Stress analysis
...the experience counts

Your guarantee for superior products and increased safety
Experience counts...

Experimental stress analysis with HBM: Safety and optimum quality for

Highly reliable products guarantee your success

Highly reliable products are synonymous with your success. Therefore it is essential to attach importance to developing or manufacturing products and components that provide optimum quality.

Experimental stress analysis enables you to measure stress occurring in the components used in your products. This is the direct prerequisite for an optimal design of the components.

Visit the “World of Experimental Stress Analysis” at: www.hbm.com/stressanalysis
your products

HBM is your partner for experimental stress analysis

We provide strain gages, electronics, and software, supported by professional services that are also available at your own premises. All products incorporated in our measurement chains are optimally matched and ensure precise and reliable results.

... in experimental stress analysis
Crucial to your success...

Cost-effective, safe, reliable: Profit from the benefits of experience

**Increased safety, higher reliability, enhanced efficiency for you**

Optimally dimensioning the components for your products is the key to your success – regardless of whether you design or manufacture mobile phones, engines, or airplanes.

- Gain increased safety, because you get components of higher quality
- Benefit from higher reliability, because components have a long service life
- Enhance your efficiency, because you only use the quantities of materials you actually need

**How to measure stresses in components**

A prerequisite for an optimal design of components is to know precisely the mechanical stresses that occur. Experimental stress analysis enables you to measure mechanical stresses quickly and reliably:

- Install the strain gages on the surface of the component
- Then use the measured strain to determine the mechanical stresses in the component

Complete solutions from HBM

Perfectly matched products and services:

- Strain gages
- Amplifiers
- Software
mental stress analysis

What mechanical stresses occur in components?

Experimental stress analysis enables mechanical stresses in components to be measured. These may have three causes: external forces, residual stresses, and thermal stresses.

**Loading stress:**
Forces (loads) that are applied from outside cause material loading.

**Residual stress:**
Internal forces in the material – without any external forces being involved – cause residual stresses. These can arise, for example, from non-uniform cooling of cast components, from forging, or from welding.

**Thermal stress:**
Thermal stresses occur in systems in which parts with different thermal expansion coefficients are used. They can arise if free thermal expansion of the components is prevented or as a result of non-uniform heating.

services

HBM provides you with the right products for every step in experimental stress analysis:

- **Strain gages** for installation on the surface of the component – as well as the complete range of accessories you need for installation
- **Measurement amplifiers** for acquisition of the strain values
- **Software** for visualization and analysis of the measured values

Benefit directly from the application know-how of the market and technology leader: Rely on our experienced service engineers, for example for consulting, contract installation, and complete order analyses.

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All components for installing strain gages from a single source

Strain gages
HBM provides you with over 1,000 different types of strain gages that fit a variety of applications.
- Robust and easy to use – tried and tested a million times over
- Available for all common connection configurations
- We manufacture and develop our own strain gages – increased safety for you

Strain gages and accessories from HBM...
...for a wide range of applications

HBM accessories ensure professional and safe installation of strain gages
- Special adhesives for installing strain gages safely on different materials. They can be used in a wide range of temperatures and are long-term stable.
- Covering agents for optimal protection from external influences such as humidity, mechanical damage, etc.
- Special accessories such as cleaning agents, solder terminals, cables, stranded wires ... – important accessories for the professional installation of strain gages.
Our package for first time users

The DAK1 starter kit
The well-designed plastic case contains all materials required for initial strain gage applications and thus is ideal when working with strain gages for the first time:

___ Strain gages
___ Solder terminals
___ Cleaning agent and cleaning pads
___ Emery cloth
___ Adhesives X60 and Z70
___ Stranded connection wires
___ Measuring point protection AK22 and ABM75
___ Specialist book “An Introduction to Measurements using Strain Gages”

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Your plus with HBM:
Precious application know–how for you

With every product from HBM you benefit from our five decades of application know–how. Be it basics, application know–how or after-sales support – the scope of delivery of products from HBM also includes precious know–how:

___ Support and expert knowledge from our engineers
___ Seminars and training videos of the HBM Academy – for example, the popular seminar on strain gage installation. Current dates at www.hbm.com/academy
___ Many technical articles and tutorials at our web site www.hbm.com/stressanalysis
___ The standard work “An Introduction to Measurements using Strain Gages” – to be downloaded or ordered at www.hbm.com/stressanalysis

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Amplifiers matching your measurement task

Each measurement task presents its own challenge. Irrespective of the number of measuring points connected and of your experience in this field, HBM provides you with the amplifier that fits your requirements.

All amplifiers have one thing in common: they provide high quality and precision:

- Parallel and synchronous data acquisition in all channels (one analog-to-digital converter per channel)
- Carrier frequency for minimizing interference effects
- Direct connection of 1/4-bridge strain gages without external completion resistors
- Integrated shunt resistor for checking the application

MGCplus

The flexible amplifier system...
also keeps pace with your future measurement tasks!

MGCplus is the modular and universal amplifier system that provides a multitude of upgrading options and is therefore optimally fit for any future measurement task.

- Easily adapt your system to the individual measurement task thanks to the modular structure
- Minimize your cable influences by the patented Expanded Kreuzer circuit
- Measure with high precision at 24 bit resolution

CANHEAD

How many measuring points do you use? Choose CANHEAD – and reduce your installation costs by 90 percent

Over are the times of kilometer-long connection cables. The CANHEAD amplifier modules are installed close to the strain gages. Data is transmitted via a standard data cable.

- Reduced wiring costs and effort
- Cost-effective acquisition of many strain gage measuring points
- 10 channels per device, up to 12 CANHEAD per data cable
Spider8 and Spider8–30

Immediately ready for use

Spider8 is the convenient alternative in PC-aided measurement. The housing is no bigger than a notebook and accommodates everything needed for measurement.

There are no switches, potentiometers or jumpers: the Spider8 is simply connected via the printer port or using the USB adaptor on the USB port.

___ Flexible and easy to use: direct connection to a PC standard interface
___ Synchronous acquisition of up to 64 channels (cascading of up to eight devices)

Your plus with HBM:
The competence of the technology leader

HBM has always convinced with trend-setting new technologies and patents for methods in the field of experimental stress analysis. We permanently invest in the research and development of new products and methods to be able to offer you the right solution to new challenges and materials:

___ Parallel acquisition of strain and other measurement quantities (for example, temperature, force, displacement, pressure, torque, acceleration)
___ Amplifiers can be upgraded individually to up to 10,000 channels
___ Perfectly matched components for the complete measurement chain

Visit the "World of Experimental Stress Analysis" at:
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Software solutions...

Measurement and analysis...
...using catman® software

Powerful and easy to use

catman® is the powerful software for configuring, visualizing and analyzing your measurement. Benefit from the strengths of catman® software, in particular in the field of experimental stress analysis:

___ Get your measurement result quickly thanks to the intuitive user interface
___ Compute mechanical stresses online from the measured strains using online rosette computation
___ Export the data into all common standard formats (for example Excel or ASCII).

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<tr>
<th>catman®Easy</th>
<th>Intuitive software for simple acquisition of measurement data</th>
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<td>___ Fast measurement results</td>
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<td>___ Simple operation thanks to intuitive design</td>
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<td>___ Free definition of individual graphical user interfaces</td>
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<td>___ Math library for experimental stress analysis</td>
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<th>catman®Professional</th>
<th>The complete solution for measurement engineers</th>
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<td>___ Software for configuration, measurement, visualization, and documentation</td>
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<td>___ Over 400 post-process analysis functions (statistics, signal analysis, rosette calculation)</td>
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<td>___ Individual analysis steps or measurement sequences</td>
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<td>___ ActiveX® interface</td>
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... for experimental stress analysis

Measurement result

**catman®Enterprise**

The easy way to handle high channel-count DAQ systems

- Easy configuration of up to 10,000 channels
- Multiple clients have online access to the data on the server
- Comprehensive trigger functions (for example reference curve or limit trigger)
- Trend analysis for fatigue testing (optional upgrade)

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Your plus with HBM: Professional services for your measurements

You do not want to make your measurements yourself? We support you directly on site at your premises – with our services in the field of experimental stress analysis. Including even the most demanding tasks:

Our experienced service engineers

... come

... consult

... install

... measure

... calibrate

on site at your premises or at our factory.

- Installation of strain gages: planning support; installing of strain gages, complementary sensors and amplifiers; taking and logging of measurements
- Residual stress analysis according to the hole drilling method
- Start-up of HBM measuring equipment
- Customized system solutions for data acquisition and processing
- Retrofitting machine parts with strain gages turns them into transducers that fit your measurement task

Visit the "World of Experimental Stress Analysis" at:

[www.hbm.com/stressanalysis](http://www.hbm.com/stressanalysis)
The whole world of experimental stress analysis using strain gages at hbm.com

For more information on experimental stress analysis please visit our web site at www.hbm.com/stressanalysis:

___ Product information – including complete technical documentation
___ Application reports covering the field of experimental stress analysis
___ Specialist books and technical articles providing you with precious application know-how

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