Simulated Real Driving at a High Altitude and Climate Roller Test Bench

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High Altitude and Climate Roller Test Bench

- Motivation
- Data Sheet
- Safety Concept
- Driving Robot
- Automation
- Simulated Real Driving by Carmaker
High Altitude and Climate Roller Test Bench Motivation

- Simulation of driving at high altitude
- Reproduction of real driving at high altitudes
High Altitude and Climate Roller Test Bench
Data sheet

Temperature Conditions
- -30 °C … + 40 °C
- Accuracy +/- 1 K

Altitude Conditions
- 0 m … 5300 m
- 1013 kPa … 500 kPa
- Accuracy +/- 10 kPa

Climatic Conditions
- Humidity control up to 82 kPa (ca. 1,800m)
- max. absolute humidity at +35°C und 40% RH
- max. relative humidity at 60%
- RH Accuracy +/- 5% RH
High Altitude and Climate Roller Test Bench Data Sheet

Test Cell

- Recirculation cooler: 187,400 m³/h
- Blower: 200 km/h
- Power of refrigeration machine: 1,885 kW
- Rated power supply: 3,300 kVA (3.3 MW)
- Thickness walls: 50 cm

Roller Set

- Usable power per axle: 230 kW
- Inertia of roller set: 450 kg ... 4,770 kg
- Wheelbase: 1,800 mm ... 4,400 mm
- Maximum speed: 250 km/h
  (wind simulation up to 200 km/h)
High Altitude and Climate Roller Test Bench Safety Concept

Regulated ascent and descent 200 m/min

17 minutes
Default speed 5…7 m/s

Emergency speed 46 m/s

Rescue speed 100 m/s
High Altitude and Climate Roller Test Bench Driving Robot

Stähle SAP 2000

- All kinds of vehicles:
  - Manual & automatic gear shift
  - Key & start button
  - Right & Left hand drive

- Applications
  - Driving cycles
  - Manual setpoint
  - Remote-controlled
High Altitude and Climate Roller Test Bench Automation
High Altitude and Climate Roller Test Bench Automation

**Driving Cycle**

**Constant Driving**

**Simulated Real Driving**

**Cycle/Injection**

**Cycle/Torque**
High Altitude and Climate Roller Test Bench Simulated Real Driving by Carmaker

Advantages

- Free driving
- Modification of vehicle configurations
- Modification of environmental and traffic influences

© IPG Automotive
High Altitude and Climate Roller Test Bench
Simulated Real Driving by Carmaker

Simulated Real Driving

Real Driver

IPGdriver

SEP

Carmaker

STARS
High Altitude and Climate Roller Test Bench Simulated Real Driving by Carmaker

Coast Down Adaption

- DEKRA Test Oval (DTO)
- Measuring of real driving resistance
- Measuring additional cornering forces

- Coast Down Adaption
- Modification of simulation parameters
- Coast-Down Adaption Tool in Carmaker

Source: http://www.datc.de/dl/allgemeinepraesentation.pdf, 02.01.2018
Results of Coast Down Adaption

Before Modification

After Modification

Modification (e.g.):
- Tire stiffness
- Ackermann steer angle
High Altitude and Climate Roller Test Bench
Simulated Real Driving by Carmaker

Source: maps.google.de

Source: IPG Carmaker
High Altitude and Climate Roller Test Bench
Simulated Real Driving by Carmaker

Real Driving vs. Simulated Real Driving

- Deviation CO$_2$: on average 3%

Not considered

- Wind influence
- Traffic influence
- Road surface
Thank You

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