Case History
No. 12/2006

Douglas Colliery

Coating evaluation of overland conveyors V3, V4 and V5

The application

As overland conveyors form the lifeblood of the supply of material used in many process plants, their general lack of future coating maintenance due to the dusty conditions at hand and unlikely adequate surface preparation for maintenance painting, coupled to their often extraordinary length, suggests that a material or coating that can offer extensive years of service free life, be used.

The V3, V4 and V5 overland conveyors at Douglas Colliery, are such a system. First reported in the ***Foreword*** of our booklet, "Steel Protection by Hot Dip Galvanizing and Duplex Systems", the original of which was produced in January 1997, these conveyors are estimated to be in excess of 20 years old.

Although the hot dip galvanized coating is performing admirably, (see our findings) the coatings on both the idler frames, which are painted and the fasteners, which are zinc electroplated, are in the process of failing.

General view of Douglas Colliery.

The V3 overland conveyor has been exposed to the elements for in excess of 20 years.

Environmental conditions

From a general atmospheric corrosion perspective the conditions at hand are most probably a C1 to C2 category – ISO 9223 (Interior – Occasional Condensation; Exterior – Exposed Rural Inland), suggesting that the corrosion rate of zinc is about 0.1 to 0.7µm per year. In addition to the general atmospheric conditions, coal dust and particularly coal ash, coupled with moisture will be corrosive to zinc and therefore the coating may be prone to a more severe attack by way of corrosion.

Conditions at hand at this site indicate that the corrosion of zinc is slow and that the hot dip galvanized coating is likely to carry on performing in a manner that has become the norm, expected from most specifiers, in their use of a hot dip galvanized steel.

Our findings

Having visited several parts of the V3, V4 and V5 conveyor steelwork we found the hot dip galvanized coating on the horizontal and vertical members to be in excellent

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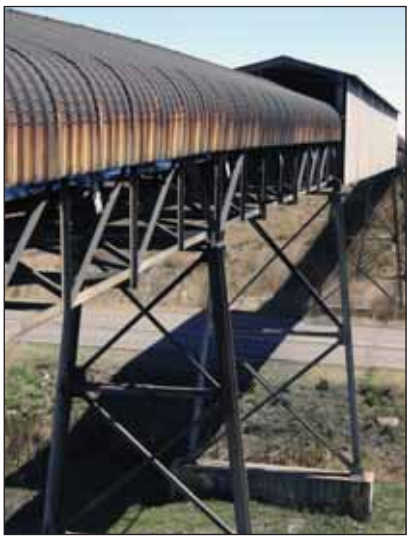
condition, with coating thickness readings varying between 117 to 279µm with a mean coating thickness of 140µm. The coating thickness readings are still well in excess of that required by the specification SANS 121, for this thickness of steel. All together 108 coating thickness readings were taken on both the horizontal and vertical angle support steelwork.

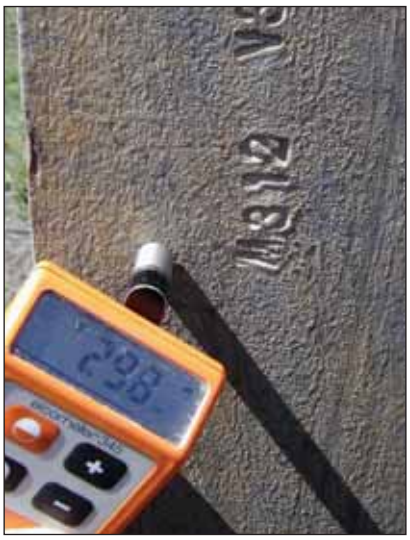
Conclusion

The hot dip galvanized coating on the overland conveyor steelwork has over the 20 year period, performed exceptionally well and if required, based on the residual coating thickness, will provide a further 40 to 60 years of maintenance free life. If necessary, the painted idler frames, which are showing signs of corrosion, may be selectively removed, abrasive blasted to remove the residual paint coating and then hot dip galvanized, providing a durable, predictable coating of extended maintenance free life. All fasteners if necessary should soon be replaced with hot dip galvanized equivalents if it is decided that the idler steelwork is hot dip galvanized.

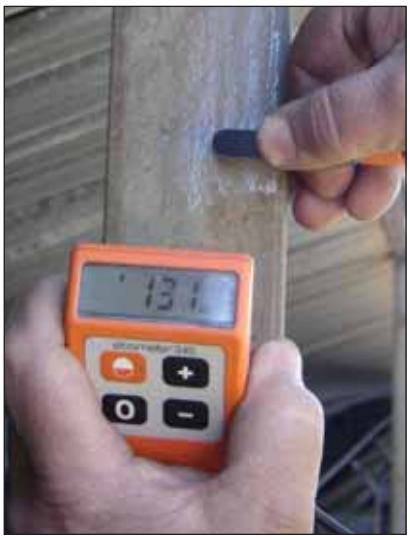
The Association wishes to thank Mr Ivan Pepler for his assistance and to Mr Mike Silcock both of BHP Billiton for the opportunity to record this case study.



The hot dip galvanized structural steelwork supporting the overland conveyor at an access road, is still performing exceptionally well after 20 years of service.



Coating thickness readings taken on the supporting structural steelwork at the access road were still in excess of that required by the specification.



Coating thickness readings taken on all the horizontal and vertical overland conveyor steelwork were still in excess of that required by the specification.

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