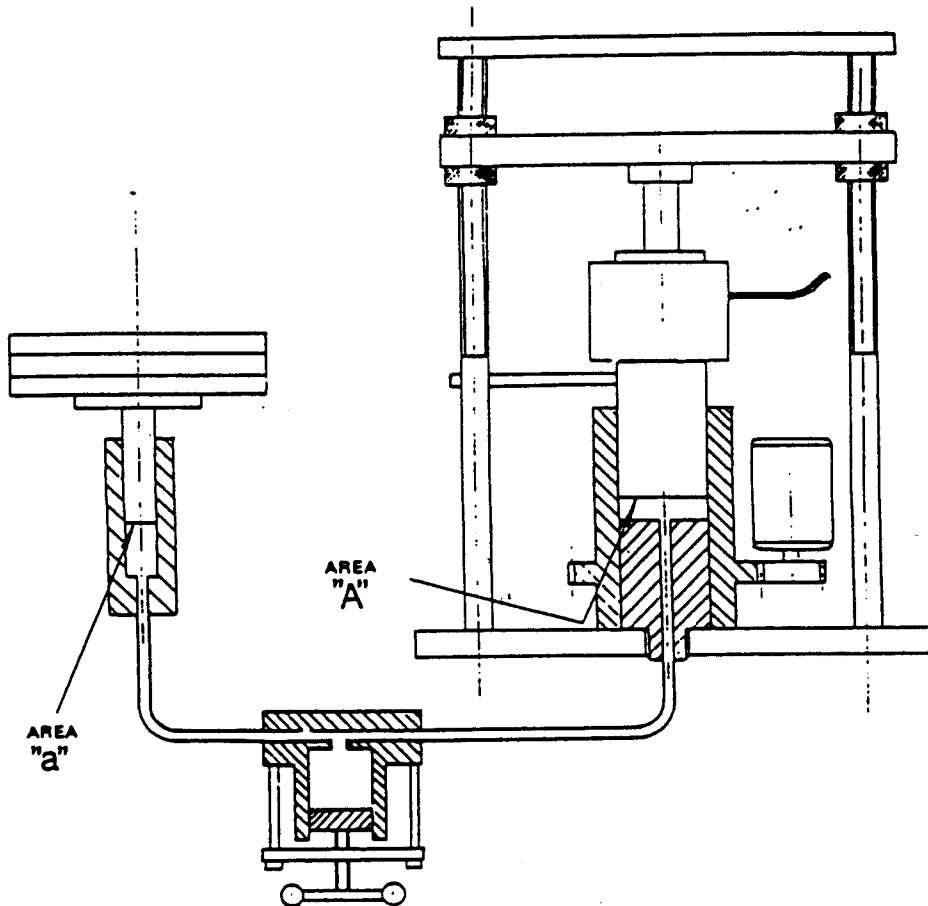


A system for the accurate calibration of load cells and proving rings, based on a rig made and used by Imperial College of Science and Technology.



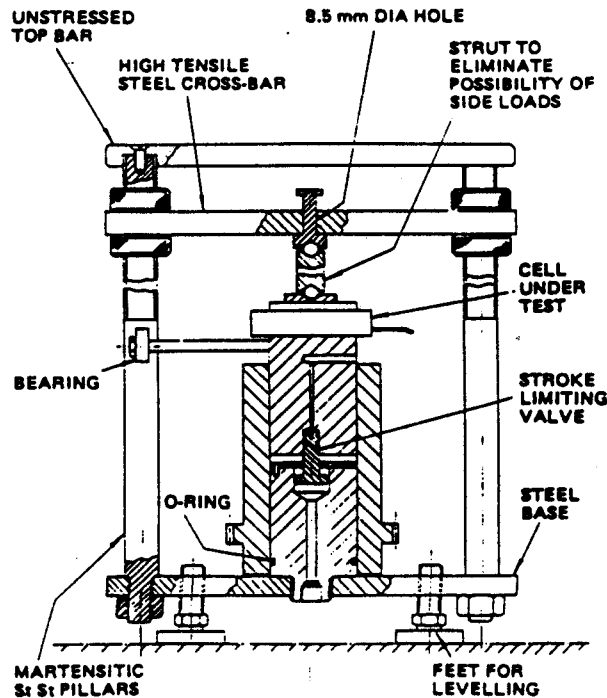
PRINCIPLE OF OPERATION

The load is applied by a piston in a revolving cylinder to which a known hydraulic pressure is admitted. The cylinder and piston are accurately machined to give a known effective area; no packing or oil seal is fitted ensuring that there is no longitudinal friction between the piston and cylinder so that the force exerted is directly proportional to the pressure applied.

The press can be used in conjunction with a dead-weight pressure tester as illustrated above. In this form it may be regarded as a force multiplier, by which the weight of the weights applied to the piston (area a) is multiplied by the ratio A/a to give the force applied to the cell being calibrated.

Maximum Force

Piston Area	Maximum Pressure	Maximum Load
0.002 m ²	{ 25 MN/m ² 250 bar	50 kN
20 cm ²	250 kg/cm ²	5000 kg
3.1 in ²	3550 lb/in ²	11,000 lb



Minimum Force

The practicality of applying a low known pressure of sufficient accuracy is likely to govern the minimum force at which the press will be used. The piston weighs 1.50 kg.

Accuracy

The effective area is within 0.05% of nominal. Overall accuracy depends on accuracy of measurement of the pressure applied.

Sensitivity

The press is sensitive to better than 0.01% of load. (The prototype was sensitive to 10 grammes on low loads).

Dimensions (mm)

Width 250, Depth 330, Height 620.

Maximum gap piston/crossbar 300.

Gap between pillars 175

Piston & Cylinder

The area of the piston is 20cm^2 . The stroke is 15mm. The cylinder revolves at 8 r.p.m. and is driven by an electric motor through gears. Electricity supply to 240V 50 Hz.

Oil

A mineral based hydraulic oil, within the Viscosity Grade VG15 to VG37 to ISO 3448 (BS.4231) is recommended.

Safety

If the stroke of the piston is exceeded a valve vents the system to atmosphere. If the pressure is connected to a system in which pressures above those given can be attained it is advisable to fit a relief valve to prevent an excessive force being applied to the press.

Pressure Source

This press is suitable for use with a Fig. 380L or 380M Deadweight Pressure Gauge Tester. These testers are already in general use in many laboratories.

Fig. 380D Dead-weight Tester may also be used, but at forces over 2500 lb (1100 kg or 11kN) the oil leakage from the press causes the piston of the tester to fall rapidly and frequent operation of the pump handle is required; this operation has not been found by Imperial College to cause any difficulty in the calibration of strain gauge type load cells.

We are able to supply gauges with 0.25% accuracy calibrated in load for use with this press. Note that the area of the piston is a round metric figure so that readings of pressure gauges graduated in metric units can easily be converted to indicate loads in kg or N as appropriate.