



Performance Report of Hot Dip Galvanized Coatings
at
Consolidated Rutile Limited
Stradbroke Island Separation Plant

30 February 1998



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Objective:

To analyze the performance of external and internal Hot Dip Galvanized coatings (A51650-1989, Section 5) within the Consolidated Rutile Limited Stradbroke Island Separation Plant, whilst increasing the "historical data" available for coating life predictions for similar applications.

Methodology:

The tests were performed with the approval of the Consolidated Rutile Limited on Friday 30 January, 1998.

All coating thickness readings were taken using a calibrated Elcometer 345 electronic digital coating thickness gauge. A Consolidated Rutile Limited representative was present for all testing.

The selection criteria for test zones was:

- A. The test zone must be Hot Dip Galvanized only. ie. not Duplex coated.
- B. The area could be accessed safely and the test zone could be sufficiently cleaned to provide accurate results. The test zones were cleaned by wire brushing prior to testing.
- C. The area could be photographed to provide an accurate site perspective. This would also enable subsequent coating performance tests to be undertaken in years to come.
- D. The "installation date" of the galvanized steel could be accurately traced through the Consolidated Rutile Limited plant records.

The Site:

The separation plant was constructed late in 1984 and has been operational since. The plant is built on a structural pontoon over a fresh water lake on the sand dunes of South Stradbroke Island. South Stradbroke Island is one of three large islands which provide the shelter for Moreton Bay on the southern Queensland Coast.

The purpose of this plant is to separate the Mineral Sands. The majority of the structural steel was originally painted in 1984 using a tar based epoxy system. The majority of this steel has since been repainted.



Results:

The results of all of the tests performed are presented in the following format:

Site No.	Steel section description. Site description and service life period. Original coating mass minimum requirement (AS 1650-1989). Coating thickness readings (microns) as at 13/06/96.
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The site numbers shown can be used as reference to the photographs and site map which follows. All of the tests performed are shown in micrometers (μm) and were converted to grams/m² by multiplying the result by 7.15 as per AS1650-1989 Appendix H 5.2. In all cases the current average coating thickness is above the original minimum average coating thickness which is required by AS1650-1989 Section 5. This occurs normally in practice with almost all hot rolled and cast steel products, due to surface reactivity and steel section thickness.

In that the results remain higher than the original coating thickness requirements it is impossible to calculate the actual corrosion rate of the hot dip galvanized coatings tested. However, given that the current readings are marginally less than the possible original coating thickness for the steels tested, it is reasonable to expect the coating to provide a maintenance free life of at least 40 years from its original construction in 1984.

Site CRL1: Tromel Walkway – Discharge End (Southern). GR50110 Expanded Mesh Walkway. This walkway and platform were galvanized and installed in 1984. This steelwork has always been exposed to the salt spray wind typical of this coastal marine environment.

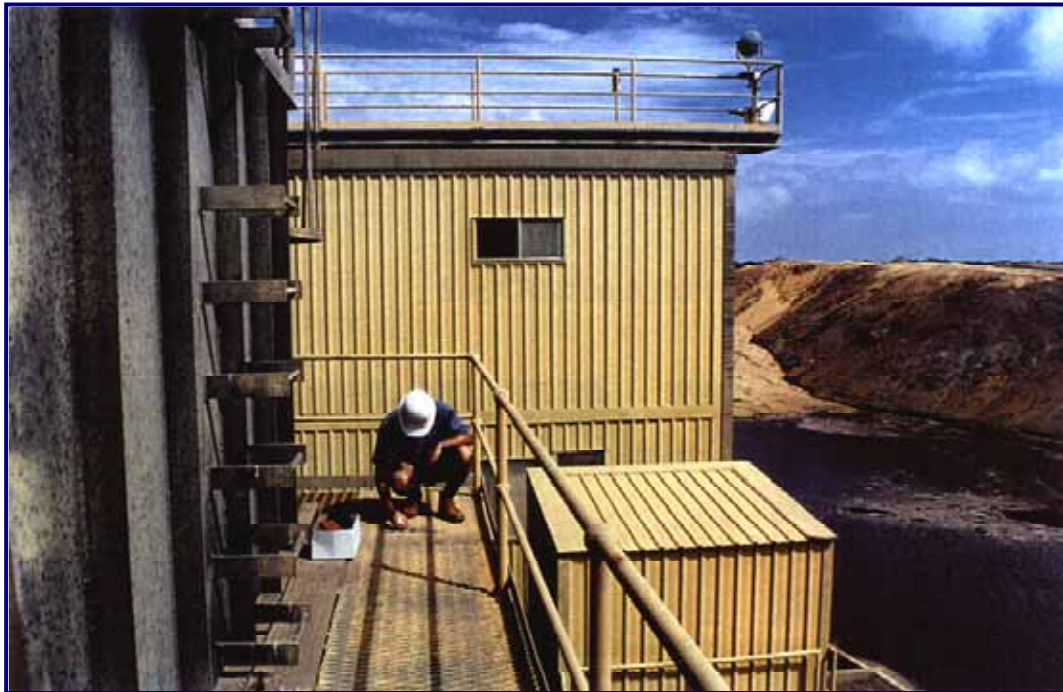
Original coating thickness requirement was $84\mu\text{m}$ or 600 grams/m².

Readings taken:

102, 93, 76, 82, 101, 73, 82, 92, 129, 85

Ave: $91.5\mu\text{m}$

Site CRL1



NB. Average thickness reading remains higher than original requirement.





Site CRL2 (a) & (b): The Rougher Spiral Frames - Intermediate level. These are the support frames for the separation spirals, galvanized and installed in 1984. Test site (a) was on the 50mm x 50mm x 4.0mm Rectangular Hollow Section steel. Test site (b) was on the 100mm x 100mm x 10mm hot rolled steel angle.

Original thickness requirement for (a) was $63\mu\text{m}$ or 450 grams/m^2 .
Original thickness requirement for (b) was $84\mu\text{m}$ or 600 grams/m^2 .

Readings taken at site (a):

81, 82, 80, 85, 77, 80, 83, 74, 78, 83

Ave: $80.3\mu\text{m}$

Readings taken at site (b):

165, 166, 122, 137, 106, 152, 127, 130, 131, 124

Ave: $136\mu\text{m}$

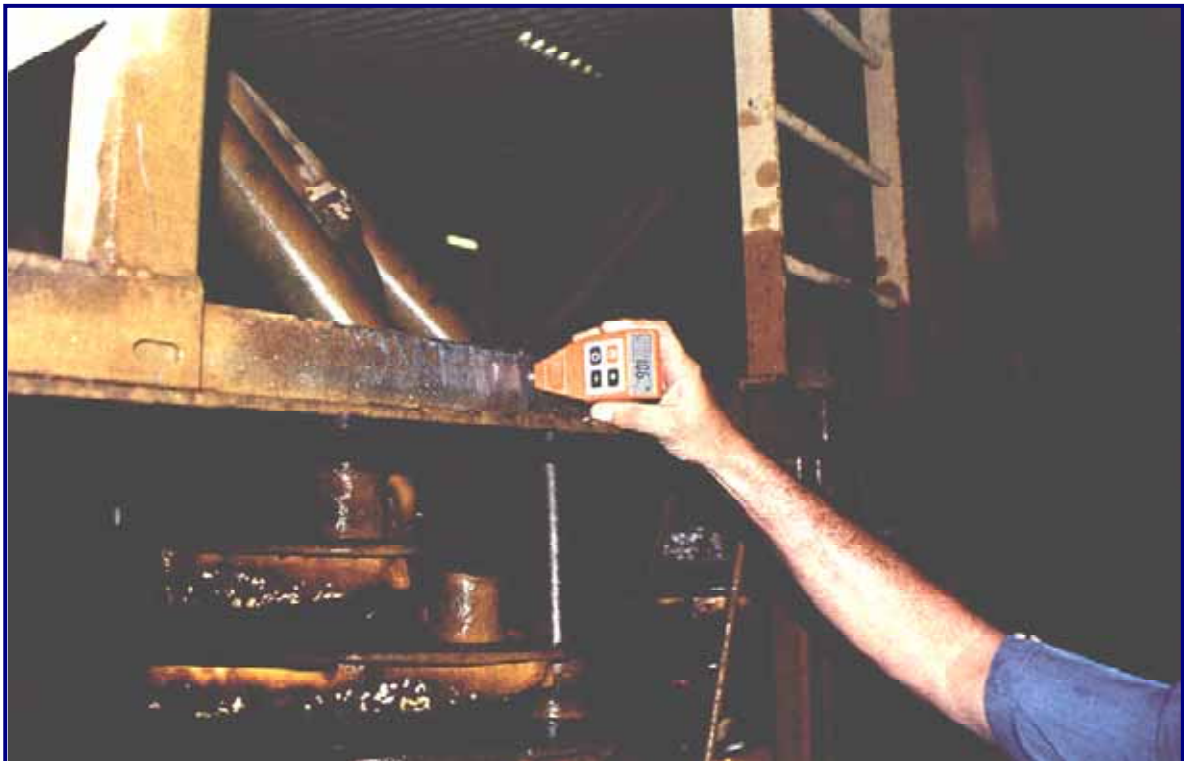
Site CRL2 (a) & (b)



Site CRL2 (a) – 4.0mm thick RHS section coating thickness reading.



Site CRL2 (b) – 10mm thick ANGLE section coating thickness reading.





Site CRL3 (a) & (b): The Cleaner Tailles Scav 1 Spiral Frames. These are the support frames for the separation spirals, galvanized and installed in 1984. Test site (a) was on the 50mm x 50mm x 4.0mm Rectangular Hollow Section steel, Test site (b) was on the 65mm x 65mm x 5mm hot rolled steel angle.

Original thickness requirement for (a) was $63\mu\text{m}$ or 450 grams/m^2 .
Original thickness requirement for (b) was $84\mu\text{m}$ or 600 grams/m^2 .

Readings taken at site (a):

92, 105, 97, 93, 89, 94, 111, 109, 98, 97

Ave: $98.5\mu\text{m}$

Readings taken at site (b):

99, 77, 96, 92, 88, 111, 102, 88, 102, 86

Ave: $94.1\mu\text{m}$

Sites: CRL3 (a) & (b)



Site CRL3 (a) – 4.0mm thick RHS section coating thickness reading.



Site CRL3 (b) – 5mm thick ANGLE section coating thickness reading.

