

# EARTHQUAKE PERFORMANCE OF GABION WALL PORT VILA, VANUATU

## RETAINING WALLS

**Product:** Galmac/PVC Gabions, Bidim, Enkamat, Megaflo

### Problem

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 engaged by Boral Gas to provide the final design and drawings for the project.

### Solution

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 backfill interface as well as Megaflo 150 to ensure sufficient drainage behind the wall. The vegetation on the steep uphill slope >1:2 was reinforced with Enkamat 7018.

The construction was carried out during the dry months of September and October by Enterprise Perronnet, a local contractor experienced in gabion construction. The construction was completed to the satisfaction of both the client, Boral Gas and their engineer Kinhill Kramer.



Site location

Date: July 1999



Gabion Wall after construction

Date: July 1999



After earthquake

Date: June 2002

Client name:

BORAL GAS

Main contractor name:

ENTERPRISE PERRONNET

Consultant:

KINHILL KRAMER

Product used:

GABIONS, BIDIM, ENKAMAT 7018, MEGAFLO 150

Construction date:

SEPTEMBER 1998



Landslip along Wharf road

Date: June 2002

## Earthquake Performance

The Boral Gas site is located along Wharf Rd, the site of two large landslides which occurred immediately following the main earthquake event. The earthquake caused significant blocks of limestone to break away from the cliff. In addition numerous fissures formed in the fill supporting the roadway.

A visual inspection of the gabion wall showed no signs of distress to the structure and no tension cracks were observed in the uphill slope above the wall.

At another site the pier for the Tuama bridge on the road out to White Sands had failed and the bridge was being support by the gabion abutment which was grouted after the earthquake for additional security until such time as a new bridge could be constructed.



Collapsed bridge pier

Date: June 2002



Column damage to school

Date: June 2002

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