

2.12 Renovation of Galvanizing

1. General

The coating applied to steel by means of hot dip galvanizing not only provides good corrosion resistance, it also provides high resistance to wear and tear and so creates tough and robust articles. However, the zinc coating may occasionally have small areas which have not been galvanized for some reason or have been damaged. It is therefore necessary to repair or renovate the coating at these points.

2. Lumps and runs

The hot dip galvanizing process involves dipping steel parts in molten zinc after they have been properly pretreated. As with any other dip process, the excess zinc is allowed to drip off but during this the zinc may solidify into lumps or runs. If the lumps are small they will not make any difference to the coating and can be allowed to remain. However, if the steel components have to fit together then the lumps may lead to problems (fig. 1).

It is bad practice to try to knock these lumps off or to use an angle grinder vigorously on them as there is a danger that the whole of the zinc coating could be ground off leaving bare steel. The use of a hand file, or careful mechanical grinding using an angle grinder with a flexible disc, is much better.

Another possibility is to remove the superfluous zinc by use of a welding torch. Using a cool flame the zinc coating can be melted locally but not burnt off. When the zinc is in the liquid state it simply drips off or it can be easily removed with a wire brush or spatula.

Zinc lumps or runs must be removed if they are very sharp or constitute a danger when being transported or assembled later (fig. 2).

3. Hinges and threaded bolts

If captive bolts are welded on to a steel structure which is to be galvanized the threads usually clog with zinc after the galvanizing process. Re-tapping the thread is both laborious and time-consuming, so a simpler, better and quicker way is to melt the zinc coating with a flame and clean the thread with a wire brush. This does not remove all the zinc and that remaining still affords protection from corrosion.

Many components have hinges or joints on them which, when the zinc coating has cooled and solidified, are thus soldered and cannot be moved.

In these cases force should not be used but instead a cool welding flame should be applied so that the zinc coating melts. When the zinc is liquid the hinge can be moved again. Then the component should be moved backwards and forwards while the zinc coating solidifies and it will be found that the part will still move even after the zinc has cooled.

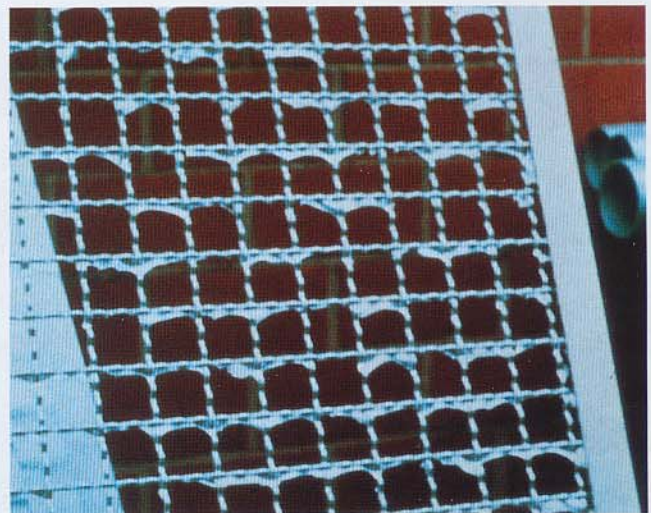
Fig. 1: A zinc lump on hot dip galvanized tubular structure



Fig. 2: Sharp zinc spikes which could cause injury must be removed



Fig. 3: Zinc flashing can be removed by brushing off using a wire brush



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4. Oxide films and zinc particles

When steel components are withdrawn from the zinc bath the liquid zinc runs back into the bath but it also reacts quickly with the surrounding air to form a thin oxide film on the surface. With some components (e.g. frames, wire netting and gratings) small foil-like particles of zinc may remain behind in some of the corners (fig. 3). Very often these zinc particles do not matter but if they do cause a problem they can easily be removed by simply brushing off with a wire brush.

5. Damage to coating

Areas of damage (e.g. sustained during transport or assembly) should be repaired using the procedures set out in BS 729: 1971 (1986).

BS 729 sets out guidance for the maximum area of damage which can be repaired. The standard states: "The maximum size of the areas for which such repairs are acceptable will depend, to some extent, on the article and the application, but for general guidance an area of 40 mm² is suggested as being suitable. For larger structures it may well be acceptable to renovate larger areas".

Thorough surface preparation is needed before galvanizing and also before repair of a damaged area. This should be done in accordance with the repair medium manufacturer's recommendations.

6. Repair methods

Repair of damaged areas should normally be done by using zinc-rich paint. A range of different types of zinc rich coating materials is available;

- two pack epoxy resin
- single pack polyurethane which hardens on contact with moisture in the atmosphere
- single pack ethyl silicate which hardens on contact with the moisture in the atmosphere.

In order to maintain the overall corrosion protection of the system, repairs to faults should

Fig. 4: Corrosion resulting from an incorrectly repaired weld



Fig. 5: Repair by thermal spraying with zinc



have a thickness at least equal to the surrounding galvanized coating.

Other repair media such as special solder alloys may also be used.

The repair should be carried out so that there is an overlap with the intact zinc coating.