

## REVISITING LARGE SIZE DIRECT SHEAR TESTING OF ROCK MASS FOUNDATIONS

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**Abstract:** *A newly developed apparatus for large size in situ shear testing of concrete-rock interfaces is described in this paper. Attention is placed on the development of the main components forming the apparatus and the advanced monitoring features which allow for continuous measurements of both the normal and shear displacements and loads by means of advanced data acquisition systems. A typical test performed on the granite rock mass foundation of the Cumbidanovu Dam (Italy) will be described together with the results obtained.*

### 1 INTRODUCTION

The design of geotechnical structures in rock masses such as dam foundations and rock slopes requires one to assess the shear strength of rock joints and discontinuities. Also of interest is the performance of such a test on concrete-rock interfaces. This is usually done by direct shear testing in the laboratory and, preferably, in situ. The latter type of test is however rather complex, time consuming, and expensive, with the consequence that it is performed in very limited number so as to make it difficult if not impossible to assess the shear strength properties with any statistical significance.

This paper is intended to describe a newly developed apparatus for large size in situ shear testing of concrete-rock interfaces and rock joints, with size of 1.60 x 1.00 m. The most attention has been placed on the development of the mechanical components forming the apparatus and the advanced monitoring features which allow for continuous measurement of both the normal and shear displacements and loads with high accuracy by means of an advanced data acquisition system.

A test can be performed in closely controlled conditions and while obtaining directly the results of testing in graphic and numerical form. In particular, a step-wise procedure can be adopted on a single interface so that both the peak and residual shear envelopes can be obtained. The results of a direct shear test on the rock mass foundation of a 72.7 m high concrete gravity dam, presently under construction in Orgosolo (Italy), will be reported in detail.

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