

Give us Moor Galvanizing - 20 years of Tropical Mooring

The Breakwater Marina Townsville is constructed of galvanized reinforcement and celebrates twenty years of service and its time for us to inspect the performance of the original galvanized steel.



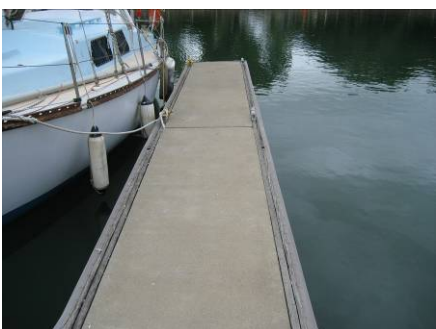
The phenomenal growth in migration and tourism in Queensland (Australia) and especially the Great Barrier Reef has seen a significant increase in boat ownership and moorings for cruisers and yachts. The 'Unifloat Marina System' is a low environmental impact marina where the moorings actually float and move up and down with the tide. This permits easy access to boats and requires fewer piles to be driven into the sea bed compared to traditional wharves and piers. These advantages have seen many of these moorings being installed along the coastline.



In Townsville, each of the moorings are long term lease which means these structures have an ongoing maintenance program. This is usually required in this type of severe marine environment. The clever modular design permits the easy repair or replacement of structural components and fittings, as needed. The Galvanizers Association of Australia visited this site in the late 1980's during construction and reported on the extensive use of galvanized components in February 1988, after its opening. Now, more than 20 years since the first piles were driven in, it is time to assess the performance of the galvanized steel in these harsh tidal conditions under a tropical environment.



The pontoon structures use galvanized steel mesh and bars which lay over polystyrene floatation cells encased in concrete. Inside these pontoons there are conduits which carry power and fresh water to each mooring and also provide the power for the security lighting. These pontoons are held in position by steel hoops around concrete rendered piles and these hoops are fitted with alignment rollers. The design of the pontoons results in the galvanized components and the top cement surface being within 1 metre, and in some cases within 0.3m of the tropical sea water. For galvanized steel, this environment is classified as severe as per ISO and Australian Standards given the temperature, rainfall, humidity, prevailing winds, cyclone exposure and the proximity to the sea.



On close inspection of the 20 year old marina it was found that the HDG fasteners holding the timber walers sections had typically degraded at the head and washers. On closer inspection the CCA treated timbers had also degraded and were nearing replacement. The rotting of wood can accelerate the corrosion of metal since it tends to retain the moisture. The HDG steel fittings such as the pile / pontoon location roller bracket and the pontoon hoops were in very good condition and did not show significant signs of deterioration of the structural steel. There were occasional localized breakdowns of the galvanized steel coatings on fittings where water ponding or abrasion had occurred. These fittings are modular and are easily replaced with new or refurbished units as part of the on-going routine maintenance. After 20 years of service, an extensive refurbishment of the existing marina and the construction of wharf extensions are due to start in March 2007, and galvanized steel will be used extensively following its excellent performance in this environment.



In comparative observations where the 'Unifloat Marina System' pontoons had previously been constructed with plain steel reinforcement, it had been reported that they would typically need replacement or significant structural repairs from corrosion of the reinforcement within 10 to 20 years depending on their specific locations. Based on our inspection and those of the responsible engineer, the galvanized steel reinforcement in these pontoons has yet to show signs of corrosion and is providing significantly greater durability.

The 20 years of exposure includes owners hosing down the boats, storms, waves, wind blown salt, humidity, and significant tidal movement without signs of corrosion of the galvanized steel reinforcement. The observed minor fine surface cracking were in areas that suffered from high levels of movement such as the joints in individual and smaller pontoon arms, and where the top concrete surfaces were slightly weakened due to the facilities man holes. These results are proof that galvanized reinforcement provides a significant extension in the durability of mooring assets, even under severe marine conditions.

GAA acknowledges with thanks the assistance of Breakwater Marina Manager Mr Chris Finucane and his staff

