



MISCONCEPTIONS

Miss Conception puts it "straight"

"Miss Conception" rectifies incorrect impressions concerning hot dip galvanizing.

As is the case with all protective coatings, discontinuations and thin areas on an applied hot dip galvanized coating will inevitably lead to disaster in all but the most benign environments.

True or false?

It must be emphasised that for satisfactory performance, coatings applied in accordance with the requirements of National or International quality standards or specifications should always be insisted upon. Unfortunately, we do not live in a perfect world and, inevitably, defects or modest faults in a coating can be overlooked despite stringent quality control methods.

There is also the possibility of coating damage occurring subsequent to final

inspection either during transportation, storage or during installation. The mechanism whereby zinc in the form of hot dip galvanizing provides protection to steel is somewhat unique in many respects. Apart from good adhesion and durable barrier protection, the zinc and, to a lesser degree, the iron/zinc (Fe/Zn) alloy layers within the coating also provide cathodic or sacrificial protection to the steel since zinc is electro-negative to steel in terms of the galvanic series of metals. This ensures that at exposed

steel surfaces, corrosion cannot creep underneath the surrounding coating and corrosion will not progress at such small exposed steel surfaces where the result is invariably limited to the presence of a thin film of rust staining.

Rust staining as opposed to severe rusting of a steel surface is the result of a mild initial reaction between the steel surface and the environment. It is invariably non-progressive where the

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environment can be described as mild to moderately aggressive. Uncontrolled corrosion of unprotected steel results in surface pitting with the volume of the corrosion products of iron (rust) of up to 3 times the volume of the original steel being formed. This is the reason why reinforced concrete spalls if corrosion of the reinforcing steel (ungalvanized) occurs.

Coating thickness is of prime importance with all protective systems. Hot dip galvanizing specifications define acceptable minimum coating thicknesses which are determined by the thickness of steel components with thicker steel sections requiring thicker minimum coating thicknesses than thinner sections. The galvanizer can implement certain measures to control the formation of the coating, but the composition of the steel to be galvanized with silicon and phosphorous content playing a major role as well as steel thicknesses are no doubt the most significant factors. The result is

that applied coatings are invariably up to 50% thicker than those called for in hot dip galvanizing specifications. The advantage of this to the end user is that the galvanizer cannot easily reduce coating thicknesses and hence coating life in order to compensate for increases in the cost of zinc. Zinc can be described as a wasting protector which thins out gradually over a period of time depending on the level of corrosion to which it is exposed.

Contrary to most other heavy duty coatings in general use, a hot dip galvanized film is virtually impermeable, (non-porous), as long as the coating has not been penetrated entirely. As far as adhesion is concerned, the Fe/Zn layers between the steel substrate and the relatively pure surface zinc layers, not only provide good corrosion resistance but they also ensure the provision of a coating that is metallurgically bonded to the underlying steel. The mechanism that provides this excellent form of

adhesion is governed by the laws of nature and provided that a few simple rules are adhered to, a coating with consistently acceptable adhesion properties will always be provided. A further significant benefit is that in the event of mechanical damage as a result of severe impact, a portion of the Fe/Zn alloy layers is not removed from the steel surface. Hence a degree of protection is retained from the remaining coating. This is in contrast to most other protective coatings where severe impact invariably removes the entire coating.

To sum up, while a good quality coating applied correctly is important for long term corrosion control regardless of which system is selected, there is no doubt that the somewhat unique properties of a hot dip galvanized coating render it to be less susceptible to premature failure in the event that defects in the applied coating are present. ➡

Definitely not a trashy affair....

A week before Steph Strydom wed Tilly Kritzinger in June 1968, he made a trip down to Port Elizabeth Municipality to purchase an item that they would need for their new home – a hot dip galvanized metal rubbish bin. The pressed metal bin, embossed with the date “1968 and PEM” (Port Elizabeth Municipality) has been with the family ever since.

The couple recalls that the bin got “no special treatment” and stood exposed in Port Elizabeth for its first 7 years of service. The bin relocated with the family to Durban in 1975 where, after some home renovations, it finally got a “roof over its head” (or shall we say lid?). The bin however did not stay put all the time – thanks to the couple’s only son Alex. Now aged 35, Alex fondly recalls the rubbish bin doubling up as wickets in his childhood during neighbourhood cricket matches and target practice during a “Ninja Star” phase. He laughs that history will probably repeat itself soon with the Strydom couple’s grandchildren now aged 9 & 10.



This remarkable piece of hardware has withstood the test of time. Recent coating thickness tests reveal that the hot dip galvanized coating is still in a remarkably good condition and the bin, unlike its pensioner owners, will not be going on retirement anytime soon. The trusty bin will be celebrating its 40th year of service a week before the Strydom couple’s ruby wedding anniversary in June 2008. Our warmest congratulations to all concerned!

The Association wishes to thank Desere Strydom for this article. ➡

