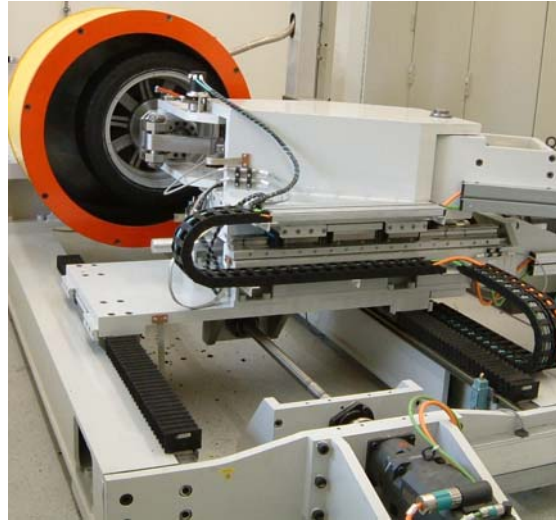


Electromechanical biaxial wheel test bench (ZWARP)

A wheel test bench is used to confirm the operating stability of trucks and cars, and to optimise the construction of new wheels, the use of new materials and new production processes.

The term "wheel" is used for the wheel rims. The wheel test bench described here does not therefore test the tyre rubber mixture capability, but the fatigue strength of the wheel rim in operation by simulation.

FEAG provides these systems with the complete electrical equipment, starting from engineering, software production, control cabinet installation and assembly up to commissioning at the end customer, and including comparison measurement with a reference wheel.



Car ZWARP

Technical description:

The test specimen rotates in a rotating drum and is subject to radial and lateral forces, as well as inclinations.

The load conditions for wheel contact and lateral forces recorded in real tests on a test road (e.g. the Nürburgring) are gathered together according to mathematical principles into a so-called load collective. This load collective is adapted to the wheel test bench and stored in a control program for the tests.

By appropriately combining the highest load conditions in the load collective, the damage content of a wheel travelling 300,000 km in everyday use can be reproduced with a test run of 10,000 km per wheel.

The ZWARP test benches were built exclusively as hydraulically powered systems up until about 2 years ago. Load forces are applied in the hydraulically controlled test benches by means of hydraulic pistons.

The company Klock Sondermaschinenbau GmbH has developed, in cooperation with FEAG, the world's first "electromechanical car wheel test bench".

In this system the load forces and the inclination are applied by spindles with linear guides that are driven by AC servo motors, which are force and angle regulated by the Siemens Simovert Masterdrives Motion-Control inverter.

The system is controlled by a Siemens Simatic WIN AC Slot PLC S7-412 installed on a PC. The system is operated and monitored via the PC monitor with keyboard or mouse.

The machine control system communicates via the standardised, open and manufacturer-independent OPC interface with the "DIAdem" (National Instruments) program, which is widely used throughout the automotive industry and test laboratories for measurement and automation technology, and it exchanges data with DIAdem to control and visualise the system, as well as archive all information.



The drive drum is controlled by an asynchronous motor with the Siemens Simover Masterdrives Vector-Control inverter. The entire system is powered via an AFE (Active Front End) feeder-energy recovery unit. The braking energy of the drive drum is then fed back into the supply network.

Characteristics:

- Compact, rigid construction with low centre of gravity
- In comparison to hydraulic test benches, no hydraulic or cooling aggregates required, and therefore significantly lower energy consumption (ca. 70 - 80% energy savings).
- No oil leakages
- No aspiration pumping required
- Expensive and sensitive servo-valves not required
- No hazards from hydraulic high pressure
- Economic energy balance
- Greater travel paths can be easily realised
- It is possible, without separating mechanical parts, to move to the wheel change position by mouse click.
- Minimum service and maintenance works



Technical data car ZWARP

Motor power:	37 kW Siemens three phase asynchronous motor
Force, vertical:	50 kN
Force, horizontal:	50 kN
Max. inclination angle:	± 25° (in wheel change position 50°)
Force, inclination angle:	100 kN
Drum inner diameter:	0.96 m
Drum width:	0.5 m
Max. wheel width:	0.4 m