EARTHQUAKE PERFORMANCE OF GABION WALL FOR BORAL GAS

PORT VILA, VANUATU, AUSTRALIA

Mass Gravity Retaining Walls

Problem

The largest earthquake recorded to date in the vicinity of Port Vila occured on 2nd January 2002. The shock measured Ms 7.3 and was located approximately 45km west of the island of Efate at a depth of 18km. This earthquake was the result of a slip of the Australasian Plate beneath the Pacific Plate on the fault near the subduction zone approximately 40km in length.

Investigations after the earhquake showed a high variation in intensities across the island of Efate. Port Vila city localities suffered the worst effects with internsities ranging from MM6 (Slight damage, felt by all, books fall of their shelves) to MM10 (Masonry and frame construction destroyed, large landslips).

In July 1998 Maccaferri NZ Ltd was approached by Boral Gas to provide technical support for the design and construction of a retaining wall to support a new LPG Storage Tank Mound located along the Port Rd in Port Vila, Vanuatu. Local engineers Kinhill Kramer were also engaged by Boral Gas to provide the final design and drawings for the project.

Solution

In addition to the technical requirements for the site Maccaferri NZ Ltd was also requested to offer product that would provide the maximum level of durability at a site located approximately 200m from shoreline in a humid tropical environment. For these reasons Maccaferri Galmac/PVC gabions were recommended and accepted by the client and his engineer for this project.

The preliminary design for a 2.5m high mass gravity gabion wall was carried out by Maccaferri NZ Ltd using the Maccaferri software GawacWin. This wall height was subsequently increased to 3m. The foundation consisted of coral rock, however for the preliminary analysis conservative soil parameters were used for the foundation material and sand backfill. The preliminary analysis by Maccaferri NZ Ltd was reviewed and final designs carried out by the engineers Kinhill Kramer.

In addition to the Galmac/PVC gabions, Bidim geotextile was supplied to provide separation and filtration at the gabion and sand back-fill interface as well as Megaflo 150 to ensure efficient drainage behind the wall.

Client: Boral Gas

Designer / Consultant: KINHILL KRAMER (VANUATU)

Contractor: ENTERPRISE PERRONNET

Products used (Qty.)

- Gabion 999

Date of construction: 07/1998 - 12/1998

General View of Boral Gas Depot

Front view of wall pre earthquake

Corner view of wall pre earthquake

Front view of wall post earthquake

Corner view of wall post earthquake

Officine Maccaferri S.p.A.
Via Kennedy, 10 40069 Zola Predosa (Bologna) Italy
Tel: +39 051 6436 000
E-mail: info@hq.maccaferri.com