



Associate of International Zinc Association

Asia Pacific Edition

Zinc Galvanizing in Car Parks

59
galvanize
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THE ARCHITECTURAL INTEGRATION OF CAR PARKS

The modern car park provides the transition from personal to public transport. These transport hubs link car use to anything from pedestrian thoroughfares to flying. Inner city dwelling is also a growing factor in the need to park cars more efficiently. "Galvanize" case studies in this issue highlight the architectural achievements evolving from upgrading strictly utility structures to unobtrusive and functional civic buildings.



Above: A galvanized pedestrian bridge structure

Right: Federation Square Car Park designed for light and transparency



Federation Square Car Park and Rail & Pedestrian Bridge

Concept: Federation Square is a world-class architectural celebration of many things, including the innovative use of galvanized steel, which is complemented in this latest city development.

The access facilities from the southern Yarra River, parklands and city sports domain have now conjoined the city, the Square and the riverbanks. This is achieved by innovative steel design capturing a city vision of these Melbourne features so long obscured from view. Other suburbs are also provided for by the on-site Flinders Street Railway Station and the new multi-story car park.

The car park takes up the levels between the river and Federation Square ground floor, while pedestrian bridges and walkways cater for the many people who enter the facility or the city from the south. The car park accommodates 500 vehicles and allows access from Federation Square, Flinders, Russell or Exhibition Streets.

The 600 tonnes of steel in the car park is heavy duty galvanized as are much of the access ways and water front structural features.

Design: The design and construct package for the entire car park was ably carried out by Alfasi Projects and Services to achieve a series of important considerations including harmony with the surroundings and availability of the inviting riverbank parkland aspect. The low profile building concept achieves this outcome where, in addition, the open span galvanized steel structure provides both the extra security of clear sight lines and a soft merging of the transport activities and the treed river side.

Of importance were the factors of low maintenance, hard wearing, light and reflective surfaces where the perforated metal side panels create virtual transparency through the structure. This makes a valuable contribution to personal and vehicular security as well as ease of access and lack of obstruction during entry or egress.

The innovative structural and landscaping links, created by this community facility, have turned one of the world's busiest traffic interchanges into a most attractive city precinct.

Editorial
George Thomson
Rosemary Scott
Chairman of GAA
John Gucciardo

Innovative structural and landscaping links, have turned one of the world's busiest traffic interchanges into a most attractive city precinct.

Project details

Client:
Federation Square Corporation
Construction Manager:
Multiplex
Design and Construction:
Alfasi Projects and Services



Ayala Avenue, Makati City, Manila, Philippines



This car park structure is situated in Makati, the main commercial center of metropolitan Manila.

The development was in response to the urgent need for additional car parking in Makati due to the rapid increase of commercial offices and shopping malls in the district.

Accompanying shopping and residential apartment complexes created a modern and prestigious neighborhood into which this highly visible car park structure has been tastefully located.

The need to build within a minimum site area in an already well developed location, while allowing fast track schedules, led to design of a bolted steel structure capable of minimum erection time.

This car park seems to epitomize the design achievements of traffic interchanges in Asia, where elevated roads mounted on galvanized steel columns play a major role in easing traffic congestion.

In particular the car park's 7 meter beam lengths and 3.5 meter vertical column height, create extra headroom, light and ventilation and a valuable 5000 square meters of floor space in this heavily built up area.

This design also offers the capacity to add to or dismantle and relocate the structure.

For this purpose galvanized steel offered unique suitability both from the standpoints of long service life and its metallic alloy abrasion resistance during steel handling.

In summary, steel design provides not only efficiency in maximizing space, light and security but offers advantages in time and cost during construction and future planning.

The final architectural appearance achieves fine harmony with its community surroundings.

Details:

Location: 6748 Ayala Avenue, Makati City

Capacity: 434 cars

Supplier/Contractor: JFE Civil Engineering & Construction Corporation (Japan) / RIOFIL Corporation (Philippines)

Construction: 1998



United Parking Car Park Melbourne Airport

This car park project was awarded to Pritchard (Builders) Pty Ltd to design and construct accommodation for 1000 vehicles, required by Nic Saraceno of United Parking Pty Ltd to provide a quality service for patrons of the nearby Tullamarine Airport.

This facility is located 3kms from the main departure terminal on the corner of Melrose Drive and Trade Park Drive and is serviced with an "on demand" courtesy bus service to transfer patrons to and from the terminal. It provides a specialist valet airport link for business travellers whose time efficiency is often of critical importance. Four levels of cost saving parking is available which requires a minimum diversion on the part of patrons leaving or returning to the airport. Facilities include self parking, full security, TV lounge and a business service center with some unique services such as wide space parking lots and Mercedes coaches to the airport.

The galvanized steel framed building is light and spacious and makes good use of the wide open span structure. The design brief prepared by Stephen Dean, Pritchard's Business Development Manager, was implemented by United's Development Manager, Robert Whitwell. The successful delivery was ensured by Pritchard's Project Manager Hok Tan.

Stephen Dean's D & C experience and commercial awareness encouraged a review and market assessment of the three typical construction systems

- Structural steel and composite concrete deck
- Post tensioned insitu concrete structure
- Precast hollow core system

The decision to adopt a composite steel construction was supported by several key issues principally time and cost benefits coming to the fore, ensuring the full delivery including all design, permits and construction for less than the \$10 million anticipated projected cost. Once the construction method was agreed, detail design was explored into a variety of cost benefits between 3 and 4 car park bays, applied finish versus hot dip galvanizing and external façade systems.

The final outcome was a 3 car park grid comprising hot dip galvanized primary and secondary beams with Stramit™ Condeck structural composite formwork system and prefinished perforated façade screens to the exposed elevations.

The use of hot dip galvanizing was adopted on the support and recommendation of Trojan Specialised Steel Structures, with support from Engineering Group, Gillion Consulting in Hughesdale.

The facility, constructed over four levels, comprises floor plates of 5000 square meters and provides for an additional level to be constructed at a future date. The joint cooperative approach involving fabricator, engineer and the entire project team guaranteed the success and realistically saved eight weeks of time in the overall delivery program.

The project comprised 700 tonnes of 300 plus grade structural steel supplied by Smorgon Steel, cut to length and predrilled prior to transfer to Smith Welds for precambering and galvanizing. The other significant design application was the 2.48m clear height requirement to enable the courtesy bus full access to each level for both drop off and pick up of travellers.



Educational Seminar on Hot Dip Galvanizing for Corrosion Protection

The Galvanizers Association of Australia has developed a 40 minute seminar on "Hot Dip Galvanizing". This educational seminar will assist in understanding the galvanizing process, specifications, grades of galvanizing and painting of galvanized steel.

It will also address properties and appropriate use for corrosion control, wear resistance and aesthetics.

This seminar is designed for architectural and engineering practices, specifiers and users of the product.

Please advise if you are interested in this presentation by contacting Galvanizers Association of Australia by email gaa@gaa.com.au

Galvanizing thickness on hollow sections and open profiles

Since the introduction of thin in-line zinc galvanized hollow and open profiles, there has been confusion among designers concerning what zinc thickness is being offered. This can lead to incorrect choice, and subsequent failure.

In 1999 the Australian specification for all hot dipped galvanizing AS1650 was deleted and replaced with several specifications covering the various grades and types of galvanizing now available.

The product which has been known for many years as "general galvanizing", "after fabrication galvanizing", or "batch galvanizing" is now covered separately in AS/NZS 4680:1999, and is the only product which offers the maximum corrosion protection and abrasion resistance.

This new primary Standard reflects the International Standard ISO 1461 which is to apply throughout the industrial world.

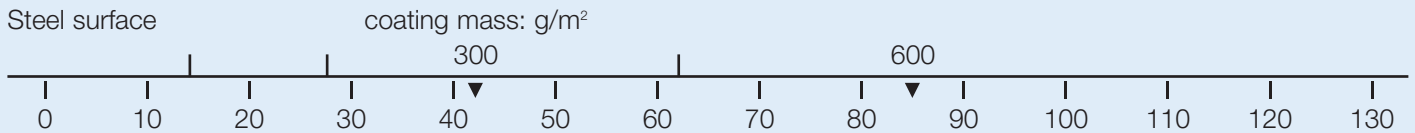
The bar chart below details the readily available hollow and open profiles which have zinc coatings of various thicknesses. As can be seen from the bar chart the thickness of the zinc coatings varies a great deal and can go down to as low as 7 µm.

In this context it is important to note that service life is proportional to galvanizing thickness in any given environment.

If you have any questions regarding the chart please do not hesitate to contact the GAA.

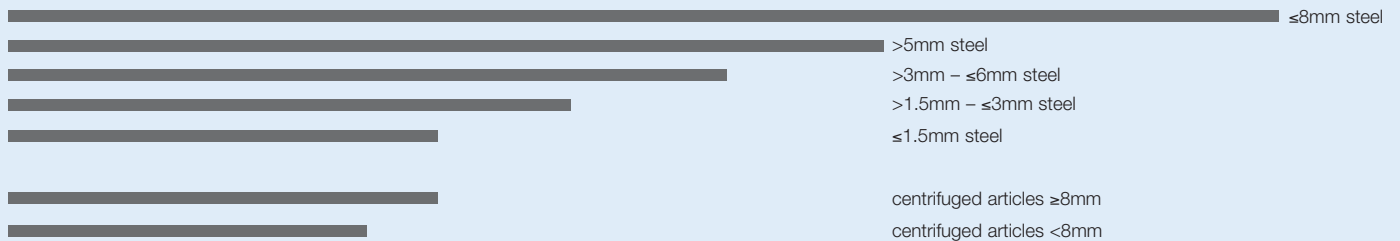
Bar chart illustrating the entire range of readily available galvanized coatings currently in Australia.

Zinc coating on steel: $1\text{g/m}^2 = 0.14\mu\text{m}$



Average minimum coating thickness: microns from steel surface

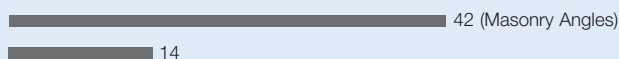
AS/NZS 4680:1999 – Hot-dip galvanized fabricated articles, identical coatings as in BS EN ISO 1461:1999



AS/NZS 4792:1999 – Galvanized hollow sections

- Both surfaces - Hot dipped Galvanized CHS 42
- External surface only – CHS, RHS 18
 14
- Manufactured from welded pre-galvanized strip – CHS, RHS 14

AS/NZS 4791:1999 – In-line galvanized open sections



AS 4750 (Int) – 2000 Electrogalvanized (zinc) coatings on ferrous hollow sections – CHS, RHS



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We provide information, publications, films and assistance on all aspects of design, performance and applications of hot dip galvanizing.
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