

The Power of Dynamic Testing



PLOT
20 november 2013
FHI te Leusden

Resonance principle



TacomaNarrowsBridge.mpg

Crash of the Tacomabridge (USA)

Company location – where are we?

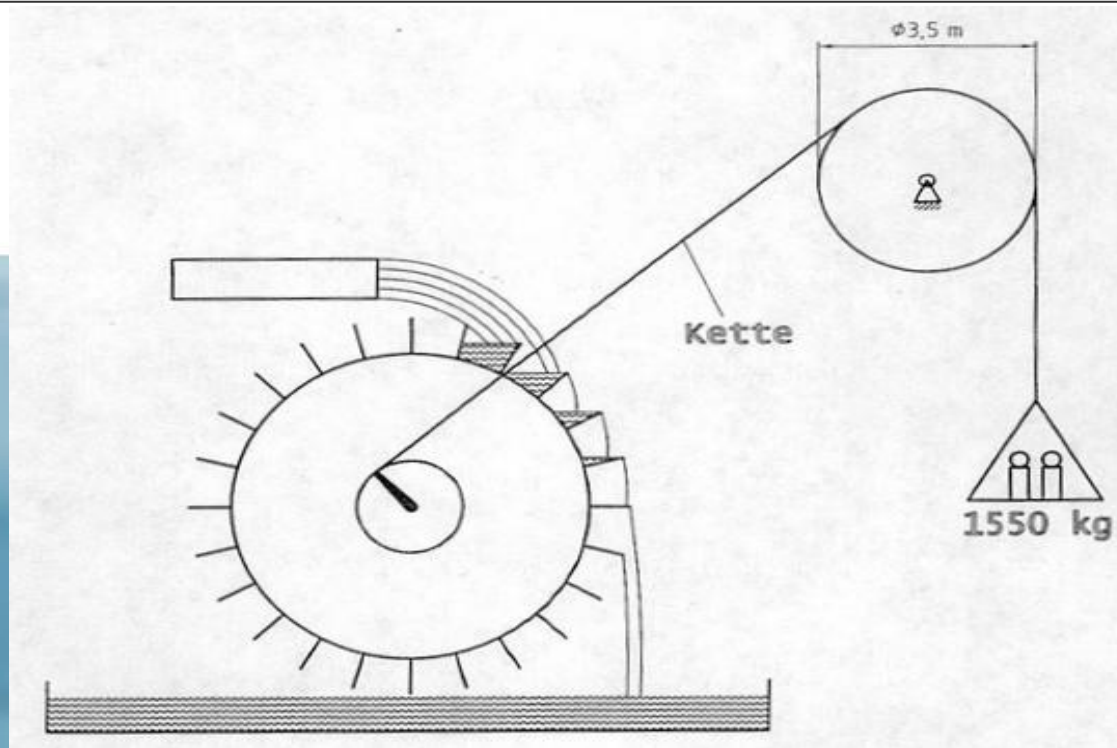


Location of the world's first dynamic test system,
1828 Julius Albert

Oberharzer Wasserregal – world cultural heritage

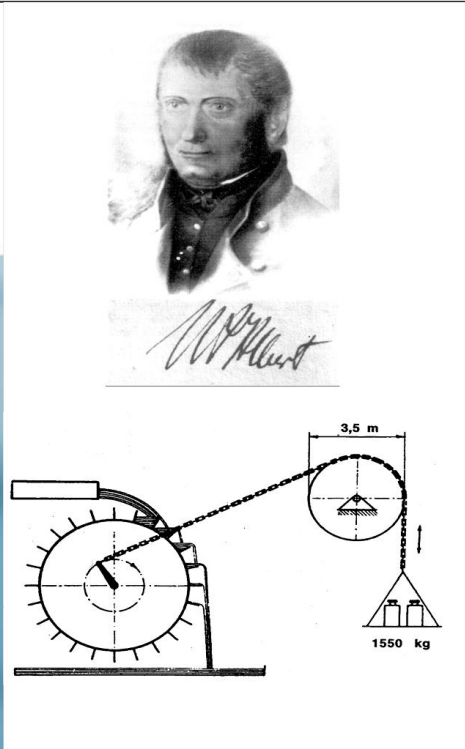


History – first dynamic testing machine of the world

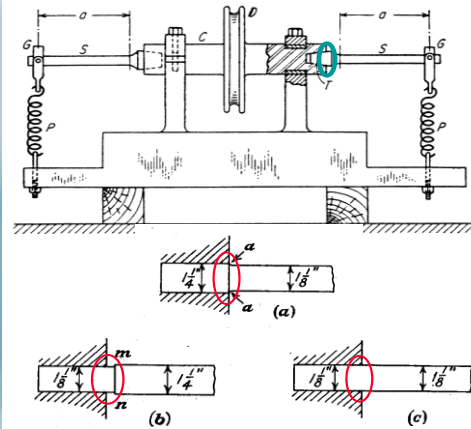
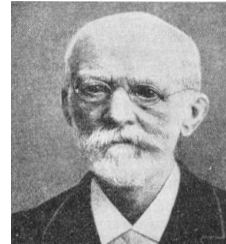


1828 in Clausthal-Zellerfeld, Germany

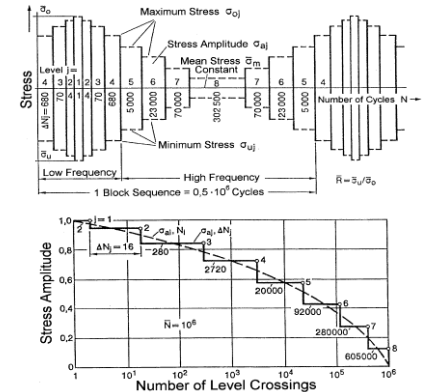
Pioniers of Fatigue



Julius Albert (1787 - 1846)
Fatigue investigation of Chains

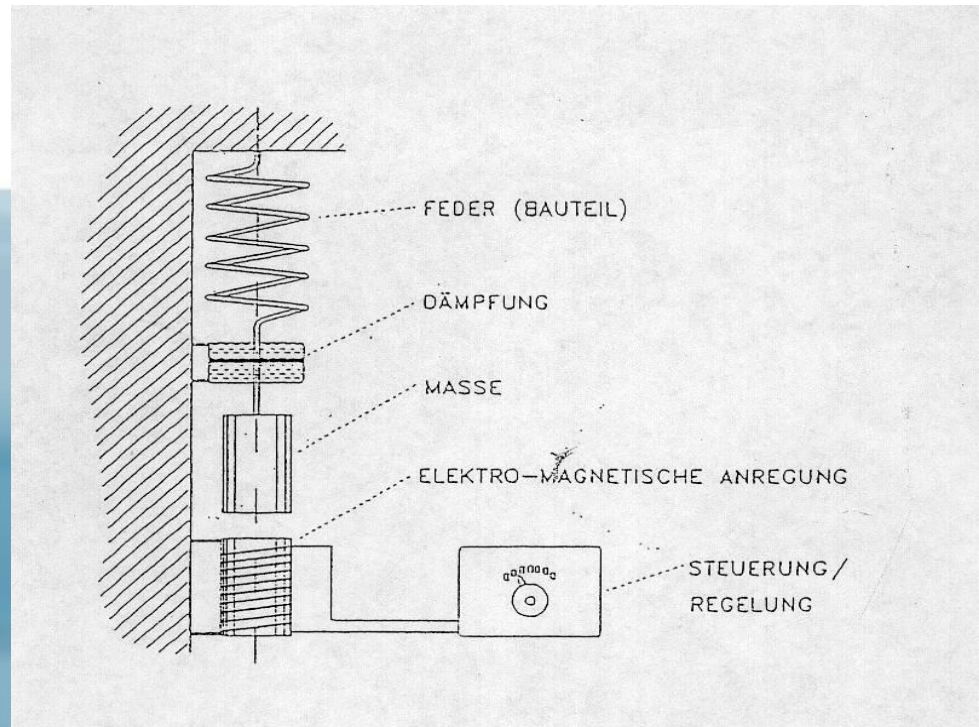


August Wöhler (1819 - 1914)
Fatigue of railway components

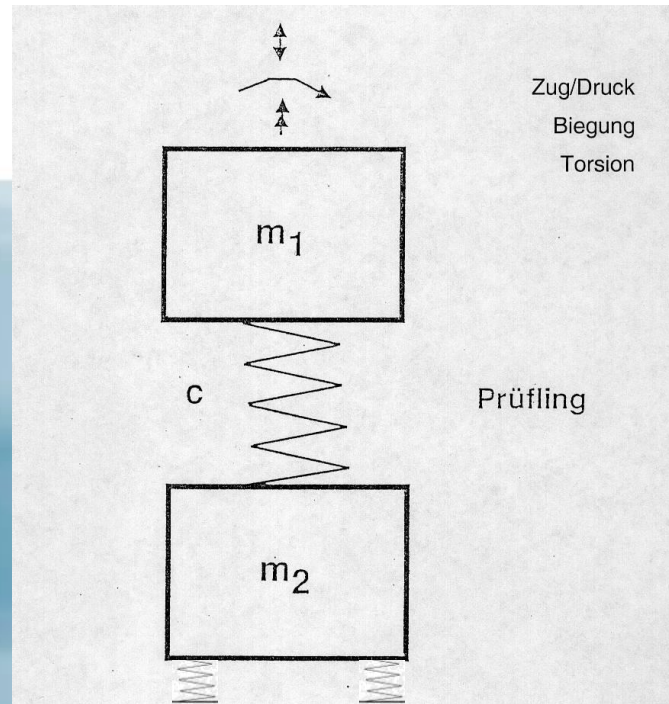


Ernst Gaßner (1908 - 1988)
„The Father of Fatigue“

One mass-resonance – dynamic system



Basic principle of resonance test systems – two mass swinger



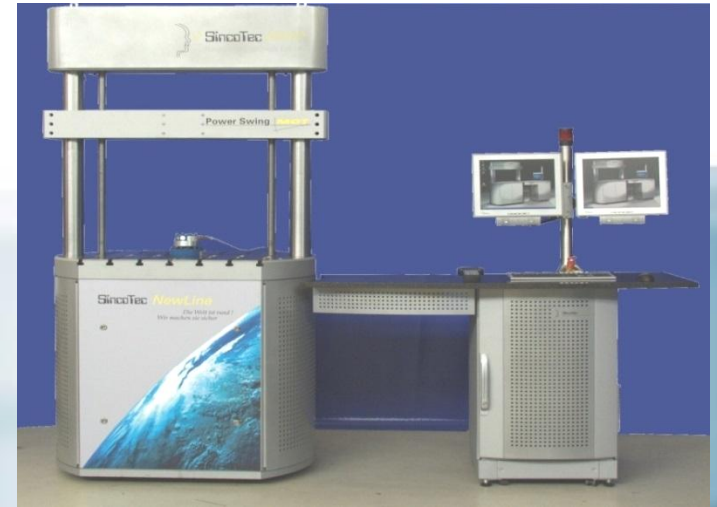
Steps of development from 1955 until today



1955: Establishment of the resonance test technology

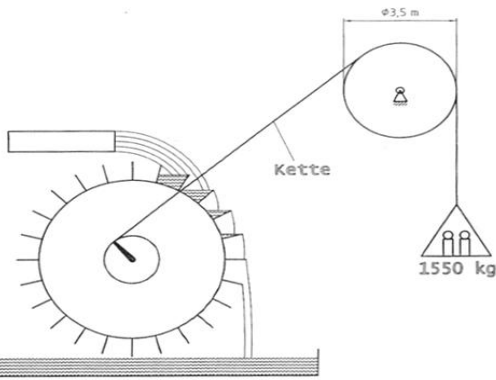


1990: first computer-controlled test machine



2005 until today: Resonance test machine of the actual generation

Dynamic testing – yesterday and today



1828 – frequencies up to 0,1 Hz



2013 – frequencies up to 1.100 Hz

Resonance testmachines

Advantages

High test frequencies, short test time

High energy efficiency

No infrastructure necessary

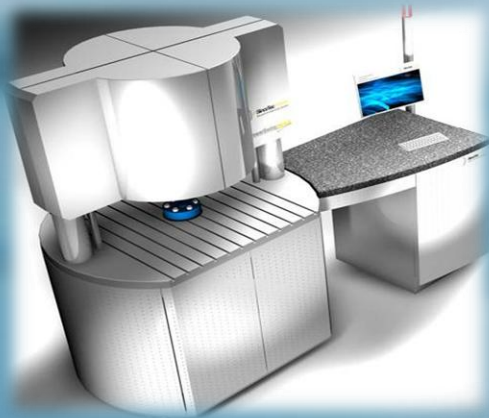
High security

High control accuracy

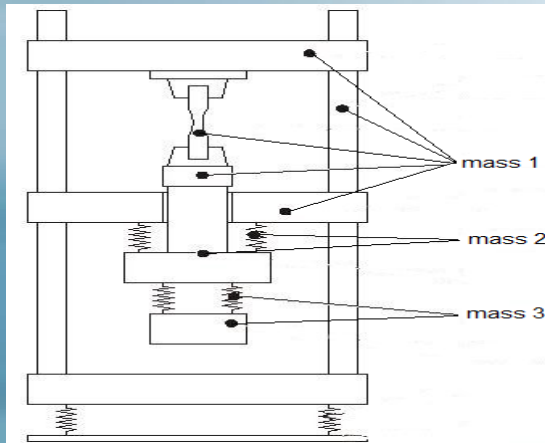
High forces

Sensitive crack detection

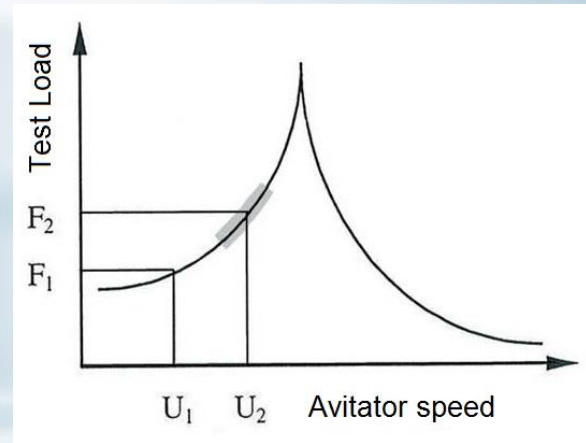
Versatile usable



POWER SWING MOT



three-mass oscillating system



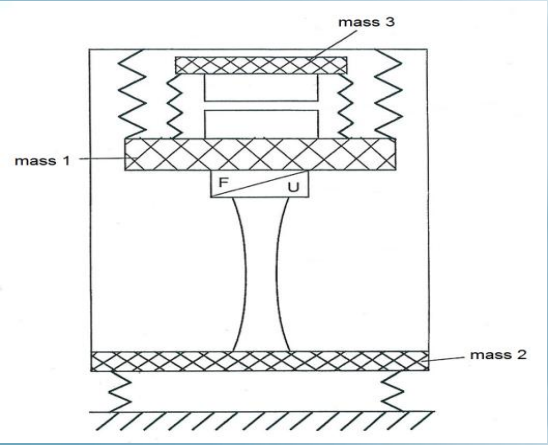
principle of control

POWER SWING MOT

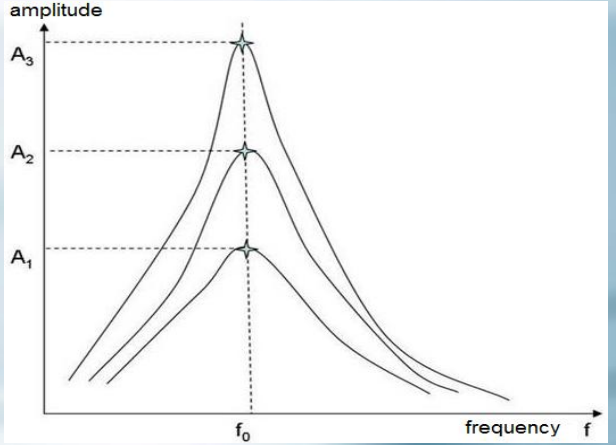


- Motor-driven
- Component and specimen testing
- Huge testing strokes up to 12 mm
- Frequency range 30 Hz...115 Hz
- Nominal load up to 2.000 kN
- Velocity up to 4,0 m/s
- Quasi-static strength tests, LCF and HCF

POWER SWING MAG

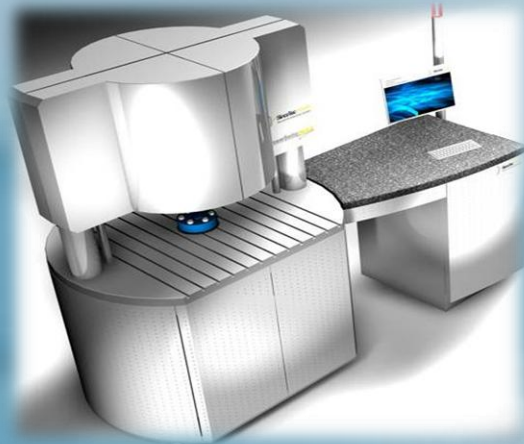


three-mass oscillating system



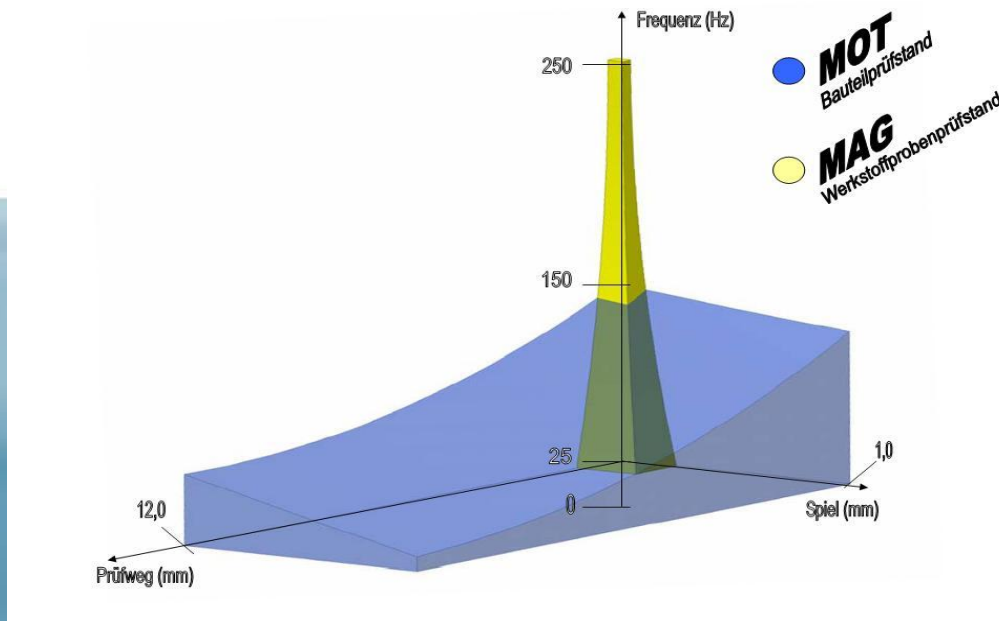
principle of control

POWER SWING MAG



- Magnetical exciting
- Component and specimen testing
- Testing strokes up to 6 mm
- Frequencies up to 1.100 Hz
- Nominal load up to 550 kN
- LCF, HCF and VHCF

Drives regarding the resonance test technology



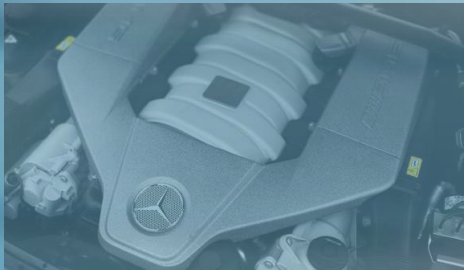
Comparison of the drive systems MAG and MOT

Clamping devices

Engine components



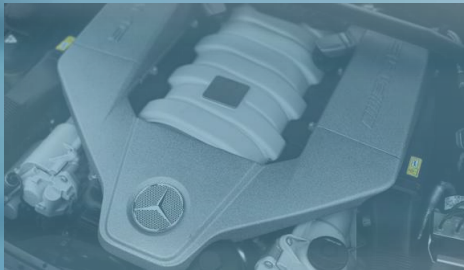
Kurbelwelle komplett
Complete Crankshaft



Clamping devices



Pleuel
Conrod



Engine components

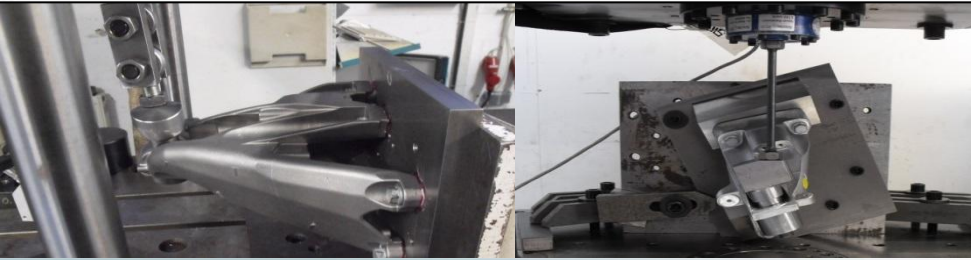


Kolben
Piston

Nockenwelle
Camshaft



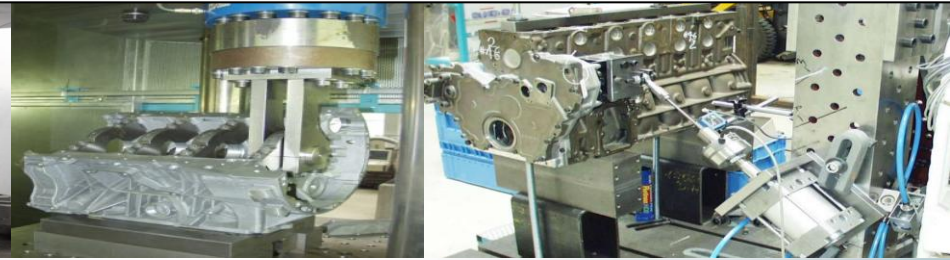
Clamping devices



Motorkonsole
Engine bracket



Engine components



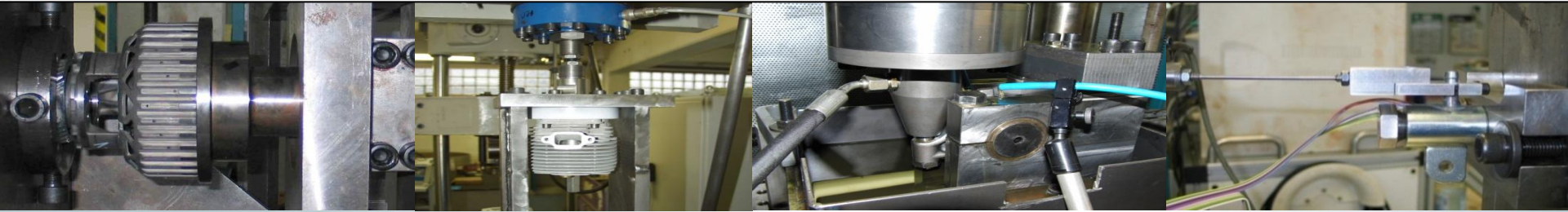
Motorblock
Engine block

Pumpenanbindung
Connection of pump



Clamping devices

Engine components



Antriebsrad

Drive wheel

Zylinderkopf

Cylinder head

Kipphebel mit Öl

Rocker with oil

Railanschluss

Rail connection



Clamping devices



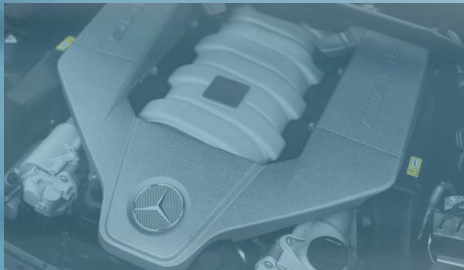
Engine components



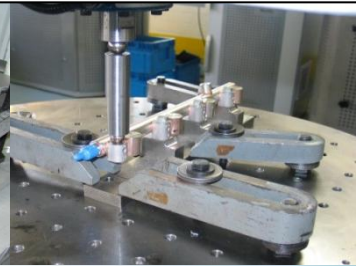
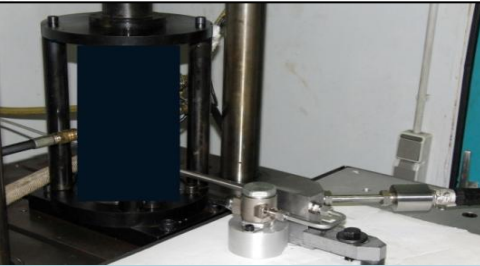
Ventilfeder
Valve spring

Ventilkörper
Valve Unit

Pumpengehäuse
Pump housing



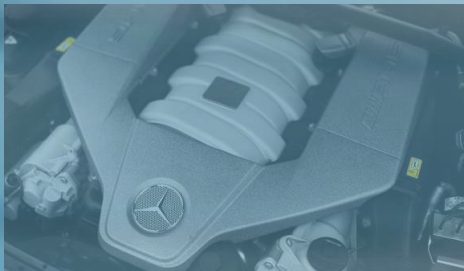
Clamping devices



Engine components

Kraftstoffleitung

Fuel pipe



Common Rail

Common rail



Clamping devices

Chassis components

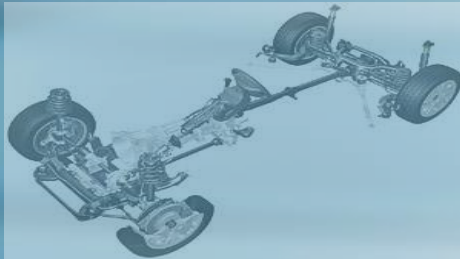


Verbundlenkerachse - Biegung

Twist-beam rear axle - Bending

Verbundlenkerachse - Torsion

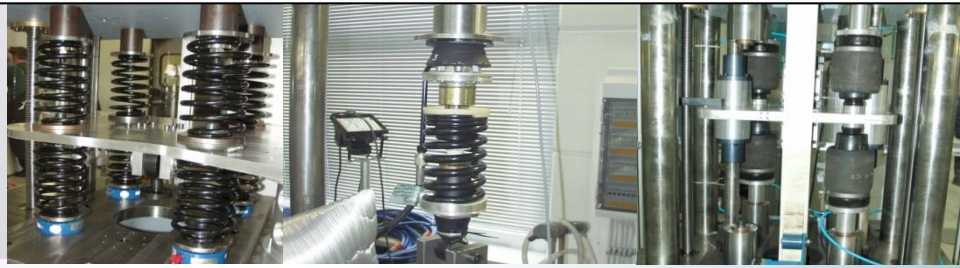
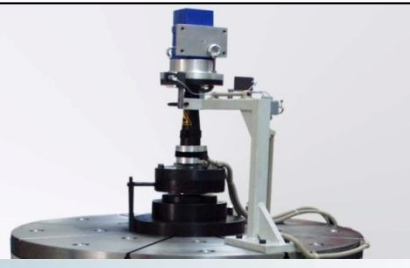
Twist-beam rear axle - Torsion



Power Axle Torsion 147.MOV



Clamping devices



Chassis components

Querlenker
Control arm

Radlager
Hub-Unit

Stahlfeder
Steel Spring

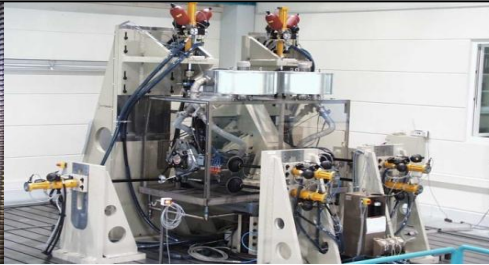
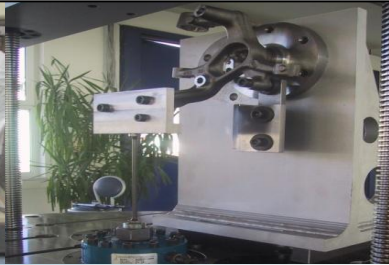
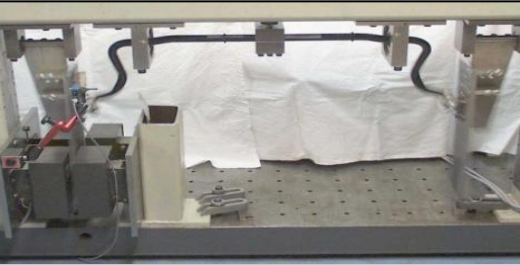
Luftfeder
Air Spring



Federtest.wmv



Clamping devices



Chassis components

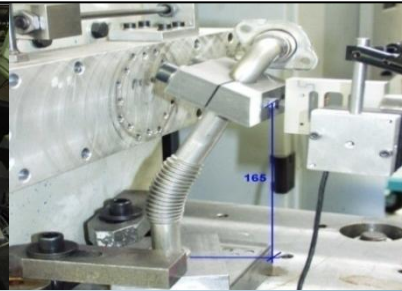
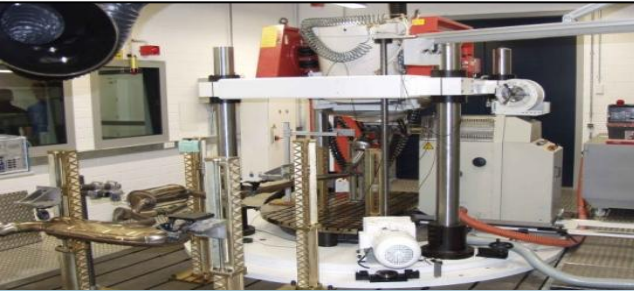
Stabilisator
Stabilizer

Schwenklager
Knuckle

Achsen – komplett
Complete axes



Clamping devices



Exhaust systems

Abgasanlagen – Baugruppen Assembly Groups of Exhaust Systems



Abgasrohre Exhaust pipes



Clamping devices



Exhaust systems

Katalysator Catalytic converter

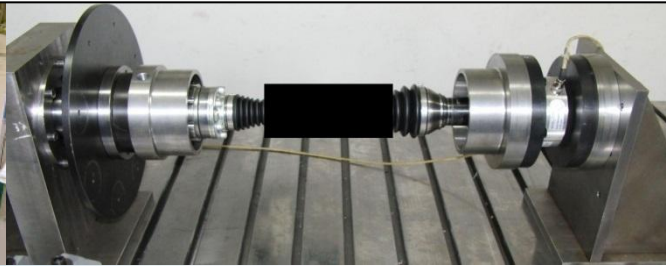
- Hot- and Warmshake tests up to 1.400° C and 100 g
- Thermoshock



Clamping devices

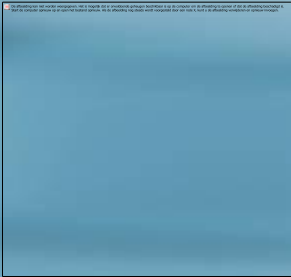


Drive train



Antriebswelle

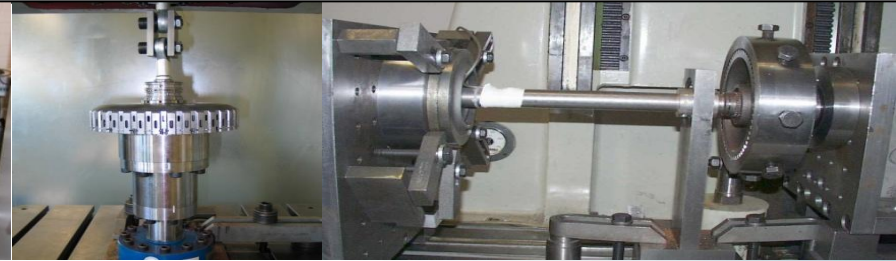
Drive shaft



Clamping devices



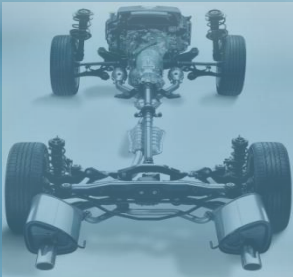
Drive train



Schwungrad
Flywheel

Kupplung
Coupling

Getriebewelle
Gearshaft



Clamping devices

Concrete steel specimens



Betonträger

Concrete Beam

Betonprobe

Concrete specimen

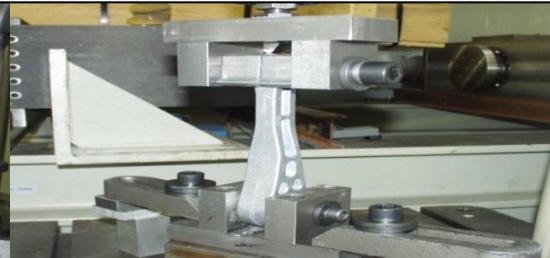
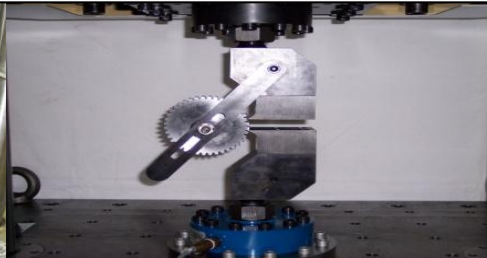
Betonstahl

Concrete steel



Clamping devices

Miscellaneous



Lagerschale
Bearing shell

Zahnrad
Gear wheel

Schweißnaht
Welding seam

Koppelstange
Coupling bar



Clamping devices

Miscellaneous



Prothese Prosthesis

Eisenbahnrad / Radsatzwelle Railway wheel / Wheelset axle



Pioniers of Fatigue



Bergakademie (founded 1775) Clausthal

Company location



- Located in Clausthal-Zellerfeld, in the middle of Germany
- 100 employees , 80 in the headquarter
- Test & Engineering Center with 120 test machines
- 14 agencies worldwide
- More than 3,000 test systems worldwide in use

Structure of SincoTec Group



Test Systems GmbH

- Standard test systems
- Customised test systems
- Innovative new developments
- Service
- More than 3000 test systems worldwide

Holding GmbH

Sinco Tec Süd
Engen

Sinco Tec China Ltd
Shanghai

Sinco Tec USA LLC
San Diego

F & E GmbH & Co. KG

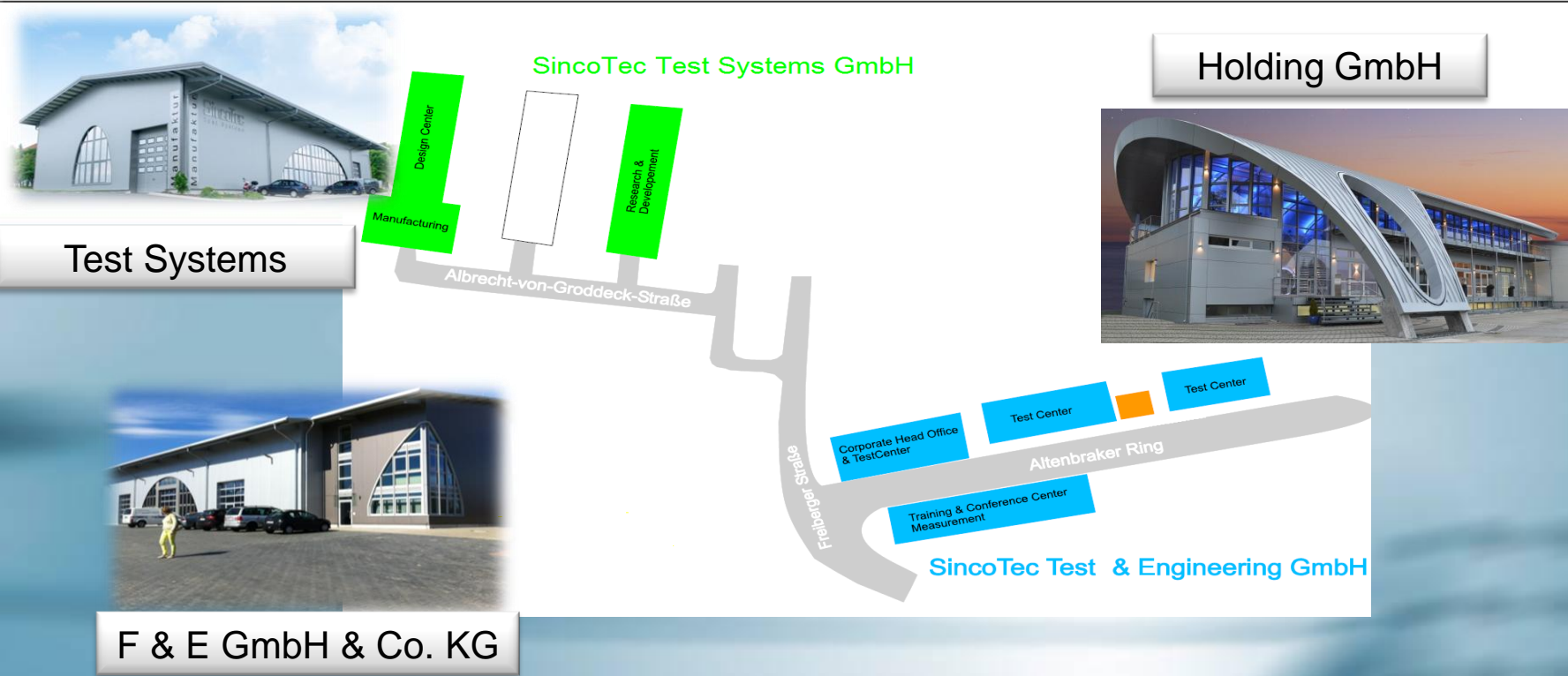
- Research & Development of new test systems and - methods
- Located in Ilsenburg

Test & Engineering GmbH

- 120 test machines are available for our customers for each scope of application.
- Seminars
- Analyses
- Consulting



Company location





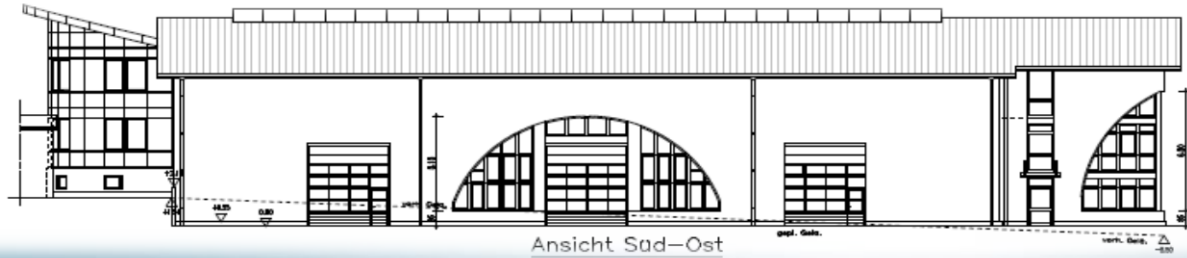
Sincotec Test Systems

Manufaktur



**Albrecht-von-Groddeck Str. 1
38678 Clausthal-Zellerfeld**

Sincotec Research & Development

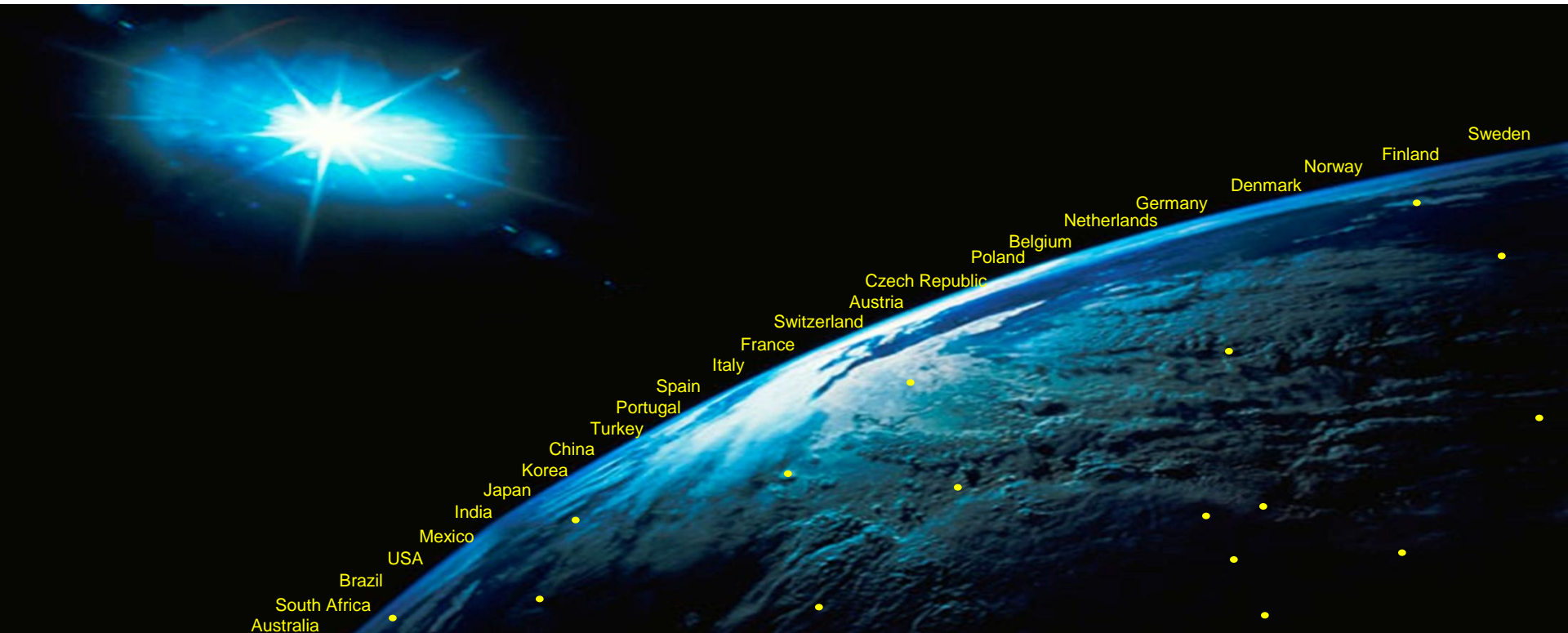


**Brockenblick 10
38871 Ilsenburg**





Customers - worldwide



Sincotec

The Power of Dynamic Testing



Gouda



Engen

South-Germany



Genua

Italy

St. Petersburg



Russia



Istanbul

Turkey

Shanghai, Hong Kong



China

Seoul



Korea

Stockholm



Sweden
Norway
Finland

Pune



India

Puebla



Mexico

Netherlands



Bordeaux

France

Lissabon



Portugal
Spain

San Diego, California



USA



Sincotec

The Power of Dynamic Testing



References



DAIMLER



HYUNDAI



Automotive PKW:

Volkswagen – Audi – Porsche – Daimler – BMW – Ford – Opel – Skoda – Fiat – Hyundai – Kayser A. Automotive Systems GmbH – Albonair – Allgaier – Anvis – Arvin Meritor – AVL Schrick GmbH – Bayrah Plastik – Benteler – Borg Warner – Bosch – Boysen – Brand KG – Componenta – Continental – ContiTech – DEKRA – Döktas – Dura – Eberspächer – Heinrich Eibach GmbH – ElringKlinger – FAG – Faurecia – FAW – Feuer Powertrain – FEV – Freudenberg – Fritz Winter – GAT – Georg Fischer – GKN – Häusermann – Hegenscheidt – Hengst GmbH – Hirschvogel – Hoeckle – Honghu Muffler – Martinrea Honsel Germany GmbH – Hydraulik Ring – IAV – IFT – Iljin – INA – INERGY – Isringhausen – GE Jenbacher – Joma – KAMAX – KnorrBremse – Kongsberg – Koyo Seiko – KSM Castings – Luk – Magna Cosma – Magna Powertrain – Magneti Marelli – Mahle – Mann + Hummel – Mercedes-AMG GmbH – Mollificio Bergamasco – Moog – Mubea – Ningbo Jianxin Vibration – NSK – NTN – Otto Schnell – PANKL – Rautenbach – RIBE – Ricardo – Rücker GmbH – Sachs – Schaeffler – Scherdel – Teleflex – Tenneco – SKF – SM Sintermetall – ThyssenKrupp – TI Automotive – Tower Golden Ring – Trelleborg – TRW – Vibracoustic – Volvo – Vorwerk Autotec – W.E.T. – WABCO – Walzwerk Finow – Wanxiang – Westfalia – WHB – Wilke GmbH – Winkelmann Powertrain – WTZ – ZF Friedrichshafen – ZF Sachs Slovakia

Automotive NKW:

MAN – Scania – ARAI – Behr GmbH – Bharat Forge – BPW – Schmitz Cargobull – Cummins – Deutz – Ditas – Doosan – EvoBus – Happich – MTU – Obereigner – Piezocryst – Sinotruk – Voith Turbo – Woco

Orthopädie/Medizintechnik:

Aesculap – Gömed – Otto Bock – Paradigm Spine – Streifeneder



References



Eisenbahn:

Deutsche Bahn – Berliner Verkehrsverbund – Bochumer Verein – Bombardier – Bonatrans – CAF – Eisenbahn-Bundesamt – Freudenberg
Hegenscheidt – KLW – Radsatzfabrik Ilsenburg – Rhein-Neckar-Verkehr GmbH – Siemens – Sumitomo Metals

Windkraft:

Enercon – Vestas – ZF Wind Power

Luftfahrt:

ALCOA – Cyperpower Ltd. – Johann Maier – KAMAX – Pankl

Universitäten/Forschungseinrichtungen:

AGP Fraunhofer – FH Esslingen – FH Mittweida – IMA Dresden – LU Hannover – Politecnico di Torino – SZA – TU Braunschweig – TU
Chemnitz – TU Clausthal – TU Darmstadt – TU Dresden – TU Erlangen – TU Karlsruhe – TU Kassel – TU Freiberg – TU München – TU
Siegen – TU Stuttgart – Universität Leoben – Universität Luxemburg – Universität Wuppertal

Sonstige:

Alstom – Barmag – BASF – Eberlein – Erasteel – Finsterwalder – GHH-Rand – Henkel Loctite – Jungheinrich – K+V – Mannesmann
Röhrenwerke – Piezocryst – Procter – Rohloff – Steinbeiss-Transferzentrum – Stihl – Thermo Fischer – TÜV Nord – Voith Turbo –
Wärtsilä – WIP – Wittler – Zollern

See you in Clausthal !

