

RECYCLING OLD STEELWORK

by CM Staff

INTRODUCTION

Conservation and sustainability of materials are becoming increasingly important issues for the building and construction industry.

While steel is an eminently recyclable material, a significant amount of energy is still required to re-melt it and roll it into its finished or semi-finished products.

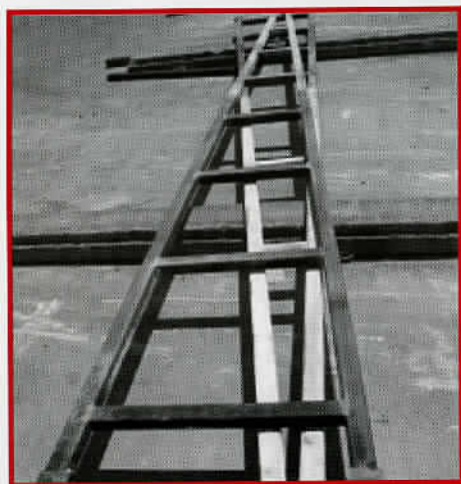
The form of many structural sections has not changed significantly for many years, and columns, beams, angles, flats and hollow sections still provide similar engineering performance, regardless of their vintage.

One of the best ways to give these structural products a new lease of life, is to re-galvanize them.

RE-COATING OLD STEELWORK

In its original form, most older structural steelwork is painted, as galvanizing of this type of steelwork was not able to be done in Australia prior to 1980 because of the limited size of the galvanizing baths prior to that time.

Inevitably, such old paintwork may be in poor condition, and the steel itself may be badly corroded. However, as long as the steel sections



These fabricated "A" frames are ready for re-galvanizing. They have been abrasive blasted. The surface rust that forms after blasting is easily removed in the galvanizing pre-treatment.

are structurally sound, it can be re-furbished at considerable cost savings to fabricating new steelwork.

The steps required for re-coating old steelwork are as follows:

1. Have the steel checked to see if it is fit for purpose.
2. Remove all paint and rust by abrasive blasting to Class 2
3. Check design for suitability for galvanizing. Modify design for venting and draining if required.
4. Submit for galvanizing.

POTENTIAL SAVINGS PER TONNE*

*These costs are local estimates only.

The potential cost savings per tonne are:

-	Steel cost	\$1000/t
-	Fabrication cost	\$2000/t
-	Design cost	\$?
	TOTAL	\$3000+/t

Additional costs include:

-	Abrasive blasting	\$200/t
-	Galvanizing	\$600/t
	TOTAL	\$800/t

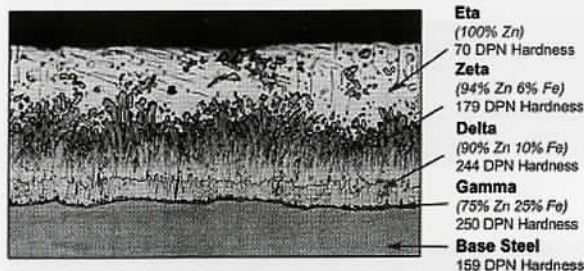
TOTAL SAVING \$2200/t

There may be other cost factors associated with the refurbishment of old steelwork, including additional freight. In any event, cost savings exceeding 50% can be easily achieved by refurbishing old steelwork by hot dip galvanizing.

COATING QUALITY

A major advantage of hot dip galvanized coatings over old steelwork is that the re-galvanized coating will be equal, or in some cases, better than that applied to new steelwork in terms of durability.

The above micrograph (over page) of a galvanized coating shows a section through a coating about

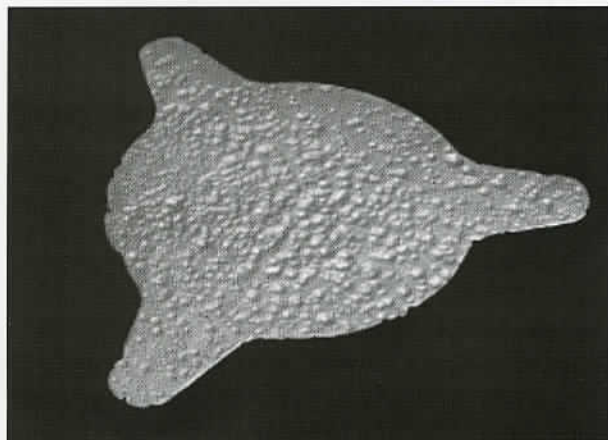


100 microns in thickness. Much of the coatings is made up of a crystalline layer of zinc-iron alloys, formed when the steel reacts with the zinc at galvanizing temperature. This reaction will not take place if the steel is dirty or rusty, and the coating will not form.

With recycled steel that has been abrasive blast cleaned, the roughness of the surface causes the steel to react more vigorously with the zinc, resulting in a heavier coating. Galvanized

coatings on recycled steel will therefore have a longer life expectancy than those on new steelwork.

Previously galvanized steel items are very easy to re-galvanize, as long as there is a remnant of the original galvanized coating remaining. The old coating can be quickly removed in the pre-treatment process, exposing what is virtually new steel for re-galvanizing. Roll-top mesh fence panels are a good example. The product has been used in Australia for over 30 years, with no significant change in design, many of these fences are reaching the end of their coating life. They are easily removed from the fence posts and can be returned to as-new appearance and performance by re-galvanizing at approximately half the cost of a new fence.



This steel cover plate has been fabricated from old 12 mm plate and hot dip galvanized. The texture of the pitting from the original badly rusted steel is easily visible. The hot dip galvanized coating is about 50% thicker than would be the case on a similar item made of new steel plate.



These crane monorail beams are being refurbished in the pre-treatment area of a galvanizing plant, where the original epoxy coating has failed completely. The beam at the rear has been removed, abrasive blasted, hot dip galvanized and coated with an acid-resistant chlorinated rubber paint coating.

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Editor.

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Cover:

The Walsh Bay Bond Stores refurbishment is the first major ice blasting project done in Australia. Specialist site services has ice blasted the old coating from 6000m² of these heritage structures.

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