CORROSION TECHNICAL BULLETIN 23

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Concrete decking

The use of galvanised products for the formation of profiled concrete formwork decking which is permanently placed prior to pouring the reinforced concrete slab has been a common building practise within Australia for over 20 years. Galvanised material is well suited to applications involving contact with concrete slurries and the mild etching that the highly alkaline mix initiates. This leads to superior bonding with the galvanised deck.

However, there are four areas that are of direct concern with regard to possible corrosion.

1) Corrosion can result from poor detailing and positioning of the concrete reinforcing components, the positioning of the structural reinforcing steel or the positioning of the expansion joints. The poor performance of any of these components will lead to the penetration of water through exposed concrete decks causing premature failure of the supporting galvanised structural deck and any associated strucutral steelwork.

2) Corrosion of the bottom surface of the deck is also possible where the decking either constitutes a severely unwashed area, is placed in a severe environment or is placed at distances closer than 450mm to moist soil. Characteristic unwashed area corrosion mechanisms, will lead to the early consumption of the metallic coating in severe environments. Heavy coating mass galvanised material should be considered for use in such environments and further post painting of the decking with a high build industrial coating system may be required.

3) Incorrect edge detailing will lead to the direction of run off waters from the slab surface into the shrinkage gap between the edge of the supported concrete slab and the structural steel decking. This will lead to corrosion of the galvanised component of the decking at the interface and possibly, the loss of structural requirements.

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4) In all cases where studs are to be welded to structural steel beam, the surface in contact with the steel decking should be coated with a weld-through primer of an appropriate thickness (25µm). This is to prevent dissimilar metal corrosion of eh galvanised steel decking. Given the difficulty of rectification, it is strongly recommended that this practice be followed.

Figure 1: Corroded concrete decking showing the result of sub-standard expansion joint and finish detail.

ZINCALUME® steel is not recommended for concrete decking as formwork. While ZINCALUME® steel is resistant to corrosion in most atmospheric environemnts it is rapidly attacked by the alkaline concrete mix and must not be selected for this end use.

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