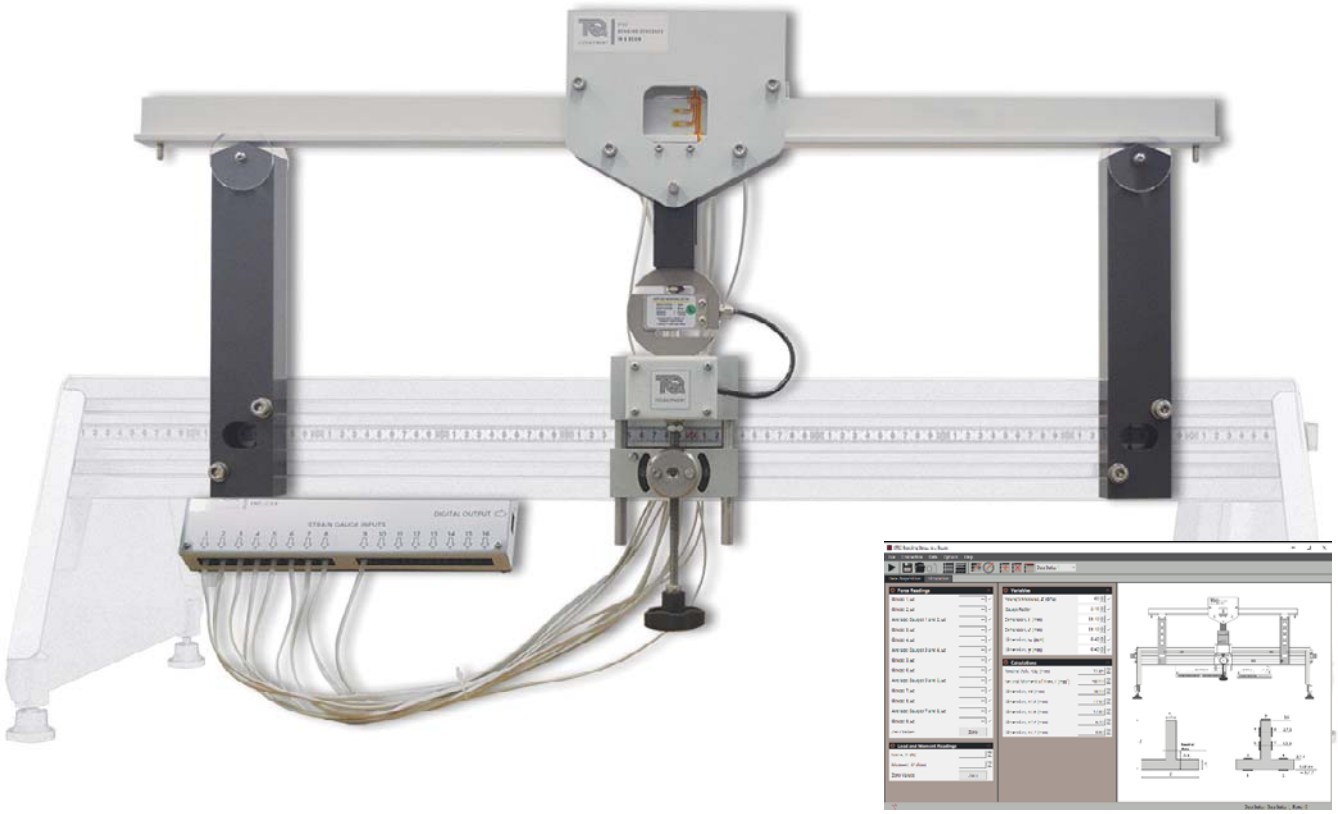
BENDING STRESS IN A BEAM

VDAS® ONBOARD STS5

Experiment for the study of stress distribution across the section of a beam. Mounts on the Structures platform and connects to the Structures automatic data acquisition unit and software (VDAS® Onboard).



SCREENSHOT OF THE VDAS® SOFTWARE

KEY FEATURES

- One of a range of experiment modules that teach structures principles
- Fits to the Structures platform for ergonomic use and space-saving storage
- Strain gauge amplifier and multiple strain gauges for a complete measurement of strain at different positions around the beam section
- T-section beam for stability, with an offset neutral axis
- Includes Vernier caliper for beam cross-section measurement
- Supplied with a storage tray to keep smaller items safe
- Works with user-friendly software (VDAS®)

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BENDING STRESS IN A BEAM

VDAS® ONBOARD STS5

DESCRIPTION

One of a range of experiment modules that fit to the Structures platform (STS1, available separately), this product helps students to understand the bending stresses at various positions of a beam section due to a load. Students add loads to an inverted T-section beam held on two supports. Strain gauges at different heights up the beam measure the strains due to the load. A load cell measures the force applied at the mid span of the beam.

Students apply the load and measure the resulting strains. They use textbook beam equations to predict the stresses and bending moments for any given load, comparing them to measured results. This helps confirm the reliability of the textbook equations and the accuracy of the experiment results.

This product includes a Vernier caliper for accurate measurement of the beam cross-section.

The strain gauges connect to a strain gauge amplifier, which connects (with the load cell) to the USB interface hub of the Structures platform for computer display and data acquisition (VDAS® Onboard).

STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Made in accordance with the latest European Union directives
- ISO9001 certified manufacturer

LEARNING OUTCOMES

- Stress and strain relationship
- Strain gauges as instruments
- Finding the neutral axis by experiment and calculation
- How the beam cross-section dimensions affect the second moment of area (I value) and neutral axis

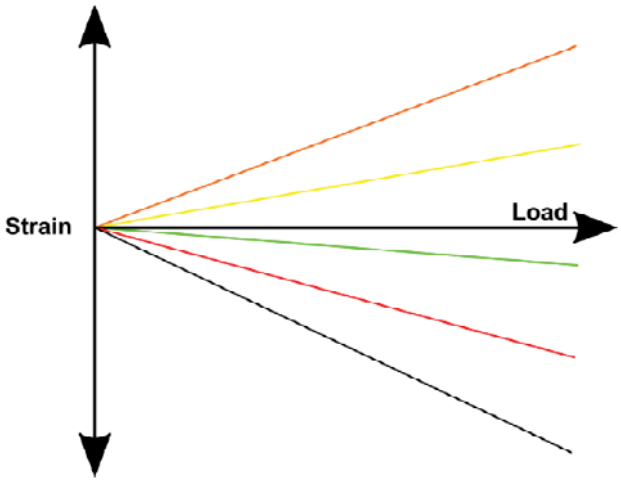
ESSENTIAL ANCILLARY

- Structures Platform (STS1)

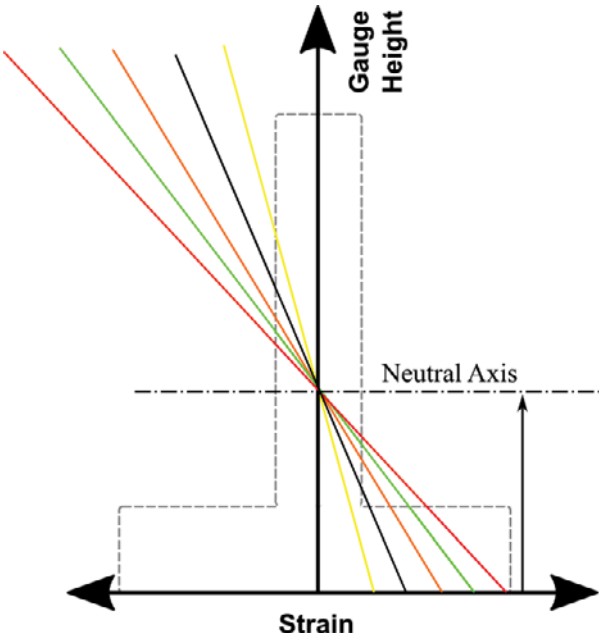
SOFTWARE

TecQuipment has created data acquisition applications (VDAS® Onboard) for each experiment module, with additional simulated experiments.

The simulated experiments allow students to simulate the hands-on laboratory experiments, verifying their results. They also allow simulation of alternative set-ups, such as beams of different cross-sectional shape and material properties, extending the learning experience beyond the practical laboratory session.



TYPICAL EXPERIMENT RESULTS SHOWING THE STRAIN AND LOAD LINEARITY



TYPICAL EXPERIMENT RESULTS SHOWING ZERO MEASURED STRAIN AT THE NEUTRAL AXIS

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BENDING STRESS IN A BEAM

VDAS ONBOARD® STS5

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

STORAGE TEMPERATURE RANGE:

–25°C to +55°C (when packed for transport)

OPERATING TEMPERATURE RANGE:

+5°C to +40°C

OPERATING RELATIVE HUMIDITY RANGE:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

DETAILED SPECIFICATIONS

TecQuipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specifcation without prior notice.

DIMENSIONS AND WEIGHT:

- Nett (assembled): 850 mm long x 130 mm front to back and 500 mm high and 14 kg
- Approximate primary packed (with storage tray): 0.08 m^3 and 16 kg

SPACE NEEDED:

- 1500 mm x 600 mm, level bench or desk

ITEMS INCLUDED:

- Two beam supports
- T-section beam with nine strain gauges. 0.85 m length and 0.7 m span
- Strain gauge amplifier, 16 input
- Load cell of maximum capacity 650 N
- Nine 1 m strain gauge cables
- Two cables
- Hexagon tools for beam fixings
- Vernier caliper
- Inclinometer
- Storage tray
- Comprehensive user guide