

**OBJECTIVE:** To discuss options for the preservation of sheet piling using CSI Technology.

**OVERVIEW:** Shorewater Marine is a specialist marine maintenance company representing the Goldseal Group in Western Australia. While dealing with structural maintenance around Marinas and Wharfs they have been expending their experience in the protection of sheet piling.

Sheet piling is usually driven into the seabed to create a berthing face, with infill to create level marine maintenance facilities or recreational facilities for the public. In the case of port facilities, wharfs are extended into deeper water to facilitate the unloading of cargo vessels.

Sheet piling may be installed as raw steel or precoated. It is often tied back into bedrock to support the sheet wall while filling and consolidation is undertaken and to support the wall in case ground water should break through and cut out the fill

**Degradation:** Where anodes or other electric protection is used, corrosion is usually controllable below the waterline (some exceptions include Accelerated Low water Corrosion and Microbial activity). In general most steel loss is in the tidal splash zone resulting in oxidation flaking of the sheet piling surface. Once holes in the sheet piling occur then groundwater preferentially flows to this point taking consolidated fill with it.

## GOLDSEAL GROUP

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Commercial sheet piling fishing harbour



Tie back rod



## MAINTENANCE OPTIONS :



**1. Blast and Paint.** This involves air chiselling off up to 30mm of flake , sand blasting to a clean surface , scaffolding and encapsulation and a paint system applied without salt contamination of the blasted steel or intercoat contamination during application.

This option could be cost effective where sheet piling is in its best condition.

**2. Goldseal CSI Single Coat:** This option is appropriate in sheltered waters inside a marina where wave action and sea weed or rubbish in the water is controllable. Goldseal can be applied directly to either clean sheet piling or air chiselled sheet piling without Grit blasting. It can be applied down to the low tide mark by hot spray or cold glove application up to 10,000 microns( if necessary) in one application.

Goldseal can be applied by Hotspray , brush or Glove to any steel member subject to tidal immersion in relatively still water.

It is a particularly cost effective option where shipping wharfs have been built out to deeper water from a sheet piling face , with a rock fill slope at the base which reduces wave action.

In this situation where sheet piling is difficult to replace Goldseal CSI can be applied directly to thick scale as a cost effective rescue coating while other options are sought.

Goldseal will seal the concrete to steel join and will halt the Chloride Ion spalling process.

**3. Smartboard Goldseal Barrier System:** This system is designed to

- a. Halt further damage to the exposed splash zone , protect to the low water line and may even be deployed to the sea bed.
- b. Significantly upgrade the visual aspect of ageing sheet piling , particularly in public recreational or boat launching areas.

In this option scale is removed as required and the surface washed and neutralised. CSI Technology is formulated for application direct to oxidised steel without grit blasting.

Firstly penetrants take anticorrosives to the surface of the steel and penetrate the steel surface. See photo 4. The formulation cannot separate



Polystyrene cut to the sheet pile profile protects the water line.



Close up of penetrants in action after 5 years





*Foam infill...tidy up goldseal and rust down to water level.*



*Smart board installation*



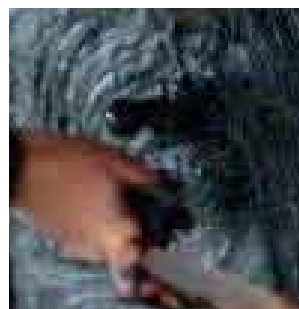
*Smart board closeup*



*Mindarie before.....*

or delaminate like a paint. There are no intercoat or contamination issues as there is one waterproof application. Performance is supported in the field by service life in wet, condensation or submerged conditions of over 20 years.:

Secondly the black Smartboard is installed by nuts and washers compressing the board to the steel flat faces of the sheet piling, using threaded studs welded to the cleaned sheet pile surface. This will



leave a still Goldseal coated void behind the concave section of the sheet. This void has no day light, little water movement or nutrients to support growth.

The Goldseal surface does not support marine growth. The boards are simple to dis-install for inspection.

**4. Smartboard Goldseal Infill Barrier System:** Where it is felt an infill system is required behind the smart board (to reduce wave action or marine growth behind the board), then a computer cut infill is installed. Cold Goldseal is applied as a surfacing compound to fill voids. This produces a level surface where the tightening of the nuts forces the board into compression contact with the Goldseal coated steel and infill surface.

**Environmentally Appropriate:** The smart board is made from recycled and reconstituted material. It is strong, flexible and impact resistant. Goldseal CSI Technology is 97% solids and can be applied to any film build without running or sagging. The product has no catalysts or solvents and is non Dangerous Goods for transport, handling and storage. It will float on water without rainbowing and is spill recycle able to commercial use.



*and Mindarie after*