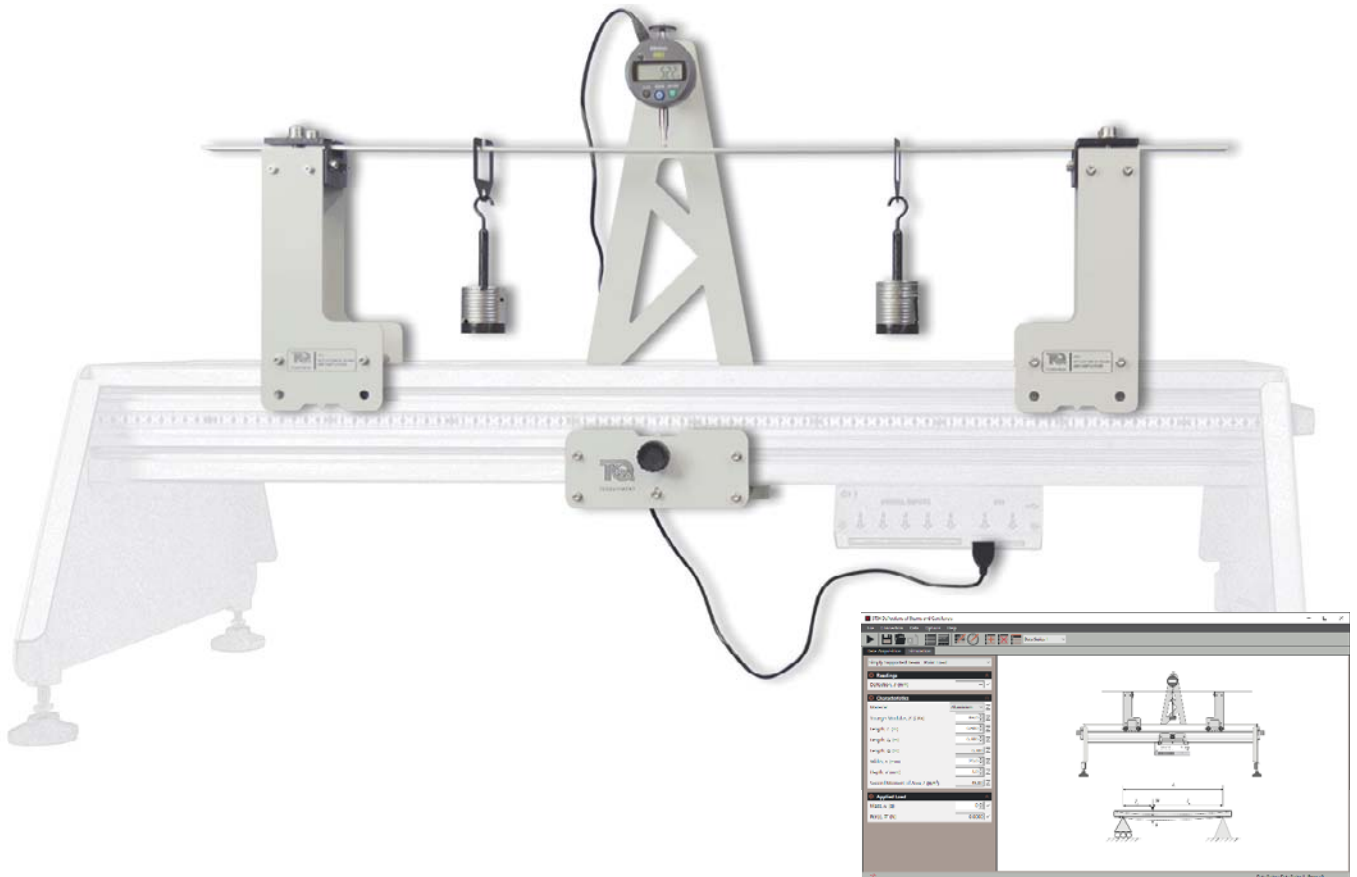




DEFLECTION OF BEAMS AND CANTILEVERS



Experiment for the study of beam deflection under different loads and fixing conditions, and the demonstration of Young's modulus. 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 (STS1) for ergonomic use and space-saving storage
- Selectable beam fixing conditions, with fully adjustable load and deflection measuring positions for increased experiment range
- Includes beams of different material and cross-section for comparison of elastic (Young's) modulus and Second Moment of Area ('I' value)
- High-resolution digital deflection indicator for maximum measurement accuracy
- Includes Vernier caliper for cross-section measurement
- Supplied with a storage tray to keep smaller items safe
- Works with user-friendly software (VDAS®)



DEFLECTION OF BEAMS AND CANTILEVERS



DESCRIPTION

One of a range of experiment modules that fit to the Structures platform (STS1, available separately), this product helps students to understand the elastic properties of beams and cantilevers. Students choose from a selection of test beams and fit them to supports. They may choose to fit the beams to one support only, forming a cantilever. They may also fit them between two supports with different fixing methods, forming simply supported and fixed or 'encastre' beams. Each support includes pointers that work with the scale on the platform for accurate positioning.

Students apply loads to any position along the beam and measure the resulting deflection, also at any point along the beam. They use textbook beam equations to predict the deflection for any given load and compare the calculated results with the measured results. This helps confirm the reliability of the textbook equations and the accuracy of the experiment results.

This product includes a set of beam 'specimens' of different metals and cross-section for comparison of the elastic properties and 'I' value. It also allows the student to vary the effective length of the beam to see how this affects the magnitude of deflection for any given load.

The deflection indicator has its own display, but it can connect 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

- Beam bending formula and structural 'stiffness'
- Deflection due to point loads and UDLs (uniformly distributed loads)
- How beam fixings affect deflection of:
 - Simply supported beams
 - Fixed or 'encastre' beams
 - Cantilever beams
 - Propped cantilever
- Shape of a deflected beam
- Beam length and deflection
- Beam material and deflection – the elastic (Young's) modulus
- Beam cross-section and deflection – the Second Moment of Area ('I' value)
- Pure bending of a beam
- Reciprocal theorem (Maxwell-Betti)

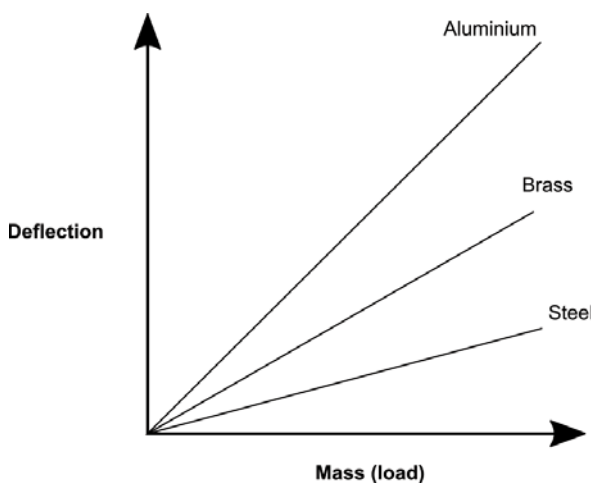
ESSENTIAL ANCILLARY

- Structures Platform (STS1)

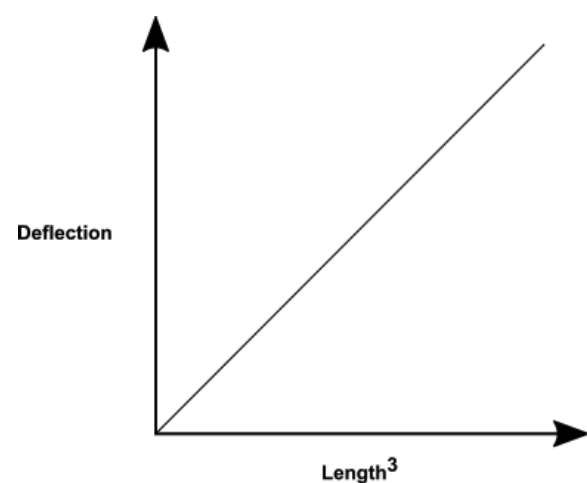
SOFTWARE

TecEquipment 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 different beam cross-sectional shapes and material properties, extending the learning experience beyond the practical laboratory session.



TYPICAL EXPERIMENT RESULTS COMPARING THE DEFLECTION OF BEAMS OF DIFFERENT METALS



TYPICAL EXPERIMENT RESULTS COMPARING DEFLECTION AGAINST LENGTH CUBED

DEFLECTION OF BEAMS AND CANTILEVERS



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

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

DIMENSIONS AND WEIGHT:

- Nett (assembled): 850 mm long x 108 mm front to back and 413 mm high and 8 kg
- Approximate primary packed (with storage tray): 0.07 m³ and 10 kg

SPACE NEEDED:

- 1500 mm x 600 mm, level bench or desk

ITEMS INCLUDED:

- Two beam supports with two fixing methods
- Support with digital deflection indicator of resolution 0.01 mm
- Five different beams of length 850 mm and nominal cross sections:
 - Aluminium: 19 x 3.2 mm, 19 x 4.8 mm and 25.4 x 3.2 mm
 - Brass: 25.4 mm x 3.2 mm
 - Mild steel: 25.4 mm x 3.2 mm
- Cable
- Nine mass hangers
- 50 x 20 g masses
- Hexagon tools for beam fixings
- Vernier caliper
- Storage tray
- Comprehensive user guide