



Performance Report of Hot Dip Galvanized Coatings

at

Surfers Paradise Ocean Front



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**CONDUCTED BY: SEAN McCORMICK
INDUSTRIAL GALVANIZERS**



1.0 INTRODUCTION

The purpose of this brief report is to establish the corrosion rate of hot dip galvanized products along the oceanfront at Surfer Paradise. From this information it will be possible to establish an approximate life span for internal steelwork (galvanized) used in the refurbishment of the building at number 2 Wharf Street.

It is important to note that all references made about galvanizing in this report are based on the steelwork being completely exposed (external) or completely enclosed (internal). Galvanized steelwork that is partially exposed or subject to areas where it will pool water will generally corrode at a much higher rate.

2.0 RESULTS

2.1.0 Areas Tested

There was three (3) areas tested at Surfers Paradise. The age of the galvanized steelwork tested ranged from two and a half (2.5) to twelve (12) years. All tests were conducted on the ocean side of the steelwork.

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

Site No.	Steel section description. Original coating mass minimum requirement (AS1650-1989). Coating thickness readings (microns) as at 24/02/99
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All of the tests performed are shown in micrometres, however some readings have been converted to grams/m² by multiplying the result by 7.15 as per AS1650-1989 Appendix H 5.2. All coating thickness readings were taken using a calibrated Elcometer 345 electronic digital coating thickness gauge.

Both the light pole and pole nails current average coating thickness still remains higher than the original minimum average coating thickness required by AS1650-1989 Section 5. This is not uncommon and is largely a result of the steel metallurgy and thickness.

2.2.1 Site One: 75NB (3mm) Pipe Geoffery Cornish Walkway

This particular pole is at the very northern end of the walkway and is approximately 100 metres south of Wharf Road. The pole was galvanized and erected approximately six – seven years ago. Original coating thickness requirement was $63\mu m$ or 450 grams/m^2 .

Readings taken:

53, 56, 52, 54, 58, 58, 49, 51, 43, 49

Ave: $52.3\mu m$





2.2.2 Site Two: Pole Nails (10mm FMS) Cnr Broadbeach Blvd & Second Ave

This pole nail is located approximately 150 metres south of Wharf Road. The pole nail was installed approximately 2.5 years ago in 1996. Original coating thickness requirement was $84\mu\text{m}$ or 600 grams/m^2 .

Readings taken:

116, 108, 120, 104, 152, 104, 112, 103, 110, 118

Ave: $114.7\mu\text{m}$



2.2.3 Site Three: Light Pole (5mm) Broadbeach Surf Life Saving Club

The readings on this light pole still remain well above the minimum requirements of AS1650, which is $84\mu\text{m}$ or 600 grams/m^2 . The pole is situated in front of the Broadbeach Surf Life Saving Club and was installed approximately 12 years ago.

Readings taken:

124, 124, 129, 138, 123, 127, 112, 136, 126, 148

Ave: $128.7\mu\text{m}$





3.0 EXPECTED LIFE

Without knowing the actual thickness of the coating when the steel was initially galvanized it is not possible to calculate the exact corrosion rate at Surfers Paradise. However by using past experiences it is possible to predict the expected life of the hot dip galvanized products.

The formula used in all calculations is as follows:

$((\text{initial coating thickness} - \text{current coating thickness})/\text{life in service})$

The 75NB pipe has an average reading today of $52.3\mu\text{m}$. Because of the way this pipe is galvanized it would be highly unlikely that its initial coating thickness would have been much greater than what the standard called for ($63\mu\text{m}$). However if you were to be extremely conservative and you said $100\mu\text{m}$ was the initial coating thickness, than you would achieve a corrosion rate of $8\mu\text{m}/\text{year}$ $((100-52)/6)$.

Average readings on pole nails galvanized in our yard on the 24/02/99 averaged $130\mu\text{m}$. Therefore if we use $130\mu\text{m}$ as the original coating thickness on the pole nail tested at Surfers Paradise, you obtain a corrosion rate of $6\mu\text{m}/\text{year}$ $((130-115)/2.5)$.

The average reading on the light pole tested at Surfers Paradise is well in excess of average readings on similar sections today. There are various reasons as to why the readings are so high, but if once again we err on the side of conservatism and say the initial coating thickness was $200\mu\text{m}$, we obtain a corrosion rate of approximately $6\mu\text{m}/\text{year}$ $((200-128.7)/12)$.

Therefore it is possible to conservatively state that the corrosion rate on completely exposed hot dip galvanized steelwork on the oceanfront at Surfers Paradise is approximately $6 - 8\mu\text{m}/\text{year}$.

Corrosion rates of internal galvanized steel at a similar location will obviously be different. A recent report completed by Industrial Galvanizers (conducted over five years) found that corrosion rates inside are in the vicinity of ten (10) times less than corrosion rates experienced outside.

It can therefore be strongly supported that, providing atmospheric conditions remain relatively similar to those currently being experienced at Surfers Paradise, it would not be unreasonable to expect the galvanized coating (internal) to have a maintenance free life of at least thirty (30) years.