

Case Study: Propeller Scour

Engineer: Scott Wilson Contractor: BAM Nuttall 2012



New Combi Piled Quay Wall

CT150 concrete mattress was selected to provide scour protection at Campbeltown harbour as part of the New Quay Expansion Project. Some 1,700 m² of mattress was installed to protect the extended slipway and the existing old quay structure from tug boat propeller action whilst manoeuvring large vessels.

The concrete mattress provides a 150mm thick cast insitu concrete slab on the harbour bed, with interlocking ball and socket joints providing highly effective protection from propeller action.

Required protection thickness is significantly reduced compared to other methods, as the slab construction prevents entry of positive pressures from vessel propellers and interlocking mattress panels cannot be displaced by rolling or sliding.

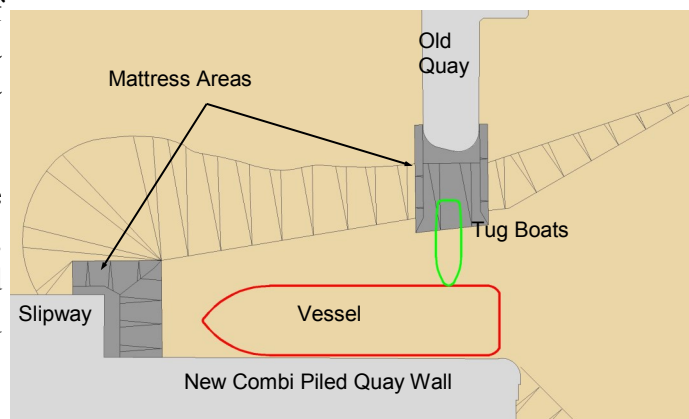
Proserve's Engineers designed the mattress construction system to overcome the challenges of the sloping bed mattress and site conditions, in consultation with the Main Contractor and Diver. Mattress panels were fabricated to suit, and Proserve provided detailed installation guidance, site visits, diver training and office based support to aid construction.

The concrete mattress was laid on a prepared bed made primarily of clay and marine sediment. Mattress panels were filled using a combination of automated layflat hose and diver filling. Fabric restraint envelopes pre-sewn to the top of individual mattress panels and slower filling rates allowed successful filling of the mattresses on slopes up to 1:2. The edges of the mattress were protected in the form of a toe trench covered in rock armour and a tremie concrete seal to the piled walls.

The concrete mattress system allowed the slab thickness to be accurately controlled, over locally undulating and sloping bed profiles, importantly maintaining the tug and vessel clearance.



Mattress Test Filling



Plan of the Mattress Areas and Boat Positions