



ROCK FACE STABILISATION

Italy, 1992

PROJECT CHARACTERISTICS

Works: A high overhanging rock face is impending over the penstock of a power plant issuing at the base of the cliff. Rock falling from the cliff barely missed the penstock in several occasions. The danger of more such falls is real and a study of the cliff geometry, of the rock jointing and of likely trajectories of rock units of different size, falling from different points, was considered necessary. The work extended to stabilising measures on the face and to catching structures at the toe of the face.

Purpose: Safety and increased reliability of a hydroelectric power plant.

Dimensions:

- height of the cliff face: 110 m
- area surveyed : 20 000 m²
- area of stabilising works: 5 000 m² approximately

Materials:

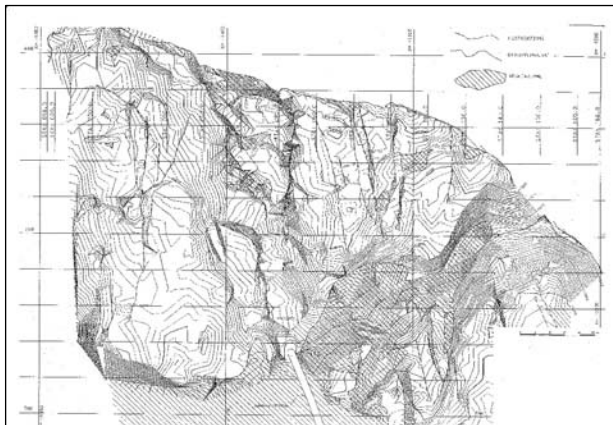
- limestone rock



PROFESSIONAL SERVICES PERFORMED

Site investigations, photogrammetric mapping and production of a 3D CAD terrain model of the face (a map with the vertical plane as datum has been produced). Stability analyses, identification of potentially unstable units on different sections of the face and definition of the free fall and rebound trajectories. Design of several different measures to stabilise the rock face and to protect the penstock from falling blocks. Visual representations of the cliff surface. Report, maps and construction drawings.

Several structures and facilities (like roads) have been built in the past ignoring the potential danger represented by the fall of large rock blocks. Rain, temperature cycles, ice and fires may trigger rock falls. The danger of rockfalls increases for vertical or overhanging rock faces.



Here conventional surveying and analyses become impractical.

This assignment related to a hydro PP in Sicily, was used to develop a methodology allowing the production of a convenient vertical datum map, with remote land photomapping techniques and to apply the relevant stability analyses to rock units defined by the actual jointing systems.

Free fall trajectories were defined, as well as their rebounding, or a rolling continuation after the first impact with the ground, for several initial locations and size of the falling rocks.

The assignment was also a good example of application of rock slope stabilising measures in unusual conditions.