**The application**

Over the past 50 years, Eskom transmission towers have been hot dip galvanized for corrosion control purposes. These tower pylons are situated throughout the country and are therefore subjected to the full spectrum of environmental and climatic conditions. The application and use, by Eskom, of hot dip galvanizing to provide corrosion control of this National asset, is testimony to the corrosion protective properties of this type of coating.

**Environmental conditions**

South Africa is known for its many severe corrosive atmospheric conditions. These environmental conditions are not only restricted to the coastal regions, but include many inland industrial areas as well. Environmental conditions range from benign rural areas to severe marine and industrial sites. Atmospheric corrosive environments are broadly classified in terms of ISO 9223, which are similar to ISO 12944 and ISO 14713.

**The site**

As indicated the sites range across the full spectrum of climatic conditions. We shall therefore restrict this case study to three sites, ranging from a benign condition, an inland industrial and a severe marine coastal environment.

**Site No. 1**
- Relatively Benign Conditions.
- 53kV DC line from Cahora Basa to Eskom’s Apollo Sub-Station South of Pretoria installed 1973.

**Site No. 2**
- Inland Industrial site selected for its relatively severe corrosive conditions. This site is located within Germiston Industrial area.
- The specific tower is believed to have been in service for the past 40 years.

**Site No. 3**
- Severe Marine Coastal Conditions
- Buffalo-Port Rex Transmission Line situated in East London. At the time of the coating inspection, the towers had been in service for about 25 years.

The site selected for the severe marine conditions consists of transmission towers on the Buffalo-Port Rex Transmission Lines situated in East London. We acknowledge and thank Eskom for allowing us the use of their inspection report relating to this particular installation.

**Our findings**

**Site No. 1**

After removing the “apparent” rust discoloration, the underlying zinc hot dip galvanized coating measured...
Site No. 1. – After removing the “apparent” rust discoloration, the underlying hot dip galvanized coating measured 65.4µm. Accuracy of the instrument is approximately 5%.

Site No. 2. After the removal of the discoloration, i.e. corrosion products, the hot dip galvanized coating thickness measured to be 119µm.

Site No. 3. General condition of the tower after 25 years of service. A subsequent paint coating (providing a duplex coating system), has been recommended in order to extend the life of the structure.

Conclusion

The information gained from inspections of transmission towers is very useful in that it allows us to study the effects of corrosion and the protective qualities of hot dip galvanized steel, across the full spectrum of environmental conditions knowing the years of service. Service life of a steel structure depends on two fundamentals, viz. type and quality of the protective coating and environmental conditions in which the structure is located.

Hot dip galvanized structures have been shown to exhibit outstanding performance over the full spectrum of environmental conditions. Where severe environmental conditions are encountered, Duplex coatings (hot dip galvanizing plus a top paint coating) should be considered.