

SUMMARY

Gansbaai's New Fishing Harbour is located in an area along the South African coastline subject to severe wave conditions. It is located approximately 65 km from the southernmost tip of Africa. Emergency repairs became vital when sections of the leeward breakwater failed. A total of 60 m (Ch 66 to Ch 126) of breakwater had failed by March 2011 when the contractor, Guerrini Marine Construction, based in South Africa, arrived on site.

Along the first 30 m (Ch 66 to Ch 96) of this 60 m section of failed breakwater rock armour was displaced over a distance of 30 m from the breakwater due to severe wave action in May 2010. Wave breaking along this section is in the form of plunging breakers on a hard rock bed (Failure Mechanism 1). In addition, the original core that predominantly consisted of fine material unprotected by a geomembrane had washed out from the breakwater core (Failure Mechanism 2). This resulted in a massive cavity 30 m long by 0.5 m to 1 m deep forming under the concrete roadway. Subsequently, the concrete roadway started to collapse into this cavity.

Along the second 30 m (Ch 96 to Ch 126) of this 60 m section of failed breakwater armour rock was displaced downwards from the toe, slope and crest areas of the breakwater. This in turn exposed the underlying core. In addition, the parapet wall was exposed and had to absorb direct wave impact.

The client, the Department of Public Works, acted swiftly and blocked off access to the breakwater and fast tracked the design, tender and procurement phase in order to get the contractor on site as soon as possible. Combining budgetary con-

straints and innovative design by WSP Africa Coastal Engineers, based in Stellenbosch, South Africa, the following solutions were catered for.

In general:

- For sustainability reasons WSP Coastal decided to salvage and re-use all existing 1-3 t rock.

Along the first 30 m of damage sustained (Ch 66 to Ch 96):

- Demolish existing concrete roadway.
- Trim back existing sandy core and overlay with geomembrane, 10-50 kg rock and 10-500 kg rock.
- Rebuild concrete roadway to 800 mm thickness and stichcast precast parapet walls to roadway.
- Reconstruct original 1-3 t double rock protection.
- Construct new single layer 4-6 t armour rock.

Along the second 30m of damage sustained (Ch 96 to Ch 126):

- Salvage and reconstruct original 1-3 t double rock protection.
- Construct new single layer 4-6 t armour rock.

The contract commenced on March 4, 2011 and was completed on September 5, 2011. The tender contract duration was six months. The contractor did well to complete the project within this time frame.