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Flat Jack System – FJCA00

A flat jack is a special thin jack which is used for in-situ stress measurement or measurements associated with determination of elastic properties of rock masses. This is a moon shaped stainless steel cell welded around its periphery to contain a liquid, similar to a pressure cell. In addition, two steel tubes with valves at their ends exist to facilitate de-airing of the jack and producing pressure via a hydraulic pump. The thickness of the cell is usually less than 10mm and is equal to the blade thickness that creates the slot in the rock. The cell can be reused if the rock surface is smooth and is free from indentations.

Application

Some of the applications of this instrument are:
- In situ stress measurement in tunnels and mines.
- Lining stress determination.
- Measuring stress in buildings and brick structures.
- Compensation test to measure stresses in the ground associated with swelling or creep of the soft rocks.
- Stress determination in foundations.

Operation and Installation

A slot is cut into the rock mass by an electrical saw where stress measurement is desired. A pair of pins is installed at two sides of the slot which undergoes some convergence as a result of slotting and in-situ stress relaxation. The original distance between pins are measured with an accurate gauge before slotting. After cutting the slot, a flat jack (which is identical in shape and size to the slot) is inserted in the slot and a pressure is applied to the rock to cancel (compensate) for the pin movements. When the pins are back to their original locations, the pressure in the cell (with some corrections) can be assumed to be equal to the local stress normal to the jack face. With repeating similar measurements around the tunnel at three different directions, in-situ stresses can be measured in a 2D plane (or in 3D space, if at least 6 Independent measurements are done).

Technical Spec	
Jack radius	150 mm (standard Version)
Jack thickness	8 mm
Pressure range	10-200 Bars

Order information

FJCA00-A
A: Pressure range in Bars