Vol. 3 Issue 1 | 2017

Corrosion Exclusively

INSIDE:

- Corrosion management of lattice structures
- Battling building envelope corrosion
- Delivering a functional coating for a SS naval antennae
- Correcting and preventing concrete corrosion
- Some issues with reinforced concrete

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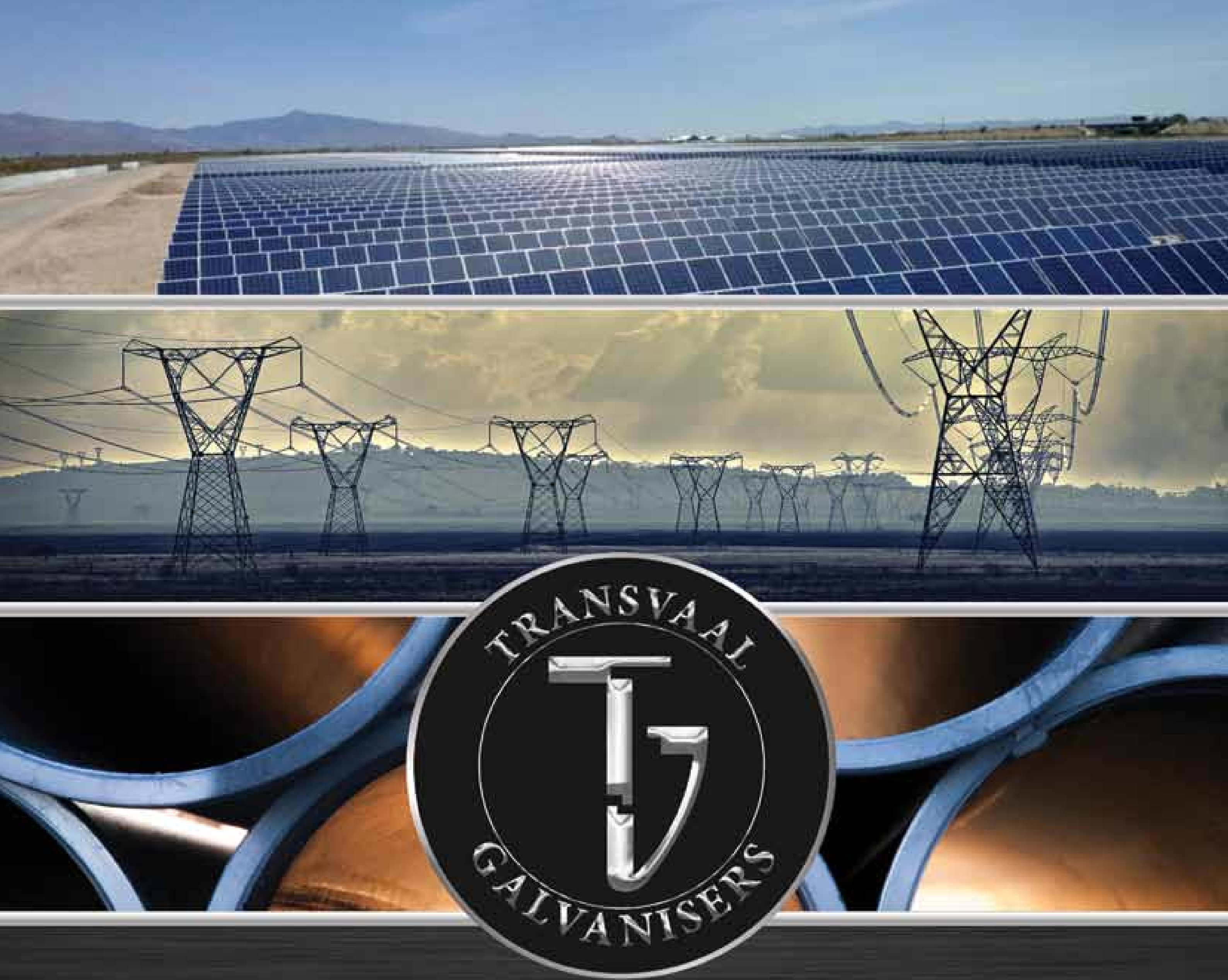
CORROSION INSTITUTE SOUTHERN AFRICA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Corrosion Exclusively

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President's Comment

Establishing and reinforcing the identity of practitioners in the Corrosion Sector, has never been more important than now. When we say that we specialise in "Corrosion" what is it that we mean? As importantly is the question of whether other Industries, those Industries which are serviced by companies specialising in Corrosion, and practitioners qualified in "Corrosion" services, recognise and give our Sector the due respect and acknowledgement we deserve?

The Corrosion Institute has taken a very broad and important decision in the last few months. That is, to work towards claiming our rightful space as the authority responsible for all companies and individuals working in Corrosion, throughout the country. We believe that it is only through a cohesive network of like-minded organisations operating in our Sector that we will project the self-regulating and responsible identity capable of interacting with other Sectors and holding our members, both private and corporate to account, not only for their competency, but for their behaviour as well.

We intend to do this by firstly establishing a "Professional Body". It is not good enough that practitioners in the world of Corrosion have qualifications obtained via Engineering, Manufacturing and the-like with almost no Corrosion training or certification. The barriers to entry in the world of Corrosion are too low and as a result too many mistakes and missteps are made which can be avoided. In establishing a Professional Body, we are saying that irrespective of the formative training obtained, we insist that for a person to be regarded as a true "Professional" in our domain, they need to be recognised not only for their education but more importantly for the work they have actually done, reflected in their "Portfolios of Evidence". Our focus needs to be on practical competence rather than simply knowledge and this is the mission we are setting for ourselves as a Professional Body. To define 'competence" find ways of measuring "competence" and holding those we recognise as truly "Professional" accountable for their own lifelong learning and "Continuous Professional Development".

We never want this Professional Body to be seen as anything other than growing from and arising within our Sector. The only people involved in Governing this body will be us, you and your elected officials at CorrISA. The people who work in the Sector of Corrosion. We do not want to be dictated to by outside organisations and we insist that at all times we are acknowledged to be Self-Governing and capable of regulating our own affairs.

To define and expand on areas of Professional Recognition, we are going to need the Sector of Industries constituting "Corrosion" to come to the party. To attend the workshops, we will be convening in all major Provinces where our members operate from. To work with us, to contribute and to provide feedback when we ask for it. It is our intention to engage you, our Members, our prospective members and those companies operating in the world of Corrosion, on the categories and criteria of Professional recognition, on how we are going to assess Professional competence, and on the rules and processes which are implemented in-terms of retaining your Professional recognition and graduating from one level to the other.

So kindly watch this space, attend our workshops and subject-matter expert sessions and help us, work with us, to build a strong and proud Professional Body as an important link in the provision of essential services, to you, our members. Please respond to our Research Questionnaires and when we are ready to pilot our Professional Designations, the mechanism we plan, to recognise you, the practitioners at the various levels you operate at, within the Sector, please be first in-line to volunteer yourselves and your employee's for these prestigious and very important activities.

As your elected officials we can assure you that the plans we have decided to move ahead with will ensure sustainability and longevity for all Practitioners and Companies within the Sector. We aim to unify this group of Industries in many ways towards one purpose, a common voice and brand.

Yours in corrosion,
Edward Livesey, President

OBJECTIVE OF THE MAGAZINE

"The objective of *'Corrosion Exclusively'* is to highlight CORRISA activities, raise and debate corrosion related issues, including circumstances where inappropriate material and/or coatings have been incorrectly specified, or have degraded due to excessive service life. Furthermore, it shall ensure that appropriate materials or coatings, be they metallic or otherwise, get equal exposure opportunity to the selected readers, provided these are appropriate for the specified exposure conditions on hand."

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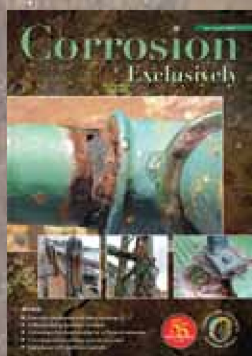

Cover: A collage of corroded components including corroding steel in concrete.

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Dont just Galvanize it, Monogalv it

Editorial Comment

It is our absolute pleasure to welcome you to the sixth edition of Corrosion Exclusively, which we are proud to say is now in its third year.

Being the official mouth piece of the Corrosion Institute of Southern Africa, we strive to compile a mixture of corrosion related articles as well as preventative measures by discussing appropriate materials and coating systems.

While we encourage local participation, we accept from an interest perspective that contributions from experienced overseas corrosion related organisations and individuals, are necessary and will in time add value to a reader's experience simultaneously enhancing the publication's credibility.

The following articles have been selected for inclusion in this sixth edition:

- The second part of "Corrosion management of elevated lattice galvanized structures" by Mark Dromgool of KTA Tator in Australia. The shortened version of the article originally appeared in the Journal of Protective Coatings and Linings (JPCL).
- "Battling building envelope corrosion" by Australasian Corrosion Association (ACA).
- "Thermal spray coatings protect refineries" by Adam Wintle of Weartech.
- "Delivering a functional coating for a stainless steel naval antennae" by Simon Norton of Chemical Investigation Services.
- "Stainless steel, saving money for municipalities" contributed by South African Stainless Steel Development Association – SASSDA.
- One aspect of corrosion which has not been published yet in CE is the Corrosion of steel in concrete structures. We introduce the subject with an article from Wesley Fawaz of ACA, "Correcting and preventing concrete corrosion". Adding more background to this costly phenomena with a contribution from Dr Stephen Yeomans. Stephen's book on the subject, "Galvanized steel reinforcement in concrete" was published by Elsevier in December 2004 and summarised over four issues of Hot Dip Galvanizing Today.
- Further to this another book edited by Amir Poursaee and published by Woodhead in 2016, "Corrosion of steel in concrete" the content and authors of which are listed in the feature, is now also available. The book is a collection of methods of preventing concrete corrosion by notable authorities in their respective field of expertise, including Dr Stephen Yeomans, Professor at Canberra University, NSW, Australia. The contents of this almost 400 page book is in my opinion extremely valuable to those engineers who have experienced this phenomena and in the future wish to avoid it.

Thanks again to all the amazing local and international contributors for their valuable contributions and willing advertisers, many of whom have accepted this year's incentive to take multiple adverts to their financial benefit, thank you!

Following on the visit late last year by Gasem Fallatah Senior Manager WA&A Area Office of NACE, where reciprocal future actions between NACE and CorrISA were discussed and now highlighted in this edition. We are happy to announce that one of the actions will result in NACE becoming a future contributor to Corrosion Exclusively.

Should there be any specific subject readers or advertisers wish to see discussed in the forum of this magazine, kindly advise?

Lynette van Zyl the Manager at the Coré as well as the Western Cape Chairman Graham Duk and the Interim Chairman of KZN, Mark Terblanche, give an account of their respective activities.

Other activities of the Institute include feedback on a number of NACE and Corrosion Engineering Courses as well as proposed courses in 2017, plus many interesting technical evenings held both in Johannesburg and Cape Town.

Our Guest Writer is Dr Ivor Blumenthul, who has been retained by CorrISA to establish an Independent Professional Body for the sector of Corrosion.

Arthur Byrns a well-known paint technologist who has retired in Port Elizabeth, gives us an account of his life in protective coatings on "The RUST Spot".

Terry Smith

Corrosion management of elevated lattice galvanized structures – *Care for the aged* (Part 2)

By Mark B Dromgool,
MD of KTA Tator Australia Pty Ltd

Republished in Corrosion Exclusively from the Journal of Protective Coatings & Linings (JPCL) with the permission of Technology Publishing Company, 2016.

If the choice of maintenance action is restricted to either fully repainting the tower/mast or to replace it with a new structure, an on-site corrosion and condition assessment needs to be made by someone with the right type of skills. There are some tools and standards, such as SSPC-Vis 2[i], that can be used although this pictorial guide depicts degrees or the **extent** of rusting as a scale or percentage rather than the **rate** at which an item or member is losing steel section. Importantly, these two things are not the same, and I consider the latter metric is more important. Nonetheless, the assessor will need to make a judgement about the average extent of corrosion, breakdown or the extent of section loss for the whole structure in order to categorise the asset.

A major facility owner in New Zealand[ii] has developed and uses a system of "Condition Assessment" scores, ranging from CA100 down to CA20 (CA100 being in as-new condition, with scores cascading down for more deterioration, with CA20 denoting replacement). In this system, this asset owner has determined that the optimum CA score to repaint is around CA40 or CA30 *(see Editorial Comment[#])*, depending on whether the environment is Very Severe, Severe, Moderate or Low. CA scores below this level suggest replacement of the structure.

Assigning a single CA score is not always easy to do because the structure being

This print shows a good example of how the lighter members, which start with an initially lower thickness of galvanizing, corrode way earlier than heavier members like the main legs. The orientation of the sections also changes the amount and rate of zinc loss. These lighter members are due to be replaced, as attempting to economically and reliably clean and paint these in situ will be futile. The legs members, however, are in a near perfect condition to be cleaned and painted whilst some galvanic capability remains.

assessed is subject to a high order of sensitivity, especially when members or zones are close in condition (i.e., degree of corrosion) to the crossover point between the candidate actions.

Given all of the lattice members on the tower are bolted, and as it is usually the lighter sections such as secondary and tertiary braces, ladder cages and cleat plates that corrode first, these often only require the removal of a few bolts to facilitate their extraction and replacement; and if carefully performed, changing lighter members will not threaten the integrity of the structure during the time that the bolts are removed and replaced.

Our strategy is to identify the steelwork members on a tower that are vulnerable to a loss of structural integrity from corrosion and separate these into a hierarchy of members with slightly different approaches needed for maintenance.

- Primary members such as the main legs and the deeply embedded steelwork, e.g., items that almost cannot be replaced or removed and must be maintained *in situ*. This would include items in compression, principal members of and around portal frames, major platform support steelwork and so on.
- Next would be secondary members that could possibly be removed and replaced, if required, but which are still critical to the integrity of the tower. These would include main braces and diagonals, cable runway supports, main antenna mounting frames, etc.
- Tertiary members would include the lighter braces, handrail angles, platform mesh or chequer plate, ladder sections, ladder cages, lighter antenna mounting bars, braces, etc.
- Lastly would be bolts and fasteners including tower bolts, step bolts, feeder and wave guide cable clamps, and so on.

Primary members must be protected and maintained to a high level, not only because they are pivotal to the structural integrity of the tower but because there is little opportunity to extract and replace these if lost or damaged by corrosion. This would include items that are very difficult or impossible to replace, e.g., the main leg angles; compression members; heavily embedded platform or bracing members; and the cable feeder runway stiles (on broadcasting/communication towers), as opposed to those that can more easily be removed by the extraction of a small number of bolts or fasteners.

Members that fall into the first category are those where the next recommended action will be to prepare and repaint these items and surfaces *in situ*. This is because the effort to extract these members is likely to be too great. Often (but not always) if a member is in compression rather than in tension in its loaded state, extraction is more difficult or perhaps impossible. For example, it is very hard to change out a main leg angle on many towers or masts, as this would require a complex leg splint to be installed, jacks be fitted to unload the bolts and the stability/integrity issues of the whole structure whilst the individual member is extracted and replaced must be considered. The site painting will usually entail carrying out cleaning, using freshwater jetwashing; surface preparation, most probably using wet abrasive blasting; and then the application of a high performance field-applied coating system. Often, the sooner these items are addressed when zinc depletion is pending, the lower the intensity of surface preparation that will be required, specifically because the remnants of the galvanizing, after cleaning, can remain to be part of the ongoing protective system.

Secondary members could potentially be extracted and replaced like-for-like, even if this happens to be quite an exercise. The feasibility of extracting a particular member would depend on how much other steelwork needs to be removed to get the affected item out. So, some secondary members would require to be treated as-fitted and others could be removed. Simple straight and un-fabricated members such as some primary and most secondary angle braces, cleat plates, feeder clamp angles, handrail members, etc., usually fall into this category. In some instances it may prove more feasible to consider assemblies or sub-assemblies as candidates for replacement as a whole. The cross arms on power towers that support the electrical conductors are an example of a group of members that can be considered for replacement as an assembly.

One important difference between these options is the degree of degradation that can be tolerated if the next action is one of the following:

(a) to repaint the member over the existing galvanizing;

(b) to abrasive blast and then paint it; or

(c) if it is to be removed and replaced.

If the next action is to simply paint any member or part of a structure (i.e., minimum surface preparation), it follows that the galvanizing must still be functional prior to painting, because if not and/or if there is any corrosion present, more extensive abrasive blasting or some other mechanical surface preparation will be required first, which puts this item into the next category and thus adds to the cost and complexity. This also means that no corrosion should be present on the member and no metal loss can have occurred.

For the other members of the tower where physically removing these and replacing them with new, like-manufactured items is possible, some delay and a much worse state of degradation can be tolerated. As the next action for these members is replacement with a newly galvanized and freshly shop-painted item, these can be left until their structural functionality is threatened due to corrosion, or when their corroded appearance becomes no longer tolerable, whichever is the sooner.

This is because, if the next maintenance activity is to blast and paint any member(s) on a structure, it follows that there is a small limit to how much structural strength each member can afford to lose by corrosion, because it is intended to stay in place after it is painted. This implies that the galvanizing could be well consumed and even red rust present, yet the item could potentially be still suitable to properly blast and paint. Whether it is economic to perform this option is another matter. However, if a change-out is the next action, its replacement can be delayed for much longer because that member is to be scrapped and replaced with a structurally new and uncompromised item. In the latter case, the member could be very badly corroded, even to the point of perforation, but if deemed to be still structurally adequate, it doesn't yet need replacement. In this instance, it is the remaining structural capability of the member that will determine when the changeout is needed; not the condition of the galvanizing, the paintability of the item or indeed, its appearance.

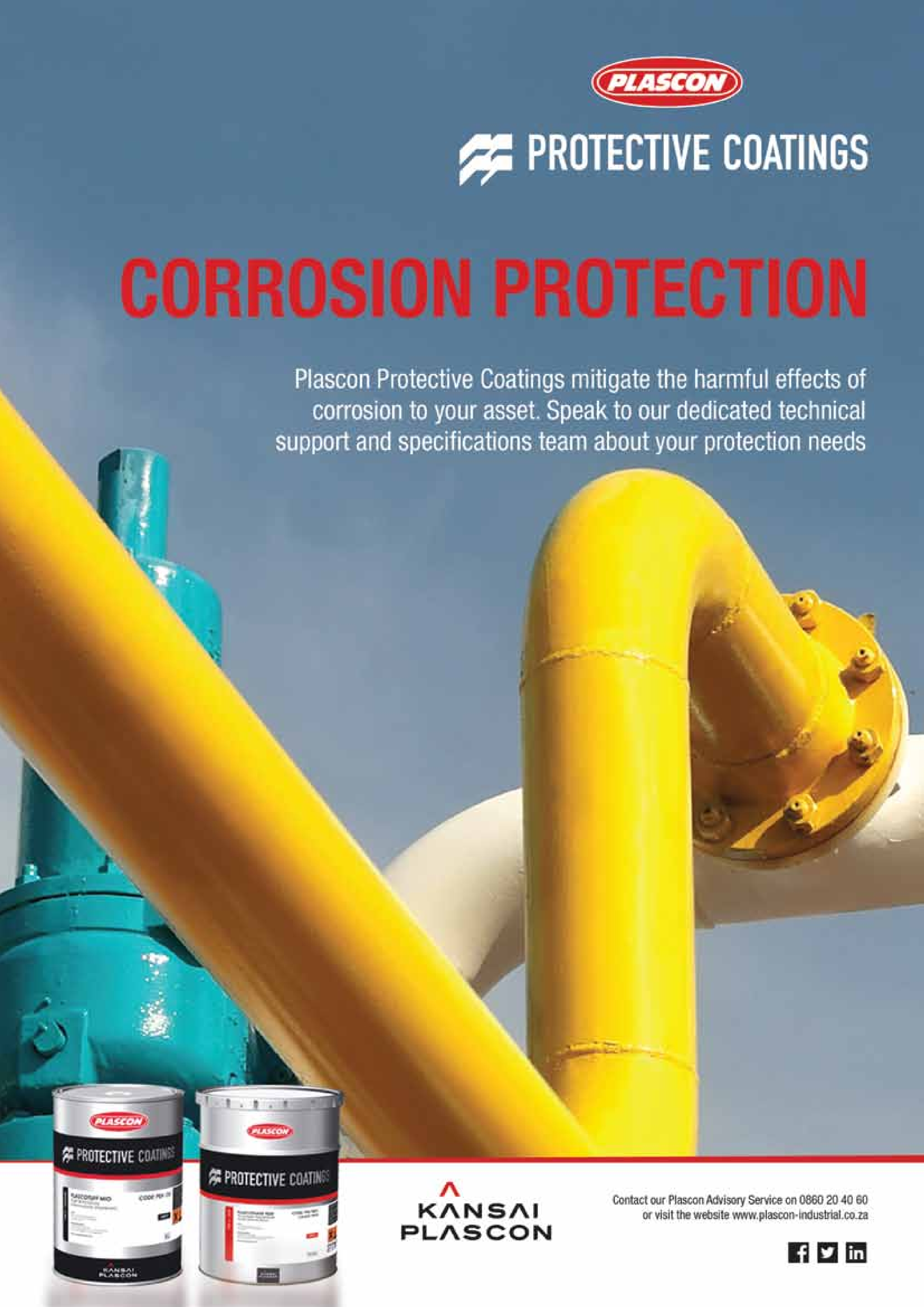
Selected items, specifically some of the more complex or fabricated sections that can be removed can also be considered to be extracted, refurbished and re-installed. This could include ladder assemblies which can be abrasive blasted and regalvanized prior to being reinstalled. For such fabricated items, this should be less expensive than refabricating new assemblies, even if it means making a temporary arrangement to allow continued access, e.g., with scaffold ladders. Likewise, some of the regular and repeated items that exist on the tower in multiple locations, could have some of their number removed and replaced with new, and then those refurbished by blasting and regalvanizing before being swapped out for like items. Some of the brackets that restrain the feeder cables to the feeder runway, repeats of face diagonal angles and various handrails could come into this category.

With bolts and fasteners, our suggestion is that these should not ever be painted in an attempt to preserve their life. New bolts are, by comparison, cheap when compared to the real cost of providing access, manpower and materials to clean and repaint them aloft; so it makes no sense to spend effort and money to paint rusty bolts. The only exception would be where primary members or deeply embedded steelwork is being blasted and coated *in situ*, then it makes some sense to coat the bolts at the same time. Tower bolts and similar high strength fasteners can lose a lot of metal from both the head and the nut from corrosion long before the bolt loses tension in the shank, which is, after all, where and how bolts work.

This makes the trigger point for action different for primary members, secondary members or tertiary or other items and surfaces. For many painters and coating contractors used to undertaking maintenance painting on structures, this concept can be hard to grasp especially if these members are adjacent to each other and their habit is to paint all areas showing distress. Maintenance painters are usually conditioned to address all breakdown as a default, so their inclination is to tackle all corroded members needs to be restrained so the work on the structure doesn't expand by scope-creep. Often, these contractors need to be educated specifically on what items to address and how, plus what members and surfaces they are to ignore.

This shows quite dramatically how lighter members and those that have sheltered surfaces not subject to fresh water rain washing, lose zinc thickness and corrode way quicker than heavier and near-vertical members. Replacement of the face braces is not yet due but is relatively easy when required as only a few bolts need to be removed to change out these simple steel sections.

One of the first signs of the loss of galvanic capability is the commencement of gingering of bolts and fasteners. This is partly due to the lower initial thickness of the galvanizing, as such items are usually centrifuged just after withdrawal from the galvanizing kettle. Note the comparative degree of condition of the cleat plate and the affixed angle members versus the bolts.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These landing handrails are currently still functional but will progressively lose section thickness and integrity. Therefore, they are not worth spending any time and money on before they are corroded enough to require replacement. However, the main leg members and the compression struts for the cross arms in the background should be cleaned and repainted shortly before their condition deteriorates to the point that the surface preparation intensity rises too far.

A splice joint in a ladder run is shown, demonstrating how lighter members and where pockets and unsealed connections are more vulnerable. The tower is about 35 years old and was painted with epoxy high build about 13 years ago. Rather than attempt to site clean, prepare and paint these surfaces, it would be better to remove, blast and regalvanise the ladder, make new splice plates and fit these together with new bolts.

The potential for quite measurable savings using this approach comes from choosing the most appropriate treatment option – which can include doing nothing in some instances.

Therefore, selective replacement of badly corroded lattice tower members with newly galvanized and shop-painted items, on a like-for-like basis, is a strategy that should be considered to be complimentary (not conflicting) with that of site painting in order to achieve the longest life-span at the lowest possible cost with the best risk profile for the structure.

It should be understood that a straight section of new angle steel, with a few bolt holes and galvanized (then painted) after fabrication, is actually quite cheap when compared to the complex and expensive exercise of erecting scaffolding and containment and manually blasting and painting some parts of an elevated structure. Using rope access methods and having the pre-fabricated replacement members and new bolts already on site, should have these changed out from a structure in a very short time.

The usual procedure followed is to survey the structure and identify members that are corroding through or below the galvanizing, indicating that they are losing section thickness and threatening structural integrity. This may require a suitably experienced inspector to climb the tower or it could be conducted from another vantage point, e.g., using a camera-equipped RPV (remotely piloted vehicle), e.g., a quadcopter sometimes (but incorrectly) called a drone. The members are identified on the original drawings (preferred), or if this is not possible, the item is physically measured. A list of all of the steel required for the member change-out program is then assembled.

The process of cutting simple angle lengths from stock steel, punching the holes correctly, hard stamping the mark number, abrasive blasting and then hot dip galvanizing each piece, is a very straightforward exercise that can be handled by a competent steel workshop or a steel merchant. Likewise, profile cutting steel cleats or attachment plates can be performed by any number of steel workshops or profile cutting operators working from an electronic drawing or CAD file. If a reasonable quantity are ordered, the cost per item should be quite economical.

One very attractive feature of adopting a selective member change-out program like has been described above, is the flexibility and compatibility that it has alongside the other maintenance options.

Adopting a member change-out strategy has the ability to reduce the work scope and/or delay the expenditure of painting, particularly on bolted lattice structures. What adds to the attractiveness of adopting a selected member change-out strategy, is that it would allow for the corroding member to deteriorate to a greater degree, i.e., by remaining exposed until more of its galvanizing was spent, and the trigger for its replacement is not then appearance or the intensity of effort to blast and paint it, but purely its structural strength. This means that it could feasibly spend a number of years more as part of the structure before it **must** be replaced.

Editorial comment. For interest sake – ISO 14713 Part 1:2011 Clause 6,5, suggests that in order to benefit from the duplex coating effect, hot dip galvanizing should be over coated when the residual galvanized coating thickness has been reduced to no less than 20 to 30µm.

i *SSPC-Vis 2, Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces; SSPC 00-08; Pittsburgh, PA.*

ii *TransPower, Asset Strategy: Tower Painting, TP.TL. 01.01; TransPower, NZ; March 2010.*

We wish to publicly apologize to Mark Dromgool and JPCL (Journal of Protective Coatings & Linings) for not acknowledging the original source of this article when it first appeared in Vol. 2 Issue 4 of CE.

Battling building envelope corrosion

Concrete is usually the foundation of a good building and efficient management of the effects of concrete corrosion can extend the life of a building. However, concrete is not the only part of a structure that is threatened by corrosion. On any building, both the cladding and the fasteners holding it in place are exposed to varying degrees of corrosion. Less obvious parts that corrode are the polymers used as sealants and the protective coatings applied to other materials.

Corrosion continues to impose a massive cost on industry. This has been estimated, in a recent report issued by NACE (USA) to be more than three per cent – or multiple billions of dollars – of global GDP each year.

Rusting steel has exposed structural timber which has begun to rot.

One cost that may not be obvious is unbudgeted capital expenditure to replace damaged frames, walls and façades resulting from the "leaky building syndrome."

A "leaky building" is one that, as a result of defective design, materials, or construction – usually a combination of all three – allows water to enter through the external building envelope which then causes decay and damage to the internal structure of the building. The situation arose from a combination of factors in the late 1990s and early 2000s that saw the construction of a large number of buildings using substandard materials, together with design flaws and insufficient maintenance that were vulnerable to moisture ingress.

"Leaky building syndrome has become a serious problem in New Zealand," stated

Protecting one's assets by regular maintenance will generally delay the expense of total replacement.

Rain water gutters must be frequently cleaned of all debris and other service pipes should not be laid within them, in order to maintain their integrity.

Making use of an inappropriately coated door latch and lock in an aggressive marine environment, will generally result in premature replacement.

corrosion expert, Les Boulton, Principal Consultant of Les Boulton and Associates in Auckland. "It is becoming a global issue for many governments as there have now been court cases in New Zealand, Australia and Canada where developers and manufacturers are being sued."

There have been many contributing factors to the problem of leaky buildings, including poor quality metal flashings which allow water to get behind the façade of a building and corrode materials such as the building framework and cladding fastenings. In some cases, bare steel has been used for internal structural elements and left exposed to harsh coastal climates.

It is not only reinforced concrete in a building or structure that is impacted by corrosion. A broad definition of corrosion is 'the degradation of a material through interaction with its environment' which means that any part of a building is prone to some type of corrosion over time and at varying rates.

The Australasian Corrosion Association (ACA) is an organisation that works with industry and academia to provide an extensive knowledge base of research that supports best practice in corrosion management for situations such as 'leaky buildings'. This collaboration helps ensure all impacts of corrosion are responsibly managed, the environment protected, public safety enhanced and economies improved.

Polymers are used extensively in the construction industry, including as seals around windows and doors; guttering and downpipes, and corrugated polycarbonate panelling. These are all affected by sunlight (UV radiation), moisture and heat. In addition to structural use, polymers are also often used as sealants over other materials, including concrete.

UV radiation interacts with a polymer at the molecular level where the UV has the right energy to modify chemical bonds. The majority of testing of polymers and other construction materials has been carried out in European countries and the climatic conditions of the Northern hemisphere. Research by organisations and government bodies has shown that at equivalent latitudes, New Zealand, Australia and South Africa experience larger amounts and more intense UV radiation.

Even if stored in a dark cupboard, polymers still interact with their environment. When used as an additive to materials such as concrete, thermal and wet/dry cycles can leach out chemical binding agents.

According to Boulton, "leaky buildings" are not unique to New Zealand, but the geography and climate of particular sections of that country seem to exacerbate the problem. In the past 10 years, corrosion on fixings of aluminium composite panels (ACPs) had caused a range of failures in commercial buildings clad using this material, resulting in panels becoming loose and allowing water to enter the building envelope.

"However, because it is not seen, building owners have been slow to recognise the problem," Boulton said. "Asset owners need to be proactive about checking their buildings and cladding to ensure there is no water ingress."

Inspection reports have shown that "leaky buildings" have been built with monolithic cladding systems, which provided little or no margin for error if moisture ever did penetrate behind the cladding and into the building envelope. Usually, the untreated, kiln-dried framing timber which had been approved by the now defunct Building Industry Authority for use in construction was particularly susceptible to any moisture ingress. By the time an asset owner realised that there was a problem it was already too late to fix it without rebuilding significant parts of the structure of the building.

Another contributing factor was that for many years, developers had no incentive to pay for the best design of their buildings, nor the appropriate level of supervision of construction to ensure the buildings were constructed properly.

Working 20 storeys above the ground adds to the challenges of protecting structures from corrosion.

The NZ Building Code (NZBC) Clause B2, Durability, requires that all building components are fit for purpose and provide a service life as stated in the NZBC.

Durability appraisals of building products are required before a new product is deemed to be fit for installation in a new building. This requires an independent assessment of the building product, system design, material corrosion resistance, and installation practices. It is also important that the testing also reflects the geographic environment of where the building materials will be used.

"Thorough appraisals give the construction industry and asset owners confidence that the new products have been subjected to a robust technical examination by experts before the product is released into the market," stated Boulton

"Some failures in the ongoing leaky building crisis have been caused by water ingress behind inadequately designed or installed cladding systems which resulted in corrosion of hidden metal fixings," Boulton added.

When plastics eventually become brittle due to UV exposure, they no longer afford the protection for which they were designed. There have been instances of objects falling through polycarbonate canopies and injuring people below. While the most visible degradation effect on polymers is an aesthetic one where a grey-white powdery substance forms on the surface, there are many other less obvious effects such as PVC guttering and downpipes developing cracks and leaks that could allow water to get inside the building envelope.

Owners of high-value assets must understand the cost implications of ignoring the effects of corrosion. There are many advantages of planning for corrosion control and mitigation, two of which are that the life of an asset can be extended and maintenance time and costs can be reduced.

Monitoring the impact of corrosion on any type of structure is a critical aspect of ensuring asset integrity. A key way of minimising corrosion is to employ appropriate corrosion protection technologies. Proactively testing and inspecting building structures gives a clearer understanding of where to spend limited resources on the maintenance of assets.

In order to effectively and comprehensively explain the benefits of incorporating maintenance planning into the design process, companies and practitioners in the industry should ensure they understand all the latest building products, construction technologies, processes and legislation.

The ACA is a not-for-profit, industry association, established in 1955 to service the needs of Australian and New Zealand companies, organisations and individuals involved in the fight against corrosion. The vision of the organisation is to reduce the impact of corrosion.

We wish to thank ACA for this article.

Corrosion conference showcased latest knowledge and technologies

Delegates to Corrosion & Prevention 2016 (C&P2016) conference and trade exhibition in Auckland were greeted with a traditional Maori haka, along with other traditional dances, at the start of the event that was staged at the SkyCity Convention Centre on Auckland's scenic harbour in November 2016.

The conference brought together a panel of industry experts to discuss the challenges brought by new technologies and materials in addition to the importance of maintaining vital infrastructure. The convention and trade exhibition provided a forum for all corrosion stakeholders to meet and discuss a wide range of topics. Attendees were able to participate in seminars and hear technical papers covering best practice in corrosion management, environmental protection techniques, public safety and economics.

Corrosion has a major economic impact on industry and the wider community: it is estimated that governments and organisations spend billions of dollars every year mitigating and repairing corrosion damage.

The design, construction and operation of facilities and infrastructure represent major investments by companies, organisations and governments. Corrosion will affect all structures at varying rates over time, depending on the material used, the types of corrosive agents in the environment and the physical processes and mechanisms involved. How to manage this degradation is a challenge for designers and engineers, as well as asset owners, managers and operators.

C&P2016 revealed the latest technical advances and research on corrosion mitigation. Plenary speakers included Professor Digby Macdonald from University of California, whose current research involves studying Simulating Coolant and Corrosion Processes

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Dr Patricia Shaw was selected to give the 2016 P F Thompson Memorial Lecture.

Delegates C&P2016 were greeted with a traditional Maori haka and other traditional dances.

in Water-Cooled Nuclear Reactors and the Development of Deterministic Corrosion Damage Models.

Plenary lectures were also delivered by Howard Combs, General Manager Global Sales, Carboline USA, a specialist in elastomeric coating technology; David Williams, Professor in Electrochemistry at the University in Auckland and Nick Laycock, Senior Materials & Corrosion Engineer at Shell Qatar.

Speakers and delegates continue to raise the profile of corrosion and its mitigation, as well as working to place corrosion control on the national agenda.

The keynote address at each C&P Conference is the PF Thomson Memorial Lecture, which has been delivered every year since 1951. Percival Faraday Thompson (1885 – 1951) is recognised as Australasia's pioneer in the science and technology of metallic corrosion and its mitigation. The Lecture is the Association's premier dedicated lecture which strives to emulate the academic and technical qualities for which Thompson became known.

Dr Patricia Shaw was selected to give the 2016 P F Thompson Memorial Lecture. Shaw is the Better Buildings Research Team Leader at BRANZ and leads a team of material scientists, fire engineers and structural engineers researching improved techniques and materials for use in the building industry. She obtained a PhD in Chemistry from the University of Auckland and has more than 20 years' experience as a Materials Scientist.

The work of Dr Shaw and her team which briefly includes the environmental effects on polymeric materials, adds to the accumulated knowledge available to industry and other academics.

In 2017, the ACA will being saying "G'day, mate" to delegates attending next year's Corrosion & Prevention event when the conference returns once more to Sydney. As always, the conference will be the premier corrosion event in the Asia Pacific region and will feature a program of keynote speakers and technical presentations.

About the Australasian Corrosion Association

The Australasian Corrosion Association Incorporated (ACA) is a not-for-profit, industry association, established in 1955 to service the needs of Australian and New Zealand companies, organisations and individuals involved in the fight against corrosion.

The vision of the ACA is that corrosion is managed sustainably and cost effectively to ensure the health and safety of the community and protection of the environment.

For further information, please visit the web site: http://www.corrosion.com.au.

Thermal spray coatings protect refineries

What is Corrosion under Insulation (CUI)? CUI is a common problem shared by the refining, petrochemical, power, industrial, onshore and offshore industries. Corrosion under insulation is difficult to find because of the insulation cover that masks the corrosion problem until it is too late.

The problem occurs on carbon steels and 300 series stainless steels. On carbon steels it manifests as generalized or localized wall loss. With the stainless pipes it is often pitting and corrosion induced stress corrosion cracking.

Though failure can occur in a broad band of temperatures, corrosion becomes a significant concern in steel at temperatures between 0 and 149°C and is most severe at about 93°C. Corrosion and corrosion induced stress corrosion cracking rarely occur when operating temperatures are constant above 149°C. Corrosion under insulation is caused by the ingress of water into the insulation, which traps the water like a sponge in contact with the metal surface. The water can come from rain water, leakage, deluge system water, wash water, or sweating from temperature cycling or low temperature operation such as refrigeration units.

It is also widely known that the results of CUI are costly. CUI can account for as much as 40 to 60 percent of a company's piping maintenance costs, can result in repairs in the millions, and lead to significant downtime. Most studies on the topic involve all forms of corrosion and their associated costs without providing the individual cost of corrosion related to insulation.

A study completed in 2001 by a research team of corrosion specialists in the USA reported the direct cost of corrosion under insulation to be $276 billion per year, with that number potentially doubling when indirect costs are also considered.

In recent years, the CUI prevention philosophy of many large petrochemical companies has been an inspection-free, maintenance-free concept. Insulated systems particularly piping systems are expected to have a service life of 25 to 30 years. Evaluation of life-cycle savings has led to consideration of new, simple approaches to preventing CUI.

All thermal spraying processes rely on the same principle of heating a feedstock, accelerating it to a high velocity, and then allowing the particles to strike the substrate. The particles will deform and freeze onto the substrate. The coating is formed when millions of particles are deposited on top of each other. With TSA, these particles are bonded to the substrate mechanically.

The first step of any coating process is surface preparation. This is done by cleaning and white metal grit blasting the surface to be coated. Masking techniques may be adopted for components that only need specific areas coated. The second step is to atomize the aluminium, which is done by introducing the feedstock material into the heat source. The heat source may be produced by either chemical reaction (combustion) or electrical power (twin wire arc spray). Next, the particles are accelerated to the substrate by the gas stream and deform on impact to make a coating. Finally, the coatings are inspected and assessed for quality by either mechanical or microstructural evaluation.

The two common thermal spray techniques used to apply TSA to components are wire flame spray and twin wire electric arc spray. Adhesion to the substrate is considered largely mechanical and is dependent on the work piece being very clean and suitably rough. Roughening is carried out by grit blasting to a white metal condition with a sharp, angular profile in the 50-to-100 micron (2-to-4 mil) range. Flame and arc spraying require relatively low capital investment and are portable; they are often applied in open workshops and on site. Consumables used for TSA with these processes are more than 99-percent purity aluminium wires.

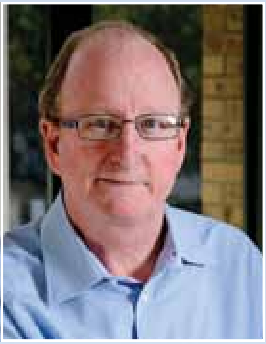
For more information contact Adam Wintle on 011 824 6010 or email: adam@weartech.co.za.

http://www.metallisation.com/videos/forth-road-bridge-coating.html


ANY
Project
Size
Specification
We have the solution.


carboline

Stainless Steel App gives users chance to win R125 000 trip to Paris!



The Southern Africa Stainless Steel Development Association (sassda) has launched an exciting new competition in which entrants (e.g. engineers, architects, quantity surveyors, end-users and specifiers and members of the public) stand to win a trip to Paris worth R125 000! Entrants need to download and use sassda's life cycle costing (LCC) app to calculate the significant long-term maintenance savings that could have been achieved had the Eiffel Tower been constructed from stainless steel.

Sassda created the LCC app in 2016 (available on the Google Play Store and Apple iStore) with the aim of boosting the use of stainless steel in the local market. The product uses the standard accountancy principle of discounted cash flow, so that total costs incurred during a stainless-steel structure's life cycle period are reduced to present day values.

Sassda Executive Director John Tarboton says; "The app calculates a realistic comparison of the options available. In terms of material selection, it takes into account the reduced maintenance and the longer life span that stainless steel offers. We put considerable time and effort developing formulas for the real-time calculation of the LCC of stainless steel and this requires minimal entry of key top-line data, before calculating a breakdown of the relevant costs and presenting the results in a convenient e-mail format to be sent to stakeholders."

The Eiffel Tower... only better

The competition was designed to bring the functionality of the app to life, with a tangible example of the fascinating and iconic Eiffel Tower which has an interesting history and was never meant to be permanent fixture in Paris. In fact, it was specifically intended as an exhibit at the Paris Exposition in 1889 and was to be dismantled after the show.

Tarboton explains; "Had the Eiffel Tower been constructed from stainless steel, a fortune would have been saved on maintenance costs – instead of these long-term benefits, the tower has required painting every seven years, using 50 tonnes of paint each time, taking 25 painters up to 18 months to complete the job. Of course, stainless steel had not been invented in 1889 and we thus ask entrants to compare the life cycle costs of steel and stainless steel if the Eiffel Tower had to be built in 2017. We provide all the input data for the App and it only takes a few minutes to enter these into the App and calculate the initial costs, the operating costs and the life cycle costs.

Other parameters in the competition include a choice between a lean duplex and a utility ferritic. The lean duplex is more expensive and requires cleaning every 20 years to maintain its brilliant aesthetics, however, it is stronger, allowing thickness and hence weight savings. The utility ferritic is cheaper than the lean duplex, does not require cleaning but would weather to a brown patina.

Entrants then need to calculate and compare what the operating costs would be for the Eiffel Tower for the next 100 years if it were built out of mild steel, and either utility ferritic or lean duplex.

Reducing complexity and highlighting benefits

"Overall, we aim to show how the app is invaluable to professionals in the field, who want to bypass the complicated steps normally associated with this type of calculation; unless they also have an accountancy qualification.

"In this way, we're hoping to educate the market on the inherent benefits of stainless steel which include minimal maintenance, a minimum 60-year lifespan and significant 'green' benefits," says Tarboton.

Full details on how to enter the competition and links to download the App can be obtained on the sassda website at http://sassda.co.za/life-cycle-costing-campaign and for a full explanation of how Life Cycle Costing works, please view our latest sassda YouTube channel video.

About sassda

The Southern Africa Stainless Steel Development Association (sassda) has been in existence for more than 50 years and is made up of members that distribute, market, manufacture and fabricate products and services relevant to stainless steel. With 400 members in sub-Saharan Africa, the association provides a platform for its members to collectively promote the sustainable growth and development of the industry, with the main emphasis on stainless steel converted within the South African economy.

Delivering a functional coating for stainless steel naval antenna

by Simon Norton of Chemical Investigation Services.

Background

Chemical Investigation Services was engaged by a specialist manufacturer of naval electronic systems to assist with the selection of coatings for their antenna system which consisted of a multi material including stainless steel housing within which were contained electronic components. Originally the antenna had been coated with an expensive and specialised coating system that required elaborate surface preparation and special oven cure processing. After this coating was applied the antenna units were subjected to the ASTM B117 salt spray test and passed the test. However when the antenna were installed on a submarine and subjected to extended sea testing and submersion, the highly specialised coating failed. The users of the antenna now required that the failed antenna coating be repaired insitu at their bases however this could not be done due to the elaborate application and curing process required for the coating. Chemical Investigation Service was therefore tasked to select and rigorously test an effective coating system that would meet the users operational requirements at sea in all weathers and submerged *(see figure below left)*.

Analysis

The antenna system required a very special coating that had to be black, non-magnetic, easily repaired insitu at naval bases, compatible with damaged old coatings and able to withstand wide environmental conditions and submersion to depth. This was no easy request. Furthermore while the existing coating had passed the ASTM B 117 salt spray test it had failed when used in practice, so a clearly a new approach was needed. Chemical Investigation Services then analysed the requirement and the problem with the unsuccessful laboratory testing and tackled the case in two ways:

i) by studying accelerated corrosion testing methods used in various industries

ii) reviewing and studying novel temporary corrosion protective coatings which it had encountered during a wire rope corrosion protection project

Solution

Chemical Investigation Services chose a cyclic accelerated corrosion test used by one of the foremost car manufacturers in Europe and modified the test cycle for this application as well as including crevice formers *(see figure below right)* and cross cut patterns in the test protocol. We studied and selected a range of novel temporary corrosion protectives from different suppliers and tested them using the accelerated test pattern in the corrosion test chamber.

Chemical Investigation Services also carried out a long term atmospheric test in an ISO 9223 rated C5+ zone and employed an automated weather station to map the sunshine, UV radiation, rainfall, humidity and air temperature over a 12 month period. The atmospheric test pattern involved physically rotating the exposed antenna on their test platform. During the atmospheric weathering the test antenna were also subjected to pressure testing in a pressure vessel to simulate extended submersion.

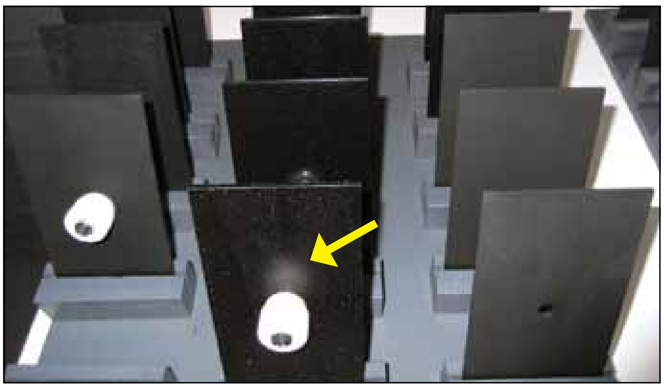
Outcome

After the exhaustive accelerated laboratory scale testing and atmospheric testing with pressure testing a set of successful coatings was now available and one of these coatings was trialed at sea for 12 months and passed the naval performance requirements. Subsequent to this work the successful candidate coating was withdrawn by its supplier for environmental reasons due to solvent content and we then tested a new range of coatings for application on stainless steel and titanium antenna housings and a successful candidate coating was again derived. The client was very happy and now had options to coat newly manufactured antenna or repair coat antenna insitu on naval vessels at diverse locations.

What we learnt from this case?

1. We overcame client sceptism about a new test methodology and their unfamiliarity with the novel type of coatings selected for test and for final use on the antenna.
2. We introduced the client to cyclic accelerated corrosion testing something they had not previously used and it worked for them and gave them an excellent solution to their difficult problem.
3. The coating system adopted was easy to apply, could repair coat antenna on naval vessels in harbour without removing the specially fixed antenna and without in any way affected electronic performance.
4. The coatings did not interfere with electronic signals and provided excellent corrosion protection to the various antenna on which it as used.

Submarine at sea – the arrow shows the antenna we investigated.



Coated test plates after being subjected to a cyclic corrosion test – note where crevice former has been detached to examine the surface (arrow) for corrosion.

Municipal stainless steel solutions could save SA millions in water losses

With South Africa experiencing Stage 2 and 3 water restrictions following its worst drought in decades, the spotlight falls on the solution of using stainless steel in water distribution and service pipes in South Africa to reduce leakages and maintenance costs and preserve our already strained water resources into the long-term future. The importance of tightening up South Africa's water supply infrastructure comes into sharp focus when one considers statistics cited in a Timeslive.co.za report, which stated that up to 40% of Johannesburg's water goes unaccounted for annually, costing the city R1.16-billion in the year (ending June 30, 2015). Of that about R851-million of water was lost to leaks.

These high losses have been identified in part to the use of inferior or inappropriate (system) metals in pipe joints and other fittings being used by municipalities including flanges, tee-pieces, reducers, and bolts and nuts all bearing short lifespans further compounded by high pressure systems and high corrosion levels in South African soils and resultant challenges in leak detection.

Southern Africa Stainless Steel Development Association (sassda) Executive Director John Tarboton says; "There is high value potential of using stainless steel material for service piping and all fittings predominately manufactured using grade 316 stainless steel in the service delivery of municipal water that can potentially save millions of rands currently lost in leakage and filtration costs as well as see a reduction in the usage of water per capita.

"With the use of corrugated stainless steel piping, the need for joints in the system is reduced, allowing the corrugated stainless steel pipes to maintain their strength, improve workability and extend the piping systems service life. There is a clear case of cost savings both on the treatment of water that is lost through leakage as well as water that municipalities are unable to charge service fees for its distribution and use. Stainless steel is an optimal material in water system applications and while it comes at a price, it is an investment in the country's infrastructure, the benefits and cost-savings which will still be seen 100 years from now."

A model municipality

With the Newcastle area in KwaZulu-Natal, representing some of the worst cases of water waste, where three municipalities see as much as 65 percent of treated water leaking away or being used illegally. On the other end of the scale, the Drakenstein Municipality in the Western Cape is just one of a handful of municipalities which has the wisdom to ensure its water wise future.

When asked why his municipality is a frontrunner in the use of stainless steel applications, Drakenstein Municipality Senior Engineer: Water Services Andre Kowaleski who has 33 years' experience as a technical official in the municipality comments; "Since 2002 we have applied grade 316 stainless steel in all the metal we use in our underground network or grade 304 in above-ground applications. We also use stainless steel in all our refurbishments, including the recent refurbishment of the Meulwater Reservoir, Paarl Mountain and Van Blerk Reservoir in Wellington.

Leliefontein booster pump station.

300mm diameter bulk water connection installation for Pearl Valley, Paarl.

Refurbishment of pipe work at Van Blerk Reservoir, Wellington.

"This stems from the fact that when it comes to replacement maintenance, it would be unwise to put a pipe in the ground that has an operating life of between 50 and 100 years and then have to replace fittings, such as T-pieces and connection saddles that corrode and rust away after just a few years – there's no logic in that. You must use material with a life span of 50 – 100 years.

"So even though the initial cost of stainless steel installations is considerably higher than other available materials, we are reaping the rewards of our long-term approach and currently have a 13.4% water loss figure, as compared to other municipalities' average water loss of 39% and our figure will only improve as we continue replacing inferior fittings over the years."

While Japan, for example, uses stainless steel in its entire service piping network installations, South Africa faces both cost and criminal obstacles. As Kowaleski explains; "We use stainless steel for piping lengths only if it is inside a locked chamber with high security and pepper spray mechanisms. If we lay a stainless steel pipe in the ground, criminals will dig it up, even if it is full of sewage. We use high density polyethylene (HDPE) pipes in those cases, which do not corrode and have the same lifespan as stainless steel."

Long-term savings

International Water Association Water Loss Specialist Group Chairman Dr Ronnie McKenzie says he wishes more municipalities operated in the manner of Drakenstein Municipality. "What we are seeing currently is that most municipal tenders are just looking at price. Long term sustainability is not in the equation. The company offering the cheapest solution is usually awarded the tender and in some cases, they will not use quality valves and fittings but cheap lookalikes with a very limited lifespan. Unfortunately, once it is buried, no one knows if it is a high-quality fitting that will last for more than 50 years or a cheap fitting that may only last for a few years. Water pressures in South Africa tend to be very high in many areas and it is false economy to use poor quality fittings."

He adds that stainless steel fittings and specials are more expensive initially but can often be highly cost effective in the long run when the life of the installation is considered especially in humid coastal areas and areas with highly aggressive soil conditions.

"When you apply stainless steel, the maintenance costs are reduced which will often outweigh the higher initial capital costs. It is always a balance between affordability and sustainability and in certain cases it makes sound financial sense to utilise stainless steel for specific sections of the water reticulation infrastructure.

"Relatively few municipalities have the foresight of Drakenstein, which places significant emphasis on quality and the life-span of any new infrastructure. This approach has served the Municipality well over the past 20 years which has seen its leakage levels drop from over 30% to around 13.4% which is one of the lowest levels of leakage in South Africa," says McKenzie.

Tarboton comments; "Unfortunately, current short sighted, cost-cutting practices do not serve for our future. The implementation costs of stainless steel should instead be viewed as a cost-saving opportunity; where initial outlay would be recouped through the savings gained in reduced energy costs and streamlined monitoring and billing systems. If finance companies could see fit to finance the implementation of stainless steel systems based on the savings gained from wasted and unauthorised water usage costs, a return on investment and total project costs could be built into the financing structure and provide a compelling initiative for South Africa's water distribution services.

"We also have the ability and the technology available here in South Africa to manufacture the specified stainless steel pipes, something which could be a coup for the manufacturing industry in South Africa both at an incubator level and as a commercial enterprise. If our municipalities are already investing so heavily in leakage repairs and replacement piping, it makes sense to replace outdated pipe systems with stainless steel."

We wish to thank sassda for this article.

SA Stainless Steel survey lights the way for possible industry upturn

Johannesburg, 17 November 2016 – Predictions that 2016 would be another tough year for the stainless steel industry may be less accurate than originally thought. This after the last three Southern Africa Stainless Steel Development Association (sassda) Short Track Surveys revealed an overall average improvement in market statistics.

Sassda Executive Director John Tarboton confirms that in the latest survey (October 2016), 38% of the 89 sassda member respondents indicated a positive response to the current order situation, although this is a slight deterioration on last month's 40%. "The improvement in sentiment of our members is also encouraging as 33% of sassda respondents see their current business situation as positive, albeit slightly down from September's 36%.

"So while the year started off pessimistically, we now have systematic survey data from our members, who deal with customers and orders on a daily basis, indicating that business has improved. Our worst months were April, May, June and July of this year but we are hoping that the industry has now bottomed out and we are seeing a gradual recovery."

With this generally more optimistic outlook, Tarboton sees potential for growth stemming from the prospect of increasing per person consumption levels, as well as local supply and imports for stainless steel going into local fabrication markets.

A 'schizophrenic' situation

He adds, however, that this month's survey did suffer from an anomaly of sorts since the first batch of responses received were before National Prosecuting Authority head Shaun Abrahams announced the withdrawal of fraud charges against Finance Minister Pravin Gordhan, while the second batch were gathered after this announcement. The two batches of responses were also before and after the release of the 'State of Capture' report by former Public Protector Thuli Madonsela. Not surprisingly then, the first set of responses was considerably more negative than the second batch which shows the significant influence of politics on business sentiment.

"That said, and considering the volatile nature of the South African situation and the resultant changeable psyche of its citizens, it will be interesting to see the next set of results which will probably show the effects of the shifting South Africa sentiment yet again. "Overall, it's clear that the new normal in South Africa; is that there is no normal and we therefore must be mindful of the effects of this almost schizophrenic situation when looking at the results of this largely 'sentiment' based survey," stresses Tarboton.

The bigger picture…

Looking at the broader performance of the industry over 2016, Tarboton says it's clear that the stainless steel sector is resilient. For example, in 2015 when the global stainless steel production dropped by 0.7%, South Africa stainless steel consumption stayed at the same level as 2014.

However, a significant shift has arisen this year, when comparing data for the first eight months of this year to the first eight months of last year, the primary product supply into the local market was 6% down. The primary product supply into the local market for the last 12 months was 1.7% down on the previous 12 months.

Prospects

Looking to the end of 2016, Tarboton says there is anecdotal evidence of some improvement for the South African stainless steel industry, but no-one is prepared to predict what will happen in 2017. It is hoped that the stronger performance seen in the last few months will continue into next year and that 2017 will not see a drop in stainless steel consumption.

Sassda members also report that agro-processing, food and beverage, and the pharmaceutical sectors are showing the most promise with regards to consumption. Unfortunately, challenges remain for the manufacturing industry including the ongoing issues of high administered price increases, electricity tariffs, labour instability etc.

To counter the lack of growth in the South African economy, sassda is facilitating members' exposure to a range of African opportunities and together with the Department of Trade and Industry (the dti) and Team Export South Africa (TESA), is exploring several partnership projects that include cross-border training and project development initiatives in other African markets.

Issued by: MediaInk Communications on behalf of the Southern Africa Stainless Steel Development Association (sassda):

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Guest Writer

Dr. Ivor Blumenthal

Dr Ivor Blumenthal has been retained by Corrisa to establish an Independent Professional Body for the Sector of Corrosion. We sat down with him to find out more about the man behind the plan to bring strong and publicly acknowledged Self-Governance to our collection of Industries.

We know you were first the Chairperson of the Services SETA and then were appointed to be its first CEO between 2000 and 2011. What did you do before that?

Before being employed as CEO of The Services SETA, I trained in Law and Psychology, did Honours in Clinical Psychology and then Management, worked in the Banking, Printing and the FMCG Industries before being appointed and serving for five years as CEO of the Furniture Industries Training Board (The FITB). After that I was appointed as CEO of APSO (The Association of Personnel Service Organisations – The Recruitment Industry). I had the privilege while at APSO of chairing the initial formation of the Services SETA and was then in 2000, appointed as its first CEO where I remained for 11 years.

When did you obtain your Phd?

It took me seven years, during my tenure as CEO of the Services SETA to complete my Ph.D. in Innovation and Technology at Da Vinci University, in November 2010.

Why Da Vinci?

Da Vinci, is South Africa's MIT. It was started by Madiba and Professor Roy Marcus (Previously Dean of Wits's School of Engineering and Chairman of UJ) with a vision to create a University of Excellence in Science, Technology and the World of Work. I loved the idea of studying at a University which was far more attuned to the World of Work than either Wits, RAU or even Wits Business School were, each of which by the way were my Alma Mata institutions. Da Vinci refers to itself as a Mode 2 University for this reason.

We believe you also dabbled in politics?

Yes I was elected to serve as a Ward Councillor and served for five years until 2000. I spent the majority of my tenure as an Independent a-political City Councillor.

Why?

Because I always believed and still do that Local Government is not about Politics but about Service. Politics is played at Provincial and National Government levels. I opted out of Party Politics when I was a Councillor to be of service to my constituents.

When you were CEO of the Services SETA, what was the size of your membership and some of your greatest achievements running the SETA?

By the time I left the Services SETA in 2011, it had grown to represent some 35 Industries and had in the region of over 200 000 companies as its levy paying members. I have to say that whereas we began as the Rubbish-Bin SETA, where Industries would be placed if they didn't fit into any of the more conventional ones, we ended up as the largest, most cohesive, well established SETA's by the time I resigned.

You resigned? Why?

The situation became untenable for me after Jacob Zuma came into power, SETA's were transferred from the Department of Labour to Higher Education and Training, and were then hijacked by that Ministry, I believe for the funds sitting in the SETA bank accounts. My SETA elected to go to court and challenge the new Minister's actions. Six court cases later, (the two original cases, two appeals, and two actions to compel honouring the Court Orders) all awarded to the Services SETA with costs but I had already resigned. I had had enough. I had grown the organisation to a R1 Billion turnover, and over 45 000 beneficiaries of Learnership and other Grants. I had done the job I was appointed to do.

What Statutory Bodies have you played a role in?

I was a member of the National Skills Authority. I sat on various Standard Generating Bodies and National Standards Bodies.

And globally have you represented South Africa in any way?

I represented the Services SETA at the European Union for six years, in the Personnel Services Council, I was a Board Member of the European Marketing Confederation for seven years, was involved in projects at the International Labour Organisation, and served as Vice President of World-Skills, for Africa, for six years.

You are CEO of ArkKonsult. Why that name?

I chose the Ark symbol because I believe in Associations and Confederations of Business. In the value of coming together. In the principle of Economies of Scale. I firmly believe that Small and Medium-sized Business is not organised. It has bad leadership in general and therefore is regularly bullied by a better organised Labour and Government caucus at NEDLAC and in every Statutory Council I know of. My Consultancy is geared unashamedly at being of service to collective Business with the aim of regaining the lost authority business had 20 years ago. Of righting the imbalance. Of Self-Regulating.

Correcting and preventing concrete corrosion

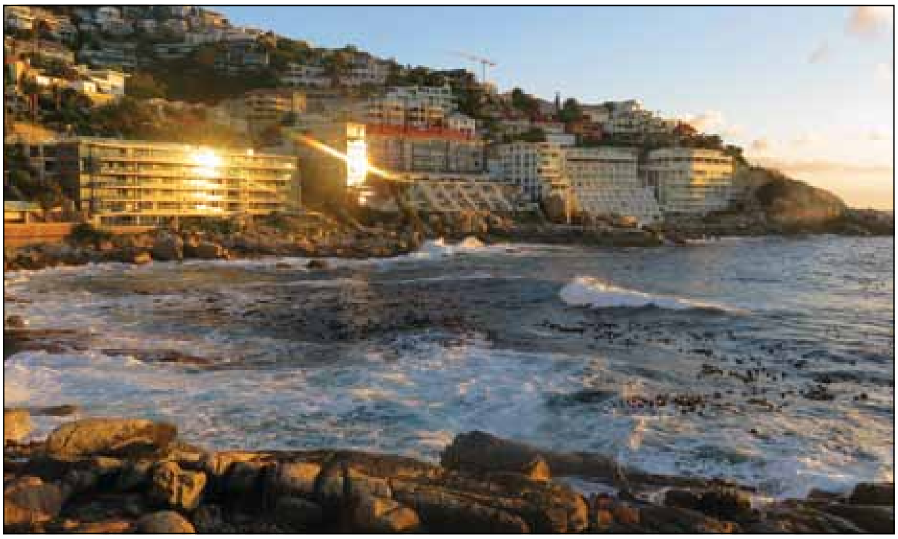
By Wesley Fawaz of Australasian Corrosion Association

Takeaway

Corrosion of reinforcing steel in concrete is a worldwide problem that causes a range of economic, aesthetic and utilization issues. However, if corrosion effects are considered in the design phase and the right decisions are made prior to construction, public-use buildings such as hotels can be built to last and protected against corrosion for as long as possible.

Corrosion affects all concrete buildings and structures around the world to some extent, with annual costs in the billions to national economies. With hotel assets, corrosion is often an issue of aesthetics and falling concrete where spalling occurs creates public safety risks. Hotel operators do not want scaffolds, cables, and exposed metalwork on display for extended periods of time. The corrosion of steel in concrete is accelerated in harsh environments, especially in coastal, tropical or desert environments where high salt levels or extreme temperatures can accelerate the rate of decay.

Usually, the most exposed elements deteriorate first – but the underlying corrosion is unseen. Active corrosion in the steel beneath may take five to 15 years to initiate cracks in the concrete, but much of the corroded reinforcement is not visible.



Concrete corrosion can occur rapidly on buildings subjected to marine environments.

Corrosion mechanisms of reinforcing steel

In new concrete, alkaline (high pH) conditions form a passive film on the surface of the steel rebar rods, thus preventing or minimizing corrosion initially. But eventually, a pH reduction caused by carbonation or by ingress of chloride (salt) causes the passive film to degrade, allowing the reinforcement to corrode in the presence of oxygen and moisture.

When this occurs, a voltage differential of approximately 0.5 V is set up between the corroding (anodic) sites and the passive (cathodic) sites, resulting in a corrosion cell where electrons move through the steel from anode to cathode. The rate of the reaction is largely determined by the resistance or resistivity of the concrete. Acid forms at the anodic (corroding) site, which reduces the pH and promotes corrosion of the steel.

Common causes of concrete corrosion

The two most common causes of concrete corrosion are carbonation and chloride (salt attack). In broad terms, when carbonation, chlorides and other aggressive agents penetrate concrete, they initiate corrosion that produces cracking, spalling and

Surface discoloration and cracking of the concrete will ultimately lead to concrete spalling and potential failure.

weakening of the concrete infrastructure. As reinforcing rods rust the volume of rust product can increase up to six times that of the original steel, thus increasing pressure on the surrounding material, which slowly cracks the concrete. Over the course of many years, the cracks eventually appear on the surface and concrete starts to flake off or spall.

Degradation of reinforcing steel and the subsequent weakening of the concrete occurs from the inside and may be unseen for many years. It is often referred to as "concrete cancer."

According to Infracorr Consulting PL managing director Ian Godson, it may take up to 15 years before any cracking is visible. "It is a hidden problem which means that when you find it, it is often well advanced, very much like the tip of the iceberg," Godson said.

Carbonation is the result of CO_2 dissolving in the concrete pore fluid and reacting with calcium from calcium hydroxide and calcium silicate hydrate to form calcite ($CaCO_3$). Within a relatively short space of time, the surface of fresh concrete will have reacted with CO_2 from the air. Gradually, the process penetrates deeper into the concrete and after a year it may reach a depth of 1mm for dense concrete of low permeability, or up to 5mm for more porous and permeable concrete, depending on the water-to-cement ratio.

Chlorides, usually from seaside splash or wind, migrate into the porous concrete over time, causing corrosion when the concentration of chlorides reaches critical levels at the reinforcement. In addition, older structures may have used calcium chloride as a concrete "set accelerator" at the time of construction, resulting in serious corrosion issues.

Repair and prevention

The traditional concrete repair method is to remove the cracked and spalled concrete to a depth of 20 – 30mm behind the reinforcing bars to fully expose the rusted material and remove the contaminated concrete from the steel. All of the corroded material is then removed and the steel treated or replaced. After this is done, specialist repair concrete mortars are applied and the surface made good.

A modern development is for the repair mortars to be polymer modified to improve adhesion and resist further ingress of contaminants. Coatings are commonly used in combination with patch repairs to reduce future entry of carbonation or chlorides.

Patch repairs that remove contaminated concrete from the deteriorating sections often do not fully address the hidden corrosion and result in accelerated deterioration to surrounding areas, commonly failing again within three to five years. Godson added, "One of the limitations of patch repairs is that you have to remove large quantities of sound concrete to solve the problem, causing significant noise and disruption to the building occupants."

According to Justin Rigby, coatings consultant at Remedy Asset Protection, "Concrete is a great material and is generally impervious at the start, but to increase durability, a coating should be applied." (See Anti-Corrosive Coatings for Different Service Exposures for more information on choosing a coating.)

Protective elastomeric waterproofing membranes can be either rolled or sprayed onto a concrete surface. Flat rooftops allow membranes to be rolled on, but where there are complex geometries, spraying is the most effective application method.

Impressed current cathodic protection

The main alternative to patch repair is cathodic protection. One type, impressed current cathodic protection (ICCP), is a technique where a small permanent current is passed through the concrete to the reinforcement in order to virtually stop steel corrosion.

The main benefit of ICCP is that the removal and repair of concrete is vastly reduced, with only the spalled and delaminated concrete requiring repairs. (Learn more about Why Concrete Delamination Occurs and What to Do About It.) Once installed, corrosion can be controlled for the long term, eliminating future spalling and deterioration even in severe chloride or carbonation contaminated concrete.

Proper anode system selection is the most vital design consideration for a durable and efficient ICCP system. Incorrect selection and placement of the anode system can result in poor performance and a vastly reduced installation lifetime.

According to Godson, cathodic protection is relatively simple in theory. "Insert anodes into the concrete at set spacing attached to the positive terminal of a DC-power supply and connect the negative terminal to the reinforcing steel. ICCP systems commonly operate at 2 to 5 Volts DC," he said. "The drawback is that you need lots of cables and permanent power supplies which result in this technology being mainly restricted to civil structures such as wharves and bridges with very rare applications to buildings."

Hybrid cathodic protection

A fairly recent development has been hybrid cathodic protection, which uses zinc anodes installed in drilled holes. The anodes are powered for an initial period of around ten days. The initial high CP current totally passivates the steel reinforcement by migrating chloride away from the bars and restoring an alkaline (high pH) environment in the concrete.

Following the initial impressed current phase, the temporary power supply and cables are removed and the anodes are then connected to the reinforcement via locally placed junction boxes to provide ongoing galvanic protection. This relatively low galvanic current maintains the ongoing passive condition at the reinforcement and prevents further concrete damage. Hybrid CP systems are usually designed for a 30-year or longer design life.

Hybrid CP offers all the advantages of ICCP, including corrosion control and less concrete removal, without the high cost and maintenance of power supplies, cables and control systems. Areas and structures that were previously difficult and uneconomical to treat with ICCP can be protected using hybrid CP technology. This includes small scale and remote structures situated in non-powered sites such as bridges and culverts.

For buildings, hybrid CP offers significant advantages over ICCP by eliminating the need for unsightly and costly cabling and power supplies.

In conclusion, it is important for owners of high-value assets such as hotels to consider the cost implications of ignoring the effects of corrosion on concrete buildings and structures. There are many advantages of planning during the design phase for corrosion control and mitigation. Two key benefits of proper corrosion management are that the life of an asset is extended and maintenance time and costs are reduced. In addition, lower maintenance increases an asset's overall utilization and can improve its environmental sustainability.

Where de-icing salts have led to the corrosion of the upper reinforcement in this bridge deck, a grid of mixed metal oxide (MMO) coated anode strips have been installed. These will be fully encapsulated with a dense concrete over layer.

Underslab grid of mixed metal oxide (MMO) coated anode strips installed to significantly retard the corrosion of the underside insitu reinforcement of this concrete slab.

Corrosion of steel in concrete can be prevented

The management of corrosion can be handled in many ways. However, approaches proposed for the corrosion protection of reinforcing steel bars in concrete do not replace the significance of high-quality concrete as the primary source of barrier protection against corrosive species. Steel in concrete can be protected from corrosion in three main ways: (1) seal the surface of the concrete to minimize the ingress of chloride ions, carbon dioxides, and water, (2) modify the concrete to reduce its permeability, and (3) protect the reinforcing bars to reduce the effects of chlorides and carbon dioxide when they do reach the steel.

At potentials and pH levels normally measured in the concrete, a protective passive layer forms on the surface of carbon steel. It is believed that this layer is an ultrathin (<10 nm) protective oxide or hydroxide layer that decreases the anodic dissolution rate to negligible levels. However, the partial or complete loss of the passive layer, known as depassivation, leads to active corrosion of steel bars. Loss of passivation of steel bars in concrete is caused by either chloride ions or carbonation exposure. The corrosive products of iron are expansive, and their formation can cause cracking and further deterioration in the concrete.

A comprehensive book on the subject "The corrosion of steel in concrete structures" was edited by Amir Poursaee and published in 2016 by Woodhead Publishing. The book is a collection of methods of preventing concrete corrosion by notable authorities in their respective field of expertise, including Dr Stephen Yeomans. The contents of this almost 400 page book (shown below) is in my opinion extremely valuable to those engineers who have experienced this phenomena and in the future wish to avoid it.

Bridge collapse due to corrosion of steel in concrete.

A copy of the book can be ordered from:
https://www.elsevier.com/books/corrosion-of-steel-in-concrete-structures/poursaee/978-1-78242-381-2

Important differences between galvanizing and other coatings for reinforcing steel

Unlike painting and epoxy coating on steel which are solely barrier-type coatings, galvanizing provides both barrier and sacrificial protection to the underlying steel. In a barrier coating, once the coating is damaged and the underlying steel is exposed, corrosion commences. This often leads to so-called under-film or filiform corrosion in which corrosion proceeds under the adjacent coating resulting in the further decohesion of the coating and continuation of corrosion.

As a barrier, the galvanized coating on reinforcement isolates the steel from the cement matrix and corrosion of the underlying steel will only commence once the coating has been completely corroded away. Because of the rate of corrosion of zinc in concrete is usually extremely slow, the loss of the coating in this way is a very long-term process and so corrosion of the steel is significantly delayed.

However, even if the coating has dissolved or been mechanically damaged such that the underlying steel is exposed, the remaining zinc on the adjacent surface becomes anodic and provides sacrificial cathodic protection to the bare steel. As such, the corrosion of the exposed steel is further delayed. The extent of coverage afforded by this reaction depends on many factors but primarily the conductivity of the surrounding environment, i.e. concrete in this case. Experimental data has shown that in sand-cement mortars with a w/c ratio of about 0.4, exposed steel to a distance of about 8mm is protected by the presence of the zinc.

Some issues with reinforced concrete

View with a rainbow and a train approaching of the hot dip galvanized high yield starter steel bars for the crash impact designed coping barrier of the Clovelly (Cape Town), retaining wall.

A cover meter was used to check the concrete cover over the hot dip galvanized high yield reinforcing steel, before assembling the steel coping shutters.

When steel is placed in concrete it is protected from corrosion due to the formation of a protective, so-called passive, film on the surface of the metal in the highly alkaline environment of hydrated cement (>pH 12.5).

For long-term corrosion protection, the concrete cover must limit the transport of aggressive species such as chloride and other ions, oxygen, carbon dioxide and other gases through to the depth of the reinforcement. The effect of these is that they change the protective nature of the concrete and/or disrupt the passive film on the surface of the steel leading to the onset of corrosion. This situation in reinforced concrete construction is broadly identified as a lack of durability.

Once corrosion of the reinforcement commences, physical deterioration of the concrete mass soon follows *(see figure on page 27)*. The reasons for this are that the various iron corrosion products formed are expansive (by a factor of 2-10x compared to iron) and their presence at the surface of the steel causes a swelling pressure sufficient to crack the concrete in tension. Once the cracks reach the external surface, a more direct entry path for the aggressive species is created and the corrosion process gathers momentum. At this stage, rust staining of the surface is usually evident and, as more corrosion products are formed, pieces of concrete may spall from the surface.

In this condition, issues of public safety become a concern – the problem of falling concrete – and eventually the structural integrity of the element may be impaired.

The prevention of reinforcement corrosion

Without question, the most cost effective way to minimise the risk of corrosion in reinforced concrete is to ensure that the concrete is of appropriate quality for the intended application and that the depth of cover to the reinforcement is adequate. These are matters

Elcometer revolutionises coating thickness inspection on concrete substrates

The non-destructive measurement of dry film thickness on concrete is now more accurate, faster and much easier than ever before, thanks to the new Elcometer 500 Coating Thickness Gauge for coatings on concrete.

With all the features that you have come to expect from an Elcometer designed and manufactured product, including ease of use, robust and ergonomic design, menu driven colour display, user selectable statistics, memory, USB & Bluetooth® data transfer to PC or mobile devices, the new Elcometer 500 accurately measures the thickness of dry film on concrete and other cementitious substrates* up to 10mm‡thick.

Key features of the Elcometer 500 coatings on concrete gauge

- **Fast:** 3 times faster than other technologies; 60+ readings per minute in standard mode and over 140 readings per minute in scan mode
- **Reliable:** Prevents false or incorrect readings; the gauge only displays a reading when the signal strength indicator goes green
- **Ergonomic:** Designed for continuous use; comfortably inspect all day, every day
- **Rugged:** Gauges and probes are ideal for harsh environments; dust & waterproof design equivalent to IP54, with field replaceable probe wear tips
- **Easy to use:** select the coating material and start measuring; no need to set up gates, range values or know the thickness of the coating
- **Powerful:** 100,000 reading memory with data transfer via Bluetooth® or USB to ElcoMaster® for PC or mobile devices for instant report generation

The Elcometer 500 Coating Thickness Gauge can be used in accordance with:
ASTM 06132, SSPC PA9 & ISO 2808.

For more information on the new Elcometer 500 Coating Thickness Gauge, please contact Elcometer at sales@elcometer.com or visit our website at www.elcometer.com. Alternatively contact BAMR on +27 21 683 2100 or sales@bamr.co.za primarily related to the design and laboratory manufacture of the concrete itself and its placement on site including positioning of the reinforcement followed by proper compaction and curing of the fresh concrete. Though this is all well understood and, if followed, a long and trouble-free life of reinforced concrete construction can be achieved, it is unfortunate that the deterioration of concrete due to corrosion of embedded steel in the form of reinforcement, bolts, fittings, anchorages etc, is not uncommon.

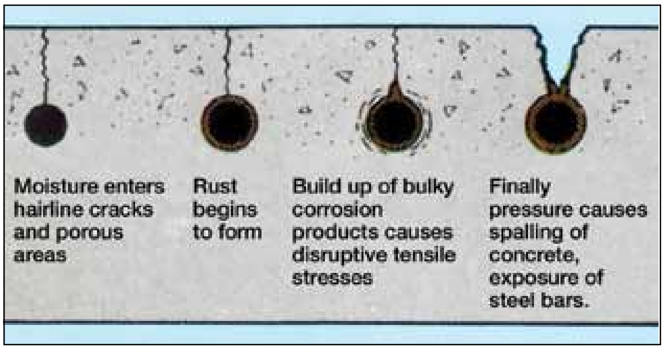
What then can be done to minimise the risk of corrosion in the event that the concrete mass is not of sufficient durability? A number of options are available including the use of membranes on the surface of concrete, corrosion resisting reinforcement such as stainless steels, cathodic protection of the reinforcement, or coating of the reinforcement itself. The choice of any of these supplementary protective measures is based on both economic and technical considerations. Clearly issues such as availability of the product or system, initial and long-term costs, need for repair and maintenance, and its overall suitability for the intended application are all important.

As far as coatings are concerned, hot dip galvanizing is by far the most common. Its first regular use was in the 1930s in the USA. Since this time, and especially the last 25 – 30 years, its use in a wide variety of types of concrete construction and exposure conditions in many countries has been widely documented.

There is also a published record of both laboratory based research and field studies of the characteristics and performance of zinc-coated steel products in concrete construction.

Acceptance of the use of hot dip galvanized reinforcement is also reflected in the significant number of national and international standards for the use of zinc coated (i.e. hot dip galvanized) reinforcement published in recent years, as well as technical publications, codes of practice and specifications relating to hot dip galvanized reinforcement.

We wish to thank Professor Stephen Yeomans as well as acknowledge the Hot Dip Galvanizers Association Southern Africa where this article was previously published in Hot Dip Galvanizing Today.



The progress of corrosion induced damage in concrete.

From the KETTLE

Because corrosion control of steel by hot dip galvanizing plays such an extremely important role for specifiers and end-users in their specification choice, it was proposed that we highlight and demystify a number of surface conditions over a series of editions that bear very little influence of the coatings durability seen both during the initial inspection and also after years of being exposed to a particular environment. See surface condition F7 and F11.

Legend

#1 As the life of a zinc coating is proportional to its thickness, a thicker coating will proportionally outlast a thinner one, however, a thicker coating can be more prone to mechanical damage, when handled inappropriately.

#2 All passivation products including sodium di-chromate will be excluded by the galvanizer when he has received written instructions that the hot dip galvanized steel is to be painted.

#3 While double dipping is occasionally seen to be necessary due to a limited bath size, the galvanizer must inform the customer that this practice can increase the propensity for distortion, before he commences with the work.

#4 While the galvanizer can lower the zinc temperature and shorten the immersion time to limit coating pickup, however, due to increased costs to himself, he is not obliged to do this and if necessary will recover the cost from the purchaser. Insufficient vent, fill and drain holes will lengthen immersion times.

Hdg Hot dip galvanizing **A** Accept **R** Reject **N** Negotiate **C** Clean **REP** Repair **SS** Significant surface.

F7

DESCRIPTION:
Thick hot dip galvanized coatings are more susceptible to mechanical damage but when damage occurs a residual fe/zn alloy layer of between 20 and 60µm remains.

CAUSE:
Slightly different to phosphorous, out of specification silicon can increase the potential for brittleness and therefore easier mechanical damage, particularly on edges, etc.

EFFECT / REMEDY:
While specifying the correct silicon content of the steel (0.15% to 0.25%) is important, when mechanical damage to the hot dip galvanizing does occur, a residual iron/zinc alloy layer of about 20 to 60µm normally remains.

ACCEPTABLE TO SANS 121:
A – REP

ACCEPTABLE FOR DUPLEX AND ARCHITECTURAL FINISH:
R

Customer to refer to steel supplier.

See the Hot Dip Galvanizers Association Architectural Check List #4.

Extracted from Table 3. SANS 121 (ISO 1461) Profiles	Local coating thickness, min. µm	Mean coating thickness, min. µm
Steel > 6mm	70	85
Steel > 3mm to $\leq$ 6mm	55	70
Steel $\geq$ 1.5mm to $\leq$ 3mm	45	55

In terms of SANS 121, there is no maximum coating thickness

Coating thickness of 565µm.

Coating thickness of 357µm.

Residual coating of 38,7µm of Fe/ZN alloy layer remains.

Residual coating of 38,4µm of Fe/ZN alloy layer remains.

F11

DESCRIPTION:
Rust staining of the hot dip galvanized coating on the steel surface after about 30 years or more exposure to a mild to moderate atmosphere.

CAUSE:
The atmospheric exposure of a hot dip galvanized coating comprising mainly of Fe/Zn alloys may, because of the propensity for iron in

F11 continued...

the coating to corrode (rust), after many years and take on a localised rusty appearance.

EFFECT / REMEDY:
While the coating appears to be locally rusting, the residual coating layer is generally extensive and will provide many more years of serviceable life. If unacceptable it can be painted for aesthetic reasons. Painting of the component will generally increase service life but also increase prospective maintenance intervals.

ACCEPTABLE TO SANS 121:
A
Can be appropriately painted.

ACCEPTABLE FOR DUPLEX AND ARCHITECTURAL FINISH:
A
Can be appropriately painted.

Coating thickness of 234μm on the matt grey portion.

Coating thickness of 103μm on the matt grey portion.

Coating thickness of 180μm on the Fe/Zn discolored portion.

Coating thickness of 83.7μm on the Fe/Zn discolored portion.

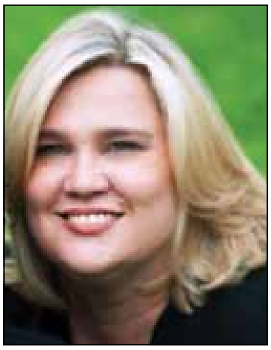
Simple Active Tactics produces pure white glass grit abrasives

Simple Active Tactics, based at Atlantis Cape Town, began producing pure white glass grit abrasives trade named Glass WhizDom™ to supplement its recycled steel abrasive product range in late 2016. The company has specialised in converting industrial waste streams of materials, previously dumped on land fill sites into low cost abrasives which offer outstanding value.

The demand for Glass WhizDom™ has pushed the company to expand operations, now producing over 100 tons per month of crushed glass for diverse applications in the abrasives industry including blast cleaning of non-ferrous metals, specialised blasting applications, mould cleaning, finishing of fabricated stainless steel, wet blasting applications, pre-cleaning prior to non-destructive testing of weld seams, paint stripping of car bodies and refurbishing turbines amongst others.

Glass grit media is the latest addition to the company's product range. Glass WhizDom™ is clean, environmentally friendly and delivered in neat 20/25kg bags packed into unitised 1-ton bulk bags for ease of handling and storage.

www.satactics.co.za



Manager's Message

2017 is well on its way and this year promises to be a very busy and exciting year. Towards the end of 2016 the Corrosion Institute of Southern Africa received accreditation from the MERSETA. We are very excited and soon our accredited courses will be available.

Thobi Thubane has returned from maternity leave and we are so pleased to have her back with us. We would like to let you know that Desiree Armugen and Jenny Taylor's contracts ended and we wish them well with their future endeavours, but are happy to announce that two new people will be joining us at the beginning of March 2017. Ratanang Moraladi will be Junior Administrator and will be managing the various sub-committees' administrative tasks and secretarial services. Keren Ross will be joining us as Membership Administrator. We look forward to building long tern relationships with both ladies and believe that they will be assets to CorrISA in the future.

On April 21 2017 we will be hosting our Annual Corrosion Awareness Day and invite you to participate in this day by either exhibiting or sponsoring. For more information please contact Thobi – Admin@corrisa.org.za.

A list of our upcoming events can be seen on our website and on our Facebook page, we invite you to contact us should you wish to be involved.

Our 2017 Training Schedule is available in this issue and Linda is always accessible for assistance and guidance. Linda can be contacted on 0861 267 772.

Our Technical Evenings are scheduled well in advance, however should you wish to present and sponsor our evenings in Gauteng, KZN or WC please contact Thobi for assistance.

I look forward to meeting you at our numerous events.

Until next time.

Regards,
Lynette Van Zyl

Comment – Chairman of the Western Cape

This year kicked off with a bang in the form of a site visit to Galvatech in January. It was an exceptionally interesting tour of the hot dip galvanizing facility as well as the powder coating plant and was very well attended with 45 odd people.

We have found site visits to be very popular so with the postponement of our Mini Expo to September it was decided to have another site visit to a wine farm in February. Emplast & Louisenhof were our hosts and we were all treated to a very interesting tour of the wine making facilities and the Emplast coated tanks that are still in operation. The corrosion challenges that the wine industry face was very interesting and everyone learnt a lot about this niche industry. We were then treated to a very educational and fun wine tasting.

We have a few interesting talks coming up with Graeme Stead our next speaker. He has been very involved in the Corrosion Institute and we look forward to his presentation entitled: *The big divide – the gap between the provision of correct procedures & specifications and the contractor's program.* We have a few options for April and the rest of the year and we are just waiting for speakers to confirm.

Our Mini Expo in September promises to be an interesting event and we encourage exhibitors and interested parties to get hold of us.

Hopefully see you at Kelvin Grove for one of our functions soon! If you have not attended before, please feel free to join and if you have, bring a friend to the next gathering on the third Thursday of the month.

Yours in Corrosion

Graham Duk on behalf of Tammy Barendilla, Leonie du Rand, Flippie van Dyk, Indrin Naidoo, John Houston, Terry Smith, Thinus Grobbelaar and Pieter van Riet.

Comment – Chairman of KwaZulu Natal

2017 seems to be rushing by... The KZN section is undergoing further changes – Ryan van Wyk has, due to extreme work pressures, resigned as our Chairman. Thanks Ryan for your years of service and know we will call on you for support during our events... In the interim I will assume this role and will continue with running the activities going forward.

As previously mentioned, we will be hosting our technical meetings on the second Thursday of every second month. This change has been implemented to regrow the KZN membership by placing less impact on members, committee and hosting speakers. Please keep an eye on the CorrISA newsletters for details of the evenings. If you are not receiving a CorrISA newsletter, please drop your contact info to CorrISA office so that the database can be updated.

KZN will be hosting some of the CorrISA and NACE courses during the year. We are hoping for good attendance at these training opportunities – I can really recommend these courses to you. Course information and dates are available on the CorrISA website.

I'm looking forward to an interesting year. There will be challenges, but these bring great opportunities.

Regards

Mark Terblanche – Interim Chair KZN

Western Cape Annual Gala Dinner

The Western Cape Region was honoured to host the National Annual Awards dinner at Kelvin Grove last year. This successful event was well attended and provided an evening of memorable entertainment for all, accompanied by a delicious meal.

We thank all our Sponsors as well as those who attended and especially those who travelled from other Regions to attend.

The planning for the 2017 Western Cape Gala Dinner is already underway. Expect to be treated to an evening of mouth-watering food, quality entertainment and lively music in a beautiful setting.

The event is provisionally scheduled for 17 November and it has been hinted that there may be a surprise or two in store this year.

BOOK YOUR TABLE EARLY TO QUALIFY FOR A DISCOUNTED RATE

Enquire with tammy.barendilla@stoncor.com or contact Tammy on 072 838 6033.

NACE Office visits Corrosion Institute of Southern Africa

We recently had the pleasure of hosting Dr. Gasem Fallatah from NACE International West Asia and Africa region. Gasem, himself a well published and experienced coatings and corrosion professional, was able to share and engage with CorrISA on several aspects regarding the CorrISA/NACE relationship. One key aspect, among many others, that was explored was the development and expansion of CorrISA's influence into Africa. I am pleased to report that NACE is very amiable to assisting and promoting courses into Africa and utilizing CorrISA's already well placed reputation.

Gasem also attended the CorrISA annual dinner in Cape Town and engaged with many of our members. More work remains to be concluded, but there is a positive approach from NACE and CorrISA is well placed to enjoy further benefit from this relationship.

On 17 – 19 November 2016, Dr Gasem Fallatah, Senior Manager of NACE West Asia & Africa Area, visited Corrosion Institute of Southern Africa (CorrISA) headquartered in Midrand, South Africa. The objective of this visit was to explore possible opportunities of collaboration for both organizations.

For more than 56 years, CorrISA exists to serve a broad spectrum of stakeholders with an interest in controlling the impact of corrosion on asset lifecycles, productivity and human life. CorrISA started as the South African Corrosion Council in the 1960s established by small group of corrosion engineers. It was then constituted in 1974 as the Corrosion Institute of Southern Africa.

Headed by their current president Mr Edward Levesey, CorrISA is committed in their fight against corrosion. CorrISA offers NACE courses in South Africa, together with other courses that they have developed.

The areas of possible collaboration explored are Events & Conferences, Education & Certification, Publications, Marketing of Events and Activities, and NACE International Strategic Plan.

Overall, the meeting between NACE and CorrISA was very productive and both organizations are looking forward to the future collaborations discussed in the meeting.

CORRISA – NACE INTERNATIONAL COOPERATION AREAS MATRIX

Discussion Item/Subject	Description	CorrISA Point of Contact	NACE International Point of Contact
Events	CorrISA welcomes partnering with NACE International in organizing conferences and events. AfriCORR Congress – 2018 has been identified as a potential start.	Lynette van Zyl, General Manager	CaLae Browne, Senior Manager Conferences & Events and Gasem Fallatah, Senior Manager WA&A Area Office
Technical	Currently CorrISA is not directly involved in standards development hence this item will be put on hold.	N/A	Ed, Director Standards and Strategic Technical Initiatives
Education & Certification	CorrISA proposed several ideas related to Education and Certification within South Africa and on their ambition to provide NACE programs in neighbouring countries.	Armin Schwab, CorrISA Education Committee Chairman, Mark Terblanche & Louis Pretorius, Executive Committee Members, and Lynette van Zyl, General Manager	Pam Nicoletti, Director Education and Gasem Fallatah, Senior Manager WA&A Area Office
Publication	CorrISA has recently published a quarterly magazine (Corrosion Exclusively) and would like to include in it articles from NACE International on a regular basis.	Terry Smith, Editor Corrosion Exclusively and Lynette van Zyl, General Manager	Gretchen Jacobson, Managing Editor in Chief – MP and Newsletters and Gasem Fallatah, Senior Manager WA&A Area Office
NACE International Strategic Plan	CorrISA is interested to know more about NACE International Key Strategic Initiatives	Mr Edward Livesey, President and Lynette van Zyl, General Manager	Tommy Tam, Global Operations Director and Gasem Fallatah, Senior Manager WA&A Area Office
Marketing of Events / Activities	CorrISA would like to use NACE International marketing abilities to advertise their events and Courses at NACE international expo's.	Lynette van Zyl, General Manager	Jody Bradel, Sales & Marketing Director and Gasem Fallatah, Senior Manager WA&A Area Office

Corrosion Institute of the Western Cape, tours Louisenhof Wine farm

Following the involvement of John Houston of Emplast (Pty) Ltd in refurbishing and relining of a number of wine tanks at Louisenhof Wine farm just outside Stellenbosch, the Corrosion Institute of the Western Cape was invited to tour the facility recently.

Located on the slopes of Devon Valley and the Papegaaiberg, Louisenhof has been growing grapes and distilling brandy for more than a century. The estate incorporates 130ha of vineyards and 40ha of the Bottelary Hills fynbos area, containing some of the rarest flora in the region. Stefan Smit, the owner and cellar master, who studied in Weinsberg, the oldest wine institute in Germany, had the courtesy to show us around.

Following the tour we were spoilt by some wine tastings and light refreshments.

CorrISA Gauteng 2016 AGM

TECHNICAL EVENT: Gauteng




STUDENT TECHNICAL EVENING: Awards Certificates



PLANT TOUR OF GALVATECH: Western Cape



CorrISA members and their guests enjoying the recent tour of Galvatech Galvanizers including the many explanations received.

NACE CIP 1 TRAINING COURSE: Johannesburg

Gert Conradie *(pictured first left)* receives perfect instructor evaluation score

Dear Gert

Congratulations on a perfect instructor evaluation score of 5.0 for course #42417244 – CIP Level 1 – January 23 - 28, 2017, Johannesburg, SA.

Thank you for representing NACE in such a positive way and giving the students the best possible NACE training experience.

Well done!

Paula McCordic, Manager, Instructor Relations and Development, NACE International

NACE CIP 2 TRAINING COURSE: Johannesburg

NACE CP 1 TRAINING COURSE: Johannesburg

THE CORROSION INSTITUTE OF SOUTHERN AFRICA
COURSE SCHEDULE 2017

Introduction to Corrosion Engineering Course

15th - 19th May 2017	Durban, KZN
5th - 9th June 2017	Johannesburg, GP
2nd - 6th October 2017	Johannesburg, GP

Economics of Corrosion

2nd - 3rd August 2017	Johannesburg, GP

Not Just Rust

2nd May 2017	Johannesburg, GP
1st June 2017	Johannesburg, GP
12th June 2017	Cape Town, WC
9th October 2017	Durban, KZN
1st November 2017	Johannesburg, GP

ECDA – External Corrosion Direct Assessment

10th - 11th April 2017	Johannesburg, GP
17th - 18th July 2017	Johannesburg, GP

CITWI – Corrosion in the water Industry

16th - 19th October 2017	Johannesburg, GP

NACE CIP 1 – Coating Inspector Program

3rd - 8th April 2017	Johannesburg, GP
5th - 10th June 2017	Durban, KZN
3rd - 8th July 2017	Johannesburg, GP
14th - 19th August 2017	Cape Town, WC
4th - 9th September 2017	Johannesburg, GP
13th - 18th November 2017	Johannesburg, GP

NACE CIP 2 – Coating Inspector Program

18th - 23rd September 2017	Johannesburg, GP

NACE CIP 3 – PEER Review

13th - 15th March 2017	Johannesburg, GP

NACE PCS – Protective Coating Specialist 1 (Basic Principals)

27th - 29th March 2017	Johannesburg, GP

NACE CP 1 – Cathodic Protection Tester

8th - 12th May 2017	Johannesburg, GP

NACE CP 2 – Cathodic Protection Technician

22nd - 26th May 2017	Johannesburg, GP

NACE CP 3 – Cathodic Protection Technologist

27th - 1st December 2017	Johannesburg, GP

NACE P-CAFT – Pipeline Corrosion Assessment Field Techniques

19th - 23rd June 2017	Johannesburg, GP

NACE NPP – Nuclear Power Plant for Coating Inspectors

24th - 28th July 2017	Cape Town, WC

NACE PCIM – Pipeline Corrosion Integrity Management

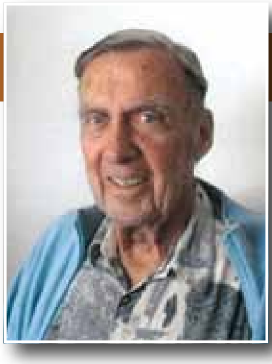
21st - 25th August 2017	Johannesburg, GP

NACE O-CAT – Offshore Corrosion Assessment Training

23rd - 27th October 2017	Cape Town, WC

REGISTRATION LINK: https://docs.google.com/forms/d/1e9ZGDsMO1Sd8aXuCvys2bstXr5SrpVBxuqEQPK9lfUM /viewform?c=0&w=1

The RUST Spot...



in conversation with Arthur Byrns

In the early 60s I joined O.C.C.A. since, among other things, I was working for Lewis Berger & Sons (L.B.S.). Tom Edwards was Chief Chemist, Colin Pickford, Bob Rouse and others were all in the laboratory.

In the late 60s we merged with Dima Paints and became United Paints (U.P.L.) and from Somerset West we were transferred to the new Dima labs at Alberton, Transvaal.

In 1953 and 1954 I sailed as a junior chemist in the Abraham Larsen in November from Durban to the Antarctic (I had Tom Howard's permission, the MD of L.B.S.); each trip was approximately 6 months.

In 1955 I again sailed in the Abraham Larsen as a supernumerary to Liverpool to discharge about 25 000 tons of whale oil, in the company of Lever Brothers personnel, to be hydrogenated to form margarine, a cheap substitute for butter, at the Hull plant.

From Liverpool I travelled to London for five and a half years to study at the Borough Polytechnic, now University of the South, on a "day release" scheme organized by L.B.S. Chadwell Heath.

Long hours, finishing at 10pm 3 days a week.

At L.B.S. I spent about 9 to 12 months in each laboratory/section, starting in resins, industrial, decorative, etc.

I then flew back to S.A. via the "long route", London (Gatwick), Tripoli, Alexandria (4 days waiting for plane spares), Dar-es-Salaam and then Lorenzo Marques. There we waited for a plane to take us on to Durban. After about a week in Durban I was handed an air ticket to Cape Town by Mr Tom Howard; there I was met by Mr James Miller and we travelled to the laboratories in Somerset West, dynamite factory!

I stayed at the Paarde Vlei Club and a 5 minute walk brought me to work in the U.P.L. labs. Here I met many people, including Mr Tom Edwards again.

At the U.P.L. Labs in Somerset West I started a corrosion series in 3 different cabinets:

(a) Sea water ex Strand Beach pH 6.5 – 7.2

(b) Saturated SO2 pH 3.0

(c) 3% Naoh/Ammonia NH3 pH12

Each was reported on weekly and topped up monthly. I also visited the various A.E.C.I. plants, acids, fertilizer, chemicals, explosives and vynide on corrosion problems. I spent over 2 years at Somerset West labs.

As mentioned earlier, in the late 60s we were all transferred to the new laboratories on the Dima Paints site in Alberton, Transvaal. Once there I soon made a number of new friends both in the factory and at Head Office/Admin.

Because of my background I was soon taken over as a Technical Rep. I acquired a car, expense account, etc and travelled the whole Transvaal. Long before cell phones, one would get back to Alrode only to find some other person at Springs, Nigel, Germiston or wherever needed help on some other technical matter.

During this period I went to several Corrosion Council meetings in the Transvaal together with Tom Edwards, Bob Rouse and others. While at the Cape I flew to Durban and joined a Corrosion Conference on board the S.S. "Europa" to Beira and back to Durban.

In 1967 I resigned from U.P.L. and moved down to the Cape where I joined Alkydex Paints, where the MD and owner was Mr Van Boxel.

John Viney who had resigned from U.P.L. earlier that year was the sales director at Alkydex and I was again the technical representative and serviced the marine, contractors and industrial markets. Customers included Nautilus, Safmarine, Ovenstones, Cape Steel and others.

In 1972 I received a phone call from Mr Richard Shave asking me to rejoin U.P.L. and form a small team of "Heavy Duty" coatings specialists. I agreed as Alkydex had recently merged with Crown Cebestos (Plascon) and I was not happy with that.

At U.P.L. my customer base was much the same as before but Consolidated Diamond Mines (C.D.M.) was then added.

I made several trips by road with the late Mr Chick Malcolm, most memorable. I also built a paint factory in Swakopmund for Dulux/SWA Chem. I was helped in the paint plant planning by Dr. Hulett Dulux. The trips were made by air to Windhoek and then by overnight train to Swakopmund.

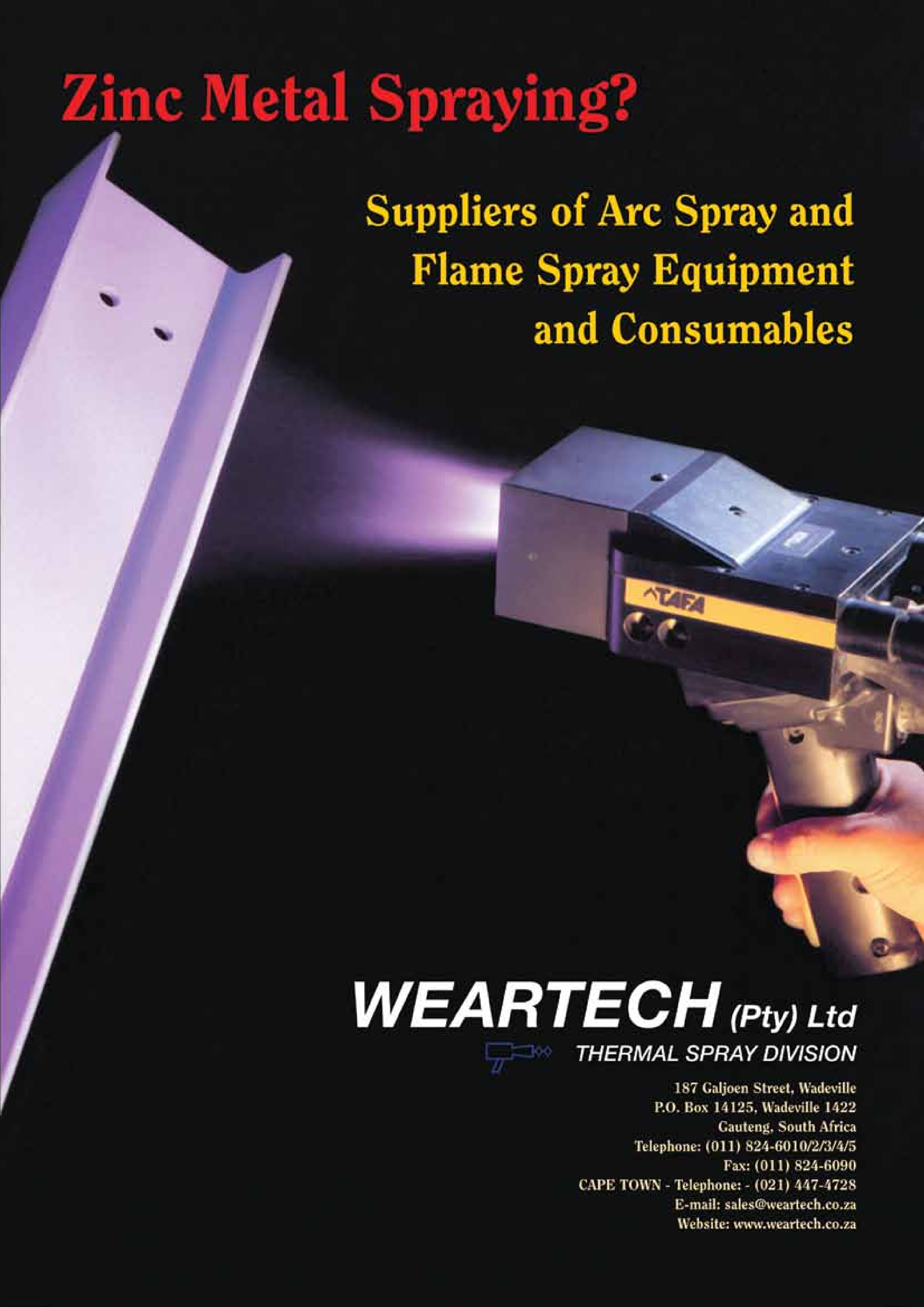
In Cape Town I met Mr D.C. Nel, owner and MD of Nautilus, a large paint contractor in the docks. I oversaw the repainting of the underwater areas of many small ships on the new "Syncrolift".

In 1977 we moved from Paarden Eiland to Bellville South where we had our office block and a small factory which I ran. From here in 1981 I was transferred to P.E. where I was involved in the building and training of staff for the new Cathodic Resin Plant on the Duco Dulux site in Struandale.

In 1988 I was again involved in sales and I began helping out with E-Coat process which painted the surface of a steel component. I also helped out in the industrial market reformulating "Boskor Brown" among others. I was also responsible for S&R stock (slow moving and redundant). I took early retirement in 1999 and began lecturing the S.A.P.M.A. Courses 01 to 06 at what was then the University of P.E., now NMMU. Module 05 was not included as it was felt this was for technologists working full time in the paint industry, and not likely to join the Plastics or Rubber Industries; this was a Polymer course under Mr Fanus Gerber.

The 5-module course was lectured over 2 years and a fresh intake of students was taken in every second year.

I retired from NMMU in 2014 having spent almost 14 years "giving back" to young, intelligent people. I hope they go on to make a good life in the Paint Industry.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