



TEST BENCHES



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RAILWAYS

Simpro has designed and erected an industrial complex: the **Osmannoro Centre for Experimental Dynamics**, intended for research activities and tests on rolling stock in order to get the relevant **certification** and **type approval**, within the Osmannoro Technological Pole (Florence). A cutting-edge plant, unique in Europe, of the greatest importance for the Italian research in the railway sector, whose project also involved many Italian universities.

The plan has been erected in an area of about **55,000 m²**, and consists of four specific buildings where test benches are subdivided by thematic areas: Mechanical and Electrical Tests (PME); Electromagnetic Compatibility Tests erected around a roller test bench for locomotives (EMC); Subsidiary Building; Power Supply Unit Building.

Main features:

- Certification tests according to the UIC and EN European Standards;
- Possibility of performing mechanical, pneumatic, electrical and EMC tests;
- Tests on components, systems, up to the complete rolling stock;
- Wide configurability and expandability;
- Centralised database for further development.

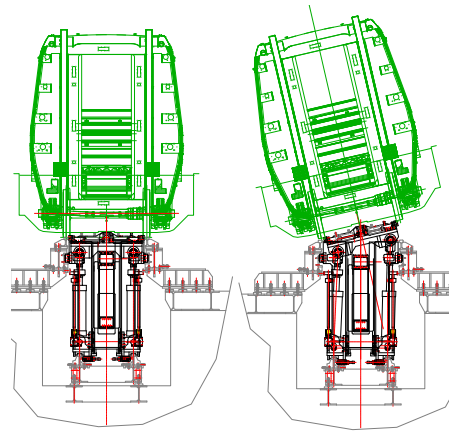
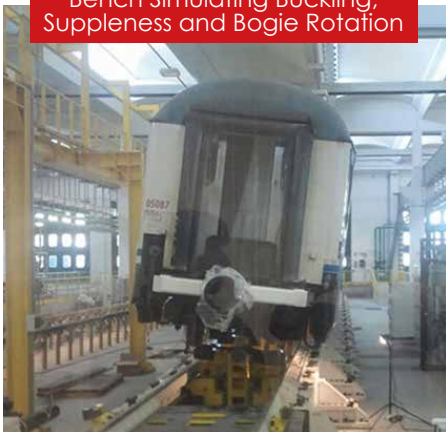


Pantograph Test Bench



Roller Test Bench

Bench Simulating Buckling, Suppleness and Bogie Rotation



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- forces up to 1500 kN - vertical;
- frequencies up to 1.2 Hz;
- modular load application according to the type of bogie under test.

Axle Fatigue Test Bench

- Specimen fixed at one end and supported at the other end;
- maximum actuator force: 500 kN;
- maximum speed: 2000 rpm;
- constant-load or block-load cycles;
- dynamic compensation of axle vibration;
- forced ventilation with thermostatic check of the test room;
- separate bench for bearing tests is also available.

Wheel Fatigue Test Bench

- Vertical-axis architecture, with a wheel clamping journal and a vice for application of static or dynamic loads;
- oleodynamic actuator applying a dynamic force of 105 kN and a static force of 240 kN;
- vibration amplitude up to +/- 2mm;
- frequency up to 30 Hz;
- oleodynamic vice wedge-type clamping with clamping pressure check.

Pantograph test bench

- Separate heads for sliding bow and side structure excitation, positionable and orientable at one's discretion;
- excitation frequency range: from 0 to over 40 Hz;
- rigid and resonance-free bench structure within the whole measuring range;
- main head with transverse reciprocating motion +/- 250 mm simulating the transversal movement of the overhead line;
- fatigue tests, modal analysis, dynamic tests with contact point reproduction.

Roller Test Bench

- Longitudinal dynamics and performance tests;
- homologation tests;
- electromagnetic compatibility tests;
- possibility of receiving 4-axle locomotors, set up for 6 axles;
- axles and axle wheels, independently controlled;
- fixed and movable constraint for stabilising the locomotive and reacting to forces;
- wide range of instruments for field data acquisition (load cells, laser, ...);
- 900 kW motors, 42 kNm each;
- speed over 360 km/h;
- possibility of testing diesel VUT through an exhaust gas suction system;
- total integration with the semi-anechoic chamber;
- special-purpose rolling stock conditioning and cooling system, fed by a roof top unit.

- experimental measurement of the max torque of the secondary suspension;
- experimental measurement of the body-bogie friction coefficient;
- buckling Testing Module: suppleness tests;
- buckling tests – bogie, pivot pitch;
- torsional rigidity tests on the body by suspension locking, if required;
- curve and reverse curve entry/exit tests;
- transversal and longitudinal inclination tests;
- determination of body weight and centre of gravity;
- vehicle excitation for modal analysis (instruments not included), if required.

Brake Test Bench

- Configurable testing cycles in compliance with the main international standards (UIC/EN have been currently implemented);
- fully automatic operation;
- local and remote historicization of the results for future traceability and post-processing;
- also suitable for EOL tests on new or overhauled components;
- also available mechanical and pneumatic test for brake components.

Bogie Fatigue Test Bench

- Coordinated actuator control, with the possibility of generating longitudinal, vertical or transversal loads, as well as hunting and rolling, according to predefined or programmable sequences;

Buckling, Suppleness and Bogie Rotation Bench

- Application of bogie rotation torques, measured by means of load cells;
- quasi-static conditions with frequency up to 0.2 Hz;
- air cushions in order to minimise the friction during the movement.
- application of reciprocating motion under the axles (simulation of curve and reverse curve);
- max frequency 10 Hz applied in order to set the suspensions;
- independent motion of the four axles;
- safety tests during bending derailment;

Axle Fatigue Test Bench



Pantograph Test Bench



Dynamometer Bench for Brake Testing

