzed in a controlled laboratory environment, utilizing MTS’ RPC software, allowing researchers to reproduce realistic environmental conditions.

**SYSTEM OVERVIEW**

This is an entry level system with two actuators attached to the rail on both sides of the tie, with the ability to independently control both vertical loads. A more sophisticated system with multiple actuators attached to the track, can reproduce desired loading conditions from the train. For more realistic conditions, it is critical to synchronize the loads applied to each part of the track.

The larger system has the option to come with multiple vertical actuators (half for each side) delivering loads to every 3 meters. Furthermore, lateral actuators can be added to the system to satisfy more demanding requirements. The loading frame, with attached actuators, can be moved to different parts of a 20-meter long track/bed to repeat the test.
KOREA RAILROAD RESEARCH INSTITUTE

In 2008, MTS collaborated with the Korea Railroad Research Institute (KRRI) to provide 24 structural actuators along with hydraulic pumps, hydraulic distribution, controllers, software, and two moveable portal-style load frames*. The final product was a solution for testing the dynamic behavior of railroad structures.

MTS also provided a standard 4-column uniaxial load frame with accessories. The system is well suited for rail joint fatigue testing and bending fatigue of sleeper ties.

ADJUSTABLE LOAD FRAME

- Adjustable height frame – upper part of frame can be adjusted +/- 500 mm independently
- 6 mL X 2 mW X 4.5 mH (rough approximation)
- Loading frame can be adjusted in the longitudinal direction via a hydraulic pressure system

*Note: This adjustable load was custom designed for KRRI and provided locally. MTS did not construct the final frame product

KRRI ACTUATOR PACKAGE

<table>
<thead>
<tr>
<th>MTS Model Number</th>
<th>Dynamic Force Rating</th>
<th>Stroke Length</th>
<th>Servovalve Capacity</th>
<th>Quantity Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>244.31</td>
<td>250 kN</td>
<td>250 mm</td>
<td>340 lpm</td>
<td>+/-75 mm</td>
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<tr>
<td>244.31</td>
<td>250 kN</td>
<td>250 mm</td>
<td>Dual 945 lpm</td>
<td>400 mm/s</td>
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<tr>
<td>244.31</td>
<td>250 kN</td>
<td>750 mm</td>
<td>340 lpm</td>
<td>6 g</td>
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<tr>
<td>244.41</td>
<td>500 kN</td>
<td>250 mm</td>
<td>340 lpm</td>
<td>30 Hz</td>
</tr>
</tbody>
</table>

MTS MODEL 322 LOAD FRAME

- ± 500 kN dynamic load rating
- Self-reacting, self-supporting frame design
- 1 m by 2 m t-slot base for large samples
- Interchangeable accessories including hydraulic grips, bending fixtures, and compression platens allow for a multitude of test applications
- Optional environmental chamber also available

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