

Safely to the destination – POWER SWING ahead: Railway rails on the test system!

SincoTec defines new standards in rail testing

Railway tracks are central elements of the worldwide rail network – daily exposed to extreme loads from fluctuating temperatures, axle loads and vibrations. To guarantee the safety and durability of these components, they must be tested under realistic conditions. Until now, test engineers have mostly relied on servo-hydraulic systems – reliable but very energy-intensive and costly.

At SincoTec, our resonance test machine **POWER SWING MOT** is used to test rails and rail connections for fatigue – faster, markedly more energy-efficient and more economical than previous methods.

From hydraulics to resonance – a technology leap

Traditionally, rail testing was carried out with hydraulic test systems. These test systems achieve test frequencies of only 5 – 10 Hz for rail testing and additionally require energy-hungry cooling systems. Servo-hydraulic test systems therefore consume more than 100 times the energy cost.

The **POWER SWING MOT**, on the contrary, follows a fundamentally different approach: an electric motor-driven resonance drive excites the test specimen, exploiting the natural resonance point of the construction. This allows considerably higher frequencies for this test – roughly 40 – 55 Hz depending on support spacing – while drastically reducing energy consumption.

Precision meets efficiency

The combination of high stroke and precise control enables the **POWER SWING MOT** to perform both 3-point and 4-point bending tests. This makes it possible to simulate realistic loading scenarios – from the rail itself to welded or bolted connections.

In the field of fatigue strength, the system shows its greatest strengths: the resonance testing technique allows high-frequency tests with minimal infrastructure requirements. Compared with servo-hydraulics, this saves not only energy but also significantly reduces maintenance effort and consequently downtime.

Cost-effectiveness with a short payback period

Another advantage: an investment in a **POWER SWING MOT** usually recoups its costs within just 1.5 – 2 years – measured against the ongoing testing costs of conventional hydraulic systems. In addition to lower operating costs, the higher test frequency contributes to cost reduction: more tests in less time mean faster development cycles and optimized utilisation of testing capacity.

Thus, SincoTec positions itself as a partner for companies that want to make their quality assurance and research more efficient.

Broad application spectrum – from quality assurance to research

The **POWER SWING MOT** is suitable for a wide range of applications:

1. **Quality assurance** – e.g., serial testing of rails and joining elements to detect manufacturing defects early.
2. **Development testing** – for trialing new materials, profile shapes or joining techniques under cyclic loading.
3. **Research** – especially concerning welding technologies, manufacturing processes or the fatigue strength of rail components under real environmental conditions.

Thanks to its modularity, the universal test system can be adapted to different testing requirements. This makes it attractive for rail operators, suppliers, research institutions and universities alike. Tension/compression, bending, torsion – everything is possible.

Whether for research, development or serial production – the resonance drive not only moves components but also drives the testing standards themselves forward.



Figures: 4-point bending test on rails with a **POWER SWING MOT** evolution 600 kN