



HOT DIP

2012 Volume 9 Issue 3

GALVANIZING

HOT DIP GALVANIZERS ASSOCIATION Southern Africa

TODAY

52



Featuring:

- Architectural hot dip galvanizing including interviews with two prominent architects, three novel homes using hot dip galvanized steel or duplex coating systems, the SAPS 10111 Call Centre and Rondebosch Shopping Centre.
- Cable ladders and wire ways
- Integalva 2012 feedback • New Elcometer 456
- Regulars - Education and Training, Bob's BANTER and On The Couch





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

JOHANNESBURG

Executive Director: Bob Wilmot
Cell: 082 325 8840
Email: bob@hdgasa.org.za

Office Manager: Saskia Salvatori
Cell: 082 326 6080
Email: hdgasa@icon.co.za

Receptionist: Marjorie Montgomerie
Email: info@hdgasa.org.za

PUBLISHED BY:

Hot Dip Galvanizers Association Southern Africa
Quality House, Unit U4,
St. Christopher Road,
St. Andrews, Bedfordview
P.O. Box 2212 Edenvale 1610
Tel: 011 456 7960
Fax: 011 454 6304
Email: hdgasa@icon.co.za
Website: www.hdgasa.org.za

CAPE TOWN

Editor and Technical Marketing Director: Terry Smith
Tel: 021 797 4735
Fax: 086 612 7284
Cell: 082 893 3911
Email: terry@hdgasa.org.za

Advertising and Sales:

Anne van Vliet
Tel: 011 462 5073
Cell: 082 775 0711
Email: mrvvliet@mweb.co.za

Design and Layout: Sandra Addinall

Tel: 011 868 3408
Fax: 011 900 1922
Email: cbtdesign@adcot.co.za

Reproduction and Printing:

Camera Press
Tel: 011 334 3815
Fax: 011 334 3912
Email: cpress@iafrica.com

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CONTENTS

ISSN 1023/781X

Advertisers' Index.....	37
Regulars	
Executive Director's Comment.....	2
Note from the Editor.....	2
Bob's Banter.....	31
On the Couch.....	40
Member's News.....	38
Architectural hot dip galvanizing	
An architect's perspective on using hot dip galvanized steel in structural designs	4
House Taylor, Ballito Bay	6
House Rooi Els	10
Rondebosch On Main Shopping Centre	13
Waterfall Country Estate /Village.....	16
House Spooner – Hout Bay	18
Construction of a new 10111 Radio Control Centre in Port Elizabeth	22
Hot dip galvanizing for general and architectural purposes	24
Cable ladder and wire ways	
'Megabow' – the long spanning, cost effective, double sided, modular cable ladder	29
All galvanized power skirting	30
Education and Training	
3-day Galvanizers Inspectors Course.....	33
Hot dip galvanized fasteners.....	34
Introductory Galvanizers Inspection Course	34
Report back from Integalva 2012	38
General	
The new Elcometer 456 offers... ..	32
Superior quality grating is vital for increased safety on mines	36

Front Cover: A kaliedoscope of photos including three novel homes, an SAPS Call Centre, Rondebosch Shopping Centre and a cable ladder installation.

Hot Dip Galvanizing – Adding value to Steel

Executive Director's Comment



The Hot Dip Galvanizers Association Southern Africa was established as an independent and creditable service provider, dedicated to the appropriate application of hot dip galvanizing and duplex coating systems.

The Association's objective is to act as technical advice bureau to member galvanizers, their customers and the broader corrosion control industry.

A review as at the end of the second quarter of 2012, we have a series of positive as well as negative concerns. As a rule our industry tends to lag behind the economic cycle. For this reason some members have reasonably full order books, while others, particularly along the coastal region, are experiencing the effects of the global impact on the local economy. These differences in production levels are due, in the main, to committed and ongoing infrastructural developments that were initiated during the time of plenty, i.e. before the full impact of the global "credit crunch".

Eskom power station construction must continue to safeguard future power and energy requirements. The infrastructural development associated with a single power station is significant. Extensions to coal mines, sub-stations, transmission and distribution networks all need to be addressed.

While we have seen a slowing within the mining industry, it is impossible to simply switch off development as well as maintenance of existing facilities. All the mining sectors, ranging from gold, platinum and coal for both local consumption and export requirements continues all be it at a slower pace.

With the advent of global warming; studies that measure the environmental impact of hot dip galvanized steel as a material of construction, have been undertaken. Zinc as an element is essential to human well being, so much so that a new phrase has been coined, "zinc, man's friendly metal". Planning to upgrade environmental controls throughout our local industry is overdue and moves are being implemented to address atmospheric pollution as well as waste management controls.

Bob Wilmot

Note from the Editor



After a number of years of trying to ensure that specifiers along the coast have reasonable access to hot dip galvanized fasteners by way of encouraging the big fastener manufacturer's in Johannesburg to keep stock of over-sized hot dip galvanized nuts and developing business relationships with fastener suppliers on the coast, the situation is steadily improving!

I had an occasion recently to visit East London because of a project in the IDZ. The entire steel building was hot dip galvanized, including all the fasteners. What was missing, however, were the flat washers, which according to the Institute of Steel Construction, are needed when the steelwork is coated with an anti-corrosion coating. The contractor suggested we call on a local fastener supplier and lo and behold he had a good stock of a range of hot dip galvanized bolts, nuts and flat washers. On asking why he invested in the stock his reply was, "Most specifiers these days know the difference between zinc electroplated and hot dip galvanized fasteners and due to the moderate to aggressive coastal conditions, hot dip galvanized fasteners are preferred and specified as such. If we don't have them, we cannot sell them!"

I would again like to thank all our participants and advertisers who because of their ongoing contributions make this magazine the success that it is! Thank you!

We intend delaying the last magazine of the year to January 2013, as I will be attending "Latingalva" in Santiago, Chile in mid-November. As one of the ongoing features of this last magazine is, "The world of hot dip galvanizing today", I hope to be able to considerably enhance this feature and provide some interesting feedback on the conference and my trip.

The main feature for this edition is **Architectural Hot Dip Galvanizing** which includes interviews with two prominent architects. Their past and present projects are also featured together with some spectacular buildings. One of which is an all hot dip galvanized, glass, concrete and timber home in Ballito Bay and a novel constructed home by a Hout Bay couple. Also included is a SAPS 10111 call centre in Port Elizabeth and a shopping centre in Rondebosch, Cape Town. There is also feedback on the development and roll out of a past winner of our Awards Event, Waterfall Country Village and Estate in Johannesburg. We have also included the updated "Architectural Check List", necessary when hot dip galvanizing is specified for architectural steelwork.

The other feature is on Cable ladders, trays and wire ways, which includes some long spanning cable ladders developed for an industrial/marine atmosphere as well as a continuously hot dip galvanized power skirting.

We have some feedback on Intergalva attended recently by Bob Wilmot and news on the new Elcometer 456.

Regulars include **Education and Training**, **Bob's BANTER**, **Members News** and **On the Couch** where we chat to Jim Baggett a well known Cape Town consulting engineer and huge supporter of hot dip galvanized rebar.

A bunch of us just returned from a 5 day Whale Trail, with glorious weather, beautiful countryside, lots to eat, lots of laughs and many many whale sightings – what a nice break!

Enjoy the "magazinc".

Terry Smith



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An architect's perspective on using hot dip galvanized steel in structural designs



Jeremie Malan.

From an architect's point of view, if hot dip galvanizing is the chosen option then the architect must have the self-confidence and resolve to implement it from the beginning, according to Jeremie Malan of Pretoria-based Jeremie Malan Architects.

Malan, who has been a professional architect for 30 years, is quite specific about the commitment required when hot dip galvanizing is specified in a building project. Not only must the architect's drawings accommodate the process, but the engineer's design and the

contractor's shop drawings must take into consideration this choice of corrosion protection. This all adds time to the process, so the client's acceptance of a longer time horizon is requisite in successfully completing the construction project.

Jeremie Malan would like to see the galvanizers offer a shop drawing service as part of the tender process, which would make a difference in the steel's acceptance for quality and save process time at the galvanizer.

"There is no doubt that hot dip galvanizing makes sense in terms of durability and ease of maintenance", says Malan "and once completed, the clients have always been satisfied with the outcome".

"However, due to time constraints we have only used this coating system option on bigger projects and not for private home owners", he continues.

Exposing steel beams to the view of the observer is part of the modernist philosophy of architecture and Jeremie Malan likes to see the honesty in the materials he chooses

for a project. Hot dip galvanizing the outside steel structures is an excellent way of protecting the steel while retaining the essence of the material.

Projects designed by Jeremie Malan Architects using hot dip galvanizing have included the award winning National Library of South Africa, the University of Pretoria lecture halls and the SANDF Health Base Depot in Pretoria. The firm is currently busy designing a training facility for artisans in Gauteng, where hot dip galvanizing has also been specified.

Support from the Hot Dip Galvanizers Association of Southern Africa has been essential to the success of the projects undertaken by Jeremie Malan's firm. The association has been able to assist in advising on the detail specifications during the design stage. Technical Director Terry Smith has always been available for on-site inspections as well as visits to the steel manufacturer and galvanizer to ensure the work is being properly carried out.

Jeremie Malan believes involving the selected galvanizer as well as the contractor from the outset is the ideal approach. He would like to see the availability of more modular components that are bolted together on site in order to lessen the effects of indiscriminate site alterations and coating repair. From an aesthetic point of view both the silicon-killed steel and/or aluminium-killed steel are acceptable, although a range of colour choices would give the designer more flexibility. He wonders if it would be possible to develop a process of hot dip galvanizing on a wider range of steel types. 🏠➡️



Exposed hot dip galvanized steelwork at the National Library of SA in Pretoria.

AUTOMATED CENTRIFUGE PLANT



Galvspin Galvanizers' new automated centrifuge plant provides for quick, high volume turnaround time on centrifugal material.

It delivers a consistent, high quality zinc coating for high tensile items such as fasteners.

The Italian designed plant works on a gas fired system and includes a backup generator that will operate the robotics during times of power cuts.

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House Taylor, Ballito Bay

A commitment to hot dip galvanized steel

For the record

The Green House on the hill in Ballito has become one of the most talked about buildings in local history. The reason is plain to see. In an attempt to build a house that is environmentally sensitive and cutting edge, owner and designer, architect Charles Taylor, has embraced technology that will hopefully revolutionise the way many future homes will be built in this region.

The extensive use of hot dip galvanized steel allows for a modulated frame to take layers of wood, glass and greenery which form the enclosures to create a house that is dramatically different from the norm.

The one acre site was previously the first water reservoir for Ballito from the 1960's and stands majestically on the crest of the highest point in lower Ballito with sweeping vistas over the rooftops of distant mountains behind it, and spectacular ocean views in front.

The ultra-modern design elements incorporate the latest in green technology. 'Passive' cooling, ventilation and lighting are always designed as a first principle, integrating latest technology in an adaptive position to allow for future systems.



The enormous commitment to hot dip galvanized steelwork can freely be seen in this view of the house and pool deck.

For the architect

My wife and I have always loved conservatories and green houses, and wanted to incorporate the feeling of being in a certain volume with steel structure, greenery and sky dominant.

The building design represents a response to site in terms of views, outdoor spaces, existing tree positions, and wind and sun orientation. The structure has been designed with flexibility and adaptability in mind.

Structural steel is a great medium – it is ancient yet modern, recyclable,

shimmers in the light, provides an ordered and square structure that can handle long spans, and is very easy to integrate with other materials.

Edges of forms have been slightly curved to soften the aesthetic and pick up on the way the eye links the edges of the structure to the sky and clouds, the rolling hills beyond and the ocean.

All living spaces and bedrooms are arranged to ensure every room has a minimum of 3 sides orientated to obtain natural light and ventilation. Large service duct areas enable adding or



The hot dip galvanized steel frame forms a rigid support onto which the flooring, glazing and floor decking is hung.



A view of the elaborate but essential steel column head.



A view from the landside of the building including the wind turbine.

changing the mechanical or electrical systems of the house.

For the engineer

Charles approached us to help him design his beautiful house on the hill. There was no doubt about the use of structural steelwork as the backbone, complete with ribs, for the double storey dwelling – the Architectural Revit models incorporated a strong visual element of exposed steelwork.

An extensive reinforced podium presented a springing point for the steel frame. A concrete sheet retains the bank set into the hill at rear, extends forward as a ground floor supported on RC columns into the basement, and finally folds into a 25m length pool along the front edge.

Since speed of construction was important to Charles, the engineering strategy was to quickly define the steel/ concrete interface, and get going with the concrete – using the wet-works construction time to design and detail the steelwork.

In our view, one of the most satisfying steelwork design processes is one which affords collaboration with architect and fabricator from the outset, and we were fortunate here. Working closely with Warren and Charles from concept structural development stage, the decision to modulate, how and with what were smooth decisions.

'Light weight', precast ECHO slab elements were used to create the floor elements, supported on steel beams which wrap upward in cycles of vertical ribs to support external balconies and vertical shading screens. The steelwork frame is horizontally braced by a series of vertical concrete walls and masonry ducts, which are carefully mechanically tied at strategic points both to steel and ECHO floor planes.

Structural trigger points:

- ◆ 'The long way around is the short way home' – Charles house is minimalist, steel needed to be modular and flush. The suite of steel sizes was selected

and validated using a full house structural model in OASYS.

- ◆ No cross-bracing or visible zigzags!
- ◆ As the steel was to be hot dip galvanized, and aesthetic, all connections needed to be shopped, and all interfaces considered – there could be no welding or touch-up on site. Thanks to Terry from the HDGASA for his valuable advice from time to time.
- ◆ On the front elevation a sweeping first floor covers an unusually high ground floor living space, complete with missing corner columns. We think the photos speak for this structural trigger point!

As there was little lead time for fabrication, Rebcon opted to go direct to shop detailing from engineering sketches and a series of detail meetings. This is no easy feat and the subsequent outcome is in no small part as a result of Rebcon's professional and outstanding commitment to their product.

continued on page 8...



steel. imagine.



The hot dip galvanized framing clearly defines the extremities of the timber floor decking and the glazing components.

For the fabricator

From the outset Charles was intent on using steel with a hot dip galvanized finish, without any further corrosion protection to be applied. The site is positioned in an extremely aggressive corrosive environment, being on top of the ridge in Ballito, hence the structure

needed to be detailed in a manner to obviate site welded joints.

Positioning of blowholes/drainage holes was carefully selected at detailing stage to ensure that the Hot Dip Galvanized finish resulted in a good architectural finish with minimal inclusions or ash marks.

A modular grid that agreed with standard material stock lengths was adopted by CTA to ensure that there was minimal waste (offcuts) from stock length material. A common section size, being mainly 152 x 152UC sections was chosen by LNA to maintain symmetry on use of section sizes. The "hooped" sections were fabricated ex plate to achieve the same section profile of the 152 x 152UC, to align with CTA's requirements for the rounded corners.

Rebcon procured and installed the Echo precast floor slabs, taking responsibility for the detailing of

geometry of same, at steel shop detailing stage. Due to the complexity of access to site, the installation of the steel structure and Echo precast slabs was carefully sequenced to work from furthest point out to site entrance.

The project was designed by CTA in phases, the main structure being phase 1 and 2 and the ancillary components being add ons. The benefit of the use of steel allowed CTA flexibility in design of ancillary components


For the environment

Cool air from a basement is pulled through a buried gabion rock mattress into one low energy fan in the centre of the building which circulates the "cooled" air throughout the building. The temperature of the earth at this depth is constantly around 15 - 17 degrees. Although the humidity is not dealt with it suffices for most of the year and takes the edge off the heat. This experimental idea originated from a friend and local engineer Bill Yeo.

The extensive glazing in the house will also play an important role in temperature control. The glazing system is a combination of HBS products that allow for single or double glazing within the same module.

Because the swimming pool water will be sanitised without the use of chemicals, chlorine or salt thanks to a remarkable E-Clear Pool Treatment system, it can be backwashed onto the garden and reticulated through conventional pipes because it will not create the corrosion associated with salt or chlorine.

The Green House will generate its own electricity. A silent vertical turbine wind generator provides 5kw of power on this appropriately windy site. The system will generate enough power to run the entire household including a single phase lift. It will also push electricity back in the local grid so the electricity meter will run backwards.

The Association would like to thank Charles Taylor of Charles Taylor Architects as well as Linda Ness of Linda Ness and Associates for this article. 

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House Rooi Els

Terry Smith caught up with George Elphick of Elpick Proome, architects of the Rooi Els house recently and posed the following questions:

TS: *From an architectural perspective and also the fact that you live on the coast the reasons why you selected a duplex coating system for the protection of the steelwork at Rooi Els?*

GE: We wanted a building to 'touch the earth lightly', floating above the fynbos, a building which is visually very light with wide column free spaces – hence the decision to use steel. We also needed comprehensive corrosion protection, hence the duplex coating system!

TS: *Seeing the building lately, are you still convinced that this is the optimum route to follow with carbon steel projects such as this?*

GE: Yes.

TS: *Would you, in the future when carbon steelwork is used extensively in a structure in an aggressive environment, consider a similar coating system?*

GE: Yes.

TS: *Are you also happy with the fact that no bolting was considered and we implemented the idea of cutting back the hot dip galvanizing and subsequent factory applied paint coatings so that following welding and weld testing of the components on site, the*



The once overbearing essential tubular steel building carcass has now been transformed into a vastly subdued and aesthetically pleasing holiday home.

hot dip galvanizing was repaired by zinc thermal spraying and then painted to re-instate the factory coatings? Would you repeat this process on other projects?

GE: Yes.

TS: *If colouring of the steelwork was not that important, would you consider using only hot dip galvanizing of carbon steelwork for architectural use in moderate to relatively exposed situations and if yes, would you require further intervention by ourselves or the galvanizers on the final finish, etc.*

GE: Yes on both counts – the raw quality of a galvanized finish needs to suit the visual quality of the building conceptually.

TS: *In the above case, when selecting your project team, would you insist that the steelwork contractor brings the selected galvanizer to at least the initial project meetings, when surface finishes are being discussed?*

GE: Without a doubt.

TS: *Jeremie Malan Architects who undertook the National Library has suggested that in order to achieve a successful hdg finish, greater detailing is essential and that in future the galvanizer should offer a steel detailing service so that the steelwork is always optimally designed, would you agree with this statement and would you offer any other suggestion/s?*



View from the timber deck with the hydraulically operated slatted timber shutters in their open position.



View showing the hydraulically operated slatted timber shutters in their semi-closed positions.



Another view showing the hydraulically operated slatted timber shutters in their open and semi-closed positions.



The incredible view from the pool deck, framed by the duplex coated steelwork.

GE: Jeremie is perfectly correct – we would select the structural engineer very carefully.

TS: I started my promotional activities mainly with consulting engineers and only after hearing that the architect mostly selects the finish of the steelwork, did I start engaging with the architectural practices. Do you agree with this that a greater amount of our promotional work should be spent with architects?

GE: Absolutely.

TS: However, if you agree with the above statement, would you not say then that instead of using the name "galvanizing" loosely, where zinc electroplating or pregalvanizing can be substituted, resulting in less coating durability that the words "hot dip galvanizing" including the correct standard should be specified on the drawings where required?

GE: Correct

TS: Or is this the responsibility of the consulting engineer, if part of the project team?

GE: Architect and structural engineer.

TS: Now that the house is nearing completion, kindly summarize your thoughts on the success of the project?

GE: This has been a very protracted project – 4 years in the making with environmental and local residents issues delaying construction – the client has been incredibly patient but appreciates that the building is extremely radical the project could

never have sustained a regular building contract or regular building contractor – we have a specialist movie set builder who is a mechanical wizard building the house – teamwork has been the cornerstone of the project with a very intense and exacting design process the client loves the project – it is the 4th home

we have designed and built for the family – they have been very integrated in the design and execution process – the concept is a single room vacation house with a minimal architectural quality and is an incredible outcome with extraordinary craftsmanship and nearly every single component being bespoke!!! ➡➡

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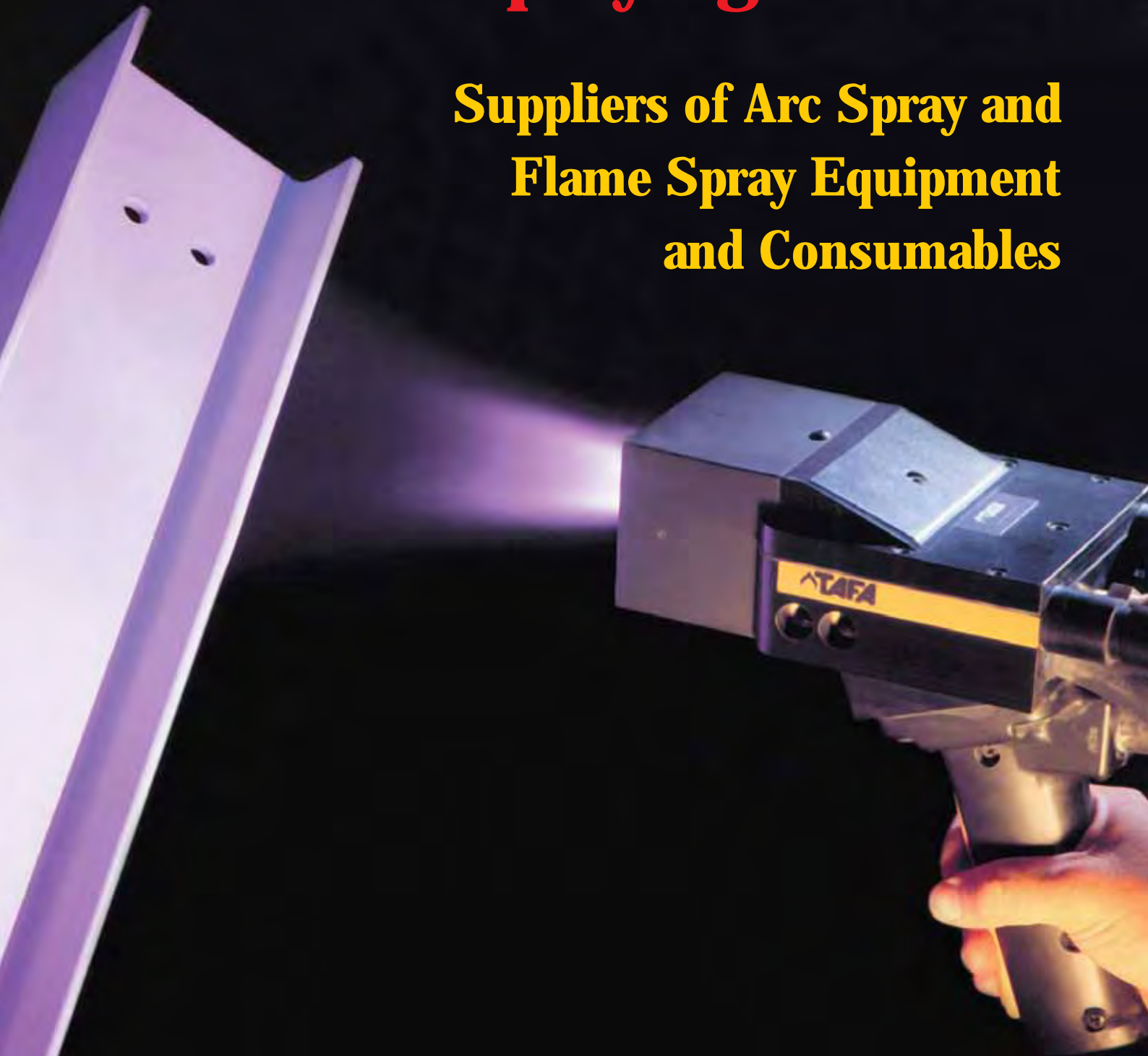
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Rondebosch On Main Shopping Centre

The Rondebosch On Main Shopping Centre in Main Road, Rondebosch, was an exciting challenge presented by the Developers, Acucap.

The site for the proposed two level parking garage was small and it had to be architecturally appealing and enhance the aesthetics of the Centre from the river side.

Furthermore, the Centre had a history of vandalism from vagrants living in and around the river. This had to be overcome.

Lastly, materials had to be used that would keep maintenance to an absolute minimum.

Off-shutter concrete, as far as possible for the parking decks, beams and columns was the obvious choice. Together with this are a number of other items that required detailing.

The architects wanted to use materials that could soften the 'heaviness' of the concrete. Steel was the obvious answer. Questions arose:

1. The area has a moderate marine exterior atmosphere.
2. Painting was going to require on-going maintenance.
3. Pedestrian traffic (students) was heavy.
4. Economic considerations.

Considering the above, it was decided that the vertical circulation, staircases, between the parking decks, the hand railing to the perimeter wall of the



The hue of the matt grey hot dip galvanized steelwork significantly blends into the general aesthetics of the building.

parking deck, the stair hand rails, the façade treatment, pergolas, etc., etc., would all be designed in steel and hot dip galvanized.

Not only hot dip galvanized but left in the natural state to weather slowly and adopt the natural colour produced by a metallurgical reaction between iron and the coating material, molten zinc. The newly galvanized steel, understandably would be bright and shiny when arriving on site and initially installed, but over a period of time this coating would oxidise in the air and form a 'dull' less obvious protective coating.

Furthermore, a decorative coating over the hot dip galvanizing was considered too expensive and once convinced that the hot dip galvanizing was the protective coating as well as an

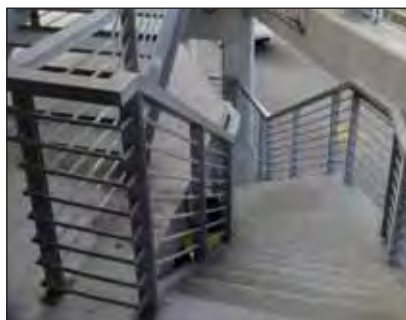
acceptable final product, the client understood that this form of corrosion protection and prevention was an essential factor in the economic utilisation of structural and decorative steel.

Facts about Hot Dip Galvanizing, Practical Guidelines, important extract:

"Provision of the appropriate protective coating can bring initial savings plus substantial economies in service, due to the reduction or elimination of maintenance and lost service time, and by deferring the replacement date of structures and equipment."

The architect soon realised that there was no limit to what could be done and hence a combination of hot dip galvanized steel and hardwood timber was used extensively.

continued on page 14...



All vertical circulation, staircases between parking decks, are hot dip galvanized for minimum maintenance.



All horizontal and vertical handrails are hot dip galvanized to minimise maintenance.

Stair nosings were used on the leading edges of tiled stair treads and risers. The toughness, strength of coating and durability of the final product allowed this.

Pergolas were curved to allow for a 'wavey' face-form structure, adding to the architecturally appealing experience as one entered the centre from the parking decks.

To achieve the required neat, simple and appealing elements, the engineers

and architects had to discuss the requirements of hot dip galvanizing.

They had to remember that hot dip galvanizing meant articles were immersed in a bath of molten zinc at 450°C.

Individual items could not be too slender, so as to cause buckling. Also, hollow sections had to have 'venting holes'/drawing holes to ensure adequate internal coating.

Internal and external stiffeners had to be correctly installed to ensure free-flow of molten zinc.

All of the above, as well as the individual component size had to be correctly designed. Component size considerations were important, not only for the hot dip galvanizing process but also for transport and final handling into position and fixing. Space constraints were a large factor and this also led to a further consideration.

Modular design of the various components: this was done to avoid the on-site welding of the various components. The architect carefully designed each element to allow for either a bolted connection, mechanical friction connection or a double fixing with an appropriate break in the element, such as the parking balustrading. This allowed for easier fabrication, transport, handling and installation, without compromising the coating in any way.

Finally, with all the thought having gone into the components, detailing, sizing, modular design etc., more thought had to go into the way these items were connected.



Dark timber facades were attached to inaccessible hot dip galvanized steelwork.



The hot dip galvanized handrails and tree supports provide an edge to the river way, reducing the possibilities of vagrants.



In order to create a neat, flush finish that enhanced the overall design hot dip galvanized sleeve anchors were used with countersunk studs.



Modular design and fabricated hand rails were successfully hot dip galvanized with very little site alterations and unnecessary coating repair.



Hot dip galvanized steel stair nosings were used on the leading edges of tiled stair treads and risers.



Pergolas were curved to allow for a 'wavey' face-form structure, adding to the architecturally appealing experience as one entered the centre from the parking decks.



The combination of dark timber and hot dip galvanized steel provided an aesthetical appeal to some of the pergolas in the parking bays.

The two areas that required attention were:

1. Fixing plates into concrete
2. Hot dip galvanized steel to steel connection

To add to the neat, slim and aesthetics, it was decided that hot dip galvanized counter sunk bolts would be used.

Galvanized sleeve anchors were used with countersunk studs. This created a neat, flush finish that enhanced the design.

In summary, this project experienced the benefits of hot dip galvanizing of all of the exposed, structural and architectural steelwork used to create an exciting and architecturally success project. Hot dip galvanizing allowed

Reliability (uniform coating),
Dependability (cathodic protection) and
Predictability (uniform corrosion of zinc).

The Association would like to thank Mike Hurworth of M Hurworth & Associates cc for this article. ➡

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Waterfall Country Estate / Village

Previously featured as a winner in the Overall and Architectural Category in the 2011 SA Hot Dip Galvanizing Awards, Waterfall Country Estate and Village now features a fully completed clubhouse for its residents' use. The clubhouse makes extensive use of hot dip galvanized steel, which has been used for its structural strength, visual appeal and low maintenance requirements.

Project partners

Developer /owner:

Century Property Developments

Architect:

Century Property Development Architect

Consulting engineer:

C-Plan Civil Engineers

Steel fabricator:

Goivota

Hot dip galvanizer:

Armco Galvanizers

Project value:

R220 billion total property

Development information

Century Property Developments chose hot dip galvanized steel as the ideal structural medium for the 4 500m clubhouse which serves the residents of Waterfall Country Estate and Village.



The Waterfall Country Estate / Village gate house.

The steel frames the building and provides additional strength to support a rather unusual roof which has a garden which serves to keep the building warm in winter and cool in summer.

Hot dip galvanized steel has been used to good effect on the gatehouse to Waterfall Country Village and Estate.

The strength of the hot dip galvanized steel as well as its aesthetic qualities are shown to pleasing effect on the entrance to the Waterfall Country Village and Estate clubhouse, which recently opened for residents to take

advantage of the facilities. These include an olympic-sized heated training pool, a gym, squash courts, a climbing wall and a pilates studio. The clubhouse also features a children's play area which has a rubberised floor (made from recycled tyres) to prevent any injuries. Different play areas include a race track with road signs, a ball pond, a mini movie theatre and also a dress-up section.

The hot dip galvanized steel used in the clubhouse blends well with the indigenous landscaping at Waterfall Country Village and Estate. The clubhouse design took advantage of a




Front view of the Clubhouse.



Every aspect of the development is scrutinised to help it achieve this ambitious target, from architectural design to the creation of extensive green belts and landscaping using indigenous plant, recycling rain and storm water and piping liquid petroleum (LP) gas to all homes on the estate.



The sophisticated clean lines of the interior of the clubhouse are enhanced by the use of hot dip galvanized steel.

The Association wishes to thank Anne Vicente of Corporate Communications Consultants for this update. 

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House Spooner – Hout Bay

Steel and straw in the same sentence may sound like the start of a riddle, but this unusual combination; along with the addition of clay, sand, wood and a little bit of lime; serves to shelter and protect us, keeps us warm in winter, cool in summer, and dulls the noise from the road below. Perhaps this still sounds like a riddle so let me explain.

In 1995 I read a book by chance, photo-documenting Straw Bale Houses in the United States. Although eons away from being a homeowner, the thick, rounded, ochre walls with their warm, earthy texture really appealed to me, along with the idea of being able to sculpture a unique home whilst staying true to my ecological principles. I had a fleeting notion that perhaps someday I too would have the opportunity to build my own home with the same pleasing aesthetic values and ideals.

Many years later my dream started materializing when, in early 2007 my husband and I bought a plot of land in the village where I grew up.

Knowing full well that 'All construction involves destruction', we were still determined to implement ways of building that would lessen our impact as much as possible and began intensive research into alternative building methods and materials. Remembering the book I had read, I



The completed phase I or "school fees" portion of the hot dip galvanized steel framed house.

gravitated towards the straw bale method, curious as to the exact process.

Historically, the development of bale-walled buildings began in America in the mid-1800's with the invention of mechanical balers. The oldest documented house still in use is in Nebraska, built in 1905.

Straw, as opposed to hay which is produced for animal feed, is the dry, dead stems of plants left after the seed heads have been harvested. A nutrition-poor, agricultural waste product, it is either tilled back into the soil, used for animal bedding or burnt. Recycling this renewable and sustainable building material one not only saves costs, but

can build a structure that is well insulated, quiet, low-tech, strong, and comfortable.

The bales are used in essence as large, fuzzy bricks which are laid one on top of each other in a running bond, much like brick-laying. Every few courses a steel rod or wooden stake is driven through the stack of bales to increase to strength and stability. The walls are then plastered, on both faces, using either gypsum; a cement/lime stucco; or more typically a cob mixture consisting of sand, clay, straw and/or lime.

Interestingly enough, according to results from the ASTM 119 test by American laboratories (SBCA 1994),



Infill straw bale walls are fully supported by the hot dip galvanized portal frame.



Material that needs to be kept as dry as humanly possible in the wettest winter in 52 years, extended the construction time by at least three months.



One of the exterior walls showing the "scratch coat" which is applied using hands and wooden sticks.

once plastered, the straw bale wall is more fire-retardant than a standard brick and mortar wall, or a timber-frame wall.

For various reasons we decided on the non-load bearing, 'post and beam' approach to our design, as opposed to the load bearing method. This meant using a frame which is secured to the foundation and supports the roof instead of letting the walls themselves do the job.

The idea of a steel portal frame originally came from Bill, my husband's father, an architect and retired lecturer from the UCT School of Architecture. The benefits included its strength, the speed at which it can be constructed, and its qualities of geometric precision as a starting point for our 'imprecise' cladding. Although steel production definitely has its own substantial carbon footprint, being able to span much larger distances

than timber meant ultimately less material being used. This was one of the many instances where we had to weigh up which decision would be more environmentally friendly in the long term.

We scoured the internet, read books, spoke to other home builders and professionals, and visited numerous sites of not only alternative structures but also conventional ones where strangers welcomed us into their homes to share their stories; and we soaked up as much information as we could. We could only find one other house in the whole of South Africa that had been built using the same hybrid method of a steel frame with straw bale infill walls and cob plaster. The owners of this house in Kwa-Zulu Natal, as with most of the other people across the board with whom we had made contact, were very generous with their time and knowledge.

We also spent much time looking for building contractors, consultants and architects who had experience with straw bale building. Although things are slowly changing, there is still relatively little experience in green building out there. Builders tend to be uncomfortable with quoting these types of projects as it is difficult to cost, with many variables, so they would rather quote prohibitively high costs per m/sq to cover themselves. The reality is the hunt for the biggest profit also dominates the marketplace. This mindset however leaves a gap in the market for young builders who are willing to build using alternative materials and are happy to work closely with homeowners so as to gain experience in creating homes as opposed to just building houses.

I had always intended to be very involved in the build but it began to dawn on me that I was probably going
continued on page 20...



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A view on the hot dip galvanized steel portal frame as it projects from the initial phase of the building.

to have to project manage the entire operation. Always up for a challenge however, I took it on. Luckily we have a very close knit family, offering much guidance, support and encouragement, amongst them three architects, a mechanical engineer and a quantity

surveyor, so I had the reassurance that we wouldn't be able to stray too far off course. We also decided to phase the project, building the smaller first section to live in whilst completing the second. We did this for two fundamental reasons, firstly

to learn from any mistakes we made on a smaller scale (my husband refers to this as our 'school fees') and the second being so that we could pay for it as we went along, keeping us out of debt as much as possible.

There were certain criteria which we were not prepared to compromise on and this is where the bulk of our budget had to go. Solid foundations and structural integrity were critical. We hired the services a structural engineer by the name of Lis Hart who, although having never worked on a straw bale house at that point, was very open minded, accommodating and holistic in her approach. She was responsible for the technical design of the portal frame.

Aesthetically, we designed the house ourselves according to our very basic, practical requirements of the space; and a draughtsman then put the plans together which I walked through Council myself.

Regrettably it was only after the plans were passed that we met the CobCo team, experienced straw bale building consultants. Their biggest concern was that the design of the house was not ideal for the material. Aspects such as overly exposed walls and the double story first phase were problematic and susceptible to the high velocity, wind driven, Cape rain. We spent a lot of time finding solutions to these problems and in hindsight, had we designed the structure slightly differently from the beginning, we may have saved more time and money. The other issues we encountered were the marrying of all the materials, which was very challenging, with the devil being very much in the detail.

The fact that steel is not straight as we had previously believed, and often bows; the price fluctuates at best but does not get any cheaper.

We worked through the wettest winter in 52 years of recorded data, with a material that needs to be kept



dry as much as humanly possible, which extended our construction time by at least three months.

Building with bales is theoretically a quick process; the walls go up fast if you time it properly to coincide with the dry season. The time-consuming, labour intensive part is the plastering. We chose to plaster inside and out with a traditional cobbing mixture, a specific equation of sand, clay, water and loose straw, governed by the quality and properties of the clay available. Doing experiments and test patches with different aggregates and clays to see how they perform is vital.

Once the walls are in place, the first layer called the 'scratch coat' is applied using hands and wooden sticks. The cob mixture is driven into the exposed straw; into every gap, literally creating a solid impermeable surface as the clay dries.

We laid the bales 'flat' as we had the space to do so and preferred to work with the ends of the stalks which are easier to key the plaster into than the smooth lengths which would be exposed if one decided to lay the bales 'on edge'.

The next two plaster layers are finer still, with the final one containing lime, and polished to an even sheen. The clay acts as not only a binder but also manages the moisture content of the wall. On a molecular level, the dynamics of the fine clay particle require a certain amount of moisture to bind together and the clay therefore pulls moisture from the atmosphere or 'sweats' it out, enabling it to evaporate, to maintain the ideal levels. It also pulls the moisture away from the bales, within the wall, and prevents rotting. This is an important reason why most straw bale houses are often not plastered using concrete cement which does not breathe, so if the walls get wet, they would stay wet and ultimately rot.

In the rural areas, the cobbing and building of houses is done by the

women. Although the team of men that I had assembled had a general idea as to what to do, we were all learning together which created a certain amount of camaraderie on site. We had a dedicated, almost specialized crew and we developed a good relationship with our work force, the core of which remained the same over the entire seven month period. Another benefit of being so hands-on and involved in the build was that everything was over specified; screws were used instead of nails, torque screws where regular screws would have been used, etc. We took no short cuts and made sure that we put a lot of effort where it counted. We found this to be a trend amongst all the owner builders that we met, however there are laws and regulatory organisations that create unnecessary frustration for owner builders applying for building loans. This is a real shame for a country like South Africa, where people should be

encouraged to build their own homes, with proper guidance.

Creating our home has thus far been a character building experience in every sense, we continue to learn so much and truly love living in our hybrid home. It has definitely been a worthwhile process.

From a strictly purist point of view, the materials that we have chosen may not necessarily be the best or most sustainable. Every situation is different and needs to be approached as such, considering materials which are readily available, sustainably harvested and quickly renewable. We just hope that through our journey we can act as examples to others who may want to take that courageous step to investing in hope, and be a part of the paradigm shift.

The Association wishes to thank Grant and Michele Spooner for this enlightening article on their extremely novel home. ➡➡



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Construction of a new 10111 Radio Control Centre in Port Elizabeth

To improve on response times the South African Police Service has undertaken to expand its operations to provide a drastically improved and more efficient call out rate to the country. SAPS 10111 existing facilities at Mount Road, Port Elizabeth, is inadequate in terms of size and does not allow for expansion due to the nature of the existing structure. A new high-tech facility is necessary to deal with large sensitive electronic equipment with all its related supporting functions and requirements.

The building is positioned on a generous 2.4ha site in Korsten, Port Elizabeth, surrounded by secondary arterial roads to the South and open space to the North. The site, being one of the highest points in the area, provides great opportunities with respect to panoramic views across the Bay.

The building's footprint is orientated along an East West axis aligning itself to the North as opposed to the sites North East boundaries. This juxtaposition intentionally reinforces the building's form as a pavilion with its massing defined by the levels of the site.

Access is from the North East directly along the buildings central axis,



Eastern gable end completion.

allowing views though the building to the West. The central Call Centre/Radio Control is perceived as the hub of the facility and designed as an independent entity inside the space of the building's structure, defined by a single mono-pitched roof. All supporting accommodation feed off this central space taking advantage of the views.

The clients 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 800m².

Within the Call Centre space two primary steel girder beams are visible with supporting steel bearers being concealed within the ceiling void. The concrete framed structures that flank this central entity delicately interface with this core using carefully detailed steel walkways, again with an industrial touch. The central office accommodation within the two framed structures is designed as composite members using steel I-beams and flat concrete slabs. This allowed the offices below to be uninterrupted in terms of support structure and allows flexibility in terms of office compartmentalization



View showing western Gable end including entrance canopy.



Gate house and hot dip galvanized steel canopy.

which can be changed to suite the end users requirements.

The building will be submitted to GBCSA (Green Building Council of South Africa) for a four star accreditation. One point can be achieved where 50% of the buildings steel structure is designed for disassembly. This is to encourage and recognize designs that minimize 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 in turn galvanized 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 NDPW (National Department of Public Works) who as a standard also require all steel to be hot dip galvanized.

The building is scheduled for completion by the end of August 2012.

The project team is as follows:

Client:

National Department of Public Works

End user:

South African Police Service (SAPS)

Architect and principal agent:

The Matrix...cc Urban Designers and Architects

Structural and civil engineers:

BVI Consulting Engineers

Quantity surveyors:

Rousseau Probert Elliot

Electrical and mechanical engineers:

Palace Technologies

Building contractor:

Pro-Khaya Construction

Electrical and mechanical contractor:

Besamandla (Eastern Cape).

The Association wishes to thank Neal Fisher of The Matrix Urban Designers and Architects, for this article. ➡➡



Early view of the hot dip galvanized support steelwork for the call centre mezzanine.



The call centre ceiling installation showing the exposed hot dip galvanized steelwork.



Completion of the hot dip galvanized steelwork at the western gable end.



The view on the hot dip galvanized steel gable end installation.



The smoke extraction installation showing interior hot dip galvanized steelwork.



The hot dip galvanized steel lift installation.



View on the south face showing the solar shading detail.



The interior walkway installation comprises natural hot dip galvanized steel.

Hot dip galvanizing for general and architectural purposes

The achievement of a quality hot dip galvanized coating, for general and architectural use, is dependent on many issues, some controllable and some not. This checklist addresses the issues that can be controlled by the designer and those controllable by the galvanizer.

AG – Architectural Quality additional to SANS 121 (ISO 1461). Particularly Annex A.

See also HDGASA 03-2006.

GG – Normal General Hot Dip Galvanizing to SANS 121 (ISO 1461) Refer also to Annex A.

Y/N – Was this criteria achieved, yes / no?

Design aids:

#1: SPG – “Steel Protection by Hot Dip Galvanizing and Duplex Coatings” or “Design for Hot Dip Galvanizing”, wall chart, contact the Association for a copy. The latter publication is free plus postage.

Reference must also be made to SANS 14713.

Duplex coatings:

#2: Provided the primer is applied shortly (within 4 hours in moist conditions and within 8 hours in dry conditions) after hot dip galvanizing has been carried out, passivation by the galvanizer should be excluded. This step in the process is extremely important, if intercoat adhesion is to be achieved. If application of the paint coating cannot be guaranteed to be applied shortly after hot dip galvanizing and particularly in moist environments, passivation by the galvanizer should be encouraged. The reason for the latter instruction is to prevent the formation of white rust, which must be removed prior to painting.

IDEAL STEEL FOR HOT DIP GALVANIZING: TABLE 1

Industrial and Mining Applications

Silicon (Si) – 0.15 to 0.3% Max

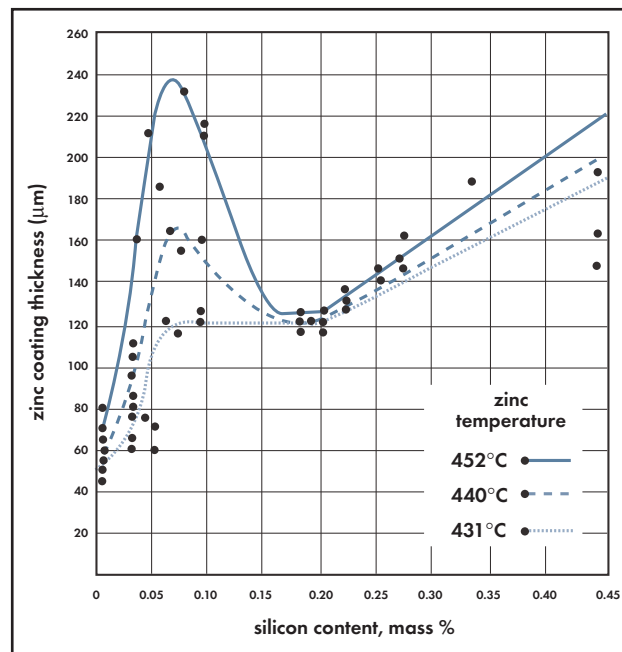
Phosphorus (P) – 0.02% Max

Architectural Applications

Silicon (Si) – 0.03 Max with Phosphorus (P) – equal or less than 0.01%

or

Silicon (Si) – 0.15 to 0.25% with Phosphorus (P) – equal or less than 0.02%



The Sandelin Curve refers to the reactivity caused by the silicon content in the steel.

Lead times:

#3: For medium to large contracts the involvement of the galvanizer with the fabricator and end-user is mandatory to ensure timeous programming and establishment of coating quality. Hot dip galvanizing is normally the final process after fabrication and prior to delivery and erection. If sufficient time for hot dip galvanizing, cleaning, fettling and inspection is not provided in the overall programme, costly delays may occur at the erection stage.

Certificate of conformance:

#4: A certificate of conformance is required to ensure that all fettling prior to coating inspection is done by the galvanizer and not by other parties, who do not necessarily understand the consequence of over cleaning.

Aluminium versus silicon killed steel:

#5: Tube and pipe and most plate work 4,5mm thick or less is manufactured from aluminium killed steel whereas hot rolled structural steel is silicon killed.

Note: This checklist is to be used as a guideline and although fairly comprehensive, suitable information may still be added.

No	THE SPECIFIER AND DESIGNERS CRITERIA:	AG	GG	Y/N
1	Discuss requirements with Hot Dip Galvanizers Association Southern Africa and/or the selected galvanizer/s before designing commences.	P1	P1	
2	The specifier or designer to ensure all steelwork contractors are informed in writing of the architectural hot dip galvanizing requirements prior to the finalisation of the tender.	P1		
3	Make use of an Association Galvanizing Member recommended by the HDGASA.	P1	P1	
4	Make the requirements known to the galvanizer, in writing, together with a sketch or sample, before placement of the order. Further discussion with the galvanizer may be required.	P1		
5	Make use of the Association wall chart- "Design for Hot Dip Galvanizing". #1	P1	P1	
6	Choose correct steel type – see table 1. If possible all parties related to the project to purchase the specified steel from the same or specified suppliers. Insist on the steel chemical analysis certificates for record purposes and issue copies to the galvanizer. #5	P1	P1	
7	Ensure components can be dipped in a single immersion or alternatively discuss the impact of double end dipping with the selected galvanizer / Association.	P2	P2	
8	Optimize size of filling, draining and vent holes, see SPG or wall chart. #1	P1	P1	
9	Optimize position of filling, draining and venting holes, see SPG or wall chart. #1 If necessary unwanted holes can be closed after hot dip galvanizing, contact the HDGASA for details.	P1	P1	
10	Should painting of the hot dip galvanizing be specified, ensure that instructions stating "No passivation is required – substrate is to be painted", is handed to the galvanizer, at order stage, unless specifically discussed and excluded. #2	P1	P1	
11	Select significant surfaces, highlight on drawing or sketch and discuss with galvanizer / Association.	P1	P1	
12	If necessary, hot dip galvanize a sample and establish acceptance / rejection criteria.	P1	P1	
13	Specify the correct temporary-marking pen for fabrication marking. (A 50/50 PVA paint to water mix, works well for temporary marking)	P1	P1	
14	Ensure that if permanent marking, such as welded lettering is used it will be appropriately hidden from final view.	P1		
15	Specify all flame cut edges to be thoroughly ground, ideally 2mm into the parent material.	P1	P1	
16	If deemed necessary, to minimize handling damage ensure correctly positioned lifting lugs are provided or if not acceptable, soft lifting slings are used, by all parties, including the galvanizer, the transporter, the off loader and the erector, etc. The use of the former is possibly more appropriate.	P1	P1	
17	Specify welding that is fit for purpose; do not allow over welding.	P2		
18	Should stick welding be used, ensure that all weld slag is comprehensively removed by abrasive blasting or grinding prior to delivery to the galvanizer. (Excessive weld porosity can have a marked effect on the quality of the hot dip galvanized coating).	P1	P1	
19	If the build-up of zinc at a weld is unacceptable for aesthetical reasons, request that the correct welding wire or rod be used. Some welding materials are reactive wrt hot dip galvanizing and can result in a thicker coating on the deposited weld. Discuss with the HDGASA.	P1		
20	Simplify componentry – Simple structures – Better coating quality Complex structures – Harder to manipulate in the galvanizing bath, more control, cleaning and fettling necessary.	P1	P1	
21	Simplify complex structures by making use of bolting where possible or alternatively design for after galvanizing welding, by using a suitable mask such as "Galvastop", which can be easily cleaned, successfully welded and correctly repaired.	P1	P1	
22	Discuss packaging / dunnage requirements with the galvanizer during transport and ensure that ample site stacking facilities are provided. A hot dip galvanized coating is applied in a factory and then transported to site where frequently the components are thrown off the truck. Inappropriate offloading may lead to unnecessary mechanical damage of the coating. As the components are generally not wrapped, coating discolouration due to contaminants being deposited by wet trades, i.e. angle grinding of wet clay bricks in the presence of hot dip galvanized components, should be prevented.	P1	P2	

No	THE SPECIFIER AND DESIGNERS CRITERIA:	AG	GG	Y/N
23	Discuss the appropriate repair method, if repair is deemed to be necessary, with the galvanizer. Silver spray paint is not acceptable. The silver spray paint may be initially more aesthetically acceptable while the hot dip galvanized coating is shiny, but will ultimately stand out and be aesthetically unacceptable, when the hot dip galvanized coating begins to weather to a matt dull grey appearance. Furthermore, most silver spray paints do not provide the same protection as a good zinc rich epoxy for repair purposes.	P1	P1	
24	Discuss the maximum size of coating repair allowable when alterations or adjustments are made on site, with the appropriate contractors. Refer to SANS 121. Get HDGASA recommendation.	P1		
25	Discuss inspection of the components prior to these leaving the galvanizer's premises.	P1	P1	
26	Ensure that a certificate of conformance in accordance with the specification, has been obtained from the galvanizer. #4	P1	P1	
27	Ensure that selected galvanizers use their appropriate identification paint, required by the SABS Mark Scheme, (if acceptable to the client) before delivering the components to site. Furthermore, identification paint is to be applied only to areas identified on the drawings by the architect or consultant or if not available, in non-significant areas, particularly if the component is not to be over coated with a paint system.	P2	P2	
28	Allow sufficient time for the hot dip galvanizing process to take place, ideally 3 to 7 working days, unless other arrangements have been made. #3	P1	P1	
No	THE GALVANIZERS' CRITERIA:	AG	NG	Y/N
1	At the tender stage, enquire whether the components are to be hot dip galvanized to an architectural standard. If yes, ensure that the enquirer understands the specifier and designers criteria and has a copy of this check list.	P1		
2	If an architectural finish is required, obtain a sketch indicating significant surfaces or a sample which may be hot dip galvanized, for discussion purposes.	P1		
3	Insist on the appropriate steel chemical analysis certificates for galvanizing control and record purposes.	P1	P1	
4	Ensure that significant surfaces if necessary have been discussed and agreed on.	P1	P1	
5	Ensure components can be dipped in a single immersion, unless discussed with the fabricator/customer/specifier or the Association.	P1	P1	
6	Ensure when offloading plain steel components, that any transport damage is recorded and the client appropriately notified.	P1	P1	
7	Ensure that reasonable fill, draining and vent holes have been provided.	P1	P1	
8	Ensure that filling, draining and vent holes have been positioned correctly.	P1	P1	
9	When handling the component, make use of lifting lugs if supplied or alternatively use soft lifting slings after hot dip galvanizing.	P1	P1	
10	Ensure the use of optimum aluminium content in the zinc bath.	P1	P2	
11	Based on the chemical analysis of the steel, discuss immediate water quenching after galvanizing, if necessary to limit iron/zinc alloy build-up with reactive steel. The galvanizer should also be aware of the increased likelihood of distortion with certain components when quenching and discuss these with the customer/ Association. (This is only necessary if the appropriate steel has not been specified and steel used is reactive to molten zinc).	P1	P1	
12	Ensure all agreed upon significant surfaces have been cleaned and free of imperfections after hot dip galvanizing, according to instructions.	P1	P1	
13	Ensure adequate fettling of the components using appropriate methods, particularly with reference to lumps, runs and excessive surface roughness, especially on significant surfaces, while taking care not to excessively clean the surface, leading to uncoated areas. Discuss flame cleaning vs mechanical cleaning, with specifier/customer.	P1	P1	
14	Zinc spray paint is not acceptable. Ensure that the specifier is informed of the method of renovation of uncoated areas that might occur due to air entrapment during galvanizing or as a result of mechanical damage at the galvanizer.	P1	P1	
15	Passivating chemical in the quench water must be excluded if subsequent painting is to shortly follow hot dip galvanizing. See #2	P2	P2	
16	Ensure that inspection of the components is carried out before and after hot dip galvanizing, to the customers requirements. Issue a certificate of non-conformance before galvanizing or conformance with SANS 121, after hot dip galvanizing.	P1	P1	
17	Ensure that any identification paint required by the SABS Mark Scheme and used by the galvanizer, (unless specifically excluded by the client) is applied in an agreed upon location, or on a non-significant surface of the component.			

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'Megabow' - the long spanning, cost effective, double sided, modular cable ladder

Following Strutfast's brief to design a double sided cable ladder suitable of spanning in excess of 10m supporting a uniformly distributed cable load of 300kg per metre length for an industrial application situated in a



marine environment, the "Megabow" cable ladder was developed.

The cable ladder was designed, fabricated and then fully tested in-house and proved conclusively that it could easily span 10m supporting a 300kg/m length loading with a minimum deflection.

Strutfast will soon verify the in-house test results with Gerotech or the SABS.

As the local site conditions were confirmed to fall into a corrosion category of C4 or less and the steel of the component would in all likelihood attract a mean hot dip galvanized coating thickness of at least 70 to 80 microns, this would comfortably translate into a service

life of at least 20 years, maintenance free!


The design was done taking into account the SANS 14713 specification "Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel in structures" – Part 1 "General principles of design and corrosion resistance" and Part 2 "Hot dip galvanizing".

All components relating to the cable ladder, the full range of accessories such as vertical and horizontal bends, splices, etc. are hot dip galvanized to SANS 121:2012 (ISO 1461:2009).

Strutfast has patented the Megabow Cable ladder (SA Patent No 2010/07869). ➡



The splice is designed to be placed anywhere in the span.






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All galvanized power skirting

When it comes to quality power skirting, there's no doubt that using galvanized steel makes the most sense in terms of durability and maintenance. This standard of product is offered by cable reticulation and management company Cabstrut, with several other benefits added.

Cabstrut, with offices throughout South Africa and in Botswana, manufactures state-of-the-art power skirting made from Z-275 continuous hot dip galvanized steel. The skirting comes in convenient 3 metre lengths and has a stylish, textured powder coating finish for visible exterior surfaces. The galvanized steel ensures that any ingress of moisture, even in hidden seams is completely protected against. Cabstrut also supplies covers separately.

Cabstrut was responsible for the design, in conjunction with Bombela and Wade Walker Alstrom, for the cable management systems at all the Gautrain stations. This system, which includes all wiring, ducting and channels is manufactured using Z-275 pre-galvanized steel. The system houses all the control, data and power cables as well as having lighting, audio and signage fitted to it.

The galvanized steel power skirting from Cabstrut is superior to the mild steel version and comes at exactly the same cost. ➡➡

Health benefits of zinc

The health benefits of Zinc include proper functioning of immune system, digestion, control of diabetes, improves stress level, energy metabolism, acne and wounds healing. Also, pregnancy, hair care, eczema, weight loss, night blindness, cold, eye care, appetite loss and many other factors are included as health benefits of zinc.

Zinc, being an important mineral plays a vital role for the protein synthesis and helps in regulation of the cells production in the immune system of the human body. Zinc is mostly found in the strong muscles of the body and especially in high concentrations in the white and red blood cells, eye retina, skin, liver, kidneys, bones and pancreas. The semen and prostate gland in men constitutes large zinc amount. In a human body, even 300 enzymes or more than that requires zinc for the normal functioning. The researchers believe that 3000 proteins out of 100,000 are involved in human body consisting of Zinc.

A normal human body consists of two to three grams of Zinc.

The Association wishes to thank Dr Kylie Montgomerie for this contribution. ➡➡



Make tracks for the name that supplied the Gautrain project.

A project as huge and as significant as the Gautrain had no room for error or second best. Exacting standards insisted that only the very best suppliers were elected.

With our proven track record for exceptional products and service and a reputation for unerring quality, Cabstrut is proud to have been selected for a project that has resulted in world-class excellence.

If we were chosen for a project as demanding as the Gautrain, doesn't it make sense to choose us for yours?



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Consider reinventing, instead of reengineering, your business for survival and success

Is business process reengineering (BPR) the panacea for all business ills? It would appear that it is not, if one listens to Thomas Davenport of the Graduate School of Business of the University of Texas in Austin. He was one of the original creators of the technique in the late 1980s and now seems to have grave misgivings about it. One of the problems with BPR is that it often treated the people inside companies as "if they were just so many bits and bytes, interchangeable parts to be reengineered". No one wants to "be reengineered". BPR also became synonymous with "downsizing", even though the original intention of BPR was to reduce costs by improving the efficiency and effectiveness of business processes, not by the laying off people. The fact, however, is that once let out of the bottle, the reengineering genie turned nasty. Ironically, in the USA at any rate, the only people who have really benefited from BPR are consultants and vendors of computer software. In 1995, claims Davenport, BPR had become a \$51 billion industry in the USA!

Reengineering is manipulation, rather like moving your household furniture around; it provides a nice change for a while. Sometimes you may even go as far as holding a garage sale to get rid of the old junk and buy some new bits and pieces. Then you may long for old stuff and regret having got rid of it. That's like BPR: the changes made are not drastic enough to allow for a genuinely fresh start. People, and companies, hanker over what they removed and changed and slowly try and revert back to the old ways. Real change needs reinvention, not reengineering.

South Africa in general, and its businesses in particular, need real change. Business change is needed not only to help address and correct the ills of the past, or to rush into exploitation of global markets, but also to develop the wonderful



opportunities that this unique country of ours has to offer. We all are quite readily inclined to accept the new global challenges, but are we as ready to recognise and accept the challenges of our new country? Our ability to "marry" the international and local challenges is the critical factor for our future success.

So, how can companies reinvent themselves to meet these twin challenges, what basic concepts are necessary? Firstly, getting rid of people is not the answer: South Africa needs people with jobs. Secondly, our people need to be uplifted. Thirdly, our workforce must be inside the process, not outside it. Three critical factors: more employees ("upsizing"), education and motivation. All three have one common factor: people. Reinvention is more about people; reengineering is more about technology.

How can more people be employed in recessionary times? How can people be uplifted and trained without money? How can people be motivated if they don't have jobs? These are the questions we have to answer. To answer them we need to be innovative and creative; we need de Bono's lateral thinking and Handy's "upside down thinking". We also need to address the questions as Africans, not as North Americans or Europeans. There are

two guiding concepts: Ubuntu and Partnership.

Ubuntu is about sharing and caring; partnership is about co-operation; they are very similar. What if companies were to share more with their employees, see them as real assets and incorporate them more intimately in the company? What about focusing more on self-managing teams, with legitimate leaders, instead of management-appointed managers? What about incorporating unions into management? What about using technology to train and make people more creative rather than using it to improve business process efficiencies? What about partnerships between companies and communities, not just for labour requirements but for providing goods and services? Can we not see our companies as large caring communities?

The value of Ubuntu is that both the individual and the group have equal standing and respect. The value of partnership is the synergy it can create.

As the imaginative and creative people we South Africans are, we must ask a lot of crazy questions and find even crazier answers. We must move forward and not dwell in the past and present; we must not hanker over the furniture sold in the garage sale. The reinvention of South Africa in 1994 was not a miracle, it was the achievement of a vision based on a drastic change. Surely it is not beyond us to have a similar vision for the reinvention of South African business?

Published in the Sunday Independent

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

The new Elcometer 456 offers...

As part of Elcometer's on-going commitment to release upgrades on a regular basis, we are pleased to announce the next release of the Elcometer 456 Digital Coating Thickness Gauge with the following new and improved product features. These new features are accessible to all users of the new Elcometer 456 through the upgrade of firmware facility.

Addition of Live Reading (Trend) Graph when in batching mode

Elcometer 456 Models S & T now include a new 'Live Reading Trend Graph' feature. By selecting 'Show Graph on LCD' via the Stats menu, users can view a line (trend) graph of the last 20 measurements (see image), which is updated automatically when each reading is taken. When selected, up to five measurement trends (horizontal axes) can be displayed: (i) highest reading (ii) lowest reading (iii) mean (average) of the batch readings (iv) high limit (v) low limit.

PIN Code Locking of the calibration

To avoid accidental amendments to the calibration settings Models B, S and T already have a calibration lock feature which stops users making any changes without first disabling the calibration lock. For extra security, we have added an optional PIN Code function allowing users to lock the calibration settings by setting a four digit PIN code which then has to be re-entered before any changes can be made. This feature works in a very similar manner to digital room safes in a hotel. The user programs a four digit (numerical) PIN and is asked to confirm the number. After confirmation, the calibrations are locked. To unlock, the PIN should be re-entered. If the user forgets the number, simply connect the gauge to ElcoMaster 2.0 software to reset the PIN.

Increased memory on Model S and T gauges

By re-coding the firmware in the gauge and reorganising the language sets we have been able to considerably increase the memory available for batch data storage in both the Model S & T gauges as follows:

- ◆ **Model S:** Increased from 750 readings in a single batch to **1,500 readings** in a single batch
- ◆ **Model T:** Increased from 75,000 readings in up to 999 batches to **150,000 readings** in up to **2,500 batches**

Integral gauges – Auto Probe Switch On

All Elcometer 456 integral probe models have historically been fitted with an auto power on function as a reading is taken. In order to minimise power consumption, users can now disable this auto-on function. This feature is available via the Setup menu on the Model E gauges and the Setup/ Probe menu option on Model B, S & T integral gauges.

Tap Awake feature

Available on Models B, S and T; when the gauge goes into 'sleep' mode the screen dims, with this upgrade the screen can be reactivated simply by tapping or gently shaking the gauge and this returns the screen to full brightness.

All new Elcometer 456 Mark 4 gauges can be upgraded to the latest firmware by connecting the gauge to ElcoMaster™ 2.0. All users will be able to upgrade their existing gauges using the auto update feature in ElcoMaster™ 2.0 and we do recommend that you update your gauge to the latest firmware.

If you would prefer to send the gauge to us we will upgrade your gauge and issue you with an updated calibration certificate

at a cost of R750 ex vat. This will allow you to take advantage of these great new features.

Additional features to be aware of:


- ◆ On initial power up for the first time, users will be asked to not only select a language but to also select 'Manual' or 'Auto' screen brightness, allowing for greater awareness of this clever power saving feature.
- ◆ Any user created opening screen logo will no longer be lost during any gauge upgrades or re-programming.
- ◆ "Elcometer 456" is now displayed on the welcome screen below the Elcometer logo.
- ◆ If a probe is not connected to a separate gauge, the CAL softkey is now greyed out and users do not have access to the calibration menus.

Further details can be found on the attached updated Elcometer 456 leaflet: *Elcometer New 456 Coating Thickness Gauge pdf*

New waterproof and miniature probes

In addition to the above gauge enhancements, following customer requests, we have added some new probes to our extensive probe range. We are now able to offer ferrous Scale 2 Waterproof probes with 30m and 50m cable lengths and new 300mm and 400mm long miniature probes.

Full details can be found on the attached updated product literature: *Elcometer New 456 Coating Thickness Gauge Probe Options pdf*

For more information on the Elcometer 456 digital coating thickness gauge range, reply to this email or visit the new Elcometer 456 website : www.elcometer456.com 



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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 fabrication and after hot dip galvanizing the coating is inspected for compliance with the relevant specifications.

Following up on comments received from the many participants attending our regular two day inspector courses over the last nine years, we decided to expand and update our 2-Day course into a more comprehensive 3-Day course.

Included are revisions of the course material and the introduction of more practical activities in the form of a full morning at a hot dip galvanizing plant followed by an afternoon of Duplex coatings. The galvanizing plant visit examines materials prior to galvanizing and hands on inspections of finished product. The afternoon is a visit to a paint applicators yard and Duplex coatings systems. Included are demonstrations on chemical cleaning and/or sweep blasting, examination of resulting profiles and followed by the application of paint onto galvanizing. The course will provide delegates with sufficient knowledge to advise on fabrication for successful hot dip galvanizing and also test, inspect and interpret test results after hot dip galvanizing.

COURSE DURATION AND CONTENTS

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

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

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

VENUE AND NUMBER OF DELEGATES

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

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:

21 to 23 February; 13 to 15 March; 15 to 17 May; 26 to 28 June; 14 to 16 August; 9 to 11 October; 27 to 29 November.

Cape Town:

6 to 8 March; 5 to 7 June; 18 to 20 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 fasteners

Introduction

A balanced design is a sound and well established engineering principle. As a consequence of this practice; when hot dip galvanized structural steel is specified, in terms of design service life and adequate corrosion control, it follows that the corresponding fasteners should also be specified as hot dip galvanized.

Hot dip galvanizing has a long established tradition of providing corrosion control of structural steel components; however when it comes to the fasteners, such as bolts, nuts and washers, numerous misleading and incorrect perceptions have developed over time.

The term 'galvanized' is inadequate as it does not fully describe what form of zinc corrosion control system is being specified. 'Galvanized' on its own leads to confusion, in that 'zinc electroplating' or 'electro-galvanized' and numerous other forms of zinc plating are often supplied where 'hot dip galvanized' is in fact required to provide a balanced design to suit the hot dip galvanized

structural steel components being assembled.

Current practice

The South African Institute Steel Construction (SAISC) has adopted and recommends that fasteners conforming to property class 4.8 and class 5 nuts should only be used for minor applications such as purlin connections, hand railings, stair treads etc. In order to ensure logistical control and conformance in practice, it is further recommended that the use of this property class be limited to a maximum diameter of 16mm (M16 fasteners).

All load bearing and shear connections; fasteners conforming to property class 8.8 bolts and class 8 nuts, M20 (20mm diameter) and above should be specified.

South African manufacture of these fasteners, classes 4.8 and 8.8 and corresponding nuts, have been produced according to ISO or DIN standards. These two specifications have minor dimensional differences, such as across the flats, thicknesses and

length of threads. *(Note; DIN in theory does not exist anymore although in practice it is still used. The correct description is DIN EN ISO.*

Current practice is that hot dip galvanizing of all these fasteners have all been processed in terms of SANS121 (ISO 1461:2009). No additional control requirements, over and above that required by the specification, were considered necessary. Investigations relating to any isolated failures, where these fasteners had been employed, were found to be unrelated to that of the hot dip galvanized corrosion control system.

Dynamically loaded structures

Following SAISC recommended practice; where dynamically loaded structures are to be assembled; property class 10.9 bolts and class 10 nuts should be specified in terms of the 'new' standard i.e. EN ISO 13499, and HDG according to ISO 10684:2004.

Immediate past practice for hot dip galvanizing of this property class of fasteners was in terms of SANS 10094 Annex B. Annex B of this specification effectively called for a code of practice to be followed during the hot dip galvanizing process. This code of practice was included in the specification as a save guard against the potential development of hydrogen embrittlement (HE).

Hydrogen embrittlement

From our knowledge of HE, it is recognised that free hydrogen ions (H⁺) present in steel, generated during the fastener manufacturing process or pre-treatment (acid pickling) cleaning process, prior to hot dip galvanizing, can penetrate into the grain boundaries within the steel structure. Such unstable hydrogen atoms (ions) combine to form stable hydrogen molecules. The hydrogen molecule sites represent points of weakness, which could propagate a crack and result in bolt fracture failure under tensile loading. The highest risk for grade 10.9 fasteners

continued on page 36...

Introductory Galvanizers Inspection Course

This one day course has been designed to be more simple and more practical than the 3-day galvanizers inspectors course discussed elsewhere in this magazine.

Topics to be covered and discussed are:

- Brief description about corrosion
 - How zinc protects
- The hot dip galvanizing process
- Inspection before and after hot dip galvanizing
- Multiple choice question test for course effectiveness.

Should you require some background information on hot dip galvanizing and its acceptance and have a limited formal education, this course is for you!

Contact our offices for more details.

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

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

SMT Group offers the following services,

- **Hot dip galvanizing** - spinning and dipping;
- **Electroplating** - Barrel work (Yellow and trivalent blue passivating);
- **Electroplating** - Jigging up to 3.5meters;
- **De-embritteling** on site;
- **Fabrication** workshop with certified welding operators;
- **High Tech engineering workshop** - cnc milling, turning and dynamic balancing;
- **Design and building** of machines to customer requirements;
- **Supply** of electrical spares at the best prices.



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was generally in the acid cleaning process prior to hot dip galvanizing which can be eliminated with limited pickling time and controlled quantities of inhibitor in the acid. This risk was also elevated when sub-quality galvanized bolts were stripped in acid and re-galvanized. For this reason stripping of rejected fasteners are not allowed. This contamination of a few would unfortunately place the entire batch at risk.

Normal practice, when zinc electroplating of high tensile fasteners, is to place the coated components in an oven at a temperature of 200°C in order to drive off any hydrogen atoms and/or molecules. In the case of hot dip galvanized fasteners, the cleaned components are immersed into molten zinc at 450°C, which process has the effect of removing trapped hydrogen.

Notwithstanding the fact that from statistical and actual field experiences, the recorded cases of bolt failures due to hydrogen embrittlement are rare. The perception however is that when a hot dip galvanized bolt fails the cause is immediately attributed to hydrogen embrittlement. Follow up investigations however do not support this perception.

From a hot dip galvanizing point of view and in order to eliminate one of the potential sources of hydrogen atoms, i.e. during the acid pickling process, consideration has in the recent past been given to the replacement of chemical cleaning (acid pickling) with that of mechanical cleaning (shot blasting). By so doing, we remove only one potential source of hydrogen.

Current update

Following a limited number of recent site experiences where certain high tensile (class 10.9) fasteners have failed, numerous investigations have been undertaken aimed at establishing the cause/s. None of these investigations have shown or concluded that the root cause (the smoking gun) of these bolt failures were the result of hydrogen embrittlement.

Recent extensive and detailed investigations concluded with the finding of **hydrogen-induced delayed stress corrosion cracking. (H-I.SCC).**

Figure 1 (ref1), which best illustrates the principle causes, paramount of which is the need for erectors to eliminate poor installation practices resulting in stress activators.

Superior quality grating is vital for increased safety on mines

With a significant percentage of all accidents on mines related to slips, trips and falls from height, it is no wonder that project houses, designers, and contractors are insistent upon products that are geared towards reduced accidents and fatalities. Vital Engineering has spent the past eight decades perfecting a range of products that address enhanced safety of employees.

"Vital Engineering's Vitagrid precision-made and pressure-forged gratings has been improved to a quality and safety level that has seen its widespread acceptance by mines, power generation plants, food and beverage plants and in the steel industry," says Dodds Pringle, Managing Director of Vital Engineering.

Pringle explains that by localising the pressure forging of the transverse bar to either side of the bearer bar, it



effectively eliminates the whole transverse bar section being affected. This in turn allows the pressed material to flow back into the hole, ensuring a tight seal with accurate openings, vertical bearing bars for loading and a multi-direction non-slip grating.

When Vitagrid was pioneered it created a major transformation in grating development, and many companies attempted to copy this system, using their older technology.

"The result is that the panels remain 'springy' or are unable to retain their squareness in handling or galvanising, unless the underside of the panels is cross-welded to retain rigidity.," says Pringle.

Vitagrid and Vitaglass fibreglass GRP gratings are available in square or rectangular openings such as VE40 and VE100 for cost savings without performance loss. Bearer bar depths ranging from 25 to 200 mm in thickness ranging from 3mm to 12mm, and in a variety of material and fire resistant grades to suit the client's designs, needs or pocket.

"We stake our reputation on the high quality level of our products, and we are able to offer our clients complete peace of mind that their purchases are properly forged to ensure superior galvanising or coating finishes, and excellent site fitment." Pringle concludes. ➡➡➡

Valuable lessons learnt

A number of valuable lessons have been obtained from numerous investigations all of which will surely be of benefit to the fastener and construction industries.

Comments, in terms of this paper, will be restricted to the issues that affect the hot dip galvanizing process, while other participant, within the fastener industry, and users of fasteners, will be left to implement the remaining valuable conclusions that have arising from the various reports.

Implementation of 'new' specifications

The local fastener manufactures and users of 'high-strength structural bolting assemblies for preloading' will be required to implement the EN 14399 series of specifications. Associated with this specification series is EN ISO 898-1:1999 "Mechanical properties of fasteners made of carbon steel and alloy steel".

In conjunction with these 'new' fastener specifications, the hot dip galvanizers will be required to conform to the requirements of ISO 10684:2004 "Fasteners – Hot dip galvanized coatings".

ISO 10684:2004 paragraph 5.2 "Cleaning and pickling" makes provision for cleaning using an **inhibited** acid, alkaline or mechanical process. *An inhibited acid is an acid to which a suitable inhibitor has been added to reduce corrosive attack on the steel and absorption of hydrogen.*

From the above clause, the hot dip galvanizer is at liberty to use either an inhibited acid or mechanical cleaning. From recent investigations a preference to the use of an inhibited acid is being advanced in that the steel surface of the components is maintained as *relatively smooth*. Mechanical cleaning, on the other hand, results in what can be described as a *rough* surface from which crevice corrosion could initiate crack propagation.

It is important to note that the monitoring and measurement controls with regards to acid strength, limited

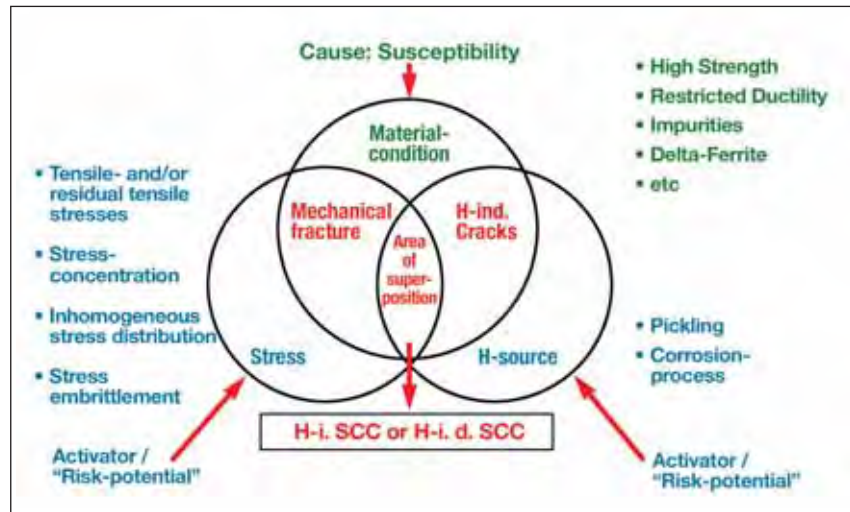


Figure 1: Conditions for hydrogen-induced crack formation in the form of hydrogen induced stress corrosion cracking (H-i. SCC) or hydrogen-induced delayed stress corrosion cracking (Hi. D. SCC) (Ref 1).

immersion times and inhibitor additions are routinely recorded and logged. Supporting documentation and certification becomes an essential requirement within the hot dip galvanizing operation.

There are a number of other important clauses contained within ISO 10684:2004, which the hot dip galvanizer needs to address and implement. Timely implementation of these clauses is advised.

Conclusion

Hot dip galvanizing of fasteners complying with property class 4.8, 5.6 and 8.8 and related nuts can continue to be process in terms of SANS121 (ISO1461:2009). There is no restriction however, to processing these components in terms of ISO 10684:2004.

Property class 8.8 and 10.9 and related nuts are to be manufactured in terms of EN 14399 and EN ISO 898-1:1999 and hot dip galvanized according to ISO 10684:2004.

It is also important to note that the fastener manufacturer will assume responsibility to co-ordinate and control the complete supply chain, including the hot dip galvanizer.

Submitted by: R.E. Wilmot

PROPOSED FEATURES FOR 2012

December/January (No 53):

- The world of hot dip galvanizing around us
- Greening of the hot dip galvanizing industry

NOTE: FEATURES MAY BE SUBJECT TO CHANGE

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BAMR	page 32
Bulldog Projects (Pty) Ltd	page 15
Cabstrut	page 30
Central Support Systems cc	page 29
Chemplus	page 39
Galvanizing Techniques (Pty) Ltd ..	page 21
Galvspin Galvanizers cc	page 5
Giardina	page 3
Macsteel Tube & Pipe	page 19
Metsep SA (Pty) Limited	page 11
Pro-Galv cc	page 20
Pro-Viro	page 17
Robor Galvanizers	Inside Front Cover
SAISC	page 7
Struifast	page 28
Supergalv (Pty) Ltd	page 8
SMT Galvanizers	page 35
Transvaal Galvanisers (Pty) Ltd	page 9
Vital Engineering and Angus McLeod	page 27
Weartech (Pty) Ltd	page 12



Report back from Integalva 2012

The 23rd International Galvanizing Conference, Integalva 2012 was held in Paris from 11 June to 15 June 2012 under the auspices of the French Galvanizers Association. Integalva is held every 3rd year, in a selected European centre, and is considered to be the leading forum for technical developments, environmental performance and marketing information. Integalva is organised by the European General Galvanizers Association (EGGA) and has delegates attending from numerous countries from around the world.

Fourteen papers were presented during the formal conference proceedings ranging from the World of Zinc, Galvanizing in Transport and Infrastructure, Plant Technology, Furnaces and Kettle Technology, Product Process Technology, Environmental Controls Recycling and Safety, Marketing and Communication, The Industry in China, Galvanizing and Architecture and Coating Performances.

In addition to the formal conference proceedings; various industrial hot dip galvanizing and related exhibitions were available for participants for review and engage in technical and commercial discussions. Proceedings culminated with arranged plant visits to hot dip galvanizing operations located in centres around France.

An unedited pack of the conference papers is already available at our offices and can be copied by Association members. A fully detailed description of all papers may be reviewed in order to select presentation of specific interest.

Integalva 2015 is to be held from 7 to 12 June 2015 at the "ACC Liverpool" in the famous UK city of Liverpool.

Environmentally friendly flux

For over twenty years, Chemplus has devoted considerable effort and resources to customer-driven research.

With the recent advent of legislation governing the emission of smoke and fumes inherent to the hot-dip galvanizing process, Chemplus embarked on an intensive research and development program, which has resulted in the introduction of a new-generation flux to the South African market.

Fluxor FFS has proved to be effective in not just reducing, but almost totally eliminating smoke and fumes. An added benefit, likely to be welcomed by the galvanizing fraternity, is that the use of Fluxor FFS has demonstrated a decrease in zinc pick-up of up to 15%, resulting in significant cost reductions.

In keeping with Chemplus's commitment to environmental sustainability, Fluxor FFS is entirely green and devoid of any nickel compounds. ➡➡

Benefits of zinc use for colds and infections

Zinc gluconate lozenges, taken at the first sign of a common cold, reduce duration and symptom severity by 42% according to a 1992 study. Zinc, an antiviral agent and astringent, is released into the saliva, relieving cough, nasal drainage and congestion. Besides shortening the duration of cold symptoms, zinc also soothes a rough, sore throat on contact.

Problems associated with zinc deficiency

Zinc deficiency is a recognised health problem. The Recommended Daily Allowance (RDA) of zinc is 15mg for a male adult, a figure that is easily met by a balanced diet containing meat and vegetables. However, certain people require more zinc than others; pregnant and lactating women for example, may need as much as 19mg a day. The average elderly person's intake is only about 9mg a day due to the fact that food consumption, especially of proteins, is often reduced and so that person may need to take a zinc supplement.

Zinc is essential for growth. It is used to control the enzymes that operate and renew the cells in our bodies. The formation of DNA, the basis of all life on our planet, would not be possible without zinc.

Robor makes soccer goal posts for Dreamfields project in Tembisa

Robor answered a plea for help from John Perlman – renowned community builder, sports and radio personality – when the Chairman, Mike Coward offered to build goal posts for the Ivory Park Stadium in Tembisa.

John champions the Dreamfields soccer initiative. Launched in 2007, the organisation takes soccer to the youth in 3 different ways:

Dreambags provides underprivileged schools with complete soccer kits, Dreamevents arranges soccer tournaments and Dreamfields provides renewed facilities to needy youths. "Robor produces hot and cold rolled tube which is used for numerous applications and producing unique soccer goal posts was just one of the many



applications for our products" said project manager Mike Longworth.

Robor's Mike Longworth co-ordinated the company's efforts to redesign the posts, produce the steel tubing and fabricate the posts at their Elandsfontein site. The posts were also treated for corrosion and rust at Robor's Galvanizing operation.

"We are delighted that we were able to make a contribution to the Dreamfields organization with the donation of these soccer goal posts. The organization has made a tremendous difference bringing soccer to deprived kids" said Robor's Chairman, Mike Coward who initiated the company's involvement. ➡➡





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On the Couch.....

Jim Baggett

By Desere Strydom

On the Couch caught up with Capetonian **Jim Baggett**, Civil Engineer and staunch supporter of hot dip galvanizing, whilst working on contract in Gauteng overseeing the construction of a bridge on a road rehabilitation contract. This active sexagenarian quips that living in Gauteng keeps him on his toes with regards to the use of GPS!

Tell us about your childhood and education? I was born in Lahore, Pakistan and returned to the UK with my parents and sister at the age of one. We moved to Nigeria when I was three but my suffering from Malaria led to me ultimately living with my grandparents in Dorset until I finished school. I began studying towards a BA at the University of London, but dropped out in 1963. I'd like to think due to laziness.

How on earth did you eventually get into engineering? In 1963 I started work in my father's company in Lagos Nigeria, where I served what was effectively a 5-year apprenticeship in fitting and turning. By that time I could swallow the very bitter anti-malaria tablets we had to take daily. I came to South Africa in 1968 and worked as a draughtsman, taking NTC courses up to NTC5, until 1970. In 1971 I registered for a civil engineering degree at UCT, graduating in 1975.

Tell us about your early career? My first employment in civil engineering was in 1974 with VKE (Cape Town), where I worked in the bridge section under Messrs H H Wiessler and H B Mills, two distinguished bridge engineers. In 1976 I left VKE to join the bridge section of Hawkins Hawkins and

Osborn, headed then by Mr G E Hoppe, another distinguished bridge engineer. In 1980 I took study leave to complete the requirements for the degree of MSc (Eng) at UCT. Most of my career has been with HHO and I worked for them from 1976 until 1990 and again from 2003 until 2009. I was registered as a Professional Engineer with SACPE (now ECSA) in 1985. From 1990 to 2002 I was employed by the City of Cape Town, in what was then the Roads Branch of the City Engineer's Department. I joined Roads Branch as Principal Engineer (Structures), with responsibility for all road-related structures in the municipal area, and in 2000 was upgraded to Chief Engineer (Structures).

Any memorable projects? The widening of the deck of Storms River Bridge (1986). I designed this deck-widening, which was achieved by the removal of the existing r.c. cantilevers and the attachment of steel cantilever ribs supporting precast concrete panels. The steel ribs, and the steel parapets for the pedestrian footway were all hot dip galvanized. The project won awards from the SAISC in 1987 for the design and from the HDGASA in 2007 for the durability of the corrosion protection system. Other projects include Elandsbos and Witteklip River bridges (1988) and Viaducts 7.1 and 7.2 on the Gautrain Pretoria-Hatfield line (2007/8).

And hot dip galvanizing? My most productive years were those I spent with the City of Cape Town. Municipal work consists mainly of repair and maintenance, and my work at Council was extremely varied. Hot dip galvanizing was pretty much



required to a greater or lesser extent in all my projects and I have always been a keen advocate of it. To me, it is without doubt the most effective and economical way of protecting vulnerable reinforcement in a corrosive environment.

Tell us about your personal life? I am single, never married and have no children. Some have said that my work is my children and I won't argue with that.

Hobbies and passions? From 1969 until about 2006 I used to jog more or less regularly to keep fit. I took up surfing in 1976 and kept it up until 1986. For entertainment I have always liked reading, but since the advent of DSTV there is also the option of cricket, which I enjoy watching. I am a lover of the game rather than a supporter of any particular side.

Friday afternoon 5pm... I sometimes go for a couple of toots after work with my nephew or with one of my friends.

Article by Des Ray for HDG Today 2012® 

Members of the Association other than Galvanizing Members

COMPANY	LOCATION	CONTACT	TELEPHONE	E-MAIL	MAIN CLASS OF WORK
INTERNATIONAL MEMBER – A GALVANIZER OR RELATED COMPANY BEYOND THE BORDERS OF SOUTH AFRICA					
Giardina SRL	Milano, Italy	Ugo Giardina	+3902 606 119	impianti@giardina-srl.it	Exclusive agent in Italy for W. Pilling. In cooperation with Scandiuzzi, GIARDINA SRL designs and implements full plants and components such as: chemical processing tanks complete with vapour suction and scrubbing systems, zinc exhaust collection enclosures and bag filters for scrubbing. Giardina also sell zinc pumps, dressing grabs and centrifuges.
Gimeco Srl	Trezzano Rosa, Italy	Ernes Moroni	+3902 9096 0751	gimecoita@tin.it	Engineering and manufacturing of hot dip galvanizing lines.
GM Gruppo Macabeo	Milano, Italy	Silvio Macabeo	+39362 340975	silvio@macabeo.it	Hot dip galvanizing plants, process lines and equipment, depuration plants and polypropylene pickling.
Kingfield Equipment (Pty) Ltd	Victoria, Australia	Geoff Lisle	+613 9876 9090	geoff@kingfeldequipment.com.au	Suppliers and designers of hot dip galvanizing equipment and furnaces.
Shree Tech International	Andheri (East) Mumbai, India	Vivek Menon	+91 22 28215995	info@pnmenon.com	Manufacturing of chemicals for galvanizing, phosphating, electroplating, pre-treatments, finishing formulation, welding, brazing, soldering, fluxes, activators, catalysts, corrosion inhibitors, antioxidants, drying agents, water treatment chemicals and development of formulations.
ASSOCIATE SUPPORT MEMBER – SUPPORT COMPANIES THAT PURCHASE AND SELL TO THE INDUSTRY					
Chemplus	Rodepoort	Pari Ligeris	011 760 6000	chemplus@mweb.co.za	Manufacture of speciality process and finishing chemicals to the hot dip galvanizing industry.
Krome Metal Chemicals (Pty) Ltd	Bedfordview	Ann Orlik	011 450 2680	reception@krome.co.za	A specialised chemical blending and manufacturing operation, supplying and servicing the Metal Finishing Industries
Metmar Trading	Bryanston	Owen Tennant	011 267 3000	owen@metmar.co.za	Metmar is focused on developing assets and generating revenues related to the mining, production and trading of ores, alloys, metals, plastics, rubber and chemicals.
Metsep (Pty) Ltd	Denver	Robert Watchorn	011 626 2425	robert@metsep.co.za	Supplying pickling plants with inhibited hydrochloric acid and removing and regenerating the spent pickle liquor in an environmentally friendly manner.
Orlik Metal Chemicals	Bedfordview	Clare Hennion	011 457 2400	clare.hennion@chemsystems.co.za	Manufacture of speciality metal finishing chemicals to the hot dip galvanizing, electroplating, anodising, wire drawing and powder coating industries.
Speccoats Paints (Pty) Ltd	Boksburg	Mervyn Cohen Graeme Stead	086 137 2468	graeme@speccoats.co.za	Manufacturing and distributing of specialised liquid coatings. Supply locally manufactured products to the architectural, commercial and industrial markets such as Zincfix.
Surface Treatment Technologies	Jupiter	Donovan Jones	011 626 2255	sttchem@mweb.co.za	Manufacture, supply and servicing of speciality metal treatment chemical products and coatings to the hot dip galvanizing, powder coating, wire drawing, anodising and paint market.
Zinchem (Pty) Ltd	Benoni Industrial	Ryan Myburgh	011 746 5000	ryanm@zinchem.co.za	Zinchem converts primary and secondary zinc to superior quality chemicals and metals. The product range includes various grades of zinc dust, zinc oxide, zinc sulphates, zinc nitrate, copper sulphate metal and a wide range of zinc alloys.
AFFILIATE COMPANY MEMBER – COMPANIES THAT SELL HOT DIP GALVANIZED ARTICLES					
Advanced Roof Technology Foundation SA	Illovo	Rick Norwood	011 605 2510	info_artf@mweb.co.za	Advisory and practicing Association of advanced level consultants, engineers, inspectors and paint applicators, in the roofing field.
Bulldog Projects cc	Wadeville	Michael Book	011 827 4221	mike@bulldogprojects.co.za	Specialists in the painting of hot dip galvanized substrates.
CIS Engineering (Pty) Ltd	Vanderbijlpark	Christo Marais	016 986 3958	admin@cisengineering.co.za	CIS Engineering specialises in the manufacturing and installation of superior steel products supporting an impressive range of communication and electrical infrastructure projects.
CWI (Pty) Ltd	Vanderbijlpark	Craig Viljoen	016 980 3111	craigvil@cwi-wire.co.za	Manufacture of galvanized wire and wire products.
Eskom NW		Sakkie vd Vyver	051 404 2053	Isak.VanDerVyver@eskom.co.za	Performance contracts with industrial customers to keep energy costs low and process efficient.
Hi-Tech Elements (Pty) Ltd	Boksburg	Andre Goosen	011 894 3937	andre@hi-techelements.co.za	Design and manufacture of heating elements, systems and control for the hot dip galvanizing industry.
MRH Blasting & Coatings	Phillipi	Rhomeez Hendricks	021 691 0862	info@mrhgroup.co.za	The painting of structural steel and corrosion control. Today MRH is one of the largest specialist blasting-and-coating companies in the Western Cape and service the industrial, commercial, building, marine and petrochemical sectors.
O-line Support Systems (Pty) Ltd	Selby	Edzard Verseput	011 613 8527	o-line@o-line.co.za	Electrical and mechanical support systems and powder coating.
Rand York Castings	Umlhanga Rocks	Justin Corbett	031 561 1023	sales@randyork.com	Fabrication of special steel profiles for civil and mining sectors.
Robor Pipe Systems	Isando	Jim Begbie	011 974 3351	jimb@robora.co.za	Supply of value added steel pipe and complete piping systems with various protective coatings.
SA Galvanizing Services (Pty) Ltd	Pretoria	Johan du Plessis	012 996 0458	sagals@eject.co.za	New hot dip galvanizing plant design, installation and project management technology experts.
Southern African Institute of Steel Construction	Parktown West	Tiana Ferreira	011 726 6111	tiana@saisc.co.za	The mission of SAISC is to develop and promote the health and wealth of the steel construction industry in Southern Africa.
Southern African Light Steel Frame Building Association	Parktown West	John Barnard	011 726 6111	info@sasfa.co.za	The mission of SASFA is to develop and grow the Southern African and export markets for light steel frame building
Strutfast (Pty) Ltd	Denver	Pieter Uys	011 622 9969	sales@strutfast.co.za	Suppliers of electrical cable support systems.
TESA Palisade Fencing & Security Systems (Pty) Ltd	Montague Gardens	Brian Wallace	021 551 2955	brian@tesafencing.com	High volume fencing manufacturers
T & E	Chamdor	Jack Siebert	011 762 1084	trucking@trucking.co.za	High and low pressure piping, stainless steel, steelwork and platework.
Weartech (Pty) Ltd	Wadeville	Simon Wintle	011 824 6010	simon@weartech.co.za	Suppliers of zinc thermal spray equipment, spare parts and wire.
AFFILIATE PROFESSIONAL MEMBER – SPECIFIERS WHO HAVE AN INTEREST IN THE ASSOCIATION					
Corrosion Technology Consultants	Bedfordview	Gerald Haynes	011 456 7960	gihaynes@icon.co.za	Reputable independent Corrosion and AC Mitigation Consulting Engineers and Project Managers.
T.Henning Corrosion Protection Services	Sherwood	Tim Henning	031 208 3819	tim.corr@tiscali.co.za	Corrosion Consultant – 3rd party inspection services and corrosion / engineering expediting
AFFILIATE GALVANIZING INSPECTOR MEMBER – APPROVED GALVANIZING INSPECTORS					
Keith Moodie	Polokwane	-	015 291 2020		
Stephen Herholdt	Garsfontein East	-	082 568 3414		
Robert Bossert	Southdale	-	082 331 6897		

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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

SANDO



12m x 1.45m x 2m
(length x width x depth)

DUNSWART



5m x 1.2m x 1.8m
(length x width x depth)

RANDFONTEIN



6m x 1.25m x 1.8m
(length x width x depth)

