

Hot Dip Galvanized Case Study No.24

Richards Bay Pontoon

The Application

Berth 208, a new bulk liquid berth, in the Port of Richards Bay. This berth shares the border with the eChwebeni Natural Heritage site, which is of conservation significance, consisting of an ecologically sensitive mangrove area.

Environmental Impact Assessment (EIA) study for Berth 208 identified potential impact of the site with specific concern for increased shoreline erosion. A second, equally important impact was the deposition of sand by high tidal waters immediately landward of the eroded zone along the shoreline.

Environmental Conditions

Extreme marine subtropical extended time of wetness including significant and extended chloride effects, e.g. jetties and offshore structures. Structures subjected to extended periods of on-shore prevailing winds, exposed areas along the coastline and being subjected to wave motion and within the splash zone of salt water.



Completed pontoons in operation

Expected service life well in excess of 35 years with hot dip galvanized reinforcement within a severe marine environment

The Site

The site is regarded as severe marine environment in which fully exposed zinc would have corrosion rate exceeding 8 μm per year. As a result of the expected corrosion rate and the consequent attack on concrete, hot dip galvanized steel reinforcement was specified.

A total number of 44 concrete pontoons with galvanised reinforcing, each weighing approximately 63 tons and being 15m long x 5m wide and 1.5m deep were precast and lifted into the water and moored into position.

The pontoons are coupled together with specialised connectors and then moored to the seabed. The pontoons will extend over a distance of approximately 700m from the existing walkway of Berth 208 to Spinach point. They act as a floating wave attenuating structure to protect the environmentally sensitive mangrove area from further erosion and sand deposition blocking the drainage channel into the mangrove swamp area.

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Completed Concrete Pontoons waiting installation



Hot dip galvanized reinforcement in cast concrete pontoons being floated out in preparation for positioning and anchoring to the sea bed

Conclusion

Hot dip galvanizing is not a replacement for poor quality concrete, but rather used to add value and longevity to the reinforced concrete structure overcoming practical difficulties in meeting the requirements of a given specification.

Hot dip galvanizing of steel reinforcement is an economical and cost effective process that can be expected to substantially extend the useful service life of these concrete pontoons by as much 3 to 4 time the service life of the normally uncoated reinforcement.

The marginal cost increase (1 to 2%) of the total cost of a project is money well spent and will without doubt provide a justifiable return on the investment.