

WP 961

Beam on two supports: shear force diagram



Description

■ application of the method of sections to determine the shear force

WP 961 consists of a beam mounted on two supports which is subjected to point loads. The beam is cut at one point. At that point there is a low-friction hinge with one degree of freedom. The force gauge indicates the internal reaction (shear force) at this point on the beam. An adjuster nut on the force gauge is used to align the beam horizontally and balance out any deflection.

The reactions are determined from the static conditions of equilibrium. To investigate the effect of the point loads in the beam, it is notionally split into two segments. Applying the method of sections, the internal forces and moments are plotted onto the two segments and calculated by way of conditions of equilibrium.

Learning objectives/experiments

- calculation of the reactions arising from the static conditions of equilibrium
- application of the method of sections to calculate the internal forces
 - ▶ under a point load
 - ▶ under multiple point loads
- calculation of the shear force diagram
- comparison of calculated and measured shear force values

Specification

- [1] investigation of shear force on beam mounted on 2 supports
- [2] measurement of shear force in beam by low-friction hinge with 1 degree of freedom
- [3] position of hinge at $1/3$ span
- [4] 2 bearing supports
- [5] loading of beam by 1 to 3 point loads
- [6] force gauge to indicate shear force
- [7] adjuster nut for horizontal alignment of beam
- [8] storage system to house the components

Technical data

Beam

- total length: 1100mm
- span: 800mm

Shear force measuring range: $\pm 50\text{N}$

Weights

- 3x 1N (weight holder)
- 3x 1N (hanger), 12x 1N, 9x 5N
- max. weight per hanger and weight holder: 20N

LxWxH: 1100x320x780mm (assembled)

LxWxH: 1180x490x180mm (storage system)

Total weight: approx. 40kg

Scope of delivery

- 1 experimental unit
- 1 set of weights
- 1 set of accessories
- 1 storage system with foam inlay
- 1 set of instructional material

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Optional accessories

WP 300.09

Laboratory trolley