Full Car and Bogie Performance Test Rig

The Full Car and Bogie Performance Test Rig is a unique tool which mainly consists of four 6 DOF excitation tables and a car simulator for rail car and bogie manufacturers to study:

- Static and dynamic stiffness and damping of the primary suspension
- Static and dynamic stiffness and damping of the secondary suspension
- Bogie steer resistance moment measurement
- Car inclination suspension coefficient measurement
- Curve track suspension coefficient measurement
- Overturning coefficient of the rail vehicle measurement
- Bogie and/or car center gravity measurement
- Bogie and/or car moment of inertia measurement
- Full car excitation
- Natural frequency
- Ride comfort
- Transmissibility
- Time history reproduction
- Integration with digital simulation and modeling

**SYSTEM TABLE PERFORMANCE**

<table>
<thead>
<tr>
<th>Direction</th>
<th>Table Force Capacity</th>
<th>Table Displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical</td>
<td>800 kN</td>
<td>+/- 100 mm</td>
</tr>
<tr>
<td>Lateral</td>
<td>400 kN</td>
<td>+/- 114 mm</td>
</tr>
<tr>
<td>Longitudinal</td>
<td>400 kN</td>
<td>+/- 85 mm</td>
</tr>
<tr>
<td>Pitch single table</td>
<td>600 kN-m</td>
<td>+/- 5.7 deg</td>
</tr>
<tr>
<td>Net pitch dual tables 1700 mm</td>
<td>2040 kN-m</td>
<td>+/- 5.7 deg</td>
</tr>
<tr>
<td>Net pitch dual tables 3000 mm</td>
<td>3600 kN-m</td>
<td>+/- 3.0 deg</td>
</tr>
<tr>
<td>Roll</td>
<td>360 kN-m</td>
<td>+/- 8 deg</td>
</tr>
<tr>
<td>Yaw single table</td>
<td>400 kN-m</td>
<td>+/- 8 deg</td>
</tr>
<tr>
<td>Net yaw dual tables 1700 mm</td>
<td>510 kN-m</td>
<td>+/- 6.5 deg</td>
</tr>
<tr>
<td>Net yaw dual tables 3000 mm</td>
<td>900 kN-m</td>
<td>+/- 5.0 deg</td>
</tr>
</tbody>
</table>

Table acceleration capability:

- 2 ton total payload on table:
  - Vertical: 10 g
  - Horizontal: 5 g
- 33 ton payload on table:
  - Vertical: 1.7 g

Table velocity capability:

- Vertical: 750 mm/s
- Lateral: 400 mm/s
- Longitudinal: 750 mm/s
**SIX DEGREE-OF FREEDOM EXCITATION TABLE**

For each bogie, there are two axle wheel-set 6 DOF excitation tables with six DOF load cells mounted in line with wheel platform.

The specification of the 6 DOF load cell:
- Vertical (Fz): 460 kN
- Lateral (Fy): 230 kN
- Longitudinal (Fx): 230 kN
- Roll (Mx): 66.4 kN-m
- Pitch (My): 194 kN-m
- Yaw (Mz): 66.4 kN

**ACTIVE REACTION FRAME (RAIL CAR SIMULATOR)**

The four DOF active loading frame simulates car body motion and load to the bogie, or it can be used as a fixed reaction for primary and secondary suspension tests.