

P4120
Structures Range
Bench Top
Teaching Apparatus

INTRODUCTION

Cussons Structures range comprises of a standard test frame, loading and measurement units, and a range of different test structures that fit into the range.

The range provides an excellent introduction to structures for demonstration or for experiments at a technician and undergraduate level.

EXPERIMENTAL CAPABILITY

- ◆ P4125 Deflection of Beams
- ◆ P4126 Buckling of Struts
- ◆ P4127 Measurement of Shear Forces
- ◆ P4128 Measurement of Bending Moment
- ◆ P4130 Rigidly Supported Arch
- ◆ P4131 Two Hinged Arch
- ◆ P4132 Three Hinged Arch
- ◆ P4133 Suspension Bridge
- ◆ P4134 Forces in a Truss
- ◆ P4135 Portal Frame
- ◆ P4140 Plastic deflection of beam
- ◆ P4141 Plastic deflection of portal

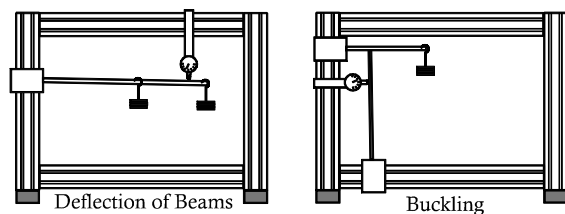
DESCRIPTION

The study of structures can be undertaken by dedicated sets of test equipment, such as Cussons Didactec Structures Range, or through a modular design, allowing a wide range of experiments to be conducted on one standard framework. This range of bench top products is designed to work from a single basic frame P4120 (a requirement for all experiments)

and with a range of dial gauges, displacement indicators weights and load cells.

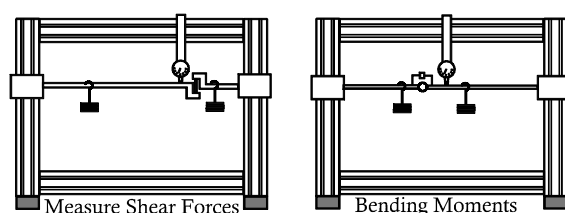
The equipment is complimented by Cussons structures software system which provides an interactive system for the input of loads and calculation of displacements. However many teachers find that the traditional weights and dial gauge system provides a better teaching base.

P4125 Deflection of Beams allows the deflections of cantilevered, encastre and simply supported beams to be measured under load. Four beams are supplied as standard.



P4126 Buckling of Struts allows vertical struts to be loaded and the deflections measured. Four struts are supplied as standard.

P4127 Measurement of Shear Forces provides a special beam that is joined from two parts and constrained in such a way that it only has freedom in shear. The shear is resisted by a load cell. P4121 is a required accessory. The beam can be simply supported or encastre.



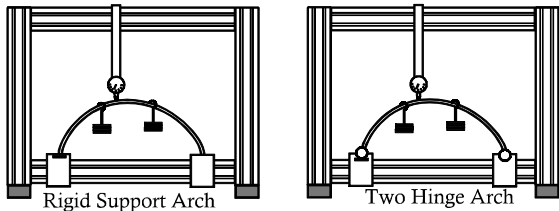
P4128 Measurement of Bending Moments provides a special beam that is joined from two parts with a pivot. Rotation of the pivot is resisted by a load cell. P4121 is a required accessory. The beam can be simply supported or encastre.

P4130 Rigidly Supported Arch provides an arch, which is located rigidly at one end and with freedom of horizontal movement at the other. The arch can be loaded at a number of points, and the deflections measured together with the lateral force at one end and the bending moment at the other.

P4131 Two Hinged Arch is similar to P4130 but allows each end of the arch to rotate.

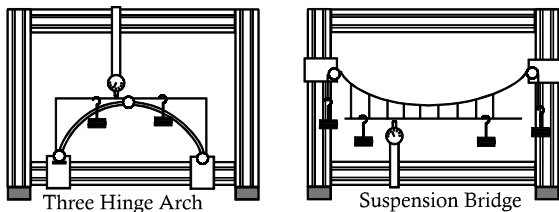
P4132 Three Hinged Arch is similar to P4131 but with a central hinge point and a bridge structure.

P4133 Suspension Bridge structure allows the loads



on the suspension cable to be measured whilst loads are applied to the roadway structure. Deflections of the structure can be measured.

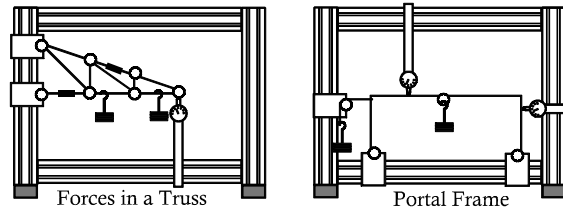
P4134 Forces in a Truss allows a truss to be built up



and loads within the truss members to be measured. Deflections on the structure can be measured at various points and the loads applied.

P4135 Portal Frame allows loads to be applied both vertically and horizontally to the frame. Deflections can be measured in each direction as the load is applied and removed.

P4140 Plastic Deflection of a Beam allows additional movement of the beam, its loads and its measuring devices to take the beam through the point of plastic failure. The beam is allowed to move from one end horizontally as the beam deforms. Simply supported

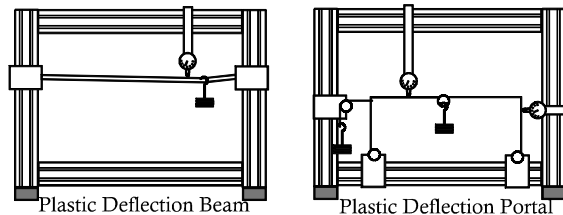


and encastre beam supports are available.

P4141 Plastic Deflection of Portals also allows portals to be deflected beyond the point of yield.

REQUIRED EQUIPMENT

P4120 Single Basic Frame is required for all of the above experiments, and should be purchased as a stand alone item. Additional P4120 Frames allow different groups of students to conduct different tests at the same time. P4120 includes two dial gauges



adapted for mounting on the frame, and two sets of weights and hangers for applying manual loads.

OPTIONAL EQUIPMENT

P4121 provides two electronic load cells by which forces can be applied, together with a digital display of the force. It also includes two displacement indicators, and display for measuring deflections.