HOT DIP

GALVANIZING TODAY

2013 Volume 10 Issue 4

HOT DIP GALVANIZERS ASSOCIATION Southern Africa

56

Featuring:

- "The World of Hot Dip Galvanizing Around Us", including contributions from North America and Australia.
- Feedback on our Awards Evening
- Effective corrosion protection of structural steel
- Beware of the salt spray test
- Regulars: Education and Training, Bob's BANTER and On the Couch

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The Association is an information centre established for the benefit of specifiers, consultants, end users and its members.

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Front Cover: *A kaleidoscope of photos including showing some of the International Projects that are featured.*

Hot Dip Galvanizing – Adding value to Steel

Executive Director's Comment

As an Association of hot dip galvanizers throughout Southern Africa we have two primary objectives, being technical marketing within the corrosion control industry and technical support of our members.

Confusion tends to exist between what is marketing and how does it differ from that of sales? A review of the definitions between the two terms provides the following.

Marketing is the process of communicating the value of a product or service to customers, for the purpose of selling that product or service. Sales on the other hand involve the act of selling a product or service in return for money or some other compensation. As an Association how do we go about marketing? How do we communicate the value of hot dip galvanizing as a corrosion control product and service?

Corrosion control is what we offer in terms of service life longevity and conservation of resources. The product consists of hot dip galvanizing and duplex systems, i.e. hot dip galvanizing plus a top paint system. The term "top paint system" indicates a specified zinc compatible paint consisting of more than a single coat of controlled coating thicknesses.

Marketing communications are multi-faceted and includes dissemination of technical knowhow of products and services. As the Association we employ a number of communication vehicles including our valued magazine, "Hot Dip Galvanizing Today", web site, black tie awards dinner (flagship event), formal technical presentations to individuals or groups of engineers and technical papers presented at seminars, conferences and technical publications.

Education is integral to communication and the attainment of our marketing objective. To this end we offer training courses to various levels of the corrosion control industry, including lecturing to engineering students, quality control specifications and our very well attended 3 day and 1 day inspector's courses.

The Association is an information centre that offers technical support to the corrosion control industry in general and specifically on the appropriate application of hot dip galvanizing and duplex system to combat the ravages of corrosion of carbon steel.

Bob Wilmot

Note from the Editor

How to achieve quality hot dip galvanizing, particularly for architectural applications?

- All steelwork is to be fabricated in accordance with SANS 14713 Part 2 and the HDGASA Wall Chart "Design for Hot Dip Galvanizing".
- In order to have sound and acceptable welding quality include reference to ISO 8501-3 2006 at least preparation Grade P2 of Table 1.
- All steelwork to be hot dip galvanized in accordance with SANS 121(ISO 1461) including Annex A.
- Include the galvanizer at the initial project team meeting and request their QCP's and comments.
- On behalf of the client consider contracting with a suitably qualified third party inspector, whose primary duties are to inspect the black steel during/after fabrication (before delivery to the galvanizer), then after galvanizing before delivery.
- Request in the order from the fabricator to the galvanizer that a certificate of conformance to SANS 121(ISO 1461) be issued by the galvanizer.
- All necessary coating repairs at the galvanizer or site is done strictly in accordance with SANS 121 (ISO 1461).
- All fasteners including chemical anchor studs and mechanical expansion bolts are to be hot dip galvanized to SANS 121 (ISO 1461). Note: "Nyloc" nuts cannot be hot dip galvanized but locking nuts (if required) can.
- Hot dip galvanized components arriving on site should be neatly stacked off the ground at an inclined angle using appropriate dunnage between the components to prevent "white rust" (moist sites) and unnecessary coating damage.
- Components should also be stacked away from the activities of the wet tradesmen, to prevent unnecessary surface contamination before erection.

The main feature for this edition is the "World of Hot Dip Galvanizing Around Us" with some significant contributions from both the Galvanizers Association of Australia (GAA) and the American Galvanizers Association (AGA) of the USA.

We include some photos of the 2013 Hot Dip Galvanizing Award winners.

The recent establishment of TSASA (Thermal Spray Association of South Africa) and their objectives is included as well as a letter to the Editor from one of our members on a previous "Miss Conception".

Members News is well supported and includes contributions from a number of our members.

Under Education and Training we include an extract from SANS 14713 part 1 on the inappropriate use of accelerated durability testing using metallic zinc coatings by salt spray testing plus an international article, "Beware of the salt spray test".

Hot dip galvanizing is considered to be "Green" see summary on "Hot dip galvanizing for sustainable design", and web site reference from the American Galvanizers Association.

Regulars include our single and 3 day hot dip galvanizing course as well as "Achieving Our Desired Future Means by managing the Unexpected" in Bob's BANTER.

On the Couch we chat to a well-known Heritage Architect from KZN, Robert JW Brusse and include one of his latest refurbishment projects where the 1892 "S" rib sheeting was removed, regalvanized and re-attached using the original holes!

121 Years old, that's what I call a "Green" coating!

Enjoy the "magazinc".

Terry Smith

GIARDINA
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Have you any problem with emission? Contact Giardina and your problems are over!

The company Giardina Srl has worked in both the hot galvanizing and in the thermal treatment sector for more than 40 years. Design and realization of hot dip galvanizing plants with a special attention to environment and energetic consumpion are its main goals.

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The rules provide that plants have got suitable control systems for the emissions inside and outside the working place. Our company produces plants for the acid vapors captation from pickling systems, of white fumes from galvanizing baths with the relevant damping with scrubbers and dry filters.

Some of our products are successfully present on the South African market both on existing and on new plants.

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2013 Hot Dip Galvanizing Awards

The Hot Dip Galvanizers Association of Southern Africa hosted the twelfth Hot Dip Galvanizing Awards Evening on Friday 23 August in The Ballroom of Montecasino.

Thank you to this year's sponsors (in alphabetical order): Armco Galvanizers, Bulldog Projects, Giardina, Macsteel Tube & Pipe, Robor Galvanizers, The SA Institute of Steel Construction and Transvaal Galvanisers.

Recipients of WGS Barnett Trophy: HA Mofutho Pedestrian Bridge.

Joint Architectural & Duplex Coating Systems Category Winner: House in Rooi Els.

Joint Architectural Category Winner: 10111 Radio Control Centre.

Mining and Industrial Category Winner: Ndlovu Roll Over.

CONGRATULATIONS TO ALL THOSE WHO PARTICIPATED IN THIS EVENT!

Innovation Category Winner: Solar Trees at Waterfall Estates.

American Galvanizers Association

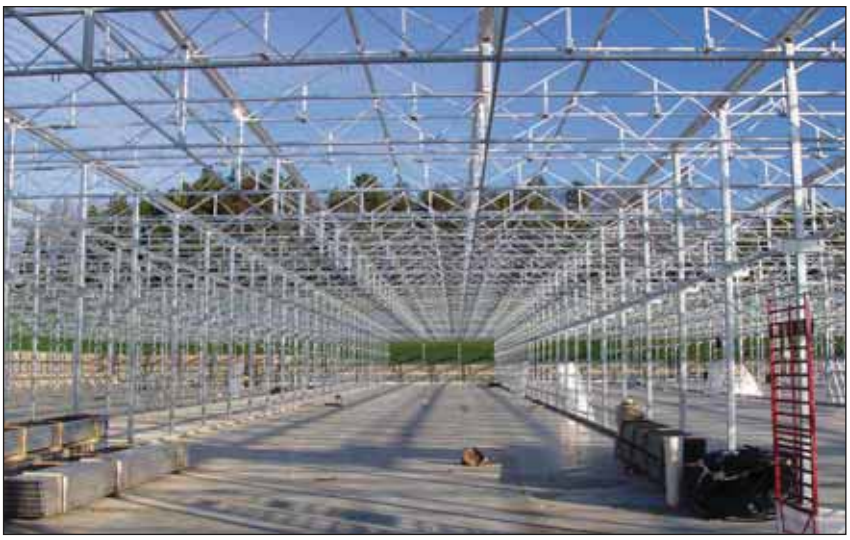
Metrolina Greenhouses
Huntersville, North Carolina

Founders Tom and Vickie VanWingerden emigrated from the Netherlands in 1971 and initially rented a 20 000 square foot greenhouse on 3 acres in Charlotte, NC, in 1972. One year later, the family moved to Huntersville, NC, opening a 40 000 square foot greenhouse on 85 acres of land and started what is now the largest single-site greenhouse in the United States. The first greenhouse was a 1 acre plastic covered galvanized structure.

By 1982 the greenhouse had grown to 12 acres, and increased again to 50 acres by 1996. During the last 15 years Metrolina has grown from 50 acres to 141 acres of greenhouse space and hot dip galvanizing has been integral to all of this construction. Galvanizing was engineered into the first buildings, and all future construction will include it to protect the steel from the moist, corrosive environment of the greenhouse.

Metrolina Greenhouses' newest $50 million addition will bring the total size of the building to 5.8 million square feet. That's a footprint area larger than the 4.3 million-square-foot Boeing plant in Everett, Washington. They employ 550 people year-round and use an additional 300 temporary workers during the peak times of the year. Employees use golf carts, mopeds and bicycles to travel through the expansive indoor farm. Every year more than 75 million plants and over 700 varieties are grown in this heated greenhouse. Metrolina Greenhouses is the largest single-story building in the United States, with annual sales of over $125 million.

Metrolina is also 'green' beyond what it grows in its greenhouses. Chevrolet has invested 40 million dollars in projects around the world that reduce carbon emissions into the atmosphere, and Metrolina Greenhouses is one of those projects. The boilers used to heat the greenhouses have replaced 100% of fossil fuels with biomass. All of the runoff water from rainfall and the greenhouse floors is captured in retention ponds, cleaned and recycled. Plastic potting trays that are not re-used are recycled at a local plastics recycler.



Metrolina Greenhouses, Huntersville, North Carolina.

Metrolina is developing organic trays that can be used to plant directly into the soil and eliminate plastic altogether.

Continuing with this sustainable trend, Metrolina chose hot dip galvanizing for all of their structures. Utilizing 100% recycled, abundant and natural zinc for corrosion protection supports these green initiatives without sacrificing corrosion protection. Unlike paint, galvanized steel does not require the wasted energy and expended chemicals of continuous paint touch-up.

Art VanWingerden said, "Not only does galvanizing provide an exceptionally long life in the hot, moist greenhouse setting, but it also corresponds with our efforts to protect the environment by eliminating the VOC's released when paint is used for corrosion protection." Metrolina Greenhouses is an outstanding example of vision to protect our resources and our planet, and hot dip galvanized steel will protect these facilities from corrosion while helping meet its needs sustainably.

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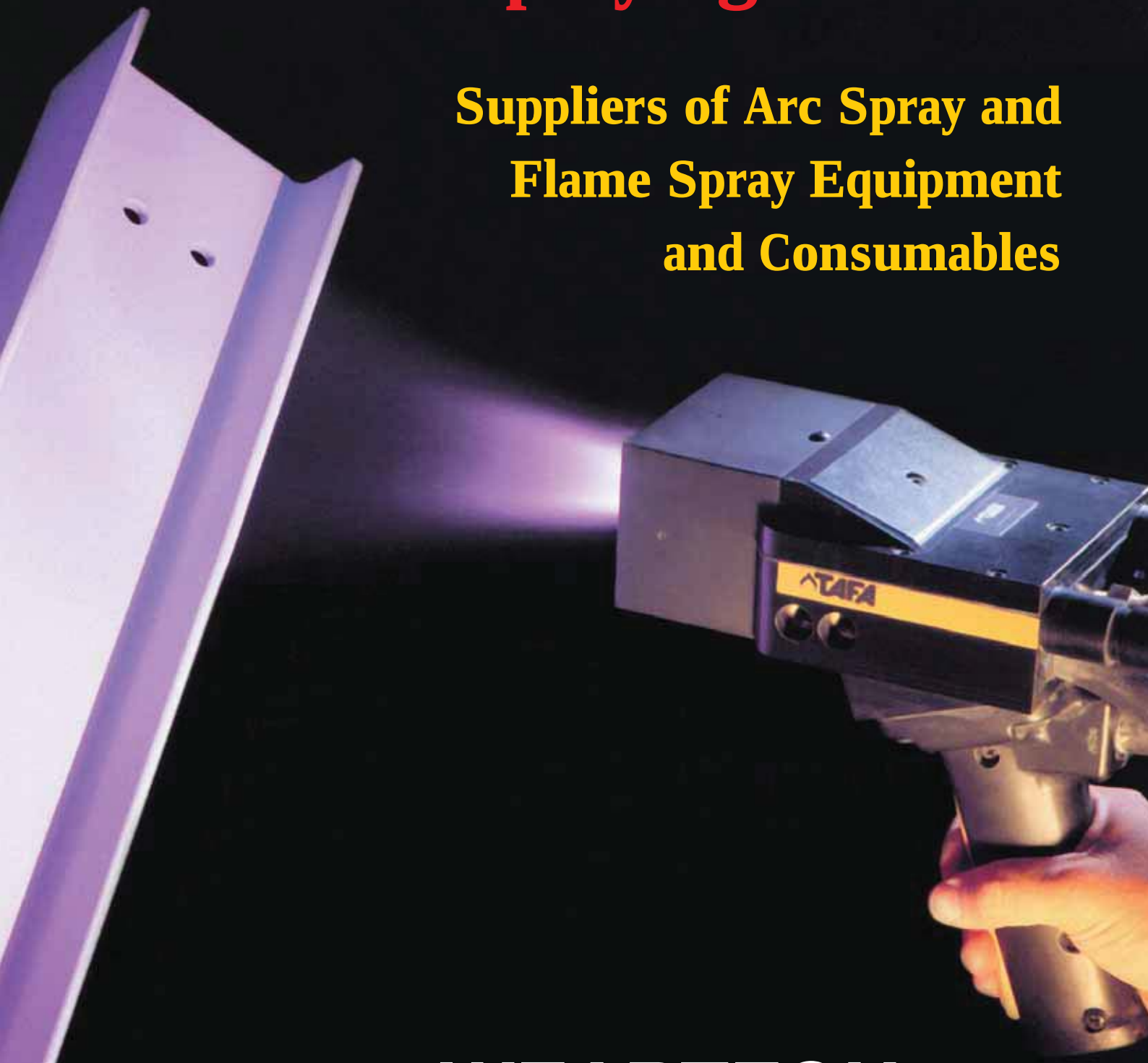
Zinc Metal Spraying?

Suppliers of Arc Spray and Flame Spray Equipment and Consumables



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South Campus Central Chiller Plant.

South Campus Central Chiller Plant

The main structure of the 10-story South Campus Central Chiller plant is comprised of all galvanized structural steel. Corrosion is not an option for this structure, as the galvanized steel will be responsible for holding up thousands of tons of HVAC and chiller equipment for the years to come. The structure will face varying internal and external temperature extremes, as it will be tasked to chill water in the heat of summer and the cold of winter in an urban Midwest environment. The selection of hot dip galvanizing was integral to the success of the project.

The Chiller Project required just-in-time delivery in an extremely confined construction space. The galvanizer was tasked with delivering the proper segments of the fabricated steel on the corresponding day of steel erection. The steel was literally removed from the truck and put directly into place – some of the material was still warm from galvanizing in order to meet the project timeline. Each load of the 1 200 tons typically spent less than 24 hours at the galvanizing plant before being delivered to the site. The steel erector and construction manager were amazed by the seamless process, from fabrication to galvanizing to delivery.

As the sun glares through the artistic glass incorporated into the concrete screen wall of the South Campus Central Chiller Plant, very few will know the strength and protection provided by the galvanizing on the heavy structural steel holding the screenwall and building in place. Those who helped in designing and erecting this building will have the added comfort of knowing the structure will be intact and corrosion-free in the years to come.

The mission of this building is to provide chilled water for the cooling and HVAC units for the Ohio State University Wexner Medical Center. The facilities and engineering department has a monumental responsibility in helping to keep the patients at the hospital comfortable when it comes to climate control. Their ability to stay focused on the operation of the chiller plant rather than have to worry about corrosion problems or touching up an elaborate paint system only helps to make their job a little easier. Their choice was to galvanize.

Franklin Park Conservatory

The original specification for the Franklin Park Conservatory's 80 000 square-foot expansion and renovation project was a 3-coat paint system. After months of marketing, construction meetings, and downright persistence, the specification was amended to hot dip galvanizing with a 2-part paint system.

The project included two new plant houses with several distinct environments within them – a desert room, a tropical rain forest, a Himalayan room, a Pacific Island water garden, and an orchid display. The varieties of temperatures, humidity levels, and herbicide exposure make this conservatory a candidate for extreme corrosion. Once the architect and ownership group realized this, they were sold on the idea of galvanizing.

According to Bill Dawson, Head Curator of the Conservatory, the structural steel that was galvanized and painted has held beyond the expectations of the owner over its 20-year existence. The expansion was created for the Ameriflora 92 event, but the entire

Franklin Park Conservatory.

community knew the structure would have to stand for years beyond in order to justify the investment.

Since the Ameriflora event, the Conservatory has hosted hundreds of events including artistic displays, blown glass exhibits, and several hundred weddings. It has become a gathering place for school groups and families of all ages.

The original structure has maintained its overall appearance and has shown no signs of corrosion. Very little touch-up, if any, has been required. In Dawson's opinion, the use of galvanizing was a wise choice and has saved the Conservatory time and money over the years.

The Franklin Park Conservatory nurtures plants and people. The Conservatory houses a seasonal butterfly exhibit called *Blooms and Butterflies*. It also shows the Chihuly Exhibit, which makes Franklin Park the only public botanical garden in the world to own and show these magnificent glass artworks. Franklin Park is not just any conservatory though, it is truly a museum with special exhibitions. Also, its extensive plant collections makes it a learning center for Ohio and beyond.

During a 2012 inspection, the duplex system showed no signs of paint failure or corrosion. There is significant and constant moisture and humidity levels on the majority of the steel due to the greenhouse atmosphere. The coating thickness readings that were taken on the steel show enough coating to last another 50 years or more, even in this humid environment.

Without having to worry about constant structural corrosion maintenance, the Franklin Park Conservatory continues to be a gathering place for learning about the natural world, gardening, and the arts.

Thanks to hot dip galvanizing, Franklin Park can continue to serve the community and the State of Ohio for many years to come.

Blast deflectors

The unveiling of the new Airbus A380 was a landmark in the commercial airline industry. The 555-seat double decker is now the largest aircraft in the sky, easily surpassing both the dimensions and passenger capacity of the Boeing 747. With its arrival, airports around the globe were challenged to modify their infrastructures to accommodate the A380, specifically runways, bridges and sound/blast deflection.

Blast Deflectors, Incorporated (BDI) is one of a few manufacturers of jet blast deflectors in the world. They recently designed and installed their biggest and most durable deflectors to date at John F. Kennedy International Airport in New York City, and hot dip galvanizing was specified as the protective coating.

Located just minutes from Manhattan, JFK Airport services nearly 25 million airline passengers annually and is one of the busiest airports in the country. The height of the blast deflector extends above the adjacent parking structure, making it highly visible to travellers and airport personnel. Hot dip galvanizing ensures the deflector's appearance as well as its functionality and structural integrity will be preserved for many years.

BDI has installed deflectors all over the world, and the costs of maintaining their products are a major determinant of the company's profitability. Repainting or repairing a structure could translate into tens of thousands of dollars, depending on where it is located.

Since the company's founding, they have always sought out the low-cost solution for corrosion protection, and hot dip galvanizing has proven time and time again to be the answer. Hot dip galvanizing eliminates the need to provide constant maintenance of the

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Blast defelectors.

deflectors over the entire product life-cycle that is necessary with other coatings such as paint or powder coating. It is also initially cost competitive with these alternatives.

Furthermore, the quick turnaround the galvanizer was able to provide allowed BDI to meet the rigid construction schedule at JFK Airport. Hot dip galvanizing's proven durability was also essential for BDI, as these deflectors must withstand engine thrusts of 115 000 pounds and temperatures up to 750°F.

BDI has been able to accommodate the aerospace industry in the development and design of its products for more than 50 years. Eventually, as the commercial airline industry progresses and the aircraft themselves evolve, the jet blast deflector at JFK Airport will become obsolete and require replacement. With the use of hot dip galvanizing, 100% of the materials used in construction will be recycled and used for future projects. No other coating system can claim such a contribution to environmental sustainability, thus hot dip galvanizing was the clear choice for BDI.

Blast Deflectors, Inc. was founded in 1957 by Stanley Lynn as a small, family-operated provider of deflectors for the U.S. Military. Lynn actually delivered the first prototype deflector, made by hand, to El Segundo Airbase in Los Angeles, California, in the back of his station wagon. His product soon became the standard for the military.

By the end of the 1960s, Lynn had expanded into the commercial aviation market, protecting the roadways, buildings and parking areas in and around airports. Through the 1970s and 1980s, BDI expanded beyond the boundaries of North America and also developed new deflector designs for aircraft such as the B-1 Bomber and the F-18 Fighter. Today, BDI continues to innovate its products to accommodate the latest aircraft such as the Airbus A380 at JFK International Airport.

Throughout the company's rich history, the designers and engineers at BDI have stood by hot dip galvanizing's ability to provide corrosion protection time and time again, and they will continue to specify hot dip galvanizing as the aerospace industry continues to evolve.

Brea Power Plant
Orange County, California

This Orange County, California, facility was designed and built in collaboration between public and private sector entities to create innovative solutions in providing clean, reliable and renewable energy. Broadrock Renewables had previously used hot dip galvanizing successfully in a similar facility on the East Coast, and was convinced that hot dip galvanizing was more cost-effective than utilizing paint.

Brea Power Plant, Orange County, California.

Electric Vehicle Rail Tramway.

This landfill gas-to-energy expansion facility became the 2nd largest power plant in the U.S. fuelled by landfill gas, thus trailblazing the potential for future plants to follow. The fabricator utilized a new computer system that provided all bolt holes and connection locations, which enabled a systematic modular job site completion.

This new energy-producing facility at the county-owned Olinda Alpha Landfill, transforms methane gas, harnessed from decaying trash, into enough electricity to power more than 20 000 homes. The project was a recipient of a $10 million stimulus grant from the US Department of Energy and was the perfect use of industrial energy technologies to cut overall energy use, reduce carbon pollution and provide clean, reliable energy to Orange County for decades to come.

Electric Vehicle Rail Tramway

The Electric Vehicle Rail Tramway was built to take passengers staying at the Ridge Resort to the popular scenic Heavenly Mountain Resort located on the California-Nevada border in South Lake Tahoe. The ski resort has the highest elevation of the Lake Tahoe area resorts with a peak elevation of 10 067ft. It has 97 runs and 29 lifts between California and Nevada. Visitors can enjoy a majestic view of snow covered mountains overlooking the sapphire-blue waters of Lake Tahoe. When the snow melts, the resort offers a variety of summer activities such as hiking, biking, mountain biking, back-packing, kayaking, fishing, rock climbing and water skiing. This tramway is located just steps away from the Ridge Clubhouse at the Ridge Resort in South Lake Tahoe, Nevada. It seats 8 passengers and operates between The Ridge Resort and Heavenly Mountain Resort. The tramway transports passengers along an 865 foot hot dip galvanized track through varied terrain to their final destination in just 2 minutes and 30 seconds.

Hot dip galvanizing was chosen for this project due to the customer's prior experience and knowledge of its longevity, durability and sustainability. Located at an elevation of 7 480 feet, this tramway will be subjected to the year round mountain elements, requiring a durable and maintenance free coating. Hot dip galvanizing provides both barrier and cathodic protection which will deliver protection during handling and installation as well as possible future scratches in the coating. The expected life span of the project is 30 - 40 years, with hot dip galvanizing providing over 70 years of maintenance free corrosion protection even in the harshest environment; this well exceeds the project's life expectancy. This tramway is built on a mountainside where it would not only be difficult to access, but using a brush or roller in a paint application would not effectively reach all required areas, and a spray application would inevitably cause harmful overspray to the surrounding environment. Hot dip galvanizing also has the ability to uniformly coat the corners, edges and tubular structures of the track providing protection for decades.

This system is new on the market with this particular one being only the second in operation today. Its applications are for residential and commercial property development with ski in/ski out access and marine access, and able to function over changing terrain from gentle to precipitous slopes. It also offers handicap accessibility solutions, freight and cargo carriers, industrial applications with towable tool and maintenance carrier. Some of the benefits the tramway offers are an aesthetically pleasing design, environmentally friendly with its low impact design, green power and drive technology, fully-automated, and 24/7 all-weather operation. This system offers great potential for market growth and expanding the use of galvanizing.

Environmental stewardship is essential to Heavenly Mountain Resorts, enacting many programs to further their involvement and educate guests, employees, and children in

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local schools as well as others in the community. HillTrac is concerned with the ecological impact of their inclined elevator system as well, offering the environmentally friendly benefits of a low impact design, green power and drive technology. Since hot dip galvanizing steel has the smallest ecological footprint and highest level of sustainability, it was the best choice to accomplish the goals of both organizations.

Gibbs Street Pedestrian Bridge

The Gibbs Street Pedestrian Bridge spans Interstate 5 under Portland's Tram System. In keeping with the silver design of the Tram support system, a galvanized coating made the most sense, aesthetically. With the highway system below, sustainability, coating performance, and durability were of utmost consideration in the design. The Gibbs Street Pedestrian Bridge spans 700' over Interstate 5 with a landing on the west side of the bridge which is 5 stories above ground level, which can be reached by either using the elevator or descending the 132-step stairway with rest areas.

The combination of a five story elevation with a 132-step stairway, crossing a highly travelled interstate highway and potential exposure to 730 crossings per day made safety requirements a great concern. Protective screening the whole

Gibbs Street Pedestrian Bridge.

distance of the span and stairway were required due these exposures. Preventing warpage of these panels presented challenges beyond what is seen in typical structural steel and standard hand railing. With the anticipation of many families with children using this bridge, a coating that is durable, aesthetically pleasing, and safe to be handled was of utmost importance. The bridge runs under the Portland Aerial Tram which provides access to the Oregon Health Sciences University Hospital. All aspects of the bridge's unique design can be seen from the Tram.

The building of Interstate 5 in the early 1960's cutoff parts of what is now the Lair Hill Neighborhood and the Southwest Portland Waterfront. Installation of the Gibbs Street Pedestrian Bridge allows safe access for pedestrians and bicyclists to Portland's scenic waterfront without taking the prior one mile detour around and under Interstate 5. At the east end of the bridge, you can find access to Portland's streetcar, bus and tram systems. Part of the unique design of this bridge is its walls, which are canted outwards to create an open design feeling for travellers instead of a typical corridor type design.

Platt Street Bridge restoration

Hot dip galvanizing was chosen for this project for multiple reasons, the main one being the corrosion

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Platt Street Bridge restoration.

Cape Galvanising Consolidated was established in 1968 and has been involved in every major project involving galvanising for 45 years. It also has the largest zinc kettle in the Western Cape measuring 14 x 1.5 x 2.6.

Some of our projects have been major infrastructure projects for Eskom including Koeberg Nuclear Power Station and transmission lines to the grid all carrying the SABS mark. Other more recent projects have been the Cape Town Docks Refrigeration Container Terminal, the City of Cape Town BRT bus program and stadiums.

CGC also has an extensive transport fleet ready to service its customers' requirements from near and far and is currently expanding its operations.

Our team of experienced professionals is looking forward to South Africa's new challenges.

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Left and above: Solaris Tower.

resistance it would provide in the harsh environment where it was installed. Hot dip galvanizing has also shown it can withstand constant vehicular traffic travelling on it, with minimal degradation. The minimal amount of maintenance required on the decking due to hot dip galvanizing will benefit the life-cycle costs of the bridge. All of these reasons are what contribute to the ease of specifying this structure to be hot dip galvanized.

As a major artery, 34 000 vehicles travel across this bridge each day. Every one of these people will see the difference between the old, rusted deck they had been driving over for the past 80 years and the new, hot dip galvanized deck. Through the years to come, they will behold the evidence of how hot dip galvanizing resists the corrosive environment of Tampa Bay and the constant traffic across this bridge. Because this grid decking was to be part of a bridge and fit tolerances were very tight, care in galvanizing had to be taken in order to minimize the distortion of each section of grid deck.

The Platt Street Bridge was originally constructed in 1926, and played a very important strategic role in the development of downtown Tampa. The bridge provides a link between downtown Tampa and the neighbourhoods and parks on the West side of the Hillsborough River. As a critical artery today, this bridge carries 34 000 cars and trucks a day from Bayshore Boulevard to downtown Tampa. The bridge had started to show its age with rusting steel and crumbling concrete so the decision was made to repair and rehabilitate the bridge. The bridge was designated a historical structure in 2006, so the rehabilitation project would seek to restore it to its original look. The bridge carries more traffic than can be detoured onto one road, so careful consideration and planning was done in order to keep the bridge closed for the shortest time possible. All of the steel components were manufactured, tested, and delivered before closing of the road. Components changed included the bascule lifting mechanism, control equipment, electrical, concrete walkways and railing, and the metal grid deck.

The salty water and air of Tampa Bay along with the corrosive exhaust fumes from the automobiles constantly work against the steel eating away at its effectiveness. The corrosion protection offered by hot dip galvanizing would ensure that the steel deck could withstand these corrosive attacks and keep the bridge sound and operational for many decades to come. Bailey Bridge was chosen to supply the hot dip galvanized grid deck. They worked with the galvanizer on critical issues such as scheduling of the steel and flatness and distortion. Hot dip galvanizing is a timely process and the material can be used immediately which helped it to fit into the critical time schedule of this project. Because the grid deck would be part of a bridge, straightness and flatness were also critical. The galvanizer used experienced techniques to minimize distortion as much as possible. Each section was then inspected before assembly. The project was completed right on schedule and the bridge was reopened three and one-half months after the closure. Commuters and residents alike are thrilled to have the bridge restored and reopened. Hot dip galvanizing once again proves its usefulness by extending the life of this critical thoroughfare.

Solaris Tower

This product is being used both domestically and internationally, and will be exposed to all kinds of environments, thus requiring corrosion control for longevity.

This unit is a lightweight solution for providing extended communications coverage in difficult terrain, remote locations, new construction and security.

The Christina and John Markey Memorial Pedestrian Bridge.

These units are easily moveable, yet set in a solid in-ground foundation that provides rapid deployment and temporary or permanent coverage to meet both short and long term needs.

The Christina and John Markey Memorial Pedestrian Bridge

The Christina and John Markey Memorial Pedestrian Bridge is located in Revere, Massachusetts, directly on the Atlantic Ocean and in an area exposed to industrial pollutants from manufacturing operations and petrochemical storage facilities. The bridge, designed by the same architect who designed the iconic Zakim Bridge in Boston, is part of the Revere Transit Facility and Streetscape Project which will be an important link to historic Revere Beach, America's first public beach. Given the aggressive environment, the historic significance of Revere beach, and the public awareness and use of this pedestrian bridge, it was determined the only method available to protect the structure from corrosion was hot dip galvanizing. To enhance the aesthetics of the project, a duplex coating was specified, giving the structure an additional measure of protection.

The 151-foot pedestrian bridge is a slender steel cable stayed structure with a pair of outward inclined towers framing access to Revere Beach. Towering 50 feet over Ocean Avenue, the bridge will be illuminated by LED lights which will bathe it in colours visible from Revere Beach Boulevard and the sea.

The fact that hot dip galvanizing was selected for this project located in an extremely aggressive environment, a highly visible link to an historic site, and an iconic design by a world-renowned architect, reinforces the reputation of hot dip galvanizing as the pre-eminent choice for corrosion protection and good looks.

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Winged Glory.

Winged Glory

The harsh southern weather in Suwanee, Georgia, could make a steel statue rust within months. Hot dip galvanizing will allow the beautiful project to be rust free in the years to come. This project is very visible to the public, and galvanizing was the look they were after. It is located right in front of Suwanee City Hall.

The Unique Aspects of this project were it was made of mostly lightweight material, thus the artist was very concerned about distortion. The galvanizer had to take special care of the sculpture and help in designing the project. The sculpture was designed to replicate the Rolls Royce Hood ornament and is highly visible to the public located in the middle of town, right at City Hall. As the statute weathers, people will experience a rust-free, maintenance-free product, and will realize more items in the state of Georgia should be galvanized.

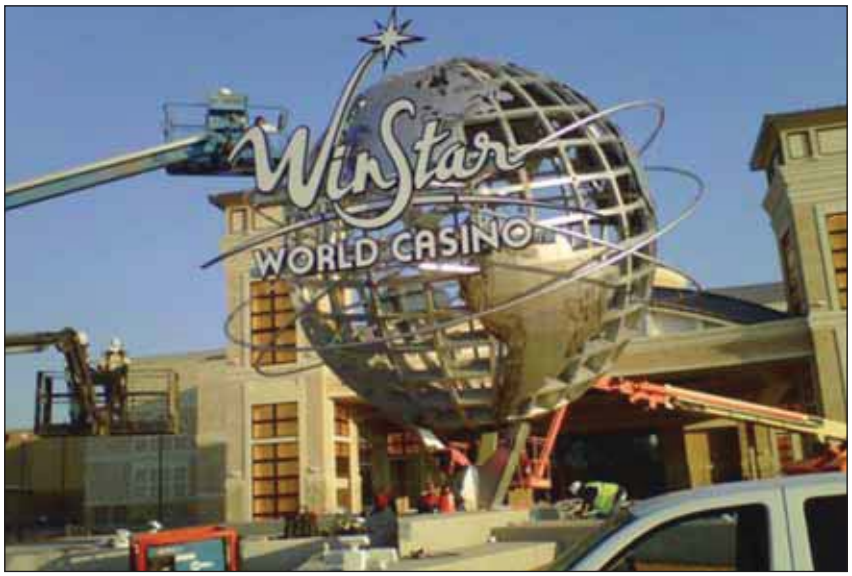
A high degree of trust was put onto the galvanizing plant to handle the degree of difficulty of this sculpture because of their experience with this artist in the past.

WinStar Casino Globe

This scaled-down replica of the 1960 New York World's Fair Globe was initially designed to be constructed out of stainless steel, but financial concerns shuttered that idea. Other considerations such as aluminum and paint quickly gave way to hot dip galvanizing because of its ability to provide corrosion protection inside and out for these modular sections. The potentially wet Oklahoma weather made the galvanized coating an important element in protecting the "globe."

Because hot dip galvanizing was not in the original design, and corrosion protection became a critical concern, specific venting and steel fabrication issues had to be rethought and adapted on the fly. Constant communication was critical in achieving the proper design and fabrication.

The WinStar Hotel and Casino, owned and operated by the Chickasaw Nation, set out to significantly upgrade their image. In becoming Oklahoma's largest casino, this $60 million expansion included new hotel accommodations and a new exterior. The galvanized world's globe is a visual marvel all patrons see upon entering the property, and has become an iconic staple of the casino.



WinStar Casino Globe.

The Association would like to thank Melissa Lindsley, Marketing Director of the American Galvanizers Association for these interesting contributions.

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Galvanizers Association of Australia

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 based duplex system that lowers total lifecycle cost whilst delivering a striking aesthetic finish.

The base hot dip galvanized layer 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 hot dip galvanized 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 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.

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 hot dip galvanized 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 jigging to ensure no build up of zinc on the inside and outside surfaces. The dipping technique employed by the galvanizer in accordance with ANZS 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.

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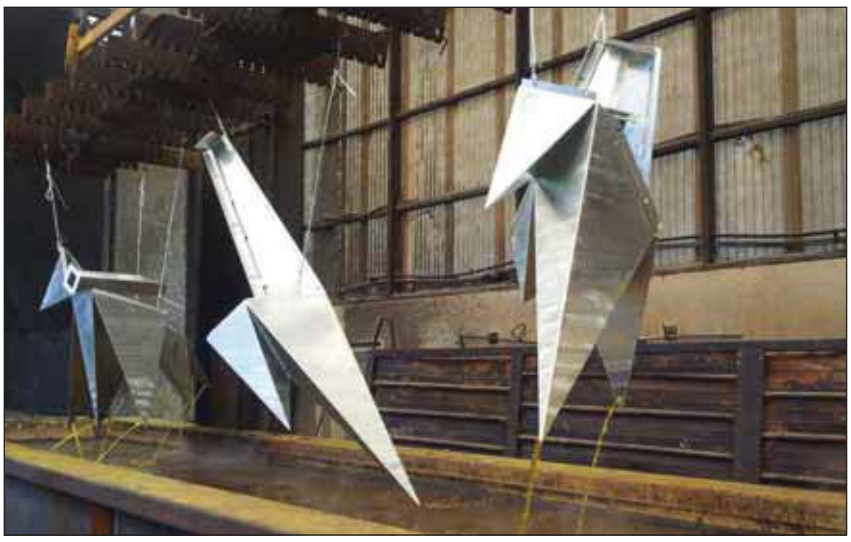

The Moment.

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SMT GALVANIZERS

SMT Galvanizers are specialists in the hot dip galvanizing of all types of fasteners including the treating of embrittlement on site. We do offer a wide variety of services to our clients by creating a comprehensive supply chain for all their galvanizing needs. Our expert services are procured by hand railing, flooring, construction, fabrication, civil and general engineering industries for open dipping.

All work is done according to SABS-ISO 1461SANS 121 Specifications. SMT Group is SABS and SATAS accredited and BEE compliant.

SMT Group offers the following services,

- **Hot dip galvanizing** - spinning and dipping;
- **Electroplating** - Barrel work (Yellow and trivalent blue passivating);
- **Electroplating** - Jigging up to 3.5meters;
- **De-embritteling** on site;
- **Fabrication** workshop with certified welding operators;
- **High Tech engineering workshop** - cnc milling, turning and dynamic balancing;
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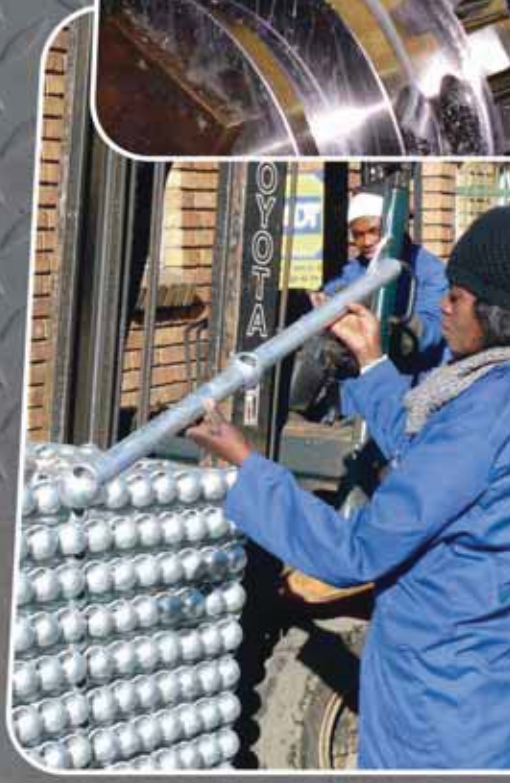

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SMT GALVANIZERS
SPINNING & DIPPING

SMT Galvanizers (Spinning & Dipping) | **jan@smtgroup.co.za**
SMT Electroplaters | **kevin@smtgroup.co.za**
SMT Steel (Engineering) | **bernadette@smtgroup.co.za**

Star City Casino.

Consultation at the initial design stage allowed for adequate venting/draining 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 exasperated 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.

High stakes skin for Star extension

Hot dip galvanizing 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 3 000sqm gaming facility featuring a new entrance facing Sydney Harbour, a floor-to-roof glass façade and a 3 000-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 hot dip galvanized 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 hot dip galvanizing 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 hot dip galvanizing 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 hot dip galvanized 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 hot dip galvanized 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.

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 hot dip galvanized 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.

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,

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otherwise considered too big for existing plant capacity, can be hot dip galvanized 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 hot dip galvanizing 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 creating 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.

Adelaide Metro rail electrification project.

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

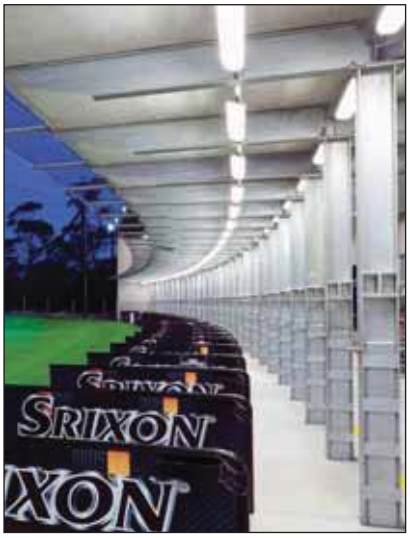
The fully enclosed pedestrian overpasses, lift towers and enclosed stairs for each station required early intervention to ensure they could be broken down efficiently to enable hot dip galvanizing. Segments were up to 3.6 to 3.8 metres high, up to 10 metres long and weighed up to five tonnes, thus comprising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

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

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



Thornleigh Golf Centre.

promote patronage, hot dip galvanizing provides a vital contribution to overall project aesthetics.

From pit to prestige sport centre

Hot dip galvanizing 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 000sqm drive range.

As the golf centre is located on a clay-capped filled site an adjustable design was called for 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 hot dip galvanized steel superstructure was chosen. Hot dip galvanizing 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 hot dip galvanized 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 that 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 hot dip galvanized 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 hot dip galvanizing 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.

The hot dip galvanizing solution was not only a lot cheaper than a stainless

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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.

Upholding very green park build

Waterloo Youth and Community Centre, NSW

The liberal use of galvanized steel has enabled a former amenities block at Waterloo Oval near Sydney's inner-city suburb of Redfern to be transformed into a built form to resist the corrosive effects of creeping vegetation it is designed to support.

Appearing almost at one with its parkland setting to house a modern workspace and counselling facility, its steel canopy structure was designed as an interlocking, but self-supported element also allowing for the future de-mounting and relocation of the structure.

Building materials were pared back and simply detailed, the building designed to be robust, low maintenance and long lasting. The steelwork not only needed to support the estimated weight of the 'creepers', but also to withstand the structure being climbed upon for maintenance, imposing greater than just maintenance loads.

Waterloo Youth and Community Centre, NSW.

Principal of project architects Collins and Turner, Huw Turner said the building was conceived as a kind of collage between architecture, landscape and urbanism with the choice of galvanizing as both corrosion protection system and finish driven by two factors.

"Firstly, there was need for a long-term, maintenance-free finish for structural steel members and surfaces that will be unreachable for servicing of any kind once the plants have taken over the majority of the structure," he said.

"But equally the desire for the building to feel very much part of an urban inner-city environment was important and we took inspiration from common things like crash barriers, railings, roller doors, security fences. We felt that such a building would feel right at home in the middle of the city on the junction of some busy streets and on the edge of a skate park.

"Parts of the building receive a daily punishing from young people using the skate park so the new building needed to be as robust and resilient as possible and take more than a few hard knocks. Given this, a galvanized finish was our first and only consideration.

"The need for speed and ease of erection were also clear factors in the choice."

The Association would like to thank Peter Golding Executive Director of the GAA for these interesting contributions

Effective corrosion protection of structural steel

Every year nearly one and a half million tons of hot dip galvanized steel products are produced for the local South African market either for domestic use or export in the form of sheet and wire, or pipe and fabricated steel structures that are dipped in general hot dip galvanizing plants. As the sheet and wire are relatively thin coatings of varying degrees of thickness our discussion will revolve around the approximately 500 000 tons that comes out of the general hot dip galvanizing industry.

All these products show a remarkable corrosion free lifetime inland as zinc corrodes at a rate of about 1 to 2 microns annually (ISO 9223 / 14713) and often exceeds the useful life of the structure for which they were designed. However it is important to know that the hot dip galvanized coating will fail over a period of time in certain aggressive environments and for this reason a suitable duplex system should be added. This is particularly relevant when thin continuous hot dip galvanized coatings (Z275 or less) are used.

The average coating from a general plant is in the region of 100 microns and will vary depending on steel profile thickness from a local coating thickness of about 55 to 250 microns on heavier sections. As silicon is added as a deoxidant in the manufacture of structural steel the heavier profiles all tend to be reactive to molten zinc. This is especially applicable when longer immersion times are necessary due to excessive component size or inadequately sized and positioned fill and exit holes in hollow sections. It is very rare to find a minimum mean coating thickness of 85µm on thick structural profiles.

As we know coating failures inland are nonexistent and the life of the coating will easily exceed 50 years. These lifetimes are common even in the average household where gates, railings, buckets, bins, light poles and garden accessories are hot dip

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Newly hot dip galvanized hand railing and light pole in an excellent condition (3 years) while in the background is the duplex coated mast (see successful duplex coatings option 2) coating system that is also in excellent condition after 12 years of exposure.

In the permanent splash zone the thin water based vinyl acrylic paint (80µm DFT) has failed and the heavy galvanized coating (250µm) has stood up well over the 21 years except on the base plate due to permanent wetting.

A hot dip galvanized watering can used in the Constantia area in Cape Town purchased in 1963 (50 years old) indicating a coating thickness reading of 85µm. For the steel thickness of 2,0mm this is still far in excess of what's required in terms of the Standard!

The duplex coated mast showing the aggressive sea spray conditions in the background.

galvanized. Failures of the coating only occur for a reason that can easily be determined by analysing the environment and are normally restricted to poor galvanizing practice containing large disguised uncoated areas, severe pollution, certain acidic waters and structures that are located in the tidal zone or too close to the sea. In these environments the coating must be reinforced with a suitable duplex system or in extreme cases be substituted with an alternative such as 316 stainless steel.

As inland coating failures do not exist without a reason galvanizers like their competitors the paint companies should not hesitate to provide guarantees to their customers specifically as these customers are substantial clients of the industry such as Eskom, Transnet and local municipalities. A warranty provides the specifier with the confidence he needs to promote the product as generally he or his firm are at risk for any failures.

It could be considered to be negligent not to specify a coating such as hot dip galvanizing or a suitably blasted and painted coating system on steel structures positioned in an aggressive exterior atmospheric environment. Wire brushing (not recommended) and painting should only be used on the inside of a building as mill scale is not appropriately removed except by pickling steel or abrasive blasting. Placed outside, the mill scale will tend to flake off with the coating due to corrosion adjacent or underneath the mill scale. On permanent installations this creates a nightmarish maintenance problem with cleaning and continuous repainting.

In an aggressive marine environment a hot dip galvanized surface needs to be reinforced with a series of suitable paint coatings. There are varying degrees of marine conditions to consider.

A. *Extremely aggressive marine*

This most aggressive marine condition is in the splash zone up until about 20 metres from the sea. Here the steel installation may be permanently damp, receive little sunlight and continuous salt spray.

B. *Very aggressive marine*

Twenty to two hundred metres from the sea with continuous salt spray and sea mist

C. *Aggressive marine*

200 metres to one (to 3)# kilometres from the sea

D. *Mild marine/suburban*

One kilometre (or 3#) to twenty kilometres from the sea

E. Rural inland

Warm and dry inland

A and B require duplex paint systems with a minimum appropriate paint coating dry film thickness (DFT) of two hundred microns.

C requires a paint DFT of one hundred microns.

D requires no overcoating.

E has an indefinite lifetime.

– Depending on the combined effect of wave action, prevailing off shore winds, velocity of wind and flat topography this could be up to 3km.

Successful duplex coatings for environment A and B

1. Epoxy primer, epoxy MIO intermediate coat, polyurethane topcoat to a DFT of 200 microns.
2. Water based styrene-acrylic copolymer plus two coats of plasticized styrene acrylic top coats to a total DFT of 350 microns.
3. Epoxy tars on jetties where there is no sunlight to a total DFT of 350 microns.

Successful duplex coatings for environment C

1. Epoxy primer and polyurethane topcoats to DFT of 100 microns.

Failures in environments A and B

Vinyl acrylics, enamels and water based systems where the total DFT does not exceed 80 microns.

While it can be seen from the accompanying photos that there are areas of rusting on structural steel in the splash zone the hot dip galvanized coating has stood up remarkably well considering that the paint system failed within a very short period of time. Failures have been restricted to the water based systems where the total dft of the paint coating did not exceed eighty microns. I beam masts were installed twenty-one years ago and the boxed section masts were installed twelve years ago.

As unprotected mild steel corrodes at a rate of in excess of about 300 microns per year in aggressive atmospheres, it is for this reason essential to install hot dip galvanized and painted coatings. These duplex coating systems have provided remarkable corrosion free lifetimes in aggressive marine installations.

Refer also to HDGASA Information Sheet No 8 Corrosion of Zinc – Corrosivity of Atmospheres, available from www.hdgasa.org.za.

Acknowledgements

Van Eijnsbergen: Duplex systems

Chandler & Bayliss: Corrosion protection of steel structures

Thermal Spray Association of Southern Africa (TSASA)

Over the past decade the local thermal spray industry stagnated and has not grown as it has in other countries. After attending the annual International Thermal Spray Conference and Exposition in Houston in 2012, which was organised by the American Society for Metals (ASM) Thermal Spray Society, Dr Jan Lourens from Thermaspray and Adam Wintle from Weartech both realised that the local industry could benefit greatly from a local thermal spray association to promote the technology and provide quality control services to regulate the industry and improve the reputation and quality of the product. Following the conference they approached SAIW to lead this initiative. Timing was opportune as SAIW plans to offer services for the evaluation and quality control of thermal spray coatings as part of the new materials testing laboratory.

The International Thermal Spray Association is a professional industrial association dedicated to expanding the use of thermal spray technologies for the benefit of industry. The association has been closely tied to major advances in thermal spray technology, equipment and materials, industry events, education, standards and market development. The association is beginning to obtain traction in developing the objectives. A conference planned for later this year will also serve as a springboard to promote the objectives of the association in developing the technology in the local market and ensure all service providers adhere to the highest standards possible for the positive re-enforcement of these technologies.

The use of thermal spray coatings is diverse; from the printing industry to the chemical processing industry with applications which include wear resistant coatings, corrosion protection coatings, hard chromium plating replacements, di-electric coatings, electrically conductive coatings, thermal barrier coatings, food processing equipment coatings, medical instrument device coatings, EMI/RFI shielding, traction control coatings and non-stick coatings. The applications are widespread and extremely exciting and will have a positive impact on industry as these products are utilised more widely across sub-Saharan Africa.

The stagnant position of the industry is evident in the lack of new applications and inadequate investment of both capital equipment and technology updates. SAIW will offer its services to the Association in general, including evaluation services to ensure that thermal spraying is of good quality and marketing of the technology. “Poor quality products do exist in the market, but the majority of the products are working to required standards,” says Sean Black, technical services manager at SAIW. “One of the directives of the Thermal Spray Association is to improve the image of the industry and enforce quality standards”.

As is the case in America, the TSA will be a subcommittee within the SAIW. The committee has already begun a working relationship with other TSAs and organisations, such as; ASM/TSS, GTS, AWS, SABS, ITSA and educational institutions. It is hoping to persuade large organisations that thermal spray coatings and other appropriate advanced surface coatings are the preferred coatings in many applications and should be used in order to extend component lifecycles.

Other objectives of the Association include to:

- Develop an organisation that will ensure that the Southern African thermal spray offering and usage is on par with that of the rest of the world
- Ensure that the members of the organisation receive tangible benefits
- Engage with research and development organisations in South Africa
- Provide education and training of all stakeholders in, and promotion of, the Thermal Spray process, materials and applications as well as the adoption of existing international standards
- Ensure continuous education of all stakeholders through local conferences, workshops and exhibitions
- Focus on safety improvements for both operators and the environment
- Develop a certification program and enforce standardisation of approvals/standards (for those who need and use them for local and/or international markets)
- Develop integrated advisory programme applications within every industry sector, aiming at the following to begin with; mining, power generation, petrochemical, oil and gas, paper and pulp, printing, metal processing, aircraft and infrastructure (anti-corrosion)

Stakeholders to be approached are thermal spray contractors and OEM's, thermal spray supply companies, welding and other engineering supply companies, welding and other surface engineering jobbing companies, gas suppliers, extraction suppliers and robotic suppliers. Further affiliation with organisations such as the Thermal Spray society and Gemeinschaft Thermische Spritzen e.V will be sought simultaneously. Blake warns that “a balance needs to be created as soon as possible in terms of representation on the management committee of the organisation between academia and industry as users and suppliers of both services and products”.

3 CPD POINTS

3-day Galvanizers Inspectors Course

Hot dip galvanizing is one of the most widely used methods of protecting steel from corrosion. During and after fabrication and after hot dip galvanizing the coating is inspected for compliance with the relevant specifications.

The course commences at the selected venue where course material is presented and reviewed, the lecturer encourages discussions between delegates and himself. Each lecture is preceded by a number of pertinent questions on the previous lecture.

Once the delegates have a reasonable knowledge of the coating, including its inspection criteria, the venue moves to a selected galvanizer where a batch of incoming components are discussed en-group and then in teams, preselected hot dip galvanized components are inspected and reports are required to be completed.

If available at the galvanizer or other venue, preparation by sweep blasting and/or chemical treatment is demonstrated and duplex coatings are discussed.

The course will provide delegates with sufficient knowledge to advise on fabrication for successful hot dip galvanizing and also test, inspect and interpret test results after hot dip galvanizing.

COURSE DURATION AND CONTENTS

Day 1	(08h00 to 16h00)
Lecture 1	Introduction to the Environment, Steel & Corrosion
Lecture 2	Understanding Zinc Coatings (How does Zn protect) ISO 9223 & 12944
Lecture 3	Designs, Fabrication and Inspection before hot dip galvanizing SANS (ISO) 14713:1999
Lecture 4	General Hot Dip Galvanizing Processes SANS 121 (ISO 1461:2009) Batch type galvanizing SANS 32 (EN 10240: 1997) Automatic T & P SANS 10094:2007 HDG of Friction Grip Fasteners
Day 2	(07h00 to 16h00)
	Hot Dip Galvanizing Plant Visit and Inspection
Lecture 5	Duplex Coatings and HDG Reinforcement in Concrete
Day 3	(08h00 to Completion of Exam)
Lecture 6	Inspections after Hot Dip Galvanizing
Lecture 7	Quality Assurances in Coating Applications Application of specifications Control documentation for a QA System Examination on Course Effectiveness

Course schedule may be altered and interesting activities added for the benefit of delegates.

Following the course and successful result in a three part exam, the delegate will be issued with a certificate and if required, registered as an approved HDGSA Galvanizing Inspector. Registration will be confirmed on an annual basis. Successful galvanizing inspectors will become Affiliate Galvanizing Inspector Members of the HDGASA for the year.

VENUE AND NUMBER OF DELEGATES

The courses are usually run in Johannesburg from the Hot Dip Galvanizers Association in St Andrews, Bedfordview and also from a suitable venue in Cape Town. Bookings are limited to 10 people per course on a first come first serve basis. Courses in other areas are possible, contact HDGASA.

DATE AND TIME

Courses commence at 08h00 sharp and end at 16h30 (or as otherwise instructed). Lunch and refreshments will be provided. Comprehensive course notes can be collected from our offices two weeks before the course (this is highly recommended).

Johannesburg:
25 to 27 February; 18 to 20 March; 13 to 15 May; 24 to 26 June; 12 to 14 August; 7 to 9 October; 25 to 27 November.

Cape Town:
4 to 6 March; 3 to 5 June; 16 to 18 September.

Special courses can be arranged for a minimum of 6 delegates at appropriate venues in South Africa.

COURSE COST AND PAYMENT TERMS

R4 200.00 per person exclusive of VAT. Should you have two or more delegates from the same company, course costs will be R4 000.00 per person exclusive of VAT. Please note that payment is due on the first day of training. Cheques are to be made out to "Hot Dip Galvanizers Association SA". Members qualify for a discount.

CONTINUOUS PROFESSIONAL DEVELOPMENT (CPD)

By attending the Association's 3 day course Galvanizing Inspectors Course, you will obtain 3 points (accredited by ECSA).

SHOULD YOU BE INTERESTED, KINDLY CONTACT SASKIA SALVATORI AT THE ASSOCIATION

Beware – salt spray testing!

Misleading accelerated corrosion tests

If you are a user of protective coatings in the construction, manufacturing or engineering industry, there is one aspect of corrosion science that requires your careful understanding – that is the role and limitations of accelerated corrosion testing. For decades, the so-called 'salt spray test' has generated misleading information about coating performance and its results still feature prominently in the marketing materials of products that, artificially, yield more favourable outcomes than in the real world.

Firstly, the test does have some value for quality control of a specific material or coating. This is what the test was originally designed for and it is used successfully by some industries for this purpose. Although, it is now largely abandoned even by the automotive industry.

The serious misuse of the 'salt spray test' is its use to compare, or rank, different materials or coatings that have differing characteristics. It is especially misleading to use the test to compare paints with metallic coatings. It is equally misleading to compare different metallic coatings. For example, comparisons between zinc and zinc alloy coatings (such as those containing small additions of magnesium and aluminium) can produce comparative results that are vastly different to real in-field performance.

Unfortunately, material comparisons are still made using the test despite the international standard for the test (ISO 9227) clearly stating that 'There is seldom a direct relation between resistance to the action of salt spray and resistance to corrosion in other media, because several factors influencing the progress of corrosion, such as the formation of protective films, vary greatly with the conditions encountered. Therefore, the test results should not be regarded as a direct guide to the corrosion resistance of the tested metallic materials in all environments where these materials might be used. Also, the performance of different materials during the test should not be taken as a direct guide to the corrosion resistance of these materials in service.' [1]

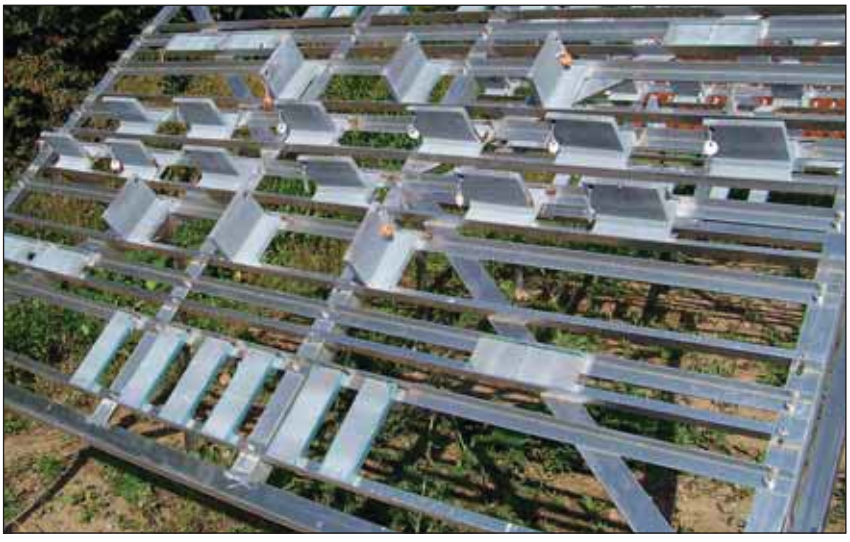
A typical salt spray chamber.

Instead, ISO 9227 recommends that salt spray tests are suitable only as quality control tests. A large number of peer-reviewed papers have also given clear warnings about the use of the salt spray test. Here are some extracts from just a few:

'In fact, it has been recognised for many years that when ranking the performance levels of organic coating systems, there is little, if any, correlation between results from standard salt spray tests and practical experience'. [2]

'Salt spray is the most widely used accelerated test. It was developed more than 50 years ago for testing metallic coatings in marine environments. Although it has been demonstrated that this test does not provide a good indication of outdoor service performance of coatings (even in a salt atmosphere), its use has become entrenched in the coatings industry'. [3]

'The well-known ASTM B-117 salt spray test provides a comparison of cold-rolled and



More reliable predictions are available from long-term exposure tests for galvanized coatings.

galvanized steel within several hundred hours. Unfortunately, the salt spray test is unable to predict the well-known superior corrosion resistance of galvanized relative to uncoated rolled steel sheet.' [4]

'Salt spray provides rapid degradation but has shown poor correlation with outdoor exposures; it often produces degradation by mechanisms different from those seen outdoors and has relatively poor precision'. [3]

Unfortunately, despite these warnings, salt spray testing is still used in communications to introduce new coatings and materials to the market.

To understand why the 'salt spray test' fails to reliably predict real corrosion performance, it is important to look at the test procedure. Samples under test are inserted into a temperature-controlled chamber where a salt-containing solution is sprayed, at 35°C, as a very fine fog mist over the samples. As the spray is continuous, the samples are constantly wet, and therefore, constantly subject to corrosion. Performance is rated by recording the number hours to reach defined levels of surface rusting. Test duration ranges from 24 hours to 1 000 hours or more.

There are some obvious reasons why the salt spray test does not correlate with real world exposure conditions, in particular:

- The surface of the test coupons is constantly wet, with no cyclic drying, which does not happen in reality. This prevents metals, such as zinc, from forming a passive film as it would in the field.
- The chloride content is very high (normally 5% NaCl) resulting in highly accelerated conditions with different acceleration factors for different metals and metal constituents.

These are unusual and severe conditions that probably never occur during normal outdoor exposure.

It is well accepted that the good performance of metallic zinc coatings in real outdoor conditions relies on drying between periods of wetness. The development of a passive and relatively stable oxide and/or carbonate film during the drying cycle contributes to the excellent performance of galvanized coatings. The continual wetness during the salt spray test does not allow this passive oxide/carbonate layer to develop. The test therefore artificially reduces the performance of zinc coatings.

St Antony ironworks in Ruhr, Germany.

When painted material is evaluated using the salt spray test, there is no exposure to ultraviolet light, a common cause of breakdown of paints. This is a serious omission, since the main failure mechanism that causes painted steel to deteriorate is not included as a condition in the salt spray test.

The salt spray test can give similarly misleading results when comparing

continued on page 32...

Accelerated test methods applied to zinc coatings in terms of SANS 14713-1:2011

Salt spray tests cannot be used to accurately test zinc-coated steel because they accelerate the wrong failure mechanism. Without a proper wet/dry cycle, the zinc coating cannot form patina layers. The absence of a patina layer allows constant attack of the zinc metal and gives a very low prediction of the zinc coating lifetime.

NOTE: Efforts have been made in many zinc coated steel applications to develop the correct test method to determine a proper "accelerated" lifetime. One test for corrosion prevention systems in the United States is ASTM B117. ASTM Committee G-1 on Corrosion of Metals has jurisdiction over the salt spray standards ASTM B117 and ASTM G85.

The Committee passed the following resolution regarding the use of ASTM B117: "*ASTM Committee G-1 on the Corrosion of Metals confirms that results of salt spray (fog) tests, run according to ASTM standard designation B117, seldom correlate with performance in natural environments. Therefore, the Committee recommends that the test not be used or referenced in other standards for that purpose, unless appropriate corroborating long-term atmospheric exposures have been conducted*". Guidance on the use of accelerated tests as applied to metallic coated systems is under preparation in ISO/TC 107 SC 7.

different variants of zinc coatings. For example, small additions of magnesium or aluminium to a zinc coating will produce salt spray test results that differ significantly from real exposure conditions. Magnesium ions, whether from the environment (sea salt) or in a zinc alloy, promote the formation of protective corrosion products in the presence of sodium chloride, thus reducing corrosion rates. This explains why zinc-magnesium-aluminium coatings show artificially better performance, as compared to zinc, in accelerated tests involving high time of wetness and high chloride load. This effect also occurs in field exposure tests in some, e.g. marine atmospheres but with a substantially lower level of improvement than is indicated by salt spray test results.

Summary

The use of salt spray test results to guide selection of protective coatings for steel remains a serious problem in the engineering community. Despite the well understood limitations of the test in the 'corrosion world', it still used to promote the use of coatings whose properties happen to produce apparently favourable results. It is hoped that this article has given some insight into the scientific background to the limitations of this type of accelerated testing. Regardless of the attractiveness of quick and short-term information, there is no substitute for corrosion data generated from long-term exposure testing and case history information from real structures or components in service.

References

[1] *ISO 9227 'Corrosion tests in artificial atmospheres – salt spray tests'.*

[2] *Skerry, J S, Alavi, A and Lindgren, K I. 'Environmental and Electrochemical Test Methods for the Evaluation of Protective Organic Coatings', J of Coatings Technology, vol 60, No 765, p97.1988.*

[3] *Appleman, B. 'Cyclic Accelerated Testing: The Prospects for Improved Coating Performance Evaluation', J Protective Coatings & Linings, p71-79. Nov 1989.*

[4] *Townsend, H E. 'Development of an Improved Laboratory Corrosion Test by the Automotive and Steel Industries', Proceedings of the 4th Annual ESD Advanced Coating Conference, Dearborn, USA, 1994.*

Swerea KIMAB

Swerea KIMAB is a leading institute within corrosion and materials research, based in Stockholm, specialising in surface technology, corrosion and corrosion protection of metals, corrosion testing and field exposures, corrosion of polymers and material analysis and metallography.

The Association wishes to thank the Galvanizers Association of the UK and the authors for this article.

Guide to hot dip galvanizing for sustainable design

The American Galvanizers Association (AGA) in collaboration with the International Zinc Association (IZA) has produced a well researched and informative booklet entitled ***Hot Dip Galvanizing for Sustainable Design.***

This publication covers everything from answering the question *"What is sustainable development?"* to looking at the environmental, economical and social performance of hot dip galvanizing. This includes an in-depth review of Life Cycle Assessment (LCA) and of Leadership in Energy and Environmental Design (LEED).

The booklet is well laid out and includes two case studies that show practical applications.

The IZA hired world-renown environmental firms Five Winds International and PE International to conduct the research. Five Winds and PE International collected worldwide galvanizing data from the American Galvanizers Association (AGA), the European General Galvanizing Association (EGGA), Galvanizers Association of Australia (GAA), and Hot Dip Galvanizers Association of Southern Africa (HDGASA) to conduct the study.

Hot Dip Galvanizing for Sustainable Design is available as a pdf download from the **American Galvanizers Association *Protecting Steel for Generations***

http://www.galvanizeit.org/education-and-resources/ publications/ hot-dip-galvanizing-for-sustainable-design

http://www.galvanizeit.org/uploads/publications/Galvanizing_for_ Sustainable_Design.pdf

Follow the links from the Hot Dip Galvanizing Association of Southern Africa's website: *www.hdgasa.org.za.*

Letter to the Editor

Hi Terry,

I would like to respond on your article on "Misconceptions" page 20 - 21 in Hot Dip Galvanizing Today No. 54.

I would like to comment that in theory you are 100% correct and in theory the article reflected the message that you wanted to get across, but in practice it is not 100% possible nor correct, depending on the quantities you are working with off course.

Allow me to explain. If you order the correct grade of steel for galvanizing (300WA), *(with the correct silicon and phosphorous[#])* the result will be a coating thickness which is acceptable according to the standard (SANS 121 ; ISO 1461) if this what you actually receive... It does happen that you sometimes receive mixed batches of steel, because of stock issues etc. etc. and then once again the galvanizer is to blamed for something which is totally out of their control.

Secondly a VERY important point, which you did not touch base on in this specific article, is that fabrication is of utmost importance when being sent for galvanizing. Certain things need to be in place before being delivered to the galvanizer, which we like to refer to as "The basics". (Marking pen need to be removed (not including chalk or a black permanent marker pen), stickers need to be removed (as well as the glue *NB*), anti-spatter should not be used on welding (not even silicon free brands) and all paints or coatings need to be removed (if the galvanizer cannot do the shotblasting themselves)

Thirdly and MOST importantly, the galvanizer cannot reduce the molten zinc temperature slightly for articles which fall outside the acceptable parameters, nor can they add a small quantity of aluminium, but they can try to ensure the shortest possible immersion time cycle in the zinc kettle.

Due to the very high energy costs in the industry, the small amount of steel work falling outside the acceptable parameters, not even to mention the minimal amount of dips/jigs which contain steelwork which fall outside the acceptable standards in accordance to the Sandelin curve, the galvanizer cannot reduce the molten zinc temperature to accommodate 1 article or even a full jig with articles of this standard. This will only be possible if the client is willing to pay for the reduction in production (waiting for molten zinc temperature to decrease) and for the energy costs of getting the molten zinc temperature back up to the normal galvanizing temperature. The only way something like this would even be considered is when an entire days production is of the same standard of steel, which fall outside the acceptable standards according to the Sandelin curve. Even in this case it is difficult, because in most cases the galvanizer is not even aware of the quality of the steel until it is too late.

Now to answer your question at the end of your article: "What then is the solution?"

The only solution is for the fabricator or the project engineer to order/specify steel that falls into the acceptable standards which you explained so well.

In my opinion communication with the galvanizer is the KEY to solving these problems. In Europe initial steel project meetings normally consist of the client, the engineering team, the fabricator and off course the galvanizer. Then issues such as design for galvanizing, quality of steel, life expectancy of the coating, possible duplex coatings and certification are sorted out.

This is the ONLY solution to the problem. The industry as a whole should work together to combine knowledge and expe-rience for the highest possible standard of client satisfaction.

Kind Regards
Christof Krugmann – Galvatech

Editors comment: Thank you for commenting Christof I agree 100% with you, kindly see our Information Sheet No 4 available from www.hdgasa.org.za[(#)].

On the Couch.....

Robert JW Brusse

By Desere Strydom

On the Couch spent a morning with Durban Heritage Architect Robert JW Brusse discussing the recent restoration of the first church at Centocow Mission for the Ingwe Municipality.

Tell us a little about your background? I grew up in East Africa, Tanzania to be specific, where my parents managed a vast Sisal Estate. I am the middle child, sandwiched between two sisters. I went to boarding school from the age of five and left Tanzania to study Architecture at the then University of Natal.

What prompted you to study architecture? I think several family connections contributed to my career choice. A great uncle on my father's side produced tremendous architectural and engineering drawings which made an impression on me. My maternal grandfather was in the Timber trade. My mother, on the Sisal Estate where we grew up was charged with the creation of shelter. We were 80 miles from civilization and everything to do with construction happened on site from brick- to window making. I think that was the start of it. I was also fortunate enough to enjoy several European holidays from the age of 3 to various destination where my parents always made a point of exposing us to the Architecture of cities.

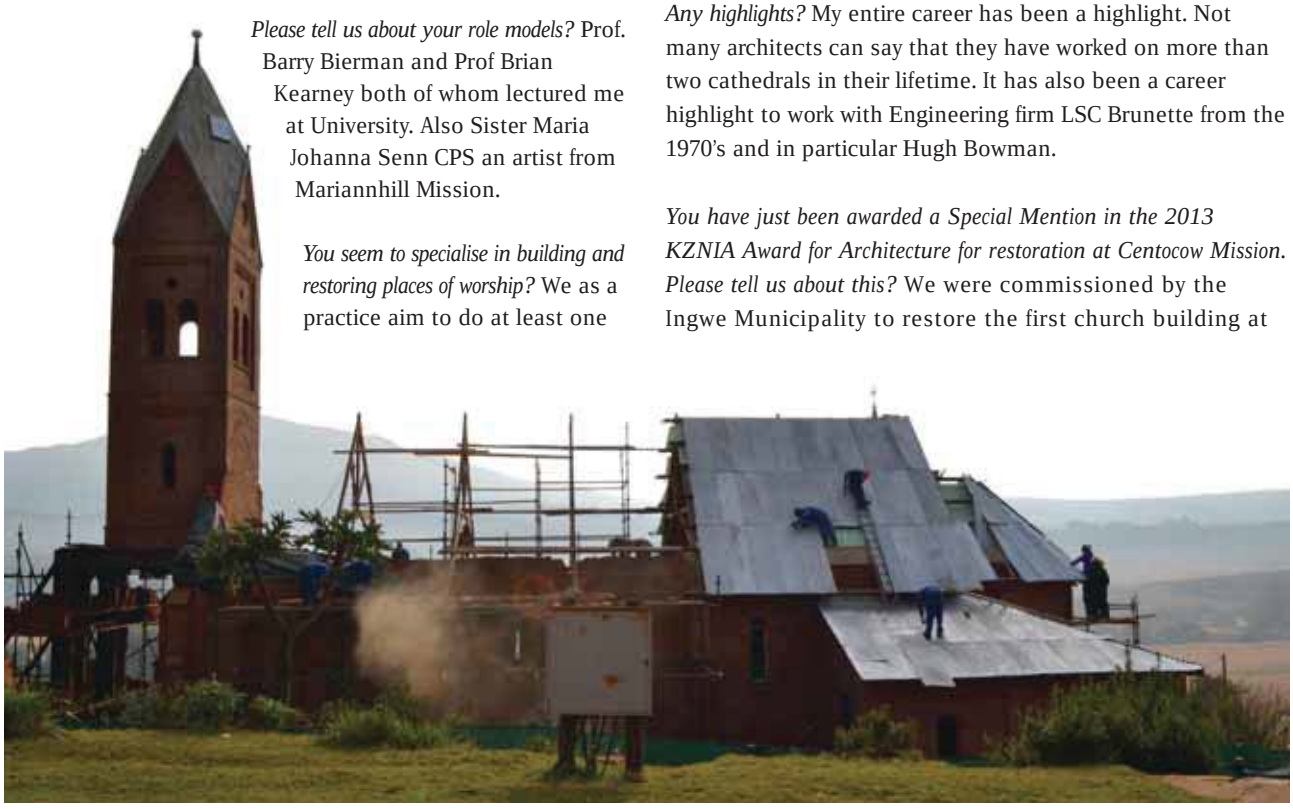
Architect Robert Brusse (left) receiving a SP Mention for the Centocow Project where he was honored by the Mayor of Ingwe Municipality – Mayor CLLR Nomangungu Luzulane (centre) and Ingwe Municipality LED Manager – Dudley Smith (right).

Please tell us about your role models? Prof. Barry Bierman and Prof Brian Kearney both of whom lectured me at University. Also Sister Maria Johanna Senn CPS an artist from Mariannhill Mission.

You seem to specialise in building and restoring places of worship? We as a practice aim to do at least one residential building per year, and it has never worked out that way (laughs). I would say that at least 75% or more of my work has been "religious architecture" not limited to churches, but also mission schools and related mission architecture.

Any highlights? My entire career has been a highlight. Not many architects can say that they have worked on more than two cathedrals in their lifetime. It has also been a career highlight to work with Engineering firm LSC Brunette from the 1970's and in particular Hugh Bowman.

You have just been awarded a Special Mention in the 2013 KZNIA Award for Architecture for restoration at Centocow Mission. Please tell us about this? We were commissioned by the Ingwe Municipality to restore the first church building at



Centocow Mission (built in 1892) with the purpose of housing the Gerard Bhengu Gallery. The entire church had been built without foundations and portions of roof trusses had been eaten by termites. The building was a ticking time bomb with both the Tower and North Nave Wall leaning. We took a very sensitive approach in aiming to reuse as much of the original material as possible. The upper tower walls were supported between I-Beams and propped up for four weeks, while the lower walls were removed to enable us to cast a foundation before rebuilding the missing walls. Neither I nor my engineer slept a wink during this phase of construction!

Legend has it that you re-galvanized the original roof sheeting? Yes that is true! We transported the original 1.2mm corrugated iron sheets to Durban, where it was stripped and re-galvanized (giving us an effective sheet thickness of 1.6 mm after re-galvanizing) We carefully re-fixed the sheets through the original nail holes so as not to compromise the new coating.

What are your comments about hot dip galvanizing? Galvanizing is an absolute imperative when using mild steel in our corrosive coastal applications. Sadly though, abuse of the product leads to unhappiness at the hands of unskilled contractors. I have seen it happen many times.

Passions and hobbies? Very few hobbies outside of work – the past fifteen months have been consumed by Centocow and UNISA restorations. A passion is JUSTICE in the broadest sense of the word.

Complete the sentence: 5pm Friday afternoon and Robert Brusse... is usually still in the office getting on with work!

Des Ray 2013 for Hot Dip Galvanizing Today

The Advanced Roof and Building Technology Foundation (ARTF)

As an owner/user of a corrosion vulnerable building and roof, in a high corrosion environment, in challenging financial times – we believe that the following could be of great value to you!

ARTF – The Advanced Roof and Building Technology Foundation, has enjoyed a long and fruitful working relationship with the HDGASA since 2007. Walter Barnett, early Executive Director of the HDGASA, provided a considerable amount of invaluable support and advice to us over the years – including with the development of the ARTF ethos and founding principles, assistance with roof design and remedial specifications (Specifier Article October 2004, Volume 35 Nbr 10), co-authoring an article on Zinc vs Zinc-Aluminium roof sheet coatings (Hot Dip Galvanizing Today – Volume 4 Issue 1, 2007 – *http://bit.ly/1a95O1p*) etc.

Walter and the HDGASA very kindly endorsed ARTF in an editorial in Hot Dip Galvanizing Today in the same month – *http://bit.ly/1a24zeu*

Early this year ARTF opened an R&D workgroup to determine the best and most affordable ways to protect galvanizing plant roofs, cladding and structures. This is vital considering the exorbitant costs of correct replacements / repairs – often over R1 300 per m^2! With very valuable assistance and case histories from the HDGASA and its members, and our own resources and members, we were able to identify a number of excellent proven protective resources – including certain coating, cladding and structural options at majorly reduced costs compared to the norm!

As a special support service to fellow HDGASA members, certain of our senior members are offering a range of specialist low-cost diagnostic assessments, and way-forward advisory consulting services. Behind these services lies the unique "Shoestring budget cost-saving systems" developed over many years to save leading corporates like SA Breweries, Mondigroup, Supergroup etc., very large amounts of money!

Download free manual on http://bit.ly/18O3EC8. For further information, please contact me. Thank you!

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Website: www.artf-scrace.com

ARTF Senior Advisory Panel members: Ron. E. Cromarty (retired) Natural Scientist, Senior Building Materials Research Authority and Chief Scientific Officer (CSIR Boutek) and (right) Rick D Norwood, Proprietor and Research Officer of RNA Consultants, recently seen reviewing and discussing a set of forensic samples removed from a prematurely corroded roof of a well-known Distillery Group.

What passivation is in practice and what it is not?

In order to understand the difference between passivated and non passivated galvanized articles, one must first understand the following basics:

1. Why passivating chemicals are used in the first place?
2. Why some galvanized articles are not passivated?
3. What to do when painting galvanized steel, passivated or not passivated?

1. In very basic terms passivating galvanized articles is to prevent "white rust" from forming. This is a once-off occurrence that can takes place after steel is galvanized and not passivated and comes into contact with a moist atmosphere.

   The zinc reacts with the oxygen, carbon dioxide and hydroxide (moisture) forming a white stain on the galvanizing that is aesthetically undesirable to some customers. The appearance of superficial white rust will not shorten the life of the galvanized coating and according to SANS 121 (ISO 1461) is acceptable provided the galvanized coating thickness has not been duly reduced by its presence.

   This superficial white staining must be comprehensively removed prior to powder coating or solution painting.

Fresh dynamics at Cape Galvanising Consolidated

Cape Galvanising Consolidated is one of the oldest galvanisers in the industry. The company's origins go back to 1958 when it was known as Parow General Galvanising. Since those days, it has grown into one of South Africa's largest galvanising plants and currently has the largest zinc tank in the Western Cape.

Constant innovation and upgrading are two of the keys to success in all businesses, and at Cape Galvanising Consolidated (CGC) this is no exception. Over the past few months the company has been actively restructuring and now has in place a dynamic and forward looking new management team.

The new CGC team brings with them vast experience in their respective fields, together with fresh new ideas and a knowledge of up to date techniques.

The new managers are:

Gys Wessels (Plant Manager) – Gys brings his passion for galvanising to CGC, a passion which was built through his fifteen years in galvanising starting under the wing of Mr. Bob Wilmot. He moved quickly through the ranks of Macsteel and Armco where he was plant manager before joining CGC and moving to the Mother City.

Louis Redelinghuys (Maintenance Manager) – Louis has many years of mechanical and electrical experience, eleven of those years as a maintenance manager in galvanising, making him a specialist in not only cranes and boilers but also the complicated electrical systems in galvanising plants and especially galvanising tanks.

Rejian Kruger (Sales Manager) – Rejian has had eighteen years of sales experience ranging from textiles to steel products and the last few years in architectural aluminum. Some of his projects include TygerValley Mall, Blue Route Mall, Cape Verdi Hotel and Cape Town International Airport.

We are very excited by the new flow of energy on the CGC management team. We are ready for the future and look forward to shaking things up!

It can be removed chemically or by sweep blasting, the latter of which at the same time will comprehensively prepare the surface for subsequent powder coating or solution painting. In order to achieve one of the best duplex coating results, do not passivate the hot dip galvanized steel articles but collect them immediately after galvanizing and take them directly to the painter or powder coater for appropriate preparation and application of the final coatings.

Another extremely successful method of preparation prior to painting or powder coating, irrespective of whether the components have been passivated or not, is to appropriately "sweep blast" the surface and then paint or powder coat.

Knowing your suppliers and their processes is key to a good quality end result.

2. There is a misconception in the market that passivated galvanized steel articles must weather before they can be painted. This is only necessarily applicable when the hot dip galvanized components are exposed to uncontaminated rural environments, it is not applicable when exposed to marine or heavy industrial conditions. Due to this misconception in the market today, clients often specify "no passivation" on their orders, without arranging the immediate preparation and painting of the components, in the belief that better adhesion will magically take place on the galvanizing, even though the incorrect surface preparation before coating has been followed.

   The other reason for not immediate passivating is that if articles are left to cool down slowly, buckling and warping on certain articles can be slightly reduced after hot dip galvanizing at 450 degrees. Results are not always successful depending on the design or fabrication techniques. Sometimes like in the case of stone guards, the rapid cooling of the steelwork actually helps to bend the articles straight again after galvanizing. It is fascinating to watch stone guards cool to a perfectly straight condition after hot dip galvanizing.

3. When painting galvanized articles to passivate or not, depends on the following factors:

   - Which surface preparation is being used by the paint applicator or powder coater after hot dip galvanizing?
   - Will the galvanized steel be etched with an acidic etching chemical like "Galv Etch" or "Phoscote" before painting?
   - Will the galvanized articles be painted using a galvanized etch primer or appropriate tie coat?
   - Are the galvanized articles tubular/hollow or solid?

The key really is to ensure your supplier has the knowledge and then trusting them to prepare the surface correctly and applying the coating correctly.

Christof Krugmann of Galvatech believes and that due to the successes Galvatech has had in the past that passivating the galvanized steel followed up by appropriate sweep blasting is the most successful preparation prior to painting or powder coating.

"The reason for this is that you still get the protection against "white rust" inside tubular/hollow structures after coating and secondly, if there is a brief storage period in a moist atmosphere prior to over coating, your galvanized steel is still protected against the formation of "white rust" states Krugmann.

"Any coating is only as good as the surface preparation prior to coating".

Transvaal Galvanisers

Transvaal Galvanisers started operating its new plant at full capacity this year in February, and raised its total monthly capacity to 7 500 tons per month. This extra capacity has allowed Transvaal Galvanisers to become a key player in the PV solar market, with IMAB Engineering supplying and manufacturing the steel for entire solar farms.

With IMAB Engineering celebrating their 40th birthday and Transvaal Galvanisers celebrating their 30th birthday next year, it is time to look back, standing on the threshold of this milestone, to the journey that has led us here.

Over the last 29 years Transvaal Galvanisers has galvanized just over a million tonnes of steel. This is the same weight as:

- 165 000 Bull Elephants
- 3676 Boeing 747's
- 137 Eiffel Towers
- 68 Brooklyn Bridges

By looking back we can be proud of our history and our heritage, but looking forward is more important to us. One man that is always looking forward is the Director of Transvaal Galvanisers, Francesco Indiveri.

"Over the last 29 years we have managed to grow with our markets and clients, and because of our willingness to adopt new technologies and adapt our methods to changing markets, we have been successful in creating sustainable growth, not only for Transvaal Galvanisers, but for our entire group as a whole. I am extremely proud of what we have achieved, and what we will still achieve in the future."

With Mr. Indiveri at the helm, Transvaal Galvanisers has expanded into new markets focusing heavily on renewable energy projects.

"With the versatility of our galvanizing lines we have been able to service entire PV solar projects, from the longer structural pieces to the smaller brackets that require spinning. By being able to do this we make the logistical process for our clients a lot easier, by having all of the steel for the entire project collected in one location, inspections are straightforward. We always aim to continually improve ourselves by adapting to changing times and markets, whilst ensuring that we always stay focused on client satisfaction."

"It is this focus that has brought us to where we are today, and I know that this focus will take us to even greater heights over the next 30 years."

Find out more at www.transgalv.co.za.

Quality Specialists in Spin, Dip and Dragline Galvanising

TRANSVAAL GALVANISERS

CORROSION PROTECTION FOR CARBON STEEL

BECAUSE SOMETHING AS TOUGH AS STEEL NEEDS PROTECTION TOO

Transvaal Galvanisers are capable of meeting any and all requirements with regards to hot dip galvanising.

With 29 years of experience in the galvanising industry, Transvaal Galvanisers ensure the highest quality product, at the most competitive prices.

Having 4 galvanising plants allows for a combined capacity of 7000 tons per month

WWW.TRANSGALV.CO.ZA

ArcelorMittal involvement in Solar and LSF (Light Steel Frame) Projects

Solar Projects

ArcelorMittal South Africa has once more confirmed its position as leader in steel innovation by taking a lead in some of the recent steel developments that promote renewable energy initiatives in the country. As it is a norm with most big steel intensive projects and in support of increased competitiveness in the local downstream industry, the company has ensured that a discounted pricing structure is in place and favours local steel beneficiators.

To increase ArcelorMittal's involvement in these projects, numerous discussions were convened with several international and local companies since 2012 with the objective of understanding customer needs, including requirements of the various design stages of the solar energy projects, product quality and quantity, and rigorous timelines to be met and penalties to be applied in case of poor service delivery.

Solar panels being attached to installed galvanized steel structures.

LSF structure of the renovation project that was broadcasted on KykNet. The 2nd floor was completed in 46 days.

These consultations led to the development of some new products and the extension of existing solar product ranges.

The first round of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) commenced in December 2011 and 28 Photovoltaic (PV) projects were awarded totalling 632MW.

ArcelorMittal was involved in 12 of 18 projects where the company supplied about 40 000 tons of steel.

Round 2 is in progress and totals 417MW Solar PV. ArcelorMittal hope to supply Hot Rolled and Galvanised Coil Products to about 8 of the 9 projects under consideration. The successful bidders for round 3 will be announced on the 29th October 2013.

Bob's BANTER!

Achieving our desired future means managing the unexpected

We normally understand 'time' to be something like an unseen line that has been with us since the day we were conceived: it has taken us through the *past*, is accompanying us in the *present* and will be with us in the *future*, until we die. We know what the past has been, we manage the present as best we can, but most of us have great difficulty in comprehending the future. But, we have a great desire to know the future and often make very serious attempts to do so, like beliefs in biblical prophecy, divination, astrology, scenario planning and forecasting. The practice and art of Futurology, or Future's Thinking, postulates possible, probable, and preferable futures, seeking to know and understand what is likely to continue, what is likely to change, and what is novel. Companies use these techniques to plot the achievement of their strategic objectives.

We are all Futurologists at heart – it's in our genes. We *have* to know what the future will hold for us. We are often quite exact in our predictions and are encouraged to be like this by our parents and family, our religious beliefs, fortune tellers and motivational speakers, who tell us that if we believe strongly and positively, we surely will get what we want. Anticipation and expectation are large parts of our make-up as human beings.

But, what we often fail to do, however, is to know and understand what we have to do to get to where we want to be and what can go wrong

along the way. Thinking about these two things are nowhere near as pleasurable as dreaming of a desirable future.

In the harsh real world, personal anticipation and expectation must be matched by knowledge of what is required to achieve the end result, and importantly, to know how to deal with the unexpected, unpredictable and unanticipated. Our greatest challenge is not just to visualize the future but to know how to deal with the unexpected. We may have the right intention, we may take the right action, but because of uncertainty, actual events may not coincide with planned actions and the outcomes could be unexpected.

Our failure to deal with the unexpected is often on account of not having enough time to think of everything, not trying to understand current trends that may decide the future, failing to plan ahead and not attending to what we have to do *now* to achieve what we want in the future. We also often take too long to recognise that the continual change happening around us now can dilute the realism of our expectations. Once we belatedly recognise that the unexpected is unfolding, our efforts at containment are often too late.

To manage the unexpected, we need to organise ourselves in such a way that we are better able to notice the unexpected as it evolves around us and to work to soften the impact it will have on us. This approach is often simply called being 'mindful' and means continually updating our interpretation of the external environment with respect to the context of our intentions, recognising problems and identifying solutions. Mindfulness gives us the ability to recognise potentially damaging signals and to act with purpose. It gives us the capability to see significance in what's happening around us and to incorporate an understanding of the continually occurring unexpected in the context of our plans.

Having a positive view of the future and a personal vision are wonderful characteristics of human beings. The probability of achieving our vision is, however, a function of how well can manage the unexpected.

The Association wishes to thank Bob Andrew who is a consulting value engineer and honourary member of the Association for his article. He can be contacted on anneve@iafrica.com or boband@mweb.co.za.

Consistently delivering superior quality galvanized products to all our customers

Armco Galvanizers Isando has been operating since 1989. Geared up to accommodate heavy structural steel up and till 13m in length. Isando has an average output of plus minus 2000 tons per month. With an improved lay down area and increased loading capacity by addition of a tower crane we strive to give "A" class service to all our customers big or small.

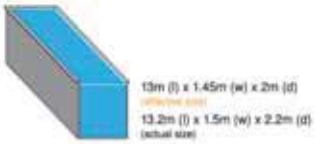
Armco Galvanizers Dunswart is a second facility based in the Boksburg area. Dunswart has an average output of plus minus 900 tons per month. This branch specializes in small structural components and is geared up to accommodate items up and till 5m length.

Armco Galvanizers Randfontein is a third facility based in the Randfontein area. Randfontein has an average output of plus minus 800 tons per month and is geared up to handle light to medium structural steel up and till 6.2 m in length.

The company has it's own SANS 121 2000 ISO 1461 accredited Hot Dip Galvanizing plants. And is listed under the SABS ISO 9001 scheme.

GALVANIZING BATH SIZE

ISANDO



DUNSWART

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