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HOT DIP GALVANIZED STEEL

# RAIL EXTENSION PUSHES BOUNDARIES



## Winner

Korvest Galvanisers for Elizabeth and Munno Para stations – Seaford SA

## Finalists

Industrial Galvanizers for Multi Use Entertainment Facility at 'The Star' casino – Darling Harbour NSW  
and

Geelong Galvanizing for The Moment sculpture on a 220-apartment block – South Melbourne VIC  
and

Galvanising Services for Golf Centre driving range and practice facility – Thornleigh NSW

Station works for a major railway electrification project in South Australia attracted this year's Sorel award for Galvanizers Association of Australia (GAA) member, Korvest Galvanisers, primarily for its treatment of impressively large-sized assemblies for a group of railway stations encompassing pedestrian overpasses, lift towers and enclosed stairways.

The rail electrification project included major redevelopments of both the Elizabeth and Munno Para stations on the northern Gawler line and construction of two major rail stations at Seaford and Seaford Meadows.

The award winner was announced at GAA's 50th anniversary Gala Dinner held in Melbourne on Friday, 18 October which was attended by over 180 local and overseas members, guests and industry suppliers.

Presented by GAA Chief Executive Officer **Peter Golding**, the award was accepted by Korvest Managing Director **Alexander Kachellek**, Korvest Galvanisers General Manager **Steven Evans**, and Technical Manager **Peter Freeth**.

The Sorel Award was this year judged by two GAA Life Members, **Mike Dennett** and **Colin Bain**, who between them brought over 60 years worth of galvanizing industry related experience and nous to the task.\*

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**galvanizers**  
ASSOCIATION OF AUSTRALIA

Editorial  
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Prepared by  
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# RAIL EXTENSION PUSHES BOUNDARIES



They said the winning Korvest Galvanisers entry scored highly on its market development potential and technical innovation by demonstrating that a high quality hot dip galvanized (HDG) coating can be applied to oversize assemblies without coating blemishes or distortion.

"Often larger components are not considered fit for galvanizing due to kettle size constraints and resistance from industry to double-end dipping as well as weld joining of galvanized pieces," Mr Evans from Korvest Galvanisers said.

"This project contained all of these elements that many engineers and architects shy away from, but with careful planning and concise communication at all phases from technical, commercial, quality and documentation to logistics, a project like this can be executed successfully.

"The process capabilities of galvanizing as well as the benefits in terms of corrosion protection were clear to all parties which made the projects easy to manage.

"Resistance to vandalism and the ability of galvanized coatings to withstand wear and tear of traffic made galvanizing the coating of preference.

"Although some of the large pieces had to be welded post galvanizing, the proven track record of field repair underwritten by GAA and ACA gave the engineers confidence that the corrosion protection would be adequate."

He said even though Korvest is one of Australia's smaller galvanizers, that has not stopped it being involved in large projects before.

"Getting involved in a project with so many technical and logistical challenges and delivering successfully proves we have the people skills as well as the systems to cope.

"Our employees are very proud to be recognised and will remember this achievement well into the future."

The judges considered that the success of this project pushes the boundaries for HDG that could open up new opportunities for the industry.

They noted that for all their differences, the entries shared architecturally exposed steelwork which must have a high performance, low maintenance corrosion protection system.

**"Often larger components are not considered fit for galvanizing due to kettle size constraints and resistance from industry to double-end dipping as well as weld joining of galvanized pieces"**

Mr Evans from Korvest Galvanisers

The other three shortlisted entries were:

- Multi Use Entertainment Facility at 'The Star' casino, Darling Harbour NSW
- The Moment sculpture on a 220-apartment block, South Melbourne VIC
- Golf Centre driving range and practice facility, Thornleigh NSW

The judges said they were pleased to consider such a diverse range of projects entered from a 300-tonne frame for an entertainment complex built atop an existing casino to a three tonne wall-mounted metal sculpture and two ground-level projects with widely differing end uses.

The Sorel Award commemorates French civil engineer Stanislaus Sorel who filed a patent in 1837 for a method of protecting iron from rust - the parent of the hot dip galvanizing process. The Award's criteria encompass account engineering, technical innovation and market development potential within the galvanizing industry.

To be eligible to win a Sorel Award, a project needs to show how it (1) offered market growth potential for the industry, (2) exhibited engineering or other technical innovation, (3) provided economic benefits for the end user and (4) showed environmental or social responsibility. The 2014 Sorel Awards will be open for entries this coming June.

## PROFILE:

# GALVANIZED FINISH GUARDS NEW RAIL WORK



The major rail station upgrades and new developments associated with the Adelaide Metro rail electrification project successfully demonstrate that oversize components on large-scale projects, otherwise considered too big for existing plant capacity, can be HDG to overcome a major limiting factor when considering corrosion protection modes.

These rail stations demonstrate that while it is not always possible to break components down into single dip sections if all parties embrace the use of double dipping, the long term benefits afforded by HDG can be realised.

The rail electrification project included major redevelopments of both the Elizabeth and Munno Para stations on the northern Gawler line and construction of two major rail stations at Seaford and Seaford Meadows on the southern line as part of a 5.7km dual track extension.

These projects required station work to create safe, attractive and welcoming transport infrastructure that is user friendly and comfortable.

Across the four rail stations a total of 850 tonnes of structural steelwork was galvanized comprising platform canopies and heavy pedestrian overpasses, lift towers and access stairs as well as ancillary steelwork including sign gantries over the rail tracks, lighting towers, bike sheds and decorative screens.

The high hardness and durability afforded will significantly reduce ongoing maintenance costs by resisting attempts at vandalism, a major concern given they are high traffic amenities which provide idle time while waiting for trains.

The challenges posed by the design of key components were identified early on with all stakeholders to ensure fabrication detailing for a quality result.

The fully enclosed pedestrian overpasses, lift towers and enclosed stairs for each station required early intervention to ensure they could be broken down efficiently to enable HDG. Segments were up to 3.6 to 3.8 metres high, up to 10 metres long and weighed up to five tonnes, thus comprising large double dips.

Once fabrication commenced, the galvanizer was in constant contact with the fabricators, particularly with respect to the draining and venting of the large rectangular hollow section frame segments for the pedestrian overpasses, lift towers and access stairs. Initial concerns over the adequacy of shop repair when welding the segments together were allayed with the assistance of the GAA technical note on this topic.

**Across the four rail stations a total of 850 tonnes of structural steelwork was galvanized comprising platform canopies and heavy pedestrian overpasses, lift towers and access stairs.**

Given that structures of this size are generally associated with large-scale projects this has the potential to significantly increase the demand for HDG.

Not only will the likely reduction in vandalism damage contribute to lower maintenance costs and reduced volatiles from paint repair, the reduced risk of degraded visual amenity going forward should encourage commuters to use the rail network in greater numbers.

With a key requirement of the rail station projects being the provision of attractive and welcoming structures to promote patronage, HDG provides a vital contribution to overall project aesthetics.

#### PROJECT TEAM

**Developer/Owner:** South Australian Government

**Specifier:** SA Department of Planning, Transport and Infrastructure

**Project Managers:** York Civil, Thiess/McConnell Dowell Construction and Bardavcol

**Main Contractors:** Manuele Engineers and Advanced Steel Fabrications

**Hot Dip Galvanizer:** Korvest Galvaniser

# HIGH STAKES SKIN FOR STAR EXTENSION



Hot Dip Galvanizing (HDG) met the multifarious demands for the recent major redevelopment atop the Star City Casino beside Sydney's Darling Harbour.

The \$760 million redevelopment has produced a 3000m<sup>2</sup> gaming facility featuring a new entrance facing Sydney Harbour, a floor-to-roof glass façade and a 3000-seat Multi Use Entertainment Facility (MUEF).

Located on the busy shoreline of Sydney Harbour exposed to a marine environment classified by ISO 9223 as a mid level corrosive environment (C3), the project demanded guaranteed low-maintenance corrosion protection for the marine exposed environment, on-time staged delivery of prepared steelwork, resistance to onsite handling damage whilst providing aesthetic appeal for such a high profile venue.

The selection of a HDG protected steel frame successfully met the site challenges of a limited lay down area, a tight construction schedule whilst the venue maintained continuous trading, guaranteed long-term performance and resistance to handling damage in delivering the project on-time and within budget.

The MUEF is a 40 by 60 metre complex geometric structure that utilises a 300-tonne galvanized steel frame to support internal walls and an external glass façade which is internally lit at night to spectacular effect.

The use of architecturally exposed structural steel is becoming increasingly popular and was a key design feature of the new MUEF.

Aesthetics were a key consideration in the selection of HDG as the steel frame is visible through the glass façade which is exposed to sunlight as well as at internal locations. Despite the filtering effect of the glass, impact of UV light on the coating had to be considered and HDG is not affected by UV. Galvanized steel quality was important including placement and precision of vent and drain holes.

Effectively the steel frame is sandwiched between the interior soundproof walls of the MUEF and the attractive external stainless-steel and glass façade. In such a structure, the asset owner needed a guarantee that minimal or no-maintenance would be required for an extended period. The durable nature of the HDG coating ensures it will exceed the warranty period providing a maintenance-free service for at least 10 years.

Normal operations were to continue during the redevelopment above the gaming facility in use 24 hours every day so minimal disruption and risk to clientele was demanded. Onsite preparation also needed to be minimised to lessen the potential impact of dust and fumes.

It was unnecessary to coat the HDG treated steel onsite and this eliminated the issues of dust, paint fume and encapsulation that would have interrupted trading operations on the site.

The construction zone was in a cul-de-sac that also contained the entry to the casino car park and loading dock. All building deliveries had to take place in a 30-metre zone that also contained the base of the tower crane leaving just 16m of useable space. Storage space was also limited and available locations were constrained by the load capacity of the concrete slabs so the steelwork erection was split into stages that were erected sequentially to minimise storage and maximise structural stability and safety.

**Hot Dip Galvanizing (HDG) met the multifarious demands for the recent major redevelopment atop the Star City Casino beside Sydney's Darling Harbour.**

The need for off-site preparation and lack of onsite storage meant that any protective coating on the steel needed to be tough and resistant to handling damage as it would be craned directly into position from the back of the transport.

The thick alloy layer that coats HDG steel proved highly beneficial in this application with the galvanic protection provided by the coating ensuring that scratches have minimal impact on service life or aesthetics.

#### PROJECT TEAM

**Asset Owner:** Echo Entertainment

**Architecture:** Fitzpatrick & Partners

**Principal Builder:** Brookfield Multiplex

**Specifier and Construction Project**

**Management:** ICM

**Galvanizing:** Industrial Galvanizers

## PROFILE:

MAKING *THE MOMENT* LAST LONG

An intricate new crimson sculpture known as *The Moment* which adorns a new apartment building in Melbourne's premier arts precinct benefits from a hot dip galvanizing (HDG)-based duplex system that lowers total lifecycle cost whilst delivering a striking aesthetic finish.

The base HDG coating for this sculpture cost around one-fifth of a three coat system to provide equivalent protection, representing a massive saving for the client.

The result is a striking HDG and painted piece seven metres in diameter by 2.4 metres deep permanently installed five metres above ground. Predominantly created from 3mm mild steel and mounted on an angle frame, the installation weighs three tonnes.

The sculpture was built by artist, **Damian Vick**, and commissioned for a new residential development comprising 220 apartments in South Melbourne, the neighbourhood being home to the National Gallery of Victoria, Victorian College of the Arts, Malthouse Theatre, Melbourne Recital Centre, Art Centre and the Australian Centre for Contemporary Art.

Due to this location in the centre of Melbourne's art hub there was a Council requirement to provide an artistic feature to the building. Considered the most significant of Mr Vick's works to date, he needed to ensure that it was developed in such a way to ensure great longevity of both the structure and the finish.

An intricate new crimson sculpture known as *The Moment* which adorns a new apartment building in Melbourne's premier arts precinct benefits from a hot dip galvanizing (HDG)-based duplex system that lowers total lifecycle cost whilst delivering a striking aesthetic finish.

Due to the complexity of the design, the structure was created from 49 individual sections with every piece hot dip galvanized; the finish primarily chosen over a paint-only application to ensure longevity. The HDG coating under the aesthetic paint means that the steel substrate will not corrode and taint the work with unsightly rust staining.

The extremely odd shapes that make up the piece required precise jiggling to ensure no build up of zinc on the inside and outside surfaces. The dipping technique employed by the galvanizer in accordance with AS/NZS 4680 ensured no runs, dribbles or pimpling on the outside surfaces and sufficient coating thickness.

Wire and touch marks were not allowed as any defect would show up due to the duplex coating. Consultation at the initial design stage allowed for adequate venting/drainage to be placed to not detract from the overall façade.

Due to the thin gauge of steel used, care with quenching was critical to ensure no distortion as any deformation at all would have made assembly of the work virtually impossible.

After the duplex paint coating had been applied and cured, the galvanizer had to ensure no damage to the top coat through handling or transporting exacerbated by the tight time schedule for transporting and installing onsite due to safety issues associated with the prominent public location. Transporting the sculpture to site required that every single item was individually wrapped and shipped to ensure no damage to the final surface finish.

The paint work component involved whip blasting surface preparation, then applying a prime coat of DUREMAX® GPE at 75 microns and a topcoat of WEATHERMAX® HBR of 50 microns thickness.

#### PROJECT TEAM

**Developer/Owner:** PGS Management/LAS Group

**Architecture:** Peddle Thorp Architects

**Project Manager:** Damian Vick

**Hot Dip Galvanizer:** Geelong Galvanizing

**Paint System:** Geelong Galvanizing

# FROM PIT TO PRESTIGE SPORT CENTRE



Hot dip galvanizing (HDG) applied to the entire structure of a driving range practice facility of a new golf centre in Sydney's northwest transformed what was a disused and derelict industrial brick pit and waste site into a modern and enduring sporting venue.

The \$5 million Thornleigh Golf Centre facility features 56 hitting bays over two levels with automated ball return complementing a mini-golf facility, clubhouse and 15,000m<sup>2</sup> drive range.

As the golf centre is located on a clay-capped filled site an adjustable design was called for to allow the two-tiered driving facility to overcome differential site settlement associated with engineering constraints onsite demanding a lightweight protective coating.

The structure therefore incorporates a system to adjust deck levels and a lightweight HDG steel superstructure was chosen. HDG was applied to the entire two tiers of the structure, comprising 80 tonnes of structural steel portal frame supporting a steel clad roof and two levels of pre-cast concrete flooring.

The HDG structural steelwork includes universal beams and columns, parallel flange channels as well as rectangular and circular hollow sections.

The most significant challenge was the need for an architectural finish from what is basically an industrial process to ensure an end surface finish which is completely uniform and unblemished with no wire or touch up marks.

The second biggest challenge was to provide the high quality galvanizing within a very tight schedule required by the builders for items to arrive onsite ready for erection without delay. This was met through tight teamwork between the galvanizer, steel contractor, owner, engineer and architect.

The vast majority of outdoor sporting facilities use paint as the preferred type of protective coating. Thornleigh Golf Centre made a conscious decision to use HDG steel due to its durable, cost-effective and aesthetic properties. The vast quantity of galvanized steel for the golf centre is clearly visible.

Already promoting sustainability and environmental awareness through land renewal, the use of galvanizing on this project was the most appropriate finish as HDG does not leach, nor require maintenance or further product applied during its lifetime.

This project scored a real hole in one for golfing enthusiasts and even resident rabbits which still thrive on the grounds.

“ Hot dip galvanizing (HDG) applied to the entire structure of a driving range practice facility of a new golf centre in Sydney's northwest transformed what was a disused and derelict industrial brick pit and waste site”

The HDG solution was not only a lot cheaper than a stainless steel or other alternatives, it provided superior weathering capabilities in the exposed outdoor setting with no touch-ups required at erection and minimal maintenance costs going forward.

The project also attracted a High Commendation in the Small Building projects category of the 2012 Australian Steel Design Awards organised by the Australian Steel Institute.

#### PROJECT TEAM

**Developer/Owner:** Steve Aisbett

**Architecture:** OPRA Architects

**Structural Design:** Kneebone and Beretta Consulting Engineers

**Project Managers:** Darren Comin, Paul Comin and Ron Comin (Combell Steelfab)

**Main Contractor:** DBHE Building Services

**Hot Dip Galvanizer:** Galvanising Services (Nepean Building & Infrastructure, [www.nepean.com/building](http://www.nepean.com/building))

## GALVANIZED FINISH GUARDS NEW RAIL WORK

More images of the winning Sorel Award.



### \*THE JUDGES

Mike Dennett commenced with Australian Zinc Development Association (AZDA) in 1963 and over the intervening 31 years was involved with providing technical information and advice on zinc coatings, predominantly hot dip galvanizing to the construction industry through the GAA. Mike was awarded life membership of the GAA in 1981. Colin Bain commenced with Australian Lead Development Association in 1963 and was appointed Director of Australian Lead and Zinc Development, including the GAA, in 1983. Colin represented Pasminco on the Board of the GAA and was awarded Life Membership of the GAA in 1993.

## 10 REAL BENEFITS OF HOT DIP GALVANIZING

- 1 Lowest first cost.** Galvanizing is lower in first cost than many other commonly specified protective coatings for steel. The application cost of labour-intensive coatings such as paint has risen far more than the cost of factory operations such as galvanizing.
- 2 Less maintenance/Lowest long-term cost.** Even in cases where the initial cost of galvanizing is higher than alternative coatings, it is almost invariably cheapest in the long term because it lasts longer and needs less maintenance. And, maintenance causes problems and adds to costs when structures are located in remote areas and when plant shutdown or disruption to production is involved.
- 3 Long life.** The life expectancy of galvanized coatings on typical structural members is far in excess of 50 years in most rural environments, and 20 to 25 years-plus even in severe urban and coastal exposure.
- 4 Reliability.** Galvanizing is carried out to Australian /New Zealand Standard 4680 and standard, guaranteed minimum coating thicknesses are formed. Coating life and performance are reliable and predictable.
- 5 Toughest coating.** A galvanized coating has a unique metallurgical structure that gives outstanding resistance to mechanical damage in transport, erection and service.
- 6 Automatic protection for damaged areas.** Galvanized coatings corrode preferentially to steel, providing cathodic or sacrificial protection to small areas of steel exposed through damage. Unlike organic coatings, small damaged areas need no touch up.
- 7 Complete protection.** Every part of a galvanized article is protected; even recesses, sharp corners and inaccessible areas. No coating applied to a structure or fabrication after completion can provide the same protection.
- 8 Ease of inspection.** Galvanized coatings are assessed readily by eye and simple non-destructive thickness testing methods can be used. The galvanizing process is such that if coatings appear sound and continuous, they are sound and continuous.
- 9 Faster erection time.** As galvanized steel members are received they are ready for use. No time is lost on-site in surface preparation, painting and inspection. When assembly of the structure is complete, it is immediately ready for use, or for the next construction stage.
- 10 A full protective coating can be applied in minutes.** The galvanizing process is not dependent on weather conditions.

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