Stratfords Guest House and Conference Centre

Entrance view showing the front laser cut hot dip galvanized signage, which has back lighting for illumination at night *(photo taken in 2001)*.

The application

Building of Stratfords commenced in November 2000 and was entered and easily won the 2001 Hot Dip Galvanizing Awards. The building is situated within easy walking distance of Vincent Park Mall in East London. Al Stratford the current president of South African Institute of Architects was then commended by the judges on the multiple uses of hot dip galvanizing in combination with other materials. They also commented, "The extensive use and novel design combined with striking features provides an aesthetic advertisement for the use of hot dip galvanizing in architectural applications".

Al Stratford.

Besides Al's love of hot dip galvanizing for its honest appeal, he also used it for its potential maintenance free life. In this case history, we do an inspection of the building after 10 years and report back our findings not only in terms of the coatings longevity but also highlight a few areas on the building that due to construction imperfections and nature requires some premature roof and fascia maintenance.

Environmental conditions

Inspecting the hot dip galvanized coating in July this year the residual coating thickness readings taken on a number of components suggest that while the area of Vincent, East London is coastal, the environment is equal to about a C3 corrosion category in terms of ISO 9223 with the predictable corrosion rate of zinc being about 1 to 2µm per year.

The north and south wing run parallel to each other and enclose a cloistered garden that terminates in a covered patio centre. The main dining room is on the right and the reception offices on the left. Note the timber banisters used to connect the hot dip galvanized steel hand rails *(photo taken in 2001)*.

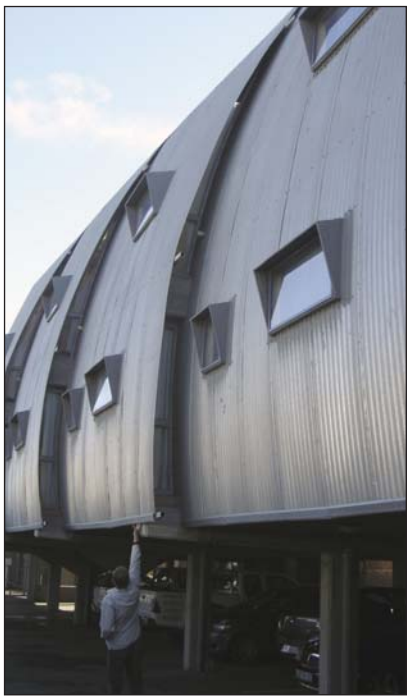

Photo 1.

Photo 2.

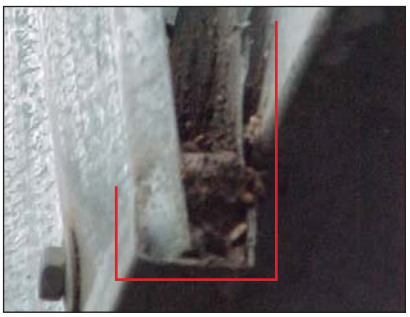

Photo 3.

Photo 4.

Photo 5.

Photo 6.

"S" rib profiled coating class Z600 (SANS 3575) continuous hot dip galvanized sheeting was used as the material of choice in the stressed skin on the South Façade as well as for the roof sheeting on the North wing. Three areas on the sheeting were identified as concerning.

The rainwater anti-drip fascia

The novel rainwater anti-drip fascia at the bottom of the stressed skin façade in 2004 was showing localised corrosion – *see photos* 1 - 7.

Photo 7.

The u-shaped novel rainwater anti-drip fascia (*see red outline following the shape in photo* 3), had collected some cement

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Photo 8.

Photo 9.

Photo 10.

Photo 11.

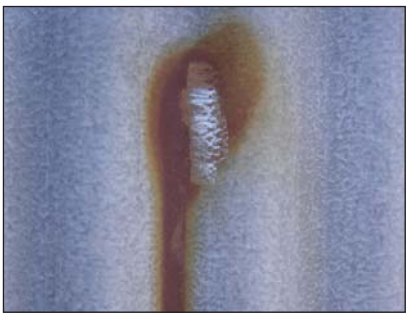

Photo 12.

Photo 13.

Photo 14.

Photo 15.

Photo 16.

Photo 17.

Photo 18.

Photo 19.

Photo 20.

Photo 21.

on the inside while the building was being constructed. This prevented the natural exit of any retained water. The solid cement therefore remained wet. This continued wetness facilitated the formation of soluble zinc hydroxide (or wet storage stain), which in turn resulted in some localised corrosion of the sheeting (*photo* 4). The area where the sheeting corroded was fixed and a new fascia (of different shape and in a Z275 coating class – spot coating thickness 12.5µm) was added. S*ee photos* 5 - 7.

Rain water gutter with return lip

This novel shaped gutter also played the role of a fascia and to add strength a 180° return lip was added on the inside, *see gutter shape in red in photo* 9. This lip together with dust, debris and leaf deposits from the closest tree together with the normal rainfall, created the conditions for under deposit corrosion and the gutter over these 10 years corroded through in a few areas (*photo* 10).

discolouration on roof sheeting

One particular spot on the roof sheet on the North Wing of the building was concerning, however, we found that the discolouration on the roof sheet was as a result of an inappropriately coated fastener, which had corroded to a point that the corrosion products now dripped onto the roof sheeting and caused staining. The coating at the discoloured area, however, proved to be intact. S*ee photos* 11 - 14.

Continuous hot dip galvanized sheeting to SANS 3575 – *coating grade* Z600

The sheeting and rain water gutter with return lip in general appeared to

Photo 22.

Photo 23.

Photo 24.

Photo 25.

Photo 26.

Photo 27.

be performing well against the environmental conditions at hand, *see photos* 15 - 19.

In terms of original coating thickness, SANS 3575 *includes various coating grades, from* Z100 *to* Z700. Z600 (*one of the coating grades*) *represents the mass of zinc in grams/sqm. To convert the coating mass to*

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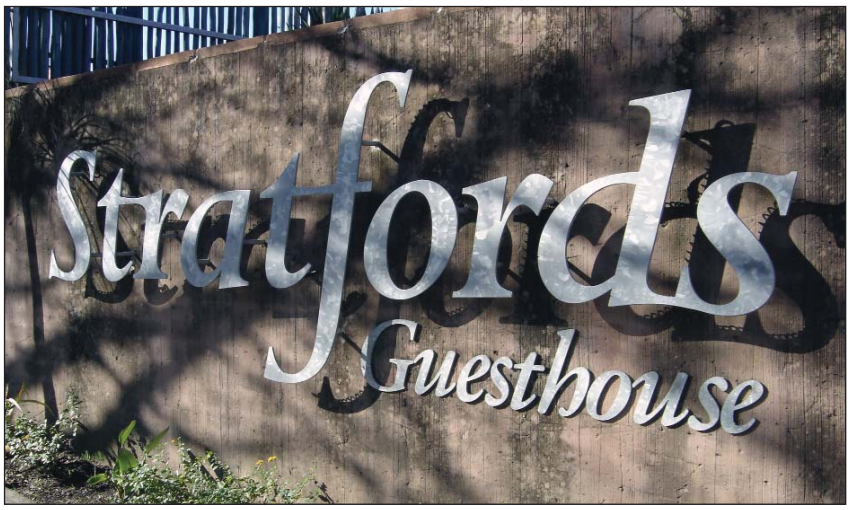

Photo 28.

Photo 29.

Photo 30.

Photo 31.

Photo 32.

Photo 33.

coating thickness, 600 must be divided by 7 (Specific Gravity of zinc) and by 2 (includes both faces), ie. 600/2x7 = 43µm. The fine print in the specification allows not less than 40% of the individual value (510 gm/sqm) to be found on one surface, ie.29µm. Coating thickness on roof and gutter averaged about 40um.

Zinc fasteners

Some of the original fasteners, which were unfortunately zinc electroplated, were showing signs of discolouration and rust (*see photos* 20 - 21).

The hot dip galvanized coating in general was performing extremely well:

- Hot dip galvanized roofing steelwork and handrails (*see photos* 22 - 27).
- Hot dip galvanized entrance signage (*see photos* 28 - 30).
- Hot dip galvanized visitor's signage – the electroplated shackles were showing signs of rusting (*see photos* 31 - 33).

Conclusion

One of the major benefits of using a metallic zinc coating no matter how applied, is the predictable life performance. This I calculated by measuring the mean hot dip galvanized coating thickness and comparing that with the corrosion rate figures given in ISO 9223, EN ISO 14713-1:2009 or even the Associations Information sheet No 8, available from our web site.

Bear in mind that coating life is proportional to its thickness and for this reason the thinner zinc electroplated coatings on the various screws highlighted, should be suitably cleaned and touched up with an appropriate paint, to ensure a longer durable life span.

The hot dip galvanized coating on both the structural steel as well as the roof and side cladding after 10 years of exposure to the atmosphere in East London, is sound and will not require any refurbishment or replacement for many years to come!