| **Product Name :** | **Product Code :** |
|---|---|
| Shear Force and Bending Moment Diagram | ALABS-A169-028 |



**Description :**

**Shear Force and Bending Moment Diagram**

Statics observes the effect of forces on a rigid
body, ignoring any possible deformations which may occur in the process.
The forces are in equilibrium. In reality, forces always produce an
effect in the component, such as deformation. These effects are
investigated in the science of the strength of materials. The methods
applied in strength of materials serve to design components so that they
cannot be deformed or destroyed by applied forces. A simple example is a
statically determinate bearing-mounted beam subjected to point loads.
The reactions are determined from the 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.  Bending Moment Diagram includes a
beam mounted on two supports. The beam is cut at one point. At that
point there is a low-friction hinge with two degrees of freedom. Two
force gauges determine the internal reactions to the externally applied
forces at the section. The shear force is recorded and displayed
directly by a force gauge. The bending moment occurring at the section
is recorded by a second force gauge acting on a fixed lever arm. This
force readout, divided by 10, gives the bending moment in Nm. Adjuster

nuts on the two force gauges are used to align the beam horizontally and balance out any deflection. In evaluating the experiment it becomes clear that the shear force, as opposed to the bending moment, is mostly negligible when designing components. The various elements of the experiment are clearly laid-out and housed securely in a storage system. The complete test setup is arranged on a frame. The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

**Specification:**

1. Determination of shear force and bending moment on beam mounted on 2 supports

2. Measurement of shear force and bending moment in beam by low-friction hinge with 2 degrees 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 gauges to indicate shear force and determine bending moment

7. Bending moment determined by force measurement and lever arm

8. Adjuster nuts for horizontal alignment of beam

9. Steel rule to determine positions of point loads

10. Storage system to house the components

**Technical Data:**

*Beam*

- total length: 1000mm

- span: 800mm

*Measuring ranges*

- bending moment via force gauge and lever arm

lever arm: 100mm

Force gauge: -100…+100N

bending moment: -10…+10Nm

- shear force: -50…+50N

- steel rule: 1000mm, graduations: 1mm

*Set of weights*

- 3x 1N (hangers)

- 12x 1N

- 9x 5N

- max. weight load per hanger: 20N