



Hot Dip Galvanized Case Study No. 19 Newlands rugby stadium – Railway stand

The Application

The decision to buy the ground the stadium stands on was made by the Western Province Rugby and Football Union in 1888. The first official match at Newlands took place on 31 May 1890 when Stellenbosch defeated Villagers there in front of a crowd of about 2 400 people. The following year the stadium hosted its first rugby test when the British Lions toured South Africa.

It wasn't until 1919 that the first permanent concrete stands were erected on the grounds. Later, in 1927, the new grandstand was erected and the field layout was changed to run from North-South. More changes came in 1931 when the South stand was also enlarged to make it bigger. In the 1950s parts of a new grandstand as well as South stand were completed with facilities such as lifts and a Presidential room were added. A fourth bay was added to the grandstand, and an extension to the lower gallery.

The 1970s saw the stadium change once again as the headquarters of SA Rugby moved to Newlands. Several stands including the Eastern Railway Stand were built (1979) or renovated, while the 1980s saw private suites and function rooms erected on top of the North stands as well as demolition of the old South stand and inauguration of the new Danie Craven stand (also with private suites and function rooms). The 1980s also saw 10 253 seats added to the stadium. Between 1990 and 1995 the stadium was again under constant renovation, adding technology, increasing capacity, and upgrading facilities, as part of a 3-phase redevelopment plan in anticipation of the 1995 Rugby World Cup. Newlands hosted the opening match of the tournament.

After the World Cup, development continued with several redevelopment and expansion projects to make the stadium more modern and increase capacity.

The stadium's name was changed several times by various sponsors, first from Newlands to Norwich Park Newlands in 1996, then to Fedsure Park Newlands in 2000 due to a merger between Fedsure and Norwich, and finally back to being called Newlands by Investec when they became the main sponsor in 2002. In late 2005, Vodacom became the stadium's main sponsor, but they followed Investec's precedent and kept the stadium name as Newlands

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**Aerial view of the Newlands
rugby stadium**



**Eastern Railway Stand built
in 1979**

Environmental Conditions

As the location is relatively close to the sea, it would generally be categorized as a mild coastal atmosphere. In reviewing the ISO 9223:2009 – Corrosion of Metals and Alloys – Corrosivity of Atmospheres it is possible to categorise the stadium site as a C3 environment. The zinc corrosion rate of such a mild coastal environment is less than $2\mu\text{m}$ per year. Within the confines of the stadium, being protected by the surrounding structures as well as other buildings, the zinc corrosion rate of the Railway Stand, would certainly be less than $2\mu\text{m}/\text{year}$.

For a fully detailed review of the ISO 9223 specification a review of Information sheet No.8 from the Association web site www.hdgasa.org.za is required.

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The Site

This case study reviews the condition of the hot dip galvanized seat support brackets and hand railings of the East Railway stand built in 1979. The build date of the East Stand indicates a service life of the hot dip galvanized seat support brackets and hand rails of approximately 30 years.



General view of the hot dip galvanized seat support brackets of the Railway Stand

Findings

The hot dip galvanized coating thickness readings measured on the support seat brackets and hand railings were in excess of 90 μ m. The following photograph is an illustration of a typical measurement being taken.



Typical measurement of a hot dip galvanized seat support bracket

Zinc coating thicknesses range from 90 μ m to 140 μ m

The instrument used is an Elcometer 456 that measures the thickness of a non-magnetic coating on a magnetic substrate. (Carbon steel)

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During the site visit inspection used to produce this case study, it was of concern that in certain areas “crevice corrosion” was evident. This situation is illustrated in the following photograph.

In other areas where the handrails have been cast into concrete, evidence of differential corrosion, so called necking corrosion, was observed.



**Cast in bottom rail showing
the effects of crevice
corrosion**

Conclusion

The Railway Stand at Newland Rugby Stadium has completed over 30 odd years of service life with hot dip galvanized steel seat brackets and handrails proving to be the correct material of choice.

Based on coating thickness measurements (more than 90µm) and a zinc corrosion rate of less than 2µm per year, the seat brackets and hand railings will continue to provide corrosion control for well in excess of further 40 years.