2013 Volume 10 Issue 3

HOT DIP GALVANIZING TODAY

HOT DIP GALVANIZERS ASSOCIATION Southern Africa

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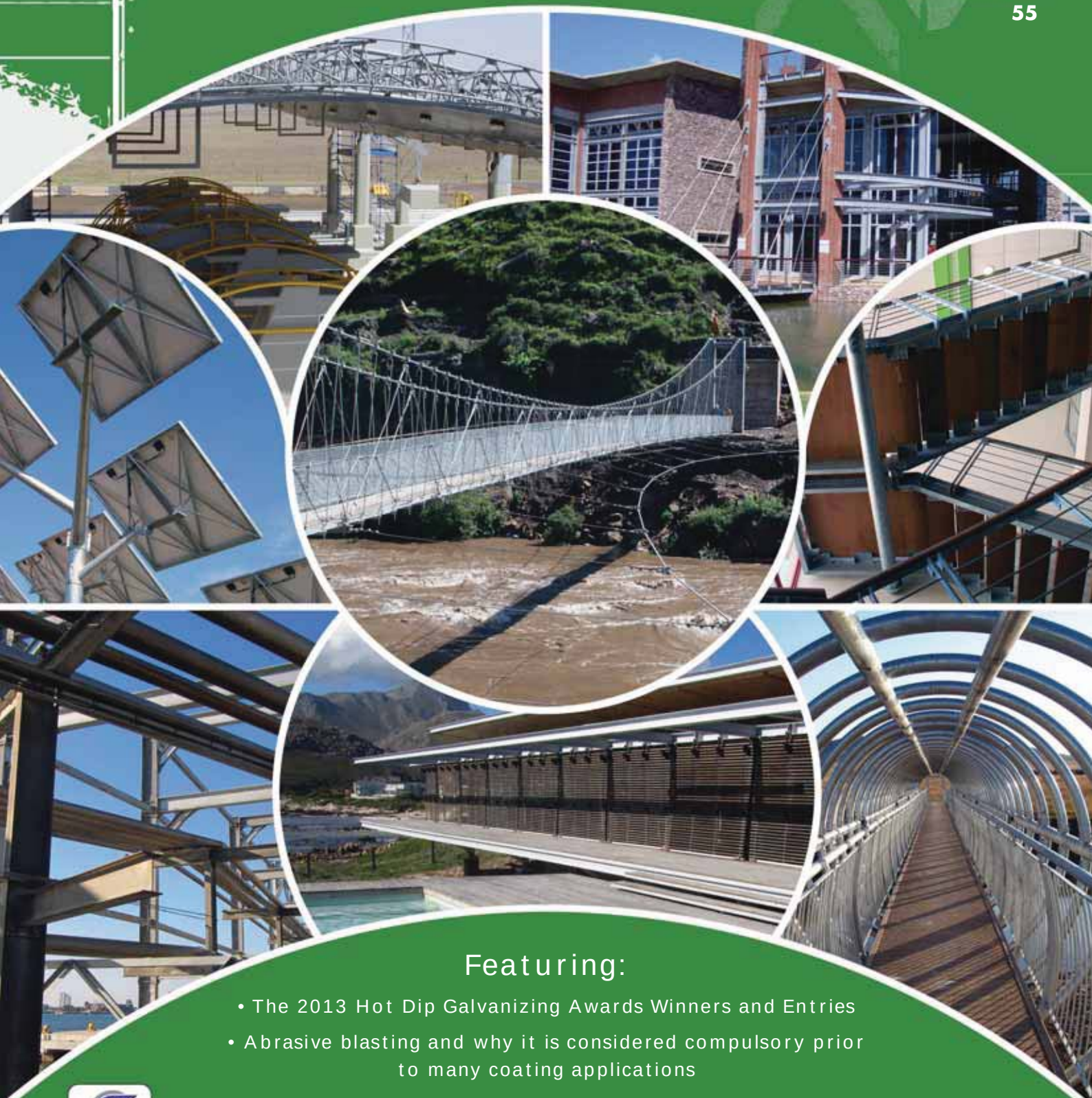

Featuring:

- The 2013 Hot Dip Galvanizing Awards Winners and Entries
- Abrasive blasting and why it is considered compulsory prior to many coating applications
- Cable ladder feature highlighting the need for strength testing
- "Best country sourcing" of steel can reduce job opportunities in SA
- Steel quality impacts on the quality of hot dip galvanizing

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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 some of the entries and winning categories of the 2013 Hot Dip Galvanizing Awards Event.*

Hot Dip Galvanizing – Adding value to Steel

Executive Director's Comment

The year is flying. It is hard to believe that we are more than half way through 2013 and about to welcome VIP guests, members and their guests to our bi-annual awards evening.

Our judges have reviewed and selected the category winners together with the overall winner for the projects where hot dip galvanizing has made a positive contribution. The criteria used during the judging process was "why galvanize or duplex", "how a galvanized or duplex coating has been employed in combating corrosion", or "what makes it unique"? It was particularly gratifying to have received very interesting project submissions, not only from our member galvanizers, but from the end users of this type of corrosion control system. Recognition and understanding, on the part of consulting engineers and project managers, of the corrosion control characteristics of hot dip galvanizing and duplex coating systems, is confirmation of the benefits to be gained by specifying such coatings.

As the hot dip galvanizing industry, our primary goal is corrosion control and longevity of carbon steel structures exposed to broad range of environmental conditions. We are extremely grateful to all, who found time in a busy year, to forward submissions for consideration by our judges and to be part of our bi-annual flagship awards evening. I believe that all the submissions are winners and an excellent representation of how hot dip galvanizing can be applied in a variety of situations.

Well done to all and thank you.

Bob Wilmot

Note from the Editor

The success of the corrosion protection of a number of projects including the MTN Head Office in Fairlands, Johannesburg (winner of the HDGASA Awards event 2005), the New National Library in Pretoria (winner of the HDGASA Awards event in 2009) and lately the Rooi Els house in the western Cape featured in this edition as a winner of both the Architectural as well as the Duplex Coating Awards categories, can be attributed to a conscientious, innovative and well informed design team. The common thread between each of these design teams was the selection of hot dip galvanizing and/or duplex coating systems for corrosion protection, the upfront involvement of the HDGASA, correct and appropriate specifications, more comprehensive steel detailing and before commencement of the project, the involvement of the selected galvanizer and/or the duplex applicator.

Due to the size of the HDGASA, its physical involvement with all associated projects is limited. However, we can still provide sound technical information and assistance at the planning stage of the project and glean involvement of our galvanizing members where necessary.

The main feature for this edition is the 2013 Hot Dip Galvanizing Awards winners and entries.

The overall winning entry is the HA Mofutho pedestrian bridge (hot dip galvanizing) near Quasha's Neck in Lesotho.

Jointly sharing the winner of the Architectural Category is the 10111 Radio Control Centre in Korsten (hot dip galvanizing), Port Elizabeth and House Rooi Els in Rooi Els, western Cape.

The winner of the Duplex Coating Category is House Rooi Els.

The Mining and Industrial Category winner is the Roll Over Protection structure for attachment to vehicles, manufactured for the safety of mining personnel (duplex coating).

The Innovation Category winner is the Solar Trees at Waterfall Estates, north of Johannesburg (hot dip galvanizing).

Included is an article on abrasive blasting and why it is considered compulsory prior to many coating applications. Part of the article (while its use generally is not necessary) is the abrasive blasting of steels that are reactive to molten zinc caused by silicon and excessive quantities of phosphorous prior to hot dip galvanizing. The resulting coating, while a lot thicker (providing extremely long service free lives), can be more aesthetically appealing and less prone to brittleness during mechanical handling.

Under the cable ladder feature, Strutfast has innovatively tested their horizontal and edge mounting cable ladders against international design criteria.

Kobus de Beer of the SAISC tells us about how "best country sourcing" can significantly impact on South African jobs in the steel industry!

Bob Wilmot discusses steel quality and its impact on the quality of hot dip galvanizing.

The new Wall Chart on Design for Hot Dip Galvanizing is currently being distributed and because it includes so much information, requests of a presentation covering the information have been motivated. This will be available shortly.

Regulars include Education and Training with our single and 3 day hot dip galvanizing course.

Other regulars include Bob's BANTER and On the Couch where we chat to John Abbot a well-known consulting engineer from Arup Façade Engineering in Johannesburg.

Enjoy the "magazinc".

Terry Smith

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2013 HOT DIP GALVANIZING AWARDS

Overall & Infrastructural and Community Development Category Winner

HA Mofutho Pedestrian Bridge

Description

A hot dip galvanized footbridge for the local community at HA Mofutho.

Location

Ha Mofutho, near Quasha's Neck, Lesotho.

Project partners

Client
Kingdom of Lesotho: Ministry of Public Works & Transport: Department of Rural Roads

Consulting Engineer
Royal HaskoningDHV

Geotechnical Specialist
Knight Hall Hendry

Contractor
Guerrini Marine Construction

Hot Dip Galvanizer
Galvatech (Pty) Ltd

Completion date

14 December 2010

Project value

R8 million

Tonnes of steel

10 tons of galvanized structural steel

Information

- The local community at HA Mofutho had to cross the Senqu River using small boats or directly through the river during low flow conditions in order to access the markets for their produce and to find employment. In 2009, the Ministry of Public Works and Transport appointed Royal HaskoningDHV to plan a footbridge to create a sustainable future for approximately 2 000 people.
- Special attention was paid during the design of the footbridge to job creation and the development of the local construction industry.
- The final plan comprised two foundation bases for the main pylons, with six mass concrete anchor blocks for the cable stays. The deck was constructed from galvanized structural steel and was suspended from the main cables crossing the river.
- The deck design consisted of steel members, steel connectors, wire

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Zinc Metal Spraying?

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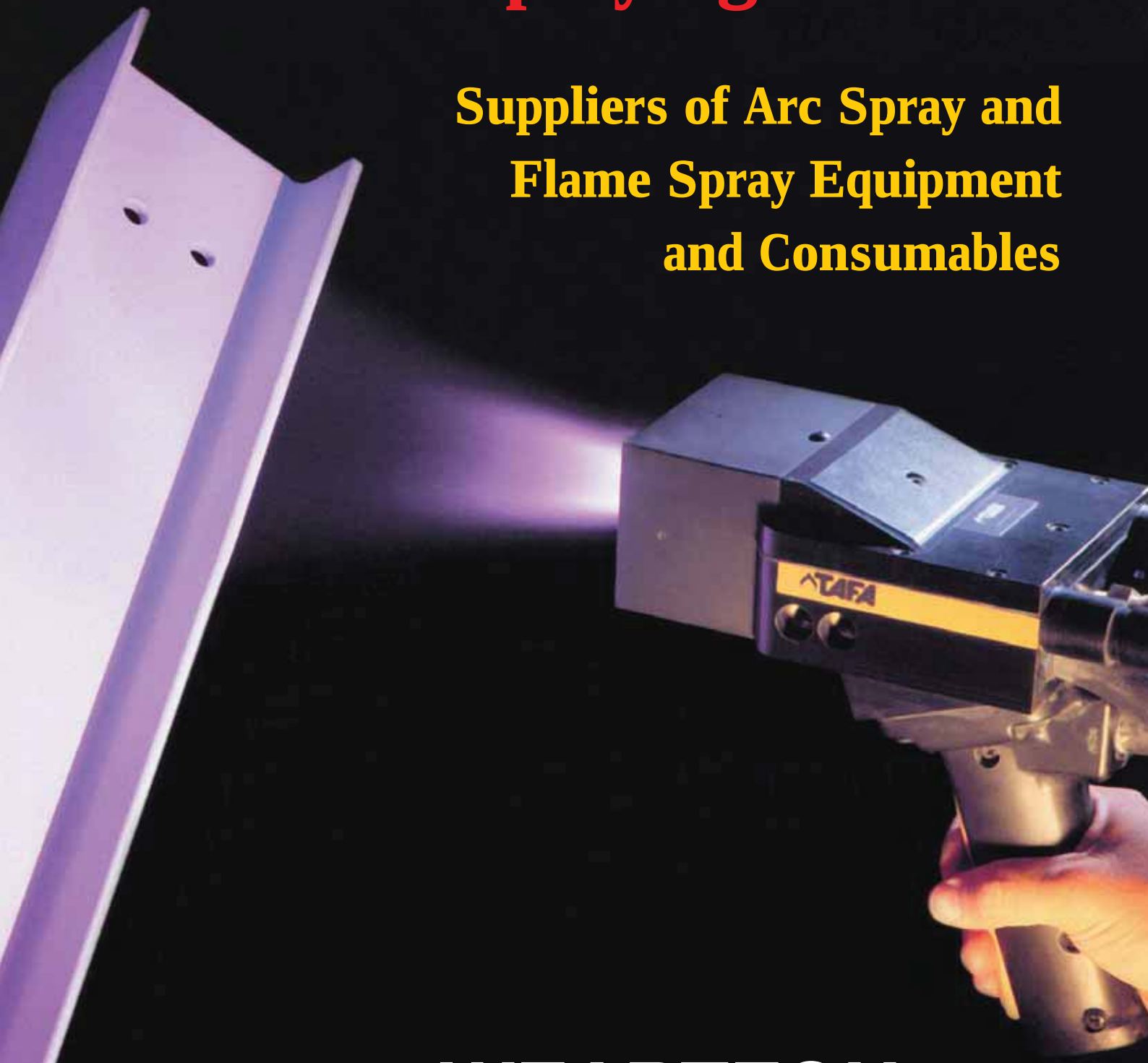

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rope, clips, turnbuckles, thimbles, wire strands etc, all galvanized and in sizes that could be manhandled to facilitate the transport thereof by mules or small delivery vehicles to a very remote site.

- Due to the remoteness of the bridge site, structural steel was favoured over conventional reinforced concrete because it could be manufactured and erected in sections that could be transported by mules and small delivery vehicles and erected by hand as opposed by crane.
- The contractors biggest challenge was the logistical problems associated with the construction of a bridge in a remote area. The steelwork was manufactured and galvanized in Cape Town and transported to Lesotho and concrete was mixed on site by means of volume batching.
- The galvanizing complemented the structural steel and provided the client with a durable and low maintenance structure.
- In preparation for the project, Royal HaskoningDHV conducted workshops for the local contractors to transfer knowledge and to ensure that the local contractors benefitted in every way possible. Further workshops with the engineers from the Roads Directorate provided for skills transfer and have left a legacy of understanding and goodwill which will be remembered for many years.
- This project highlights the advantages that a hot dip galvanized light steel structure offers in a remote area. The hot dip galvanized steel satisfied the client's requirements of a durable and low maintenance infrastructure for at least 25 years which implies a low lifecycle cost. The galvanized steel solution also resulted in a faster construction time compared to the application of a paint coating system afterwards.

Joint Architectural Category Winner

10111 Radio Control Centre

Description

The hot dip galvanizing of the new high-tech 10111 Radio Control Centre.

Location

Korsten, Port Elizabeth.

Project partners

Owner / Project Manager
National Department of Public Works

End-User
South African Police Service

Architect / Principal Agent
The Matrix cc Urban Designers & Architects

Structural / Civil Engineer
BVi Consulting Engineers Eastern Cape

Quantity Surveyor
Rousseau Probert Elliot

Electrical / Mechanical Engineers
Palace Technologies

Building Contractor
Pro-Khaya Construction

M&E Contractor
Besamandla (Eastern Cape)

Steel Sub-Contractor
Bay Steel

Hot Dip Galvanizer
Galvanizing Techniques (Pty) Ltd

Completion date

November 2012

Tons of steel used

395 tons

Project value

R104 million

Information

- To improve on response times, the SAPS has undertaken to

continued on page 8...

expand its operations to provide a drastically improved and more efficient call out rate to the country. The existing facilities at Mount Road, Port Elizabeth, are inadequate in terms of size and do not allow for expansion due to the nature of the existing structure. A new high-tech facility was necessary in order to deal with large sensitive electronic equipment with all its related supporting functions and requirements.

- The client's brief to provide an uninterrupted space for call takers required an intricate steel structure to both span and support a service platform above over an area of 800m^2. This posed a challenge structurally. The response was to introduce two large steel girder trusses that tapered centrally towards a single load bearing point. Essentially the column was then split to reduce the span between the flanked supports. The girder connection would tie back to the main roof columns.
- The building will be submitted to Green Building Council of South Africa for a four star accreditation. One point can be achieved where 50% of the building's steel structure is designed for disassembly. This is to encourage and recognise designs that minimise the embodied energy and resources associated with demolition. The use of steel as the main defining structure was therefore envisaged, with particular attention paid to detailing between the different elements of the building. This structure was then hot dip galvanized in order to achieve a harmonious "industrial" aesthetic throughout the building. This continuity enables one to perceive the entire structural

element in its "raw" state and reduces any maintenance issues throughout the buildings lifespan, a specific requirement of the National Department of Public Works.

- This project is situated within a marine environment and positioned on an exposed, elevated site within the bay of Port Elizabeth. For this reason it was essential to hot dip galvanize the steel thereby protecting it from corrosion and providing little maintenance costs and increasing its life span.
- With hot dip galvanizing as the preferred corrosion protection system, the structural elements needed to be designed and were conceived as a "kit of parts" in order to facilitate the ease of installation and maximum length of steel to fit the available galvanizing bath in Port Elizabeth of 12.4m long.
- This project also makes extensive use of exposed galvanized sheet metal in the form of ducting. The mezzanine floor above the Call Centre further demonstrates the industrial aesthetic of the building by exposing the ducting that forms part of the AC and smoke extraction system. This open area allows for panoramic views from the second floor offices and walkways.
- The lift shaft was a particular item along the buildings critical path that was required to be constructed prior to the building being water tight. The shaft was exposed to the elements for several weeks before being covered. For this reason, hot dip galvanizing enabled the contractor to push the constraints of construction by assembling the steel lift enclosure before the roof was installed.
- According to the contractor, hot dip galvanizing benefited the project in four underlying ways:

  Material handling, Storage, Painting of Steelwork, Time Constraints and Health & Safety.

- Despite initial galvanizing costs being 17% more expensive, the accumulation of maintenance costs over the comparative life cycle of the building amounts to almost double (43%).
- Due to the intricacy in design detail, it was essential that a different approach be taken from design through to fabrication. The design team worked very closely with the steel detailer and fabricator to ensure that no cross communication occurred which is essential in achieving a quality product. Clear communication of the design intent to all team members was critical. Formal and informal design team meetings were established between members of the project team.
- The project's core function is to communicate nationally between different key high sites as part of the Police Service's drive to eliminate crime. The Eastern Cape is the first region to receive a facility of this kind with emphasis placed on systems management. The project is high profile and considered mission critical with every electronic and mechanical system having to be 100% redundant in terms of failures to provide a self-sufficient uninterrupted service.
- This facility also houses a Radio Technical Workshop to repair and improve on electronic equipment within squad vehicles which forms an integral part of communication between the 10111 Call Centre and the public.
- The client and professional team stipulated the requirements for employment of local labour in all contract documentation for the construction of the project. All unskilled labour was sourced from the local community.

Joint Architectural and Duplex Coating Systems Category Winner

House in Rooi Els

Description

The use of a duplex coating system for a Vacation Beach House.

Location

Western Cape.

Project Partners

Developer
Brandbild

Architect
Elphick Proome Architect Inc.

Structural Engineer
Linda Ness Associates cc

Main Contractor
Apocalypse cc

Hot Dip Galvanizer & Duplex Applicator
Cape Galvanising Consolidated (Pty) Ltd

Paint Supplier
Sigma Coatings

Tonnes of Steel

70

Project Value

R35 million

Completion Date

2011

Information

- Designed on the back of a serviette over a plate of calamari in Hermanus, this vacation beach house is carefully crafted to create an extraordinary living experience.
- Primary design drivers revolved around minimum intrusion on the fynbos and dunes that carpet the site. Suspending the house on the dune slope allows the fynbos to be practically continuous under its footprint.
- Capitalising on its unique context with panoramic views from Cape Point through to Gordon's Bay, the house is conceived as a steel framed glass box with a hull shaped roof to facilitate distant elevated views of the surrounding mountains. All the external walls are sliding folding glass doors and are concealed by slatted timber shutters which open hydraulically to become a veranda. All interior walls dividing living and sleeping spaces

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A view on the back side of the structure before cladding.

Inside the house showing the extent of the structural steel required to resist the load of the hydraulically operated patio doors.

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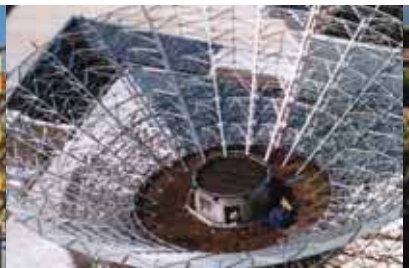


slide away during the daytime hours to create a single layer space which flows out on all four edges to broad cantilevered decks. The effect created is an umbrella, connecting iso-tropically to the amazing environment that cradles the house.

- The challenge behind constructing the house was not just the barrier to entry on the environmental responsibility front, it was also a question of how to adequately protect an open steel structure in such close proximity to some of the worst corrosive conditions in the Cape.
- Environmentally, Brandbild have made huge strides in protecting and rehabilitating dune vegetation outside of the site boundaries. Using non-woven fabric constructed with coconut husk, pinned to the constantly shifting sands, they have squeezed into a site literally not bigger than the footprint of the overhanging floor perimeters. In tribute, fynbos grows liberally on the site establishment fences.
- The location of the structure quickly focused the design team on the corrosion protection for the steelwork. With a back-to-back corrosion protection guarantee for the client in mind, a team was brought together around the design table. A 15 year guarantee for the duplex coating system has been given. This unusual guarantee satisfied a somewhat perturbed NHBRC, who referenced that 316 stainless steel was perhaps the only metal suitable for the site.
- All structural steelwork other than the tubing was abrasively blasted prior to hot dip galvanizing. The reason for this was although abrasive blasting is not necessary prior to hot dip galvanizing, it was felt that there are occasions when the fillets of structural I-beams and channels show an unsatisfactory roughness, which if not removed often results in a rough hot dip galvanized coating. This roughness would be more amplified with the use of a duplex coating system.
- To eliminate bolted joints for aesthetical purposes, all the joints were site welded to ensure a degree of structural smoothness. The applicable sections were treated with Galvastop to ensure the localised exclusion of the hot dip galvanized coating, which is essential when welding for structural purposes. The subsequent paint system was then cut back appropriately, so that each coating, including the hot dip galvanizing, could be appropriately re-instated after site welding took place.
- The Apocalypse factory floor, an area smaller than the footprint of the final skeleton, became a full scale prefabrication facility. Sequential lengths of the structure, both floor perimeter and roof, were fabricated and preassembled in the factory before being carved off into the carefully pre-planned “chunks” to be masked, hot dip galvanized, primed and coated at the premises of Cape Galvanising.
- Steel was bulk delivered onto the site for erection in two separate phases; floor perimeter and roof. All site welding was carried out on section ends that were masked prior to hot dip galvanizing and zinc metal sprayed on site prior to the final paint coating system application.

Mining & Industrial Category Winner

Ndlovu Roll Over Protection Structure and Falling Object Protection Structure

Description

The duplex coating system of a Roll Over Protection Structure offering additional protection for occupants inside a vehicle in the event of an accident, which are attached to mining vehicles.

Location

On all Anglo American, De Beers & BHP Billiton Mines.

Project Partners

Developer / Owner
Marven Equipment

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Designer
Marven Equipment

Specifier
Assistance from the Hot Dip Galvanizing Association of Southern Africa & Bulldog Projects

Project Manager
Marven Equipment

Main Contractor
Marven Equipment

Hot Dip Galvanizers
Robor Galvanizers and Macsteel Tube & Pipe

Duplex Coatings Applicator
Bulldog Projects (Pty) Ltd

Completion Date

March 2012

Tonnes of Steel

- Ndlovu Technician Roll Over Protection Structures = ± 240kgs
- Ndlovu Manager Roll Over Protection Structures = ± 186kgs (Std 1 tonner bakkies single cab, super cab, and double cabs)
- Ndlovu Land Cruiser, Hyundai and Kia Roll Over Protection Structures = ± 196kgs

Information

- The Roll Over Protection Structures (ROPS) and the Falling Object Projection Structures (FOPS) was developed, designed, registered and patented by Marven Equipment in Benoni Gauteng.
- Marven Equipment, being a family owned business founded by Wayne and Christine Geldart, is a dynamic company that is constantly

evolving with the times, and trying to accommodate the needs of their clients regarding mining vehicle products and accessory requirements.

- Marven's ROPS was branded "Ndlovu" after the African elephant, strong, robust and the lightest in its class of being a heavy duty, multiple roll over protection structure. Ndlovu is capable of handling speeds of 120km/h thus enabling additional protection for contractors and employees from the moment they leave their homes and families, on the mines, and back home safely again.
- Ndlovu is designed to offer additional protection for the occupants inside the cab of the vehicle in the event of a roll over accident and is capable of handling four to six times a vehicle's gross mass weight.
- These structures were not originally duplex coated, but when Anglo Sishen asked Marven Equipment to hot dip galvanize the Ndlovu structures to help overcome the rapid corrosion rate in the highly corrosive mining environments, they began their investigations.
- With the assistance of the Hot Dip Galvanizers Association of Southern Africa and Bulldog Projects (Pty) Ltd, a specification was put in place for the hot dip galvanizing and duplex coating system offering a 7 year warranty against rust and corrosion.
- The standard vent, fill and drainage holes required for tubular structures were unable to be applied due to possible weakening of the Ndlovu ROPS and FOPS Structures. However, the selected galvanizers went to extraordinary measures to ensure that the necessary but limited vent, fill and drainage holes were sufficient to avoid air pockets by manually manipulating the components in the molten zinc bath thereby ensuring successful hot dip galvanizing.
- The Ndlovu is hot dip galvanized both internally and externally so that hidden rust cannot take place. This is ideal for severely corrosive environments e.g. C5 Industrial and C5 Marine.
- The benefits of using this duplex system are a longer life cycle (now 7 years) and much lower maintenance costs. Applying a paint system on its own would only enable the client to receive a 12 month warranty on the structures and therefore not be able to sustain a long term life expectancy to the structure. Using a duplex coating system offers the client a 7 year warranty.
- Prior to the request of Anglo Sishen to hot dip galvanize the structures and duplex coat them, Marven Equipment had no prior knowledge regarding the process and the advantages gained from the full duplex coating of the structures.

- This project has expanded the demand for hot dip galvanizing. The duplex coating of the ROPS and FOPS structures has now become the standard for all heavy duty Ndlovu structures manufactured by Marven Equipment and is now a requirement for the mining vehicles and approved by Anglo American, BHP Biliton (for contractors) and De Beers.

Innovation Category Winner

Solar Trees at Waterfall Estates

Description

The use of hot dip galvanizing for the Solar Trees at Waterfall Estates.

Location

Sunninghill, Gauteng

Project Partners

Developer / Owner
Century Property Developments

Architect
Century Property Development Architect

Consulting Engineer
C-Plan Civil Engineers

Project Manager
Century Properties

Steel Fabricator
Mercury Steel and Construction

Hot Dip Galvanizer
Armco Galvanizers

Information

- Situated between Woodmead and Kyalami lies one of the largest estates to be developed within the South African property market. Energy requirements are of paramount importance when considering any form of property development, with clean and renewable energy being considered as first prize when planning the development of property and related energy requirements.
- This project is based on the use of a free clean energy source of nuclear fusion to produce the electrical energy to power one of the sectional gatehouses found on the estate. The architect has cleverly turned the use of solar collector panels into a feature referred to as Solar Trees. The total energy requirement for one of the gatehouses at the estate has been provided by three such solar trees.
- The technology and use of solar collector panels is well known, but generally where such panels are used, they are regarded as disturbing and out of place with

the ambience of the environment. The architect has taken what is generally regarded as unsightly and turned the solar collection panels into an interesting feature without interfering with the environment.

- Hot dip galvanized steel has been employed to provide a maintenance free service life that supports the long term energy requirements of the gatehouse installation. Given the atmospheric environment of the area, a service life of the supporting hot dip galvanized steel components has been estimated to be in excess of 60 years.

ARCHITECTURAL

Nellmapius Bridge N1 Highway, Gauteng

Description

The application of a duplex coating system to the Nellmapius Bridge.

Project Partners

Developer / Owner	SANRAL
Consulting Engineer	BKS (Pty) Ltd (now Aecom)
Architect	Mathews and Associates Architects
Corrosion Consultant	Isinyithi Corrosion Engineering
Main Contractor	Vital Steel Projects
Hot Dip Galvanizer	Robor (Pty) Ltd – Galvanizers
Paint Applicator	Vital Steel Projects
Completion Date	July 2012

Information

- The Nellmapius Bridge was commissioned by SANRAL to act as a gateway to the new Gauteng Freeway Improvement project (which originally formed part of the 2010 Soccer World Cup highway upgrade programme). It spans over the N1 highway, which connects Pretoria, the administrative Capital of South Africa, to Johannesburg, the provincial Capital of Gauteng.
- The bridge also spans the Gautrain railway line. From the train, the bridge façade is viewed from a lower perspective and is glimpsed at a higher speed. As such it assumes a fleeting sculptural quality and appears to be a piece of surprise civic culture to the observant commuter.
- The bridge has a deck width of 14.97m that includes a 1.4m sidewalk. It replaced the old bridge that had to be demolished due to insufficient span lengths to accommodate the widened Ben Schoeman freeway. The deck was constructed by means of overhead structural steel gantries supporting the formwork and wet concrete. The aesthetic appearance of the bridge deck is enhanced by the use of long cantilevers.
- The decision to change the balustrade of Nellmapius bridge from normal concrete parapets to an architectural façade fixed to a larger concrete parapet was made after construction of the bridge deck had commenced, resulting in several structural design implications.
- In order to achieve the random pattern that was required by the architect, several different components had to be designed. Forty different components were designed in order to achieve the random pattern and to safely fix the façade panels to the bridge. In total 1 642 elements were required, ranging from different shapes of façade panels and light masts to fixing brackets and cover plates.
- The façade panels were designed to consist of 8mm thick plates with angle irons as bracing and stiffening at the back.
- Although the bridge is situated in Gauteng where the environment is not as aggressive as in the coastal regions, it must be kept in mind that the bridge crosses one of the busiest freeways in Africa. Access for maintenance on the facade is limited and therefore it was decided to use a duplex coating system in order to protect the steel from corrosion and to ensure that maintenance requirements are minimised.
- To ensure that all parties were in agreement with what the final product should look like, a trial panel was manufactured. The lights were tested on the panel at the factory in order for the architect to choose the correct type and colour. Finally the panel was fixed to the bridge parapet to confirm that the fixing details were practical and correct. After the trial panel was hot dip galvanized it was found that one of the back plates on the larger panels distorted extensively. The designer added an additional angle iron as a stiffener for the plate to eliminate this problem.
- As inspiration for the design, the notion of random and the art of origami were combined to reflect the many facets of Gauteng and the country as a whole.

Waterfall Estates Clubhouse Sunninghill, Gauteng

ARCHITECTURAL

Description

The extensive and widespread use of hot dip galvanized steel in the Clubhouse of Waterfall Estates.

Project Partners

Developer / Owner	Century Property Developments
Architect	Century Property Development Architect
Consulting Engineer	C-Plan Civil Engineers
Project Manager	Century Properties
Steel Fabricator	Mercury Steel and Construction
Hot Dip Galvanizer	Armco Galvanizers
Completion Date	End 2012

Information

- A grand entrance welcomes residents via a suspended walkway overlooking a cascading waterfall and water feature flowing around the central double volume core of the building to a variety of 5 star facilities. With an indoor climbing wall, heated pool, squash courts, 500m² gym area and studio's, wellness bar, restaurant and safe kids play area, this building which overlooks the grass terraces running down to the 3 tennis courts and beautiful dam is exclusively for the use of residents and will be the social hub of the community and cater to every aspect of sport, recreation and relaxation.
- The use of hot dip galvanized steel continues to be integrated to form part of all the architectural features and aesthetics of the estate structures.
- The use of hot dip galvanizing in combination with wood is of particular aesthetic appeal.
- The architect has fully understood the corrosion control value of hot dip galvanizing and has exploited its characteristics to the full extent.
- Many people view the surface of hot dip galvanized steel as "rough and unsophisticated", but it is clearly evident in this project that the galvanized steel blends in and compliments all the other construction materials.

INFRASTRUCTURAL AND COMMUNITY DEVELOPMENT

Ncome Museum Pedestrian Spiral Bridge 43km from Dundee, Kwazulu Natal

Description

Hot dip galvanized pedestrian bridge.

Project Partners

Developer / Owner	Department of Arts & Culture
Architect	LVDW Architects Newcastle
Consulting Engineers	Anderson Vogt Consulting Dundee
Project Manager	Tjaart van der Walt
Main Contractor	Siyaxhasana Construction
Fabricator / Erector	Steelcom Engineering
Detailing	SG Detailing
Hot Dip Galvanizer	Voigt & Willecke Galvanizers
Completion Date	February 2013
Tons of Steel	22.5 tons
Project Value	R1 125 000

Information

- The Ncome Museum is situated on the Northern side of the Ncome (Blood) River Battlefield site, which is where the Zulu's launched an attack on the Boers on the 16th December 1838.
- The first phase of the museum upgrade project included the earthworks to create a platform above the flood line for new buildings and accommodations, as well as three columns in the river to accommodate a pedestrian bridge.
- Phase two of the project started in 2011 and after extensive excavations to install the bridge abutments on either side of the river, the re-design of the bridge from what was initially proposed was started in mid 2012.
- Galvanizing of the bridge was a key requirement from the architect to allow the bridge to be maintenance free, long lasting and aesthetically pleasing. However, this meant that the original design had to be changed to allow for the bridge to be made in bolt-together pieces and sections to accommodate the hot dip galvanizing process.
- The bridge was originally designed using a double helix with pipes intersecting on the top and bottom as well as the sides of the bridge. These intersections require cutting the pipes and welding the complex joints together and as a result, this type of bridge is normally painted because with a radius of 1.5m, the structure is too big to fit in a hot dip galvanizing bath.
- Steelcom came up with a proposal to use a single spiral broken into two halves and bolted either side of a middle pipe with internal sleeves for the rolled pipes to bolt onto. This bolting configuration was neater and more seamless than flanges.
- To make this concept work involved complex modelling by Anderson Vogt, who had to increase the size and change the four round pipes of the deck to five rectangular tubes which also better accommodated the railings and Eco wood decking.
- Ecowood, with a hidden fastening system, was used as an eco friendly recycled green product, which requires no maintenance and has good longevity properties.
- Politically this site is considered to be the start of oppression, hence the emphasis on reconciliation is huge, with the bridge symbolising this.
- Assembly of the bridge after galvanizing was a concern due to the rolling of the pipe and variances in the steel, resulting in slight changes to the profile radius, once the steel has been heated and cooled by the hot dip galvanizing process. Concern was also raised as to the potential for damage to the individual parts as they had to be transported 350km to site.
- For these reasons it was decided to assemble the bridge sections in the workshop with the aid of overhead cranes and the Ecowood was installed continuously from one side to the other. The sections were then transported to site and bolted into sections, ready for craning onto columns.
- The horizontal pipe joints used internal sleeves and once assembled were welded for strength required. Zincfix was used to repair all the welded sections.
- Due to time commitments made at the highest level for the bridge to be ready for certain annual commemorations, the bridge had to be installed during the rainy season, which was a real challenge with no approach roads and the heaviest rainfall experienced in years.
- To satisfy the requirements of the crane insurance companies, a launching platform with good compaction had to be built, as well as infill and compaction in two dongas between the museum and the river. The first of these were washed away by a flash flood which saw 90mm of rainfall in a two hour period.
- Once the platform was ready, three days of sunshine were required to allow the rest of the path to the bridge to dry out. It was more than 6 weeks before this finally happened and the installation of the two long sections of the bridge could be done.

N17 Light Masts, Canopies and Toll Booths Leandra, Trichardt and Ermelo

Description

The manufacturing and installation of 36 uniquely designed duplex coated light masts as well as steel manufacturing and construction work at the new N17 Toll Plazas.

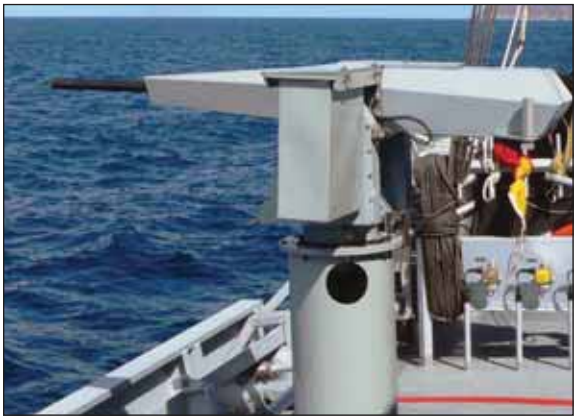
Project Partners

Developer	Basil Read; Murray & Roberts
Architect	Ilifa Africa Engineering (Pty) Ltd
Project Manager	Hansie Joubert
Main Contractor	KISME
Hot Dip Galvanizer	Robor Galvanizers
Completion Date	November 2012
Project Value	Approximately R7.5 million
Tonnes of Steel	Approximately 200 tons of structural tubing

Information

- The 26m high, uniquely designed light masts were designed in three sections that fit into each other to complete one mast.
- The hot dip galvanizing was difficult because of the size and the curved shapes of the sections that needed to be galvanized. The only galvanizing company in South Africa who were able to galvanizing sections of this size was Robor.
- The light masts were intricate and a difficult design to manufacture – specific to the design was a travelling luminaire. Specially designed jigs were used for the manufacturing of the light masts in order to ensure uniformity.
- Initially the design for the travelling luminaire was a vesconite slide. In the final stages it was found that it didn't work as planned and the design was adapted to a stainless steel roller unit, which is the first of its kind in South Africa. The roller unit makes it easier to do routine maintenance and is much safer than its former design. No scaffolding or ladders are needed for maintenance work on lights.
- This project had 40 skilled and semi-skilled full time employees working on it for 21 months.
- All steelwork was hot dip galvanized, sandblasted , primed and painted, with some sections needed to be put through the zinc bath a few times due to the curved shape.

Sea Rogue Weapon System Gauteng



Description

The use of a duplex coating system to a warship deck-mounted assembly that is used in the defence environment.

Project Partners

Developer / Owner	Reutech Solutions
Corrosion Protection Designer and Consulting Engineer	Greg Combrink
Duplex Coatings Applicator	Bulldog Projects (Pty) Ltd
Hot Dip Galvanizer	Galvadip
Completion Date	April 2012

Tonnes of Steel

- Initial anti-corrosion design and implementation for the first three units estimated cost R200 000.
- The value of the sea rogue project to Reutech is tens of millions.

Information

- The Sea Rogue Weapon System is a highly sophisticated warship deck-mounted assembly that is able to fire projectiles under extremely hostile environmental conditions.
- It is capable of acquiring several targets and firing on them in rapid fire mode with a high level of accuracy even though it is mounted on an inherently unstable platform.
- In operation on the sea it is subjected to arduous service conditions and exposed to extremely corrosive conditions. Some components of the unit are also subjected to stressful mechanical forces and vibration during operation.
- The system consists of a warship deck-mounted weapon assembly able to be fitted with an assortment of guns and a fire control system that is able to engage targets and control the gun to fire upon such threats.
- Most warships operate in the marine environment where waves often break over the ships bows wetting decks and where moist sea winds laden with salt, deposit such onto the exposed surfaces onboard the ship.
- The Sea Rogue gun assembly consists of several different materials and alloys and if they are left unprotected they will be severely attacked by corrosion. In the earlier prototype units, the focus was more on getting the system to be reliable and effective, with less attention given to managing the negative effects of corrosion.
- After successfully fine tuning the system's working ability, Greg Combrink was called in to address the anti-corrosion design of the gun assembly for subsequent units.
- Several units were subsequently manufactured and these had the new anti-corrosion design implemented. The deck mounted assembly and cover plates were of great concern as previously the steel and aluminium components had been sent out for a coating, with no thought to its anti-corrosive properties. In these cases, the carbon steel parts were dropped off at the galvanizer and the aluminium plates were sent off to be painted. At the time it was thought that such action would be sufficient.
- Unfortunately many of these prototypes corroded within a short period of time. Subsequently, these corrosion protection systems were reviewed and comprehensive design with regard to both the materials and the coating protection system to be used was drawn up. This involved the corrosion protection system to be used, their compatibility with each other, the materials being protected and the requirements of the application processes and also the delegation of responsibility to ensure compliance with the quality assurance policy and recording of quality control parameters were specified.
- The main structural part of the weapon system was an intricate carbon steel component with several difficult to access areas that was to be duplex coated. The galvanizer made valuable recommendations to the design so that the hot dip galvanizing process was optimised resulting in a very good finish.
- As the silicon content was slightly high, much skill, experience and care was required to successfully achieve the appropriate thickness and finish. The galvanizer also advised on specific design modifications taking safety aspects and the envisaged dipping angle into account so that the process could be completed in a single, smooth action resulting in a uniform finish.
- Critical aspects that ensured success was the valuable input from the vetted contractors at the early design stage and the communication between the informal anti-corrosion team members and the project engineer.

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MINING AND INDUSTRIAL

General Motors South Africa Coega Industrial Development Zone, Port Elizabeth

Description

The construction of a Parts Distribution Centre for General Motors, with all structural steelwork being hot dip galvanized.

Project Partners

Developer / Owner	Coega Development Corporation (CDC) / General Motors South Africa
Architect	R&L Architects
Specifier	Aurecon
Project Manager	Aurecon
Main Contractor	WBHO
Structural Steel Contractor	Triple S Steel / Uitenhage Steel
Hot Dip Galvanizer	Galvanizing Techniques (Pty) Ltd
Completion Date	July 2010
Tonnes of Steel	725
Project Value	R150 million

Information

- The Coega Industrial Development Zone (IDZ) is being developed approximately 20km east of Port Elizabeth, just inland of the new Coega River Deep water Port. Aurecon was appointed to undertake the design, contract administration and site monitoring for the construction of a Parts Distribution Centre for General Motors South Africa.
- This project entailed the construction of a Parts Distribution Centre, comprising a warehouse and office space, used as a distribution centre for GMSA vehicle model parts to the after-sales market to all Sub-Sahara Africa countries.
- The GMSA project was a fast track project being constructed in a 12 month period. Therefore the hot dip galvanizing process was carried out very economically in large batches as a highly mechanised and closely controlled process.
- The low initial cost and low maintenance cost made hot dip galvanizing the most versatile and economical way of protecting the steel.
- The warehouse consists of 9 meter high columns to accommodate the racking requirements. Because of the height it would have been difficult to paint all the areas during the maintenance period.
- The warehouse is located some 900 meters from the coast and is in an industrial development zone making it a highly corrosive location – hot dip galvanizing was the perfect choice!
- Many items were hot dip galvanized: the structural steel components, some of the equipment in the fire pump house, for example the pipework and fasteners, cat ladders and the dock levellers; making this equipment maintenance free from a coating perspective.

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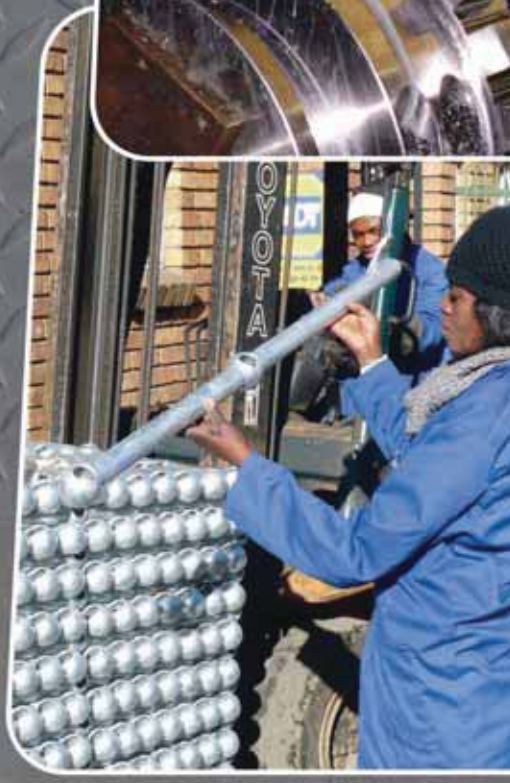

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MINING AND INDUSTRIAL

Construction of Back of Berth Pipe Racks Island View at Port of Durban

Description

The expansion and construction of the Pipe Racks along the Island View, Port of Durban berths in order to upgrade the existing pipe rack infrastructure.

Project Partners

Developer / Owner	Transnet National Ports Authority
Specifier and Project Manager	Transnet Capital Projects
Main Contractor	WBHO Construction
Hot Dip Galvanizer	Phoenix Galvanizing (Pty) Ltd
Steel Fabricator	SHESHA
Project Value	R180 million
Tonnes of Steel	1 900 tons

Information

- In 1998 Transnet National Ports Authority (TNPA) constructed an above ground pipe racking system between Island View berths 2 – 10 (excluding berth 9) to cater for industry demand for additional services. In 2006, TNPA realised that the pipe racks were nearing capacity and a need arose for the expansion of the pipe racks. Space constraints restricted further placing of underground pipes, hence the need arose for the expansion of the pipe racks.
- Stakeholders were engaged to determine the requirements for short, medium and long term pipe racking needs for new pipes. TNPA also requested that underground pipes be relocated onto the pipe racks for ease of maintenance and environmental factors.
- During the feasibility study, it was determined that the pipe racks needed to be expanded. Increased pipe racks would lead to greater volumes of product transfer at more efficient rates. Thus the Port of Durban would retain the status of being a port with world class infrastructure.
- The expansion of the pipe racks along the berths is required to upgrade the existing pipe rack infrastructure to accommodate the Petro-Chemical Industry's pipe line infrastructure ahead of demand.
- The benefits of using hot dip galvanizing include the resistance to mechanical mishandling and protection against corrosion. The latter of which can be seen by the residual hot dip galvanized coating thicknesses on the existing pipe rack which is 15 years old. A painted system was ruled out as it is not as resistant to corrosion as hot dip galvanizing and will require constant maintenance. Down time for maintenance in this project is unacceptable due to disruptions to operations.
- The new pipe racks have four times the capacity of existing pipe racks and are built over existing racks. This is a major improvement as the existing pipe racks could only hold 200 diameter pipes as opposed to the new racks that will hold 500 diameter pipes. This in turn will reduce the amount of time a ship is berthed at the port to discharge or load chemicals. With bigger pipes and more pipes being added, this results in a quicker turnaround time for ships at the harbour.
- Hot dip galvanizing will protect the structure for at least 30 to 35 years while it supports stainless steel pipes. An integral component of connecting the hot dip galvanized components are the bolts and nuts, Transnet correctly specified the use of hot dip galvanized bolts and nuts. All necessary coating repairs were done using an appropriate material applied to the requirements of SANS 121.

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MINING AND INDUSTRIAL

Tilt-Up Heavy Duty Security Walling Mapleton Paint Yard

Description

The hot dip galvanizing of the steel used for the construction of the heavy duty security wall around the Mapleton Paint yard.

Project Partners

Developer / Owner	Kobus Marais
Specifier	Paul Roscherr
Project Manager	Kobus Marais
Main Contractor	Phenix Walling Technologies
Hot Dip Galvanizers	Lianru Galvanisers & Robor Galvanizers
Property Owner	Bulldog Projects (Pty) Ltd
Completion Date	April 2012
Tonnes of Steel	25 tons
Project Value	R3 million

Information

- The Tilt-Up Heavy Duty Security Walling at the Bulldog Projects Mapleton Paint Yard is a project which is very different to the usual wall building projects across the country.
- This project is dynamic and stands out because of the speed of erecting, the fact that it is a heavy duty security wall and economics.
- The wall is approximately 1.3km in length and is designed and created using solid pre-fabricated reinforced panels that weight approximately 4.6 tons per panel and are 5m x 3.6m x 125mm in size.
- The panels are slotted into hot dip galvanized 152 x 152 I-beams which are 4.5m in height and cast into a concrete footing.
- The lifting anchors have also been hot dip galvanized.
- Hot dip galvanizing was the first choice for the coating of the I-Beams as the property owner wanted the best long term corrosion protection solution that was also robust and durable.
- Hot dip galvanizing was also a better choice than a standard 3 coat painting system not only because it offered a longer maintenance free period and longer service life, but also because hot dip galvanizing would be more robust to handle the slotting in of the large pre-cast solid concrete panels into place.
- From previous experience, the standard pre-cast walling made it very for intruders to access the property or for holes in panels to be made so that smaller items could be passed through the gaps.
- This wall is the heavy duty alternative to standard pre-cast walling which is a lot stronger. Furthermore, with the wall pillars made of hot dip galvanized carbon steel I-beams, the strength and durability far outweigh that of any other structure of its kind.
- One crew can erect approximately 120m of finished wall per day, just one week after starting the foundations.
- The use of cast-in lifting anchors into the concrete panels assisted with the lifting and moving of the heavy duty panels by use of lifting clutches.
- The wall is more robust due to a solid reinforced concrete member versus the pre-stressed hollow members.
- Company logos and / or company information and patterns can be cast into the panels.
- In this project it was also discovered that the reinforced wall panels could be cast on site thereby eliminating all transport costs.
- Specialized skills transfer has taken place on the project which has developed local skills that could be used for infrastructure development on contracts other than security, for example low cost walling and housing, schools, correctional centres etc.
- The Heavy Duty Security wall is economical and is extremely fast track with an outstanding design. Fabrication holes, including the holes required for the attaching of the electric fence, were drilled prior to hot dip galvanizing, thereby ensuring that the maximum corrosion protection was achieved in the process.
- This wall could have a 2 hour fire rating.
- 90% of the project is constructed on-site with only the concrete and reinforcing being transported, thereby saving on costs and fuel emissions.
- To the best of Bulldog's knowledge, these combinations of construction methodologies have been utilized for the first time on security walling.

Tshipi Borwa Mine Stock Pile Tunnels Northern Cape

Description

The hot dip galvanizing of Stock Pile Reclaim Tunnels.

Project Partners

Developer / Owner	Tshipi é Ntle Manganese Mining (Pty) Ltd
Architect	Armco Superlite (Construction Products) in conjunction with Aurecon Consulting Engineers and PDNA
Specifier	Armco Superlite (Construction Products)
Project Manager	Alpha Projects
Main Contractor	N.C. Construction
Hot Dip Galvanizer	Armco Galvanizers
Duplex Coatings Applicator	Bulldog Projects (Pty) Ltd
Completion Date	End January 2012
Tonnes of Steel	800
Project Value	R16 million

Information

- The Armco tunnels have been designed to accommodate a manganese stockpile height of 16m and can accommodate significant mass.
- Tshipi é Ntle Manganese Mining has brought together South African, Australian, American, Korean and Singaporean investors to establish a leading global manganese company.
- The manganese ore that is to be mined at Tshipi Borwa lies 70 metres beneath the sands of the Kalahari Desert. Work is already underway to remove this overburden and access the manganese ore that lies below.
- Tshipi Borwa has been designed to be an open pit mine, capable of producing 2.4 million tons of top quality manganese ore. Mining will be a relatively simple "truck and shovel" open cast operation.
- The first step is to remove the top soil and stockpile it for use in the rehabilitation phase. The second step is to remove the various layers of the Kalahari formation, followed by the harder banded ironstone, dolomite and manganese layers. Once exposed, the manganese ore will be drilled, blasted and loaded onto trucks where it will be hauled to the primary crusher which feeds the main Run of Mine stockpile.
- The mine required a service life of 60 years on the tunnels, therefore hot dip galvanizing was chosen as the corrosion protection system due to the mildly corrosive environmental conditions.

MINING AND INDUSTRIAL

Medupi Power Station: Ash & Coal Terrace Ellisras

Description

The use of hot dip galvanizing for the Ash & Coal Terrace at Medupi Power Station.

Project Partners

Developer / Owner	Eskom
Specifier	Eskom / ELB
Project Manager and Main Contractor	ELB
Main Contractor	Tass Engineering
Hot Dip Galvanizer	Armco Galvanizers
Project Value	± 2 500 tons

Information

- The Ash & Coal Terrace supplies coal and removes ash from all six boilers
- Tass Engineering, a well-known and respected Johannesburg based company specialising in structural steel, had been contacted to fabricate a large quantity of beams for Eskom's Medupi Ash and Coal Project. The average size of these beams were 1m in height by 10m in length with a flange width of around 450mm. The welding process was completed using submerged arc welding (a process which can minimise welding stresses owing to the lower cooling rate of the welding).
- Following the hot dip galvanizing process, areas of distortion were measured along the webs of the beams, the specified tolerance of which was 7mm. Following galvanizing the worst amount of distortion measured was 11mm and as such the entire batch was rejected by the inspector.
- After trying various methods of mechanical straightening without much success, the Vibratory Stress Relief (VSR) Witbank office was approached with a view to vibratory stress relieving the remaining batch of beams with the required end result being that of limiting the web distortion to within tolerance if not completely eliminating the distortion.
- Vibratory Stress Relief, often abbreviated VSR, is a non-thermal stress relief method used by the metal working industry to enhance the dimensional stability and mechanical integrity of castings, forgings, and welded components.
- Almost all vibratory stress relief equipment manufacturers and procedures use the workpiece's own resonant frequency to boost the loading experienced by induced vibration, so to maximize the degree of stress relief achieved.
- Internal stresses are usually caused by combinations of the following: Residual stresses induced at the steel mill during rolling of structural sections or plate; those created by bending or welding during fabrication; a lack of symmetrical section such as fabricated sections; a combination of thick and significantly thinner materials with the same assembly or large assemblies that require double end dipping to successfully coat the entire surface.

Civin Road Bridge Civin Road Bridge, Bedfordview

Description

The use of Armco Superspan with an integrated top concrete arch for the bridge in Civin Road.

Project Partners

Developer / Owner	Ekurhuleni Metropolitan Municipality
Main Contractor	Armco Robson (Pty) Ltd
Hot Dip Galvanizer and Steel Fabricator	Armco Robson (Pty) Ltd
Project Value	R125 000 (1984 figure) including additional concrete
Completion Date	Estimated 1984

Information

- The bridge, a Canadian developed concept that used an Armco Superspan arch design and integrated a top concrete slab connected to the steel, was able to accommodate live loads with a minimum of top soil cover.
- The normal Superspan arch of this type requires a minimum of approximately 1 meter of compacted soil over the top of the arch so as to distribute live loads. Employing the Novaspan concept of an integrated concrete slab and extended "wing", live loads can be accommodated over the crown of the structure.

- The Civin Road Bridge was recently inspected and found to be in an excellent condition. After approximately 28 years in service, the current condition clearly reflects the ability of hot dip galvanizing in terms of durability and longevity.
- This specific installation dates back to 1984 and spans across the notorious Jukskei River that is prone to flash flooding in the summer months.
- Based on the current condition of the structure, it can be expected that a further 50 years of service life can be achieved.

INNOVATION CATEGORY

The Grass Roll Saver Midrand

Description

Hot dip galvanized round-bale feeder.

Project Partners

Developer / Owner	Groenvoer Products
Fabricator	Adaway Home Services
Hot Dip Galvanizer	Armco Galvanizers

Information

- The Grass Roll Saver is an innovative, ecologically friendly; SA patented and design protected agricultural invention. Research has shown that it can save as much as 50% of the grass provided for livestock.
- The Grass Roll Saver has been designed taking South African economic and human resource conditions into account. Its unique clam design, swivel mechanism and locking pins allow for manual loading of 200kg grass rolls.
- It has been designed to stand outdoors in paddocks and therefore needs to withstand the effects of the weather without corroding. Groenvoer want to deliver a premium quality product that will become a benchmark for long lasting, robust, weather proof agricultural equipment in the same way that windmills have become iconic symbols of reliability, endurance and permanence.
- By using hot dip galvanizing as the corrosion protection system, it will not only provide a comfortable 25 year guarantee against corrosion, but it is not toxic to animals should they rub against the Grass Roll Saver or lick it.
- Because of its design, which is essentially a skeleton of square tubing, it was necessary to refine, enlarge and carefully place holes in order to accommodate the hot dip galvanizing process.
- The use of a round-bale feeder is necessary to avoid the 57% average hay waste, reduced hay intake and horse weight loss observed when not using a feeder. Limiting hay waste by using round-bale feeders will also reduce inspect breeding areas, mud and manure removal costs.
- Since being launched into the market place in September last year, seven Grass Roll Savers have been sold and each one has been placed in a paddock where the novelty of the design has attracted great interest.

Hot Dip Galvanizing Awards 2013: Judges

The panel of independent adjudicators appointed to assess this year's submissions are Andrew Barker of Andrew Barker Development Consultants; Spencer Erling, Education Director for the South African Institute of Steel Construction; Darelle Janse Van Rensburg of Orytech and Basie Smalberger of Trans Africa Projects.


Andrew Barker.


Basie Smalberger.


Darelle Janse Van Rensburg.


Spencer Erling.

It's the hot dip galvanized steel that makes the vision real!!

Tuesday 16 July was the great day when the Cross of Hope was erected close to Van Stadens Bridge. It stands tall and proud and magnificent. The cross (supported by a hot dip galvanized frame) commands the whole valley as it stands high up on the mountain, clearly visible from the N2 Freeway for the entire world to see. The wind blew hard that night, up to 80kms an hour and the next morning the Cross was still standing firm. Robbie Hift, the man behind the vision for the Cross of Hope said, "I feel incredibly encouraged to know there are so many fine people who have contributed prayers, time, money, effort, materials, transport, machinery, wisdom, counsel and love to build this magnificent 14 meter high Cross of Hope".

He added, "May number 88 have been the very last person to have jumped off the bridge".

The Perspex letters JESUS LOVES YOU are already constructed. The upright hot dip galvanized steel framework to house the 2 meter high letters have been designed and the 16 holes for the concrete foundations in the ground will be dug. Then comes the hot dip galvanized electric fencing and much later, the solar lighting.

Full details of this event can be seen on www.ecmirror.co.za

On the Couch.....

John Abbott

By Desere Strydom

In this edition of *On the Couch*, we chat to Arup Façade Engineer, John Abbott about the good and the bad experiences he has had with hot dip galvanizing.

Please tell us a little about your background, education and how you got into this industry. I grew up in Pretoria and attended Pretoria Boys' High School. I was probably always going to be an engineer, having been interested in making things and taking things apart from an early age. I studied Civil Engineering at Wits and had many excellent teachers.

Please tell us about your early career. After graduation and a short spell with a consultant who specialised in prestressed bridges I joined Arup in Pretoria and was married to Kate at the end of the same year. We moved to Johannesburg and then to London in the early 1970s, travelling on the Union Castle mailship before those were discontinued. This was an interesting and very political time in the UK and the building industry was very quiet. Work experience and pay at that time were not amazing but I made good friends in Arup and we were able to travel extensively and enjoy the rich cultural life of London.

Returning to SA we settled in Johannesburg and I was fortunate to be involved in interesting projects all over SA and later widely overseas.. Moving from concrete and steel to aluminium and glass made an interesting change and we did projects in Hong Kong, Turkey, the Middle East, Europe and the UK. Living in SA and working on huge projects in the Gulf was fascinating but meant a lot of travelling and time away from home.

Please tell us about projects that stand out as highlights. Our recent projects have involved steel together with facades – stadium structures in Abu Dhabi and Doha and a luxurious hospital in Doha. This mix has continued in SA on a smaller scale, keeping our good team of engineers busy with satisfying work.

Please tell us about your work involving hot dip galvanizing. We have been fortunate to have the HGDASA's help in the form of Terry Smith with galvanizing applications in Mauritius on a high profile project for a bank where curved cellular beams were galvanized then painted white and exposed as a feature on the office roof space. More recently, but less successfully, galvanized steel was the material of choice to support a glass façade in Cape Town where Terry's offer of help was not taken up and remedial work was needed after much of the steel was erected, and is still on-going.

Do you have any role models in the industry? I have been fortunate to have worked with many interesting people, engineers and architects mostly, and to mention any would be to leave out others. We have a great small team of engineers and again I am fortunate to have such people as colleagues.

Tell us a little about your family and how you enjoy spending time together. My wife, Kate and I have three sons, all successful in careers in Electrical Engineering, Theoretical Physics and Film. As a family we had many holidays in the Drakensberg and this recently led to some wonderful hiking trips with our sons to Patagonia, the Alps and, last year, the Himalayas.

Des Ray for Hot Dip Galvanizing Today 2013

Abrasive blast cleaning

A compulsory pre-treatment for different coatings applied to a steel substrate

Grit blasting, shot blasting and micro blasting are a prerequisite for a variety of reasons on protective coatings applied to steel structures.

In this article we will examine why it is necessary to blast and why it is a compulsory pre-treatment for these different coatings.

General view of the sign gantry.

1. Painting

Steel that is to be protected by a good paint system must be abrasive blast cleaned prior to painting to remove all contaminants, rust and mill scale. A quality paint requires a good clean surface with a suitable profile to provide adhesion to the paint as the life expectancy of the coating is directly proportional to the cleanliness of the surface and the thickness of the paint coating. Tests carried out in the United Kingdom have shown the life of a blasted paint coating system will outlast a wire brush system with the same paint system by 3 to 5 times in exterior environments.

Grit blasting should be carried out to a SA 2 1/2 or a SA 3 cleanliness which is a white metal finish with a surface profile which varies from 25 to 75 microns depending on the total dft of the paint system. These systems can vary from 75 microns in rural conditions to 500 microns in aggressive salt spray environments.

2. Grit blasting and metal spraying

Here the blasting profile (50 to 75 microns) is very important to ensure the necessary adhesion and the metal sprayed coating should be sealed as it tends to be slightly porous to provide a lifetime equal to hot dip galvanizing. It is the only repair system to a to galvanized coating that will match the life of hot dip galvanizing.

3. Castings

Blasting is essential on iron castings prior to hot dip galvanizing.

4. Micro blasting prior to painting on a newly hot dip galvanized coating

The choice of abrasive for blasting to provide an etch on a newly galvanized coating is all important as is the reduced air pressure of the blasting. Appropriate paint coatings over hot dip galvanizing are considered to be the Rolls Royce of corrosion protection provided they are applied correctly and are known as Duplex Systems.

continued on page 36...

Close-up showing the colour.

Damage which has occurred to a thick brittle coating that was not blasted prior to hot dip galvanizing.

5. Blasting

Prior to Hot Dip Galvanizing it is carried out for several important benefits. On heavily pitted and rusted steel the only method to remove the corrosion product is by grit blasting the affected areas. Acids will only remove surface rust and will not penetrate the pits which are often caused by proximity to aggressive chloride conditions. Once blasted the clean steel can be re-galvanized to provide the client with enormous cost saving rather than replacing the structure with new steel. Blasting is also suitable for removing old paint coatings and heavy mill-scale but contaminants such as oil, grease and salts should be pre-treated by a suitable degreasing solution prior to blasting.

6. Blasting reactive steels which contain reactive levels of silicon and high levels of phosphorus

Where these steels are hot dip galvanized and thick brittle coatings are experienced it is important to provide the client with a coating that will withstand the mechanical handling prior to erection without extensive damage that requires excessive repairing on site.

These thick brittle coatings can be accentuated by a long immersion time in the molten zinc which is sometimes unavoidable due to inappropriate venting of large tubular and complicated structures, such as road sign gantries. Blasting creates the additional necessary mechanical adhesion to that of the metallurgical bonding to the metallurgical bonding of the zinc as it provides a profile on the steel for the zinc to adhere to as the steel surface provided by the acid pickling is generally quite smooth.

Colour of base plate arrangement.

Coating thickness of the base plate.

Close-ups showing the colour and coating thickness.

7. Abrasive blasting to provide a relative uniform colour

The scourge of the Galvanizing industry is a coating which either becomes a very dark grey or due to the silicon and phosphorous levels it becomes blotchy in appearance with large portions of shiny silver, dull grey and zebra type silver streaks.

It is consistently the most rejected coating by misinformed clients due to its unpleasing appearance but in fact is a good galvanized coating that will last for substantially longer periods of time.

By discussions with the client this coating can be improved by abrasive blasting prior to galvanizing which will remove a certain amount of the contaminants in the steel on the surface and will provide a uniform matt grey colour coating that is aesthetically pleasing in appearance.

As this adds a certain cost to the finished product, clients are normally reluctant to pay for this extra cost but where heavy steel structures are for export or require travelling a certain distance it has the effect of removing the brittleness of the coating and presenting the client with an aesthetically pleasing product. Adding nickel to the zinc kettle will also improve this appearance.

It is the duty of every hot dip galvanizer to continue to provide and promote a product that is aesthetically pleasing (when required) to equal the unmatched and unquestionable qualities of corrosion resistance that is provided by a hot dip galvanized coating.

Iain Dodds

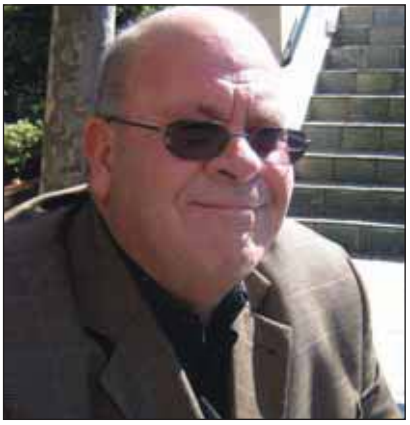
Bob's BANTER!

The simple things of project communications

Good communications can make a project a great success and bad communications a project disaster. Despite the wide range of technology to manage and control project communications, such as shareware, document management systems, active white boards, video conferencing and, of course, the perennial favourite, PowerPoint presentations, communications actually boils down to four basic attributes of people: how they talk, listen, write and read. In business and human resource management, there has been a great deal of effort to train people to become better speakers and better technical and business writers. How to listen and how to read and comprehend seem to have been overlooked.

Psychologically, our ability to speak, listen, write and read are all interrelated: our communication cognitive function is a highly complex system. The more articulate we are when we speak, the easier it becomes for someone else to listen, the better you can listen, the more effectively you will write, the better you read, the better you will speak.

Although speaking, listening, writing and reading are highly developed human skills, there is a lot we don't know about them. It would appear that most of the work that has been done by cognitive psychologists in trying to understand these skills have been focused on educational and therapeutic aspects. Accordingly, we know how people learn to read, speak, hear and write and why they fail to do so. However, we know very



little about how they comprehend what they read, how they get to say what they do to make others comprehend, how they listen and comprehend what they hear and how and why they write what they do.

The common factor in all the cognitive skills is the construction of meaning or comprehension. Psychologist Richard Mayer believes that there are three kinds of knowledge needed for constructing meaning: content knowledge (prior knowledge about the subject), strategic knowledge (the strategy used by the individual to understand written and verbal structures) and metacognitive knowledge (the ability of the individual to monitor his or her own understanding.

It's probably true that we have all had the experience of reading something or listening to someone speak, where we know what all the words mean but have little idea of the meaning of what we are reading or listening to. This clearly means that there is more to understanding than just the words themselves. Other processes are required to take the meanings of the words, together with their order in the stream of text or speech, to form a more global meaning. This, clearly has much relevance to project management, for example, understanding and being able to implement a project plan, in the context of the project and its stakeholders, requires a far higher level of meaning than just understanding what a WBS or Gantt Chart are.

Understanding is not discrete, it's a continuous scale of comprehension. You don't either understand or not understand: your understanding at one time is at a particular level, which by effort, you can improve, or by lack of effort you can retard. However well you understand something, you can still do it better. Improving your level of comprehension is by talking, listening, reading and writing.

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.*

PROPOSED FEATURES FOR 2013

November (No. 56):

Tubes, pipes and scaffolding • Masts and poles • Water storage • Heat

NOTE: FEATURES MAY BE SUBJECT TO CHANGE

The need for strength testing of cable ladders

South Africa – Currently no standard exists governing the technical specifications and requirements of cable ladder systems. As a provider of quality Cable Management Systems, Strutfast recognises the Customers need to have assurance of the technical specifications and load capability of cable ladder systems.

The National Electrical Manufacturers Association (NEMA) is a North American standard which is widely accepted along with the Canadian Standards Association. NEMA has established technical requirements relating to manufacture, performance and testing of cable ladder systems.

In line with our philosophy of delivering total quality products and services to our valued Customers, Strutfast adopted the NEMA standards in 2004 to ensure that the South African market enjoys the same predictable cable load performance of classified cable support systems, as many first world countries.

A summary of the NEMA VE-I 2009 rating method follows (converted to the Imperial System of Measurement):

- The first part of the NEMA rating method indicates the length of span:

  8ft = 2.4m / 12ft = 3.6m / 16ft = 4.8m / 20ft = 6m

- The second part of the NEMA rating method indicates minimum working load capacity:

  A = 50lbs / linear foot (75kg/m)

  B = 75lbs / linear foot (112kg/m)

  C = 100lbs / linear foot (149kg/m)

By way of example, a Strutfast LB20B (LONGBOW) cable ladder will span 6 meters and carry a cable working load of at least 112kg/meter. The load capabilities of Strutfast LONGBOW cable ladders have been independently verified on test bed facilities in our premises, and we are continuously developing and testing new initiatives to better serve the industry. Standard, nominal LONGBOW widths available from Strutfast are 150mm, 200mm, 300mm, 400mm, 500mm, 600mm, 800mm and 1 000mm. Standard, nominal LONGBOW heights available from Strutfast are 130mm and 150mm.

To the best of our knowledge there is currently no South African or International standard governing cable ladder systems intended for edge mounting. Strutfast's SB75 (STRONGBOW) cable ladder is designed and tested to carry static cable loads up to 140kg/sqm over a maximum support span of 3 meters when mounted on its edge horizontally. We are also currently developing a load test proposal to enable us to classify our cable ladders when used in an edge mounted position. Once we are able to consistently predict the cable load capacity of the products being tested, we intend seeking ratification from NEMA. Standard, nominal STRONGBOW widths available from Strutfast are 150mm, 200mm, 300mm, 400mm, 500mm, 600mm, 800mm and 1,000mm. Standard, nominal STRONGBOW heights available from Strutfast are 75mm, 100mm and 150mm.

Without the benefit of testing the edge mounting products in accordance with a local or International specification or standard, Strutfast will restrict the support span to 3 meters, as the eccentricity of the cable loading when mounted on edge could cause premature failure through the twisting of the product.

Manufacturing costs can vary considerably between the different load categories. Labour and joining costs are similar for cable trays and ladders of equal length, so the heavier categories do contain some cost efficiencies. Strutfast would advise designers to specify the lightest class of product compatible with the weight requirements of the cable ladder or tray. The width and height of a cable ladder or tray is a function of the number, size, spacing and weight of the cables in the tray or ladder. When specifying width it's important to note that the load rating does not change as the width increases.

Accessories are used in conjunction with the cable ladders and trays to alter or change the size or direction of the cable ladder or tray. Strutfast's accessories are generally available with a minimum bending radius of 450mm, 650mm and 1 000mm.

The South African market is facing some serious challenges over the short and medium term. Reduction in both capital spending and foreign direct investment is placing pressure on a range of industries. Coupled with a depreciating

Rand and rising inflation, risks relating to business, finance, operations and company reputations should be managed and monitored carefully. In the Cable Management industry these risks should be considered and managed by the Consulting Engineers who specify and source the cable support systems for their projects. Some well-known Companies are marketing their cable ladders as being compliant with NEMA standards, however, when tested and independently verified by the South African Bureau of Standards (SABS) we discovered that some of these cable ladders failed at less than half the requirement published by NEMA. A catastrophic failure of these sub-standard (falsely marketed) products on site could lead to serious financial and reputational losses for the Consulting Engineer/ Contractor who specified the sub-standard products on high value projects, not to mention the possibility of injury or worse, the loss of life on site. It is of upmost importance that local manufacturers and consulting engineers are held accountable for the quality and performance of the products they place in the market.

The Association would like to thank Strutfast for this article.

The new wall chart:

Design for Hot Dip Galvanizing

Corrosion prevention is an essential factor in the economic utilisation of steel. Provision of the appropriate protective coating can bring initial savings plus substantial economies in service, due to reduction or elimination of maintenance and lost service time, and by not deferring the replacement date of structures and equipment.

In suitable applications hot dip galvanizing provides ideal corrosion protection for steel – no other coating matches galvanizing's unique combination of low cost, ease of inspection, for coating quality, durability, predictable performance, low or no maintenance, and resistance to abrasion and mechanical damage.

When designing a structure which is to be hot dip galvanized, it must be borne in mind that articles are immersed into and withdrawn from a bath of molten zinc heated to a temperature of 450°C.

Design and fabrication is required to conform to acceptable standards which apply, regardless of whether a galvanized or a painted coating is to be applied. In the case of hot dip galvanizing, some additional requirements which aid access and drainage of molten zinc, will improve the quality of the coating and also reduce costs.

With certain fabrications, holes which are present for other purposes may fulfil the requirements of venting of air and draining of zinc; in other cases it may be necessary to provide extra holes for this purpose.

For complete protection, molten zinc must be able to flow freely to all parts of the surfaces of a fabrication. With hollow sections or where there are internal compartments, the galvanizing of the internal surfaces eliminates any danger of hidden corrosion occurring in service.

In addition to using the correct specifications in terms of coating requirements, the steel chemistry should be of a quality suitable for hot dip galvanizing.

The new Wall Chart has been updated with new specifications and a number of valuable refinements.

To obtain a copy of this valuable publication, contact either our Johannesburg or Cape Town offices.

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 10684:2004 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 HDGASA 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:
26 to 28 February; 12 to 14 March; 14 to 16 May; 9 to 11 July; 13 to 15 August; 8 to 10 October; 26 to 28 November.

Cape Town:
5 to 7 March; 4 to 6 June; 10 to 12 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 OR MARJORIE MONTGOMERIE AT THE ASSOCIATION

Hot dip galvanized steel quality

I read with interest a recent article by Kobus de Beer of SAISC *(page 43)* in which he refers to the problems associated with large quantities of imported steel from countries such as China, Saudi Arabia, India, Turkey, Thailand and elsewhere.
In his article, Mr de Beer indicates that major South African companies have introduced a policy to buy steel from the "best country source", which usually means obtaining the perceived "cheapest price".

I am reminded of an old Afrikaans idiom, "Goed koop is duur koop". Translated to English meaning, "a cheap purchase often proves expensive".

From our field experience and specifically when it comes to galvanizing such imported steel, we are confronted with steel chemistry that is not always conducive to a quality hot dip galvanized finished product. It is one thing to specify imported steel quality that is suitable for hot dip galvanizing, but is another issue when it comes to ensuring that the supplied chemistry test certificate is an accurate reflection of the steel supplied. Without defining and controlling the silicon (Si) and phosphorous (P) percentage within the steel being processed, the galvanizer cannot adequately control and produce a quality uniform surface finished product.

A project steel specification, and specifically the Si and P content, is the prerogative of the design engineer. The steel supplier is then required to comply with the specification and the fabricator to ensure that he receives the material as specified. The hot dip galvanizer then has the responsibility to produce a quality finish product. Without control of this process chain of events, it is extremely difficult for the galvanizer to fore fulfil their responsibility. The process calls for co-ordination, communication and teamwork between the parties along the chain.

Galvanizers are too often confronted by an engineer or end user complaining about a surface finish that does not "shine", or is not of a uniform surface finish. They refer to galvanized steel that "looks good" and is acceptable, while other steel in the same batch does not meet the same quality standard. The simple truth of this situation is that the steel chemistry is variable.

Hot dip galvanizing is undertaken primarily for corrosion control requirements. When aesthetics becomes a requirement, we need steel that conforms to strength specifications, and an additional stipulation as to the percentage Si and P content.

Our experiences relating to imported steel have shown that this aspect is not controlled leading to differences in hot dip galvanized steel surface finishing's. Uncontrolled steel chemistry has a direct influence on the quality of the surface finish of hot dip galvanized steel.

An ideal steel chemical analysis specification should be stated as follows;

"Aluminium Killed Steel"

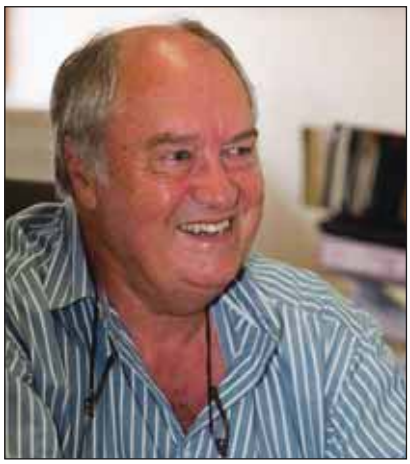
Silicon (Si) = 0.01 to 0.03%, Phosphorous (P) = 0.015% maximum (50 to 65µm, more flexible and "short term shiny finish)

OR

"Silicon Killed Steel"

Silicon (Si) = 0.15 to 0.25% and Phosphorous (P) <0.02% maximum (normal coating of approximately 120µm, tends to be hard, dull matt grey surface finish and brittle when >200µm)

Refer to the Association's website www.hdgasa.org.za, information sheet No.4 "Effect of silicon and phosphorous in steel".



South African steel fabrication industry bleeds as major clients procure abroad

"Best country sourcing" significantly impacts South African jobs

The large quantities of fabricated structural steel coming into South Africa from China, Saudi Arabia, India, Turkey, Thailand and others continue to have a significant impact on the South African economy. This is the opinion of Kobus de Beer the Southern African Institute of Steel Construction (SAISC) industry development director.

De Beer says that many of the major South African client companies have introduced a policy known as 'best country sourcing' which means they buy from the cheapest international supplier which, in many cases, turns out to be China.

"These companies say that they simply cannot be competitive with other global players if they do not continue with this practice. Many of them have gone to the extent of setting up purchasing offices in China, and other countries, to take advantage of what they call a 'massive' price advantage.

"But this, in my opinion, is a misperception," says de Beer. "They haven't made the right comparisons and they certainly haven't taken into account the full hidden, associated costs of the practice. For example, China typically needs full and final drawings to proceed and they tend to not process variations very effectively and, even if the work is done well, the costs end up high. Many buyers also "forget" the 15% import duty payable on imports of fabricated structural steel on entry into South Africa. A number of instances have been found where importers use fraudulent codes to try to avoid paying these duties.

"Also, almost every major company buying from these foreign sources needs a full time resident quality assurance (QA) team on the premises of their suppliers and, often, a second team to fix the poor quality of the work. As technical communications are also a very real problem, major quality and scheduling issues are not uncommon. These issues have made countries like Australia move away from China as a cheap source of supply," says de Beer

continued on page 44...

PROJECT	TONS OF STRUCTURAL STEEL IMPORTED	RSA VALUE LOST (RAND)	ECONOMIC ACTIVITY LOST (RSA RAND)	TAX INCOME LOST (RAND)	DECENT JOBS LOST TO RSA COMPANIES
Power Station	32 000 tons (Ex Thailand)	R800m	R1,144bn	R312m	3265
Power Station	12 000 tons (ex Saudi)	R300m	R429m	R117m	1225
Cement Plant	5 000 tons (Ex China)	R125m	R178,75m	R48,75m	510
Klinker Plant	1 500 tons (Ex China)	R37,5m	R53,6m	R14,6m	150
Mine Workshop	1 500 tons (Ex China)	R37,5m	R53,6m	R14,6m	150
Mine Furnace Bldg	6 000 tons (Ex China)	R150m	R214,5m	R58,5m	610
Coal Mine	8 000 tons (Ex import)	R200m	R286m	R78m	816
Coal Mine	2 700 tons (Ex import)	R67,5m	R96,5m	R26,3m	275
Transmission Lines	31 920 tons (last 3 years)	R488m	R713m	R278m	650
MANY OTHERS	?	?	?	?	?
TOTALS: (This (This table only)	100 620 tons	R2,208bn	R3,223bn	R948m	7 650 REAL PEOPLE

Table 1.

He adds that while it is true that delivery times are generally quick from these Eastern countries, he is convinced that delivery from South African fabricators are just as quick particularly when taking into account the six weeks shipping needed to bring foreign supplies. Most buyers also fail to account for the time and effort needed to repair paint and other damage before steel structures can be erected. "Our quality and speed of delivery is on a par with anything in the world and, taking into account the extraneous costs when buying from the East, we are also much closer to being competitive from a price perspective. And the weakening rand has made South African prices even more competitive of late," de Beer says.

"The fact that South Africans have managed to export 75 000 tons and more of structural steel per year for the past ten years does indicate a reasonable degree of competitiveness in spite of the many domestic constraints such as relatively low volumes and the inability to specialise. To give a perspective on this number: It comprises about 15% of the total South African capacity. A medium sized South African structural steel fabricator will employ some 210 people to produce 500 tons a month or 6 000 tons a year," says de Beer.

He says that it's time the industry took a holistic view and understood that, given South Africa's relative overall competitiveness, buying fabricated steel locally is not only beneficial to them in terms of the overall efficiency of trade, it is also good for the country's economy as a whole.

"A lot of Government and private sector effort goes into creating new jobs and incentivising productivity improvements at South African companies. Against this background it is totally counter-productive to allow existing decent jobs of well trained people to be wiped out while big buyers pay lip service to social compacts and local industry developments while continuing to import fabricated steel and other things.

"Perhaps the best illustration of how the country is affected by these decisions is to examine the losses on a few current jobs as calculated using the 'multiplier effect', which, in essence was developed to describe the knock-on benefits of fabricating steel for construction locally,' says de Beer.

Table 1, using approximate numbers illustrates the position.

Only a cursory glance at this table shows that the perceived advantages to a major client of saving say 15% by importing structural steel pales into insignificance compared to the benefits to South Africa of added economic activity, the double savings to the Receiver and the permanent loss of 7 650 decent South African jobs!

"China, India and others realised from the outset that even if it costs them as much as 30% of turnover to protect their own manufacturers the country still gains. So, despite having signed international treaties, they have found clever ways of protecting and assisting their industries.

"It is time for us to appreciate that we cannot afford to lose our industries, especially those that are not high-tech but provide employment for typical South Africans. It is time for us to appreciate that the world is moving in the direction of more protectionism, as free trade and globalism have not proved to be all they were cracked up to be, especially from the vantage point of the majority of the population," concluded de Beer.

THE MULTIPLIER IN STEEL CONSTRUCTION

BASE INFORMATION

People employed to fabricate 6 000 tons / year: 210
Value @ R20 000/t = R120m

People employed to erect 6 000 tons /year: 150
Value @ R10 000/t = R60m

People employed per 6 000 tons of steel construction: 360
Value = R180m

People employed annually per 1 000 tons produced: 60
Value per man = R 0.5m

LABOUR MULTIPLIER FABRICATION (x 2.90)

Direct: 210 Indirect: 120 Induced: 280 Total: 610

LABOUR MULTIPLIER ERECTION (x 2.15)

Direct: 150 Indirect: 74 Induced: 96 Total: 320

LABOUR MULTIPLIER STEEL CONSTRUCTION (x 2.59)

Direct: 360 Indirect: 192 Induced: 378 Total: 930

In an industry producing 720 000 tons per year this equates to 43 200 direct jobs and a total of 112 320 "decent" jobs per annum

MULTIPLIER IMPACT ON THE SOUTH AFRICAN ECONOMY (x 1.43)

A structural steel project worth R1 billion multiplies to R1.43 billion in the economy as follows:

- R715 million for manufacturing
- R286 million for financial services
- R143 million for community, personal and social services
- R100 million for wholesale and retail trade
- R60 million for transport and storage
- R126 million for all other sectors

And as a direct result of all these activities:

- R390 million for the National and local Government in taxes

HOT DIP GALVANIZING MEMBERS

GALVANIZER	LOCATION	TEL. NO	SPIN	NO. OF LINES	BATH SIZES (L x W x D) (m)
GAUTENG					
ArcelorMittal South Africa	Vanderbijlpark	016 889-9111		3	Sheet galvanizer
Armco Galvanizers	Isando	011 974-8511		1	13.2m x 1.5m x 2.2m
Armco Galvanizers – Dunswart	Dunswart	011 914-3512	●	3	5.2m x 1.2m x 2.0m 3.0m x 1.0m x 1.5m 2.0m x 1.0m x 1.5m
Armco Galvanizers – Randfontein	Randfontein	011 693-5825		1	6.5m x 1.3m x 2.0m
Babcock Ntuthuko Powerlines (Pty) Ltd	Nigel	011 739-8200		1	12.0m x 1.4m x 1.8m
DB Thermal SA (Pty) Ltd	Nigel	011 814-6460		In-line	16.0m x 1.0m x 1.0m
Galvadip (Pty) Ltd	Silverton	012 843-8000		1	7.0m x 1.7m x 2.0m
Galvaglow	Factoria	011 955-5200		1	4.0m x 1.5m x 2.5m
Galvspin Galvanizers cc	Boksburg North	011 918-6177	● robotic	1	3.0m x 0.9m x 1.5m
GEA Air Cooled Systems	Germiston	011 861-1571		In-line	11.5m x 1.0m x 1.0m
Lianru Galvanisers cc	Nigel	011 814-8658		2	7.2m x 1.3m x 1.6m 4.5m x 1.3m x 1.6m
Macsteel Tube and Pipe	Boksburg	011 897-2194		In-line	13.5m x 1.6m x 2.4m
Pro-Tech Galvanizers (Pty) Ltd	Nigel	011 814-4292	●	2	3.2m x 1.1m x 1.5m 3.0m x 1.1m x 1.2m
Robor Galvanizers (Pty) Ltd	Germiston	011 876-2900		3 Tube	14.0m x 1.35m x 2.5m 10.0m x 2.0m x 4.0m Dia 42mm to 114mm max tube length 6.7m
Robor Tube	Elandsfontein	011 971-1600		1	Tube & pipe galvanizer
SMT Galvanizers	Benoni South	011 421-1495	●	2	2.6m x 1.0m x 1.5m 2.0m x 1.0m x 1.5m
Supergalv	Alrode	011 908-3411		1	6.0m x 1.2m x 1.8m
Transvaal Galvanisers In-line & general	Nigel	011 814-1113		3	9.0m x 1.0m x 1.0m 8.0m x 1.2m x 1.5m 6.0m x 1.3m x 1.3m
FREE STATE					
Harrismith Galvanizing & Steel Profile (NB: Big line is not in operation)	Harrismith	058 623-2765		2	4.5m x 1.3m x 2.5m (12.0m x 1.2m x 2.5m)
NORTH WEST					
Andrag Agrico	Lichtenburg	018 632-7260		#	In-line galvanizer
WESTERN CAPE					
Advanced Galvanising (Pty) Ltd	Bellville	021 951-6242		1	8.0m x 1.5m x 3.0m
Cape Galvanising (Pty) Ltd	Parowvalley	021 931-7224		1	14.0m x 1.6m x 2.6m
Galvatech (Pty) Ltd	Bellville	021 951-1211		1	7.5m x 1.5m x 2.6m
Helderberg Galvanizing	Strand	021 845-4500		1	5.5m x 0.8m x 2.4m
Pro-Galv cc	Stikland	021 945-1803		1	7.2m x 1.3m x 2.6m
South Cape Galvanizing (Pty) Ltd (NB: Big line is not in operation)	George Industria	044 884-0882		2	3.7m x 0.94m x 2.3m (5.5m x 1.0m x 2.6m)
EASTERN CAPE					
Galvanising Techniques cc	Port Elizabeth	041 486-1432		1	12.0m x 1.3m x 2.3m
Galvaspin (Pty) Ltd	Port Elizabeth	041 451-1947	●	1	3.0m x 1.2m x 1.8m
Morhot (Pty) Ltd	East London	043 763-1143		1	6.0m x 1.2m x 2.5m
KWAZULU/NATAL					
A&A Galvanisers	Pietermaritzburg	033 387-5783	●	1	3.3m x 0.9m x 1.9m
Bay Galvanisers	Richards Bay	035 751-1942		1	5.0m x 1.2m x 2.5m
Phoenix Galvanizing (Pty) Ltd	Phoenix	031 500-1607	●	2	14.0m x 1.4m x 2.5m 3.0m x 1.2m x 1.2m
Pinetown Galvanizing	Pinetown	031 700-5599		1	9.0m x 1.2m x 3.0m
Voigt & Willecke (Pty) Ltd	Durban	031 902-2248		1	14.0m x 1.3m x 2.5m
MOZAMBIQUE					
F&F Services	Beleuane	+258 823021260		1	4.0m x 0.8m x 1.5m
MAURITIUS					
Galvanising Co Ltd	Port Louis	+230 234-5118		1	7.0m x 0.75m x 1.68m
ZIMBABWE					
Essar Tubes	Graniteside	+263772833477		1	10.0m x 1.1m x 1.0m

 # Sheet, pipe and other in-line galvanizing members dedicate their plants to the galvanizing of their own products.

Note:

- *Where more than one galvanizing line is available, the number of lines and the significant bath dimensions are listed, ie. widest, longest and deepest.*
- *For specific contact names (e.g. sales or production personnel) and mobile telephone numbers, contact company receptionist.*
- *The bath sizes are inside dimensions and not maximum component size (length, width and depth). Kindly take note of the expansion of the component when dipped into molten zinc, or discuss with relevant galvanizer.*

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.

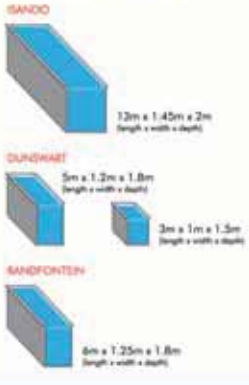
Armco Galvanizers Dunswart is a Second facility based in the Boksburg area. Dunswart has an average output of plus minus 900 tons per month. This branch specializes in small structural components and is geared up to accommodate items up and till 5m length.

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.

Isando +27 11 974 8511 | **Dunswart** +27 11 914 3512 | **Randfontein** +27 11 693 5825 | **www.armco.co.za**

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



ARMCO SUPERLITE

OBO Bettermann Group