MACCAFERRI AFRICA

CASE HISTORY

ZAF - CH - 043: Eng - Rev.07, June 2014

PIPELINE PROTECTION AT BAIE DU TOMBEAU

TOMBEAU, MAURITIUS

SHORELINE AND OFF-SHORE PROTECTION / PIPELINE PROTECTION

Product: Gabions

Problem

A sewerage pipeline 1,229m in diameter and approximately 90m long was laid along the Baie Du Tombeau sea-bed at depths varying between 5m to 10m. The pipes were exposed to the hydrodynamic forces generated by wave motion particularly during flood conditions. This led to them being undermined and with a risk of collapse. Collapse of the pipes would have led to detrimental effects on the health of the residents of Mauritius.

Scour protection of the pipes was required with a major design consideration for the works being that it should be able to resist the effects of wave induced water motion and other undersea currents. The protection system had to consider wave heights of 13m, wave periods of 14s and a return period of 1 in 100 years. A further consideration for the solution was the underwater installation technique.

Solution

Pre-filled bags of stone were placed beneath and around the undermined pipe for support and to create a platform suitable for the protection system. Gabion units were then placed over the newly "built" rock platform and pipe to prevent further scour.

The gabion units were delivered to the project, folded flat into bundles. The units erected and filled off-site weighed approximately 1,5 tons. Additional reinforcing steel rods were threaded along the selvedge wire of each filled unit. The steel rods served as reinforced lifting points for the each unit.

The pre-filled gabion units, were then lifted and placed onto a floating barge with the help of a lifting frame and crane assembly.

Lifting of pre-filled gabions Date: 2001

Lowering the units into the sea Date: 2001

After installation Date: Feb 2002

Client name:	
COMPTOIR SUD	
Main contractor name:	
JAN DE NUL SUBTECH DIVING & MARINE	
Consultant:	
NONE	
Product used:	
± 400m³ OF GABIONS	
Construction info:	
Construction date:	NOVEMBER 2001
Completion date:	FEBRUARY 2002

Solutions (Continued)

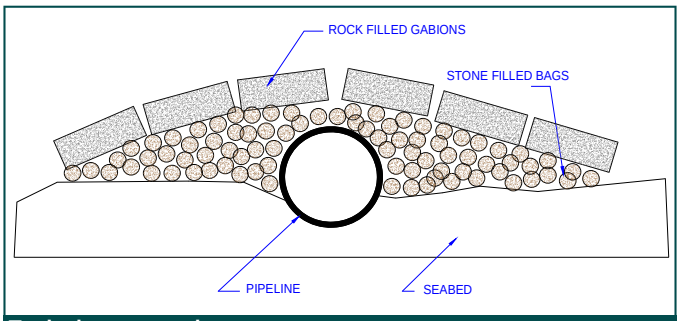
Once the barge had correctly positioned itself out at sea directly above the pipeline, the units were then lifted up by the crane lift assembly and lowered into the water. With the assistance of a diver, the units were guided into their final position over the pipeline.

Benefits

Apart from the gabion units providing adequate scour protection to the pipeline, several other benefits were noted, which include:

- The wire used to manufacture the gabions was heavily galvanised and PVC-coated. This together with the ability of the gabions to consolidate into the surrounding environment leads to an expected design life in excess of 50 years.
- Pre-filling the gabion units beforehand meant less underwater construction was required. All units could be assembled and filled off-site and merely directed and positioned underwater. This simplified construction significantly improving construction rates.
- The protection system offered additional safety to the pipeline against accidental impact, such as the lowering of anchors.
- Shortly after installing of the protection system, marine life had colonised on both the wire mesh and gabion rocks, suggesting that the gabions are beneficial to the environment and ecosystem encountered underwater.

Recolonisation of marine life Date: Feb 2002



Typical cross-section

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