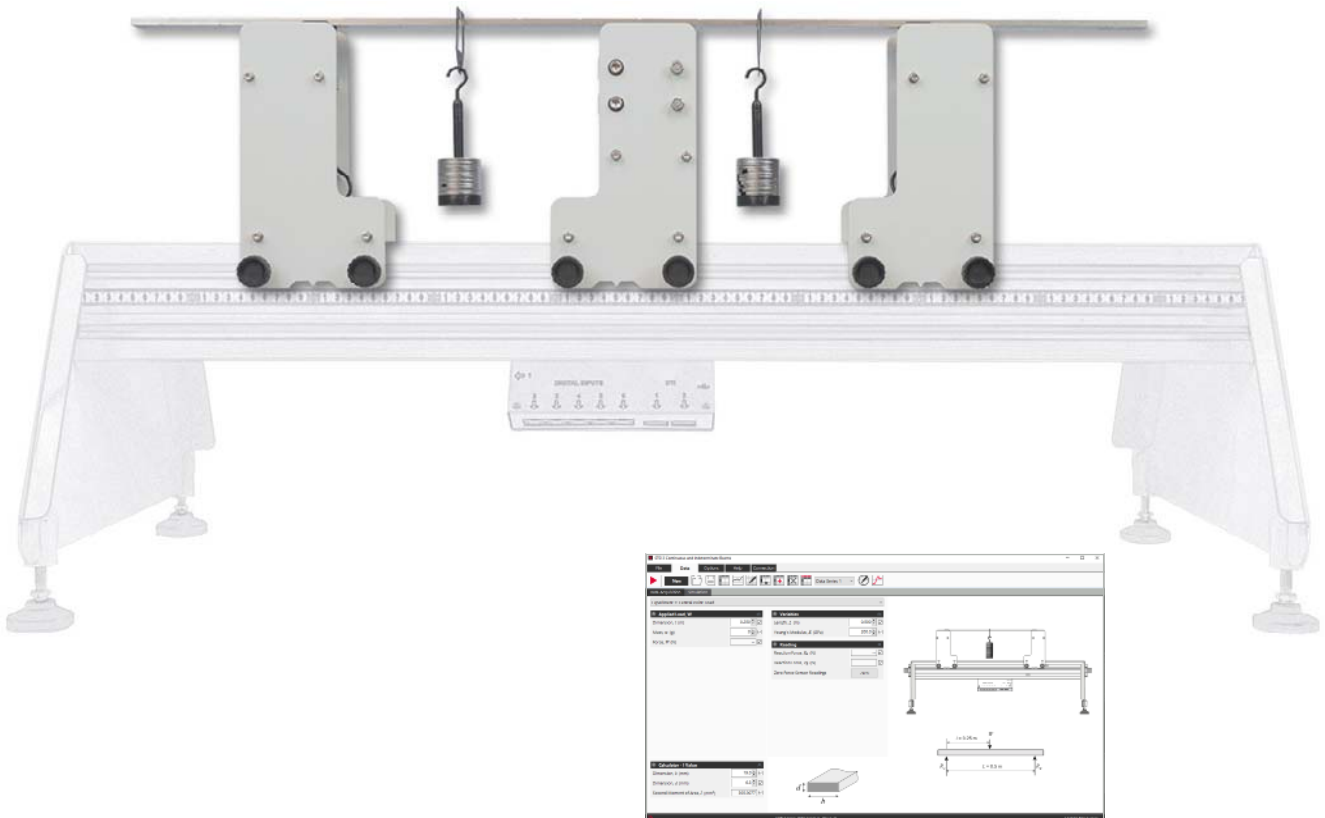




## CONTINUOUS AND INDETERMINATE BEAMS



Experiment that can be used to perform a wide variety of beam experiments, from simple cases to complex problems. Mounts on the Structures test frame 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
- Comprehensive range of experiments in both statically determinate and statically indeterminate beams
- Fits to the Structures platform for ergonomic use and space-saving storage
- Supplied with a storage tray to keep smaller items safe
- Includes additional masses for experiments with a uniformly distributed load (UDL)
- Includes Vernier caliper for beam cross-section measurement
- Works with user-friendly software (VDAS®)



# CONTINUOUS AND INDETERMINATE BEAMS



## DESCRIPTION

One of a range of experiment modules that fit to the Structures platform (STS1, available separately), this product provides a comprehensive set of experiments for the subject of beams and their support reactions and deflections.

The first experiments use two simple supports and a 'rigid' and heavy beam to examine statically determinate systems. Students learn basic principles such as moments, the principle of superposition, uniformly distributed loads (UDLs) and the concept of the influence line.

The second set of experiments relate to more advanced beam structures that are statically indeterminate, or involve a measurable beam deflection. Students use a light and 'flexible' beam. Using a 'flexible' beam allows students to consider the supports significantly more rigid, so the normal textbook theory becomes valid. Two additional supports help complete the experiments. One allows measurement of the support fixing moment, the other 'universal support' works as simple support, a clamped support and a sinking knife edge support. A precision indicator on a slide can be easily positioned to measure beam deflections. All supports and the indicator slide have pointers that work with the scale and the platform for accurate position.

**NOTE:** The alternative product, Equilibrium of a Simply Supported Beam (STS22), contains the first set of this experiment module's experiments as a more economical option if you do not need the more advanced areas of study.

Students apply loads to any position along the beams and measure the resulting reactions, deflections and moments. They use textbook beam equations to predict the results 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.

The deflection indicator has its own display but it can connect (with the load cells) 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

- Principle of moments
- Reactions for a point load along a simply supported beam
- Reactions for a uniformly distributed load (UDL) on a simply supported beam
- The principle of superposition
- Influence Lines
- Deflection of a simply supported beam
- Reactions for a continuous beam
- Reactions and moments of a propped cantilever
- Reactions and moments of a fixed beam
- The effect of a sinking support

## 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 larger loads and beam spans, extending the learning experience beyond the practical laboratory session.

## 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



# CONTINUOUS AND INDETERMINATE BEAMS



## SPECIFICATIONS

TecQuipment 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:

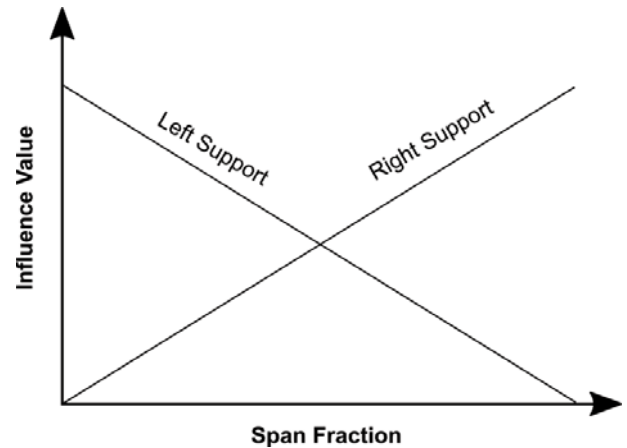
- Nett (assembled): 850 mm long x 108 mm front to back and 240 mm high and 11 kg
- Approximate primary packed (with storage tray): 0.07 m<sup>3</sup> and 13 kg

### SPACE NEEDED:

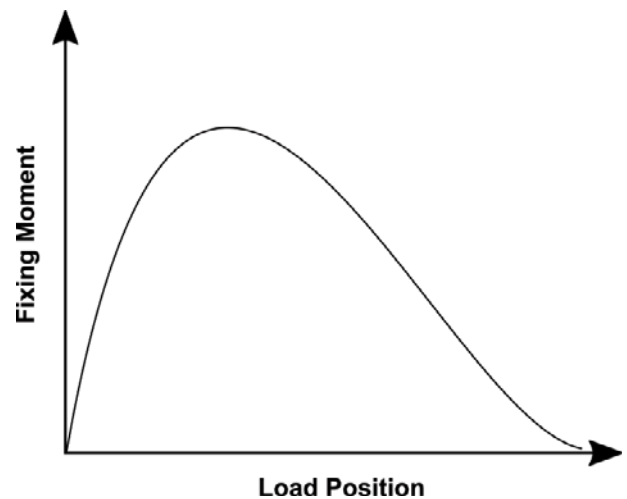
- 1500 mm x 600 mm, level bench or desk

### ITEMS INCLUDED:

- Two simple supports measuring vertical reaction
- A universal support that measures vertical reactions and can act as a fixed or sinking support
- A moment support measuring fixing moment
- Industrial deflection indicator of resolution 0.01 mm
- A rigid beam of length 850 mm and 19 x 6.3 mm section
- A flexible beam of length 600 mm and 18 x 2 mm section
- Four cables
- Nine mass hangers and 50 x 20 g masses
- Hexagon tools
- Steel rule and Vernier caliper
- Storage tray
- Comprehensive user guide



TYPICAL EXPERIMENT RESULTS SHOWING THE REACTION INFLUENCE LINES FOR A SIMPLY SUPPORTED BEAM



TYPICAL EXPERIMENT RESULTS COMPARING FIXING MOMENT TO LOAD POSITION FOR AN ENCASTRE (FIXED) BEAM