Australian Standard®

Methods of testing rocks for engineering purposes

Method 4.3: Rock strength tests—Determination of deformability of rock materials in uniaxial compression

METHOD

1 SCOPE This Standard sets out the method for determining the stress-strain curves and Young modulus, and Poisson ratio in uniaxial compression of a rock sample in the form of specimens of regular geometry. The test is mainly intended for classification and characterization of intact rock.

2 REFERENCED DOCUMENT The following document is referred to in this Standard:

AS
2193 Methods for calibration and grading of force-measuring systems of testing machines

3 APPARATUS The following apparatus is required:

(a) A suitable machine for applying and measuring axial load to the specimen. It shall be of sufficient capacity and capable of applying load at the rate specified in Clause 5 (see Note 1).

(b) Steel discs having a Rockwell hardness of not less than 30 HRC shall be placed at the specimen ends. The diameter of the discs shall be the same as the diameter of the specimen. The thickness of the discs shall be not less than the larger of 15 mm or $D/3$ where D is the specimen diameter. Surfaces of the discs shall be ground and their flatness shall be within 0.005 mm. One of the two discs shall incorporate a spherical seat. The spherical seat shall be placed on the upper end of the specimen. It shall be lightly lubricated with mineral oil so that it locks after the dead-weight of the cross-head has been picked up. The specimen, the discs and spherical seat shall be accurately centred with respect to one another and to the axis of load application of the loading machine. The curvature centre of the spherical seat surface shall coincide with the centre of the specimen top face (see Note 2).

(c) A measuring instrument such as vernier or micrometer callipers capable of measuring specimen dimensions with a precision of 0.1 mm.

(d) Electrical resistance strain gauges, linear variable differential transformers (LVDTs), compressometers, optical devices or other suitable measuring devices. Their design shall be such that the average of two circumferential and two axial strain measurements equally spaced can be determined for each increment of load. The devices shall be robust and stable, with strain sensitivity of the order of 5×10^{-6} (see Note 3).