Vol. 4 Issue 2 | 2018

Corrosion Exclusively

SPECIAL EDITION: AFRICORR
July 2018

INSIDE:

- Corrosion under insulation
- Corrosion impact on bridge infrastructure
- The challenge of installing a new pipeline
- Protecting concrete wharves with CP
- Success drives teamwork – Part 2
- Feedback on NACE Corrosion Conference

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With Transvaal Galvanizers celebrating their 33rd birthday this year, it is time to look back, standing on the threshold of this milestone, to the journey that has led us here.

Over the last 33 years, Transvaal Galvanizers has galvanized over a million tonnes of steel. This is equivalent to 165 000 Bull Elephants OR 3 676 Boeing 747's OR 137 Eiffel Towers OR 68 Brooklyn Bridges.

While looking back we are extremely proud of our history and our heritage, but looking forward is much more important to us. One man that is always looking forward is the Director of Transvaal Galvanizers, Francesco Indiveri. With Mr Indiveri at the helm, Transvaal Galvanizers has expanded into new markets focusing extensively on renewable energy projects.

With this in mind as well as the need for a larger galvanizing kettle in the industry, Transvaal Galvanizers has commissioned the biggest galvanizing plant in Africa in 2017. The size of the kettle is 15.5m L x 2m W x 3.2m D. This will provide steel manufacturers in the industry the flexibility of manufacturing larger items whether it be structural, solar, piping, reinforcing to name a few, without the cost implications of double dipping, forcing costs of projects to rise.

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We constantly aim to continually improve ourselves by adapting to changing times and markets whilst ensuring that we always stay focused on client satisfaction. It is this focus that has brought us to where we are today, and we know that this focus will take us to even greater heights over the next 33 years.

With qualified, experienced and driven personnel at our forefront, we are your one stop shop when it comes to corrosion protection.

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Corrosion Exclusively

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President's Comment

The Corrosion Institute of Southern Africa is pleased to welcome our new Director, Mr Hendrick Rasebopye to our team. We wish Hendrick many years of happiness and we look forward to his valued input.

The National Professional Body Corrosion Chamber is in full swing and we are making huge strides in this regard. I would like to thank all involved for their hard work and tireless dedication and we can all look forward to an industry we can be even more proud of.

The Corrosion Institute of Southern Africa has been updating our data base and conducting national audits on information we have. The membership is the life blood of our organisation and this needs to be accurate and concise. We have recently sent out surveys requesting an update on information. This will be a continuous exercise. I would like to thank you all for taking the time to answer and assist.

We will be holding our Annual Fishing day on the 30th June at Brookwood Trout Farm and as always, it promises to be a popular day out. We are fortunate this year to have a National Fly Fisher teaching us all how to tie flies. I am eager to learn and ask questions.

The Annual Gauteng Golf Day will be held on Friday 9 November 2018 at Jackal Creek. Please book your four ball and or advertising space as soon as possible.

The Awards Dinner will be held at Moyo Zoo Lake this year on the 19th July 2018 over the Africorr Week.

The African Corrosion Conference or Africorr will be held from the 16th to the 20th July 2018. If you have not booked or would like to attend please contact the office or Mrs Venessa Sealy Fisher for more information.

We concluded an interesting presentation from Capital Star Steel on re-introducing the company to the industry. The evening was well attended and enjoyed by all.

We look forward to the Cape Region Presentations "a Fireside Chat" on the 21st June, Koeberg site visit on the 12th July 2018, Gauteng's Weartech Presentation on the 12th July 2018 and the KZN Region's demo and presentation on "Rope Access" in August 2018.

The Corrosion Institute received an award for Industry Dedication at the recently held NACE Conference and we would like to thank Mr Aaron Raath for representing us at this event.

I would like to congratulate Mr Bruce Trembling for being nominated as the Chairman of SAQCC and we wish him well on all of his endeavours in this regard.

The Corrosion Institute of Southern Africa was represented at the recently held "Coatings for Africa" expo and what was reported was a well-attended and excellent expo.

I would like to thank Liz Rathgens for stepping in as temporary manager when we needed her over the past twelve months and I am sure she is relieved just to concentrate on finance from now on.

Donavan Slade, CorrISA – 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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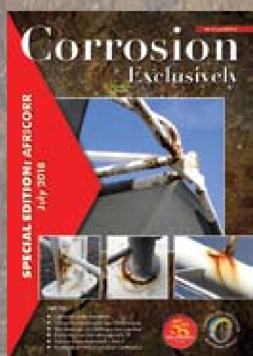
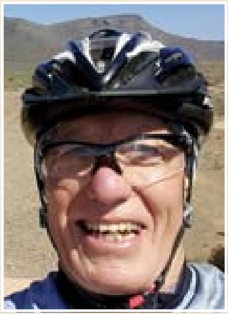


Cover: Our coastal cities and towns have endless examples of failed coatings and corrosion. When are we going to learn?

Editorial Comment



Welcome to our eleventh and special bumper edition for AfriCORR, we hope you enjoy the contents as much as I enjoyed compiling it for this purpose.

A special word of welcome to our dignitaries from NACE International, delegates from up north, students as well as the stalwart local delegates who without their tireless support, this alternative year conference would not be possible. I look forward to meeting you at AfriCORR!

Furthermore, the valuable contributions of Australian Corrosion Association (ACA), National Accreditation of Corrosion Engineers (NACE) and other authors who collectively make this publication what it is, are acknowledged for their generous support.

The following articles have been selected for inclusion of this eleventh edition:

- "Corrosion under insulation" and "Corrosion impact on Bridge Infrastructure" both articles are reported by Christine Filippis of Teraze Communications Pty Ltd, who contracts to ACA.
- "The challenge of installing a new pipeline" by Eric S. Langelund and Kimberly-Joy Harris and "Protecting concrete wharves with CP" by Kathy Riggs Larsen, Editor, Materials Performance Magazine NACE International. Both these articles supplied by the courtesy of NACE.
- A comment from a local reader on "Characterising severe bridge pile corrosion in a Florida marine environment" presented in Vol 4 Issue 1.
- "Success requires teamwork" The second part of this series presented by David Blackwell of Belzona.
- "Elcomaster® - The complete solution to your instant professional reporting needs."
- From the KETTLE, a regular contribution discusses "Stains caused by weeping" and "Burrs at plate edges or punched or drilled holes"
- Through the medium of Corrosion Exclusively we wish to welcome Hendrik Rasebopye as Director of CorrISA who relieves Liz Rathgens as the contributing "Overall Senior Manager on Site" and wish him many years of success with the organisation.

We report on many of the CorrISA activities, including the "Corrosion Awareness Day", "Coatings for Africa", two NACE CIP, CP2 and Corrosion Engineering courses all in Gauteng. Technical evenings for both Gauteng and the Cape Region are also included.

Graham Duk and Mark Terblanche together with Karyn Albrecht the Western Cape and KZN joint chairmen respectively give account of their activities.

Wally Kohlmeyer retired from Water Affairs, gives us an account of his life in "The RUST Spot".

We particularly wish to thank our loyal advertisers for their continued support, without whom the magazine would not be successful.

Should a reader wish to comment on any of the previously published articles or select a specific subject for discussion in a future edition of the magazine, kindly contact me?

Terry Smith

Out of sight must not be out of mind

Corrosion affects all concrete buildings and structures around the world and they deteriorate 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. Globally, the estimated annual cost of concrete corrosion to industry is billions of dollars.

The smooth, shiny appearance of tanks and pipework you might see at a manufacturing facility or construction site may seem pristine and safe, but often under the surface is insulation, water, a protective coating and significant amounts of corrosion.

Corrosion Under Insulation (CUI) is a pervasive but insidious form of metal corrosion. Most industrial or commercial facility – from the largest refineries and chemical plants to a local hospital or neighbourhood bakery – has insulated equipment. There are many reasons equipment is insulated, including energy conservation, production process stability or personnel protection, whether the product inside is hot, cold, or cycles between temperature extremes.

Wherever insulation is used, there will be some amount of corrosion under it.

Extensive corrosion discovered under pipe insulation.

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Unchecked CUI can cause thinning of the metal wall of a pipe or vessel which may lead to catastrophic perforation or rupture. The effects of which are increased where the vessel or pipe contains flammable or poisonous product under pressure.

In Australia, the yearly cost of asset maintenance is estimated to be approximately $32 billion. Avoidable corrosion damage, such as CUI, accounts for $8 billion of this and continues to have a major economic impact on industry and the wider community. Each year around the world there are hundreds of failures and incidents – to varying degrees of severity – caused by CUI.

It is important that owners of high-value assets understand the cost implications of ignoring the effects of corrosion under insulation. Organisations require effectively trained staff who have an understanding of the numerous types of corrosion that affect their industry and of the preventative and remediation technology available.

What lurks beneath? Much of the corrosion at a processing plant is rarely obvious.

As part of its charter, the Australasian Corrosion Association (ACA) presents a continual program of technical seminars and training courses each year. In June 2018, the ACA presented a series of two-day technical workshops dealing with CUI. The workshops were presented by international CUI specialist and consultant Peter Bock from Houston, USA. Bock has more than thirty years' experience in elevated temperature coatings and CUI and has published numerous articles as well as spoken at NACE, SSPC, ICC and other national and international conferences regarding CUI problems and solutions.

Workshops were held in Perth (19 - 20 June), Sydney (25 - 26 June) and New Plymouth (28 - 29 June), the workshop was dedicated to design, specification and inspection of corrosion control systems to prevent CUI in new or aged equipment and covered topics such as the causes of CUI, current state-of-the-art CUI coating systems, inspecting and evaluating aged CUI in the field and appropriate CUI repair coating systems.

Industrial insulation is a system composed of an outer protective jacketing, one or more layers of insulation, and a protective coating applied to the metal substrate. Even after taking every precaution during the design, construction and operation of an asset, every insulation project will sooner or later be affected by CUI. And unlike "normal" corrosion, CUI is hidden under the insulation and jacketing and is not readily visible – out of sight and too often out of mind.

The high cost of replacement insulation, labor, and operational downtime time means that only a small percentage insulated area is ever opened up for visual inspection. The rest of the area may be inspected using various electronic means, which may or may not give accurate indications of CUI. Parts of an insulated area may not be visually inspected at all during the expected 15 to 18 year service life of an asset threatened by CUI.

The full program is available through the web site.

The ACA is a not-for-profit, membership Association which provides training, seminars, conferences, publications and other activities to disseminate information about corrosion and its prevention or control.

COMMENT FROM A READER

on "Characterising severe bridge pile corrosion in a Florida marine environment"

(Vol. 4 Issue 1)

Dear Terry

I have just received the electronic copy of the March edition of Corrosion Exclusively – many thanks.

I read with interest the article on the corrosion of the Florida bridge piles. The authors referred to it as MIC – microbially induced corrosion – an interesting new (to me, at least) terminology but at the same time it appears to be a classic case of 'Accelerated Low Water Corrosion' – ALWC. As I recall, the reports on ALWC were put out jointly by CIRIA in the UK and PIANC (HQ in Brussels). The lead researcher was a British corrosion consultant whose name I cannot recall. ALWC was attributed to the same MIC causes but gave more attention to the zones of occurrence – just below low tide stages. However, in the references they did include our own Cmdr Wilfred Copenhagen, OBE as one of the pioneers in this field of research. He was, as you know one of the pioneers of corrosion science in this country. He was made an honorary fellow of the Challenger Society for his extension of this work to the sulphur eruptions off the Namibian coast.

At the time that the news of ALWC was published, I noted that it was characteristic of steel structures whereas reinforced concrete structures were free of it but exhibited their own 'Accelerated High Water Corrosion", AHWC, where steel was relatively protected. I read a paper on this at the international corrosion conference in Cape Town in 2008 noting that AHWC provided a relatively explicit way to characterise the zone of activity and eliminate the vague 'splash zone'.

Perhaps we could contribute to this American research, let me know.

Keith Mackie
Consulting Coastal & Harbour Engineer

Corrosion impact on bridge infrastructure

Throughout the Asia Pacific region there are tens of thousands of bridges and related road and rail infrastructure. The variety of designs and construction material used to build these assets present a wide range of challenges to the people charged with managing and maintaining them. Degradation of bridges is caused by many different factors including corrosion and other stresses from both the environment and heavy vehicles passing over them.

In Australia, the yearly cost of asset maintenance is estimated to be approximately $32 billion. Avoidable corrosion damage accounts for $8 billion of this and continues to have a major economic impact on industry and the wider community. The proportional costs and impact of corrosion are similar for most countries in the Asia Pacific region.

Corrosion will affect all types of metals to varying degrees of severity and speed. Unless comprehensive management plans are developed and implemented, steel and other metals will 'rust' and reinforced concrete will spall and crack. Corrosion can be prevented or minimised by either 'isolating' the material from its environment with some sort of coating or implementing an active intervention system such as cathodic protection.

The environment and prevailing climatic conditions also contribute to the degradation of bridges. The largest cities in the region are either in coastal or tropical zones, with some even exposed to the combination of both. Bridges in Darwin and Brisbane, along with many other cities throughout the region, can be impacted by extreme wind speeds of tropical storms in addition to the high levels of airborne salt found in coastal locations.

Harsh environments – especially with high chemical levels or extreme temperatures – can accelerate rates of corrosion.

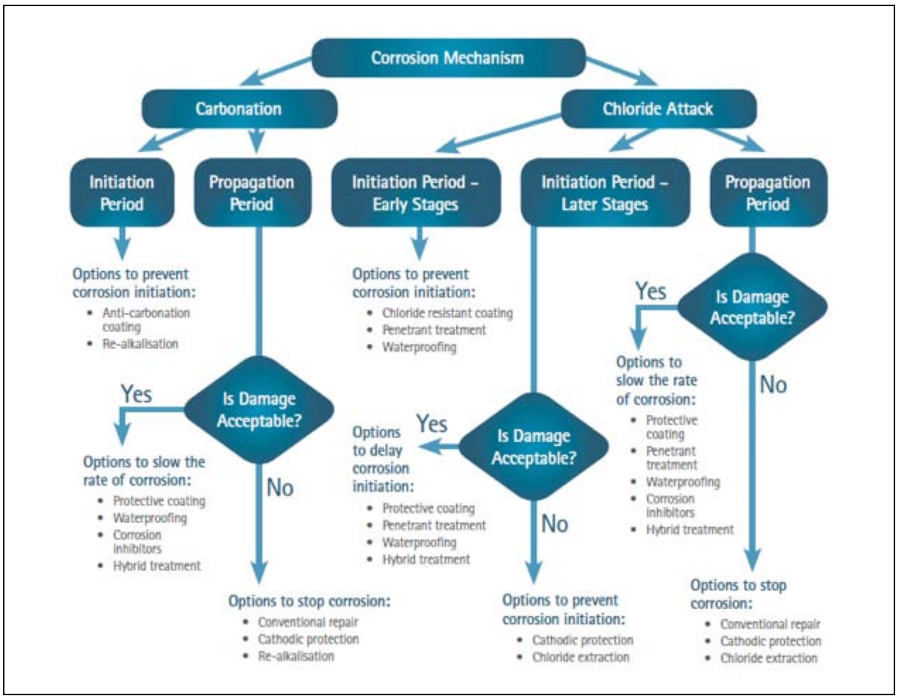
Bridges also carry massive loads from moving vehicles which impose vibrational and other stresses onto structures. Approximately 200 000 cars and trucks cross Melbourne's Westgate Bridge each day, making it one of the country's busiest road corridors. Sydney's Harbour Bridge carries 160 000 vehicles each day between North Sydney and the CBD as well as 204 trains. The Auckland Harbour Bridge carries a similar volume of road traffic, although it is estimated that half the people crossing the bridge in the morning peak hour are on buses.

Centre pylon of the Makatote viaduct in New Zealand prepared for restoration. (© 2016, TBS Group)

The owners and managers of these assets must ensure that bridges are safe, while maintaining acceptable levels of service for the duration of the expected life of the asset. If appropriate asset management strategies are implemented, it is possible to restore an asset to near its original condition and maintain its functionality for the remaining service life and, possibly, even beyond.

Working with industry and academia to research all aspects of corrosion, the Australasian Corrosion Association Inc. (ACA) provides an extensive knowledge base that supports best practice in corrosion management, thereby ensuring all impacts of corrosion are responsibly managed, the environment is protected, public safety enhanced and economies improved.

Recognition of the need to effectively maintain road and rail infrastructure is increasing. An illustration of this is the announcement by the Australian Federal government of further funding of its national Bridges Renewal Program. Darren Chester, former Federal Minister for Infrastructure and Transport, said that the Australian Government's funding would see an additional 186 projects added to the replacement or upgrade work being carried out on 201 bridges already. The new funding



Corrosion mitigation flowchart.

'Weathering steel' narrow-gauge rail bridge in New Zealand.

'Weathering steel' girder bridge.

is in addition to the $216 million already committed under the first two rounds of the program.

Another was the initiation by Raed El Sarraf, Corrosion and Asset Integrity Consultant with WSP Opus in New Zealand, of a Big Bridges Workshop in 2017 that was held in Sydney and attended by representatives of the stakeholders in the larger, iconic bridges in the region, including the Sydney Harbour Bridge, Auckland Harbour Bridge, Brisbane's Story Bridge and Melbourne's Westgate Bridge.

The two most common causes of concrete corrosion are carbonation and chloride or 'salt attack'. The alkaline (high pH) conditions in concrete forms a passive film on the surface of the steel reinforcing bars, thus preventing or minimising corrosion. Reduction of the pH caused by "carbonation" or ingress of chloride (salt) causes the passive film to degrade, allowing the reinforcement to corrode in the presence of oxygen and moisture. Leaching of the alkalinity from concrete also lowers pH to cause corrosion of steel reinforcement. Stray electrical currents, most commonly from electrified traction systems, can also breakdown the passive film and cause corrosion of steel reinforced concrete and prestressed concrete elements.

As reinforcing bars rust, the volume of the rust products can increase up to six times that of the original steel, thus increasing pressure on the surrounding material which slowly cracks the concrete. The most exposed elements usually deteriorate first and it may take 5 to 15 years for the effects of reinforcing steel corrosion to become visibly noticeable. Cracks eventually appear on the surface and concrete starts to flake off or spall.

Warren Green, Director and Corrosion Engineer at engineering consultancy firm, Vinsi Partners, stated that not all corrosion of reinforcement leads to visible rust staining, cracking, delamination or spalling of cover concrete. Significant section loss can also occur where there is localised pitting or localised corrosion at cracks and surface defects. Ultimately, structural failure may occur without any visible consequences of corrosion on the surface of the concrete. Pits usually start out quite narrow, but with time coalesce to form larger ones and result in section loss over a greater (anodic) area.

Green stated that various repair and protection technologies and approaches are possible during the lifetime of a reinforced concrete structure, depending on the type of corrosion mechanism. Remedial options available that can slow the rate of reinforcement corrosion include coatings, penetrants, waterproofing, corrosion inhibitors, electrochemical (galvanic anodes) and electrochemical (hybrid treatment).

There are also remedial options to stop corrosion of reinforcement. These include cathodic protection, electrochemical chloride extraction and electrochemical re-alkalisation.

In addition to the range of repair and protection approaches, the latest concrete structures incorporate new materials and production methods which improve longevity and performance. As a result of the research into concrete additives, construction companies and engineering consultancies have access to all the latest technologies that yield a suite of proactive and reactive processes and procedures to maximise the durability of reinforced and pre-stressed concrete.

The physical aspects of applying a coating or repairing a section of steel or concrete present their own challenges for owners and operators of bridges. The towers and stays of suspension-type bridges often require staff to have advanced abseiling skills so they can access them. Metal structures usually need specialised equipment and scaffolding to allow workers to safely perform maintenance work.

New Zealand has approximately 2 300 bridges of varying size associated with the country's highways. A large proportion of the bridges are concrete decks on steel frames and supports or pre-stressed concrete structures, in addition to bridges made of conventional reinforced concrete and timber. According to Willie Mandeno, Principal Materials and Corrosion Engineer with WSP Opus, the maintenance and monitoring of these structures continually adapts to changing conditions and technologies.

The iconic Auckland Harbour Bridge is a steel truss and box girder design. For many years, the maintenance of this bridge involved a continuing program of painting, where applicators started at one end and when they got to the other end, went back to the beginning again. According to Mandeno, this has changed. "Old oil based paints became very brittle and could crack then delaminate," he said. "In the late 1990s they changed to a moisture cured urethane which gives approximately a 20 year lifespan before the bridge needs to be repainted."

While the time between recoating is now much longer, it is still necessary to continually monitor the old coatings to ensure adhesion is maintained. "When re-coating, the ideal is to just replace the top coat," Mandeno said, "but we usually have to do some maintenance work first, such as cleaning and re-priming of edges and around rivet heads."

Early solvent-based paints used to contain chromates and lead, along with a range of other hazardous chemicals. "We have had to balance protecting the environment with the reduced performance of water-based coatings," Mandeno said. "One solvent-free long-life coating that we now recommend for use in coastal areas is thermal sprayed zinc. One limitation of this material, and the alternative high-build inorganic zinc silicate coatings, is that it is that they are only available in shades of grey."

Many roads throughout the region are being upgraded to allow for longer and heavier trucks. All road authorities face similar challenges when managing the risks of ageing infrastructure designed to a much lower standard, whilst still providing access for modern heavy vehicles.

Short span structures like culverts are only exposed to one axle group at any one time whereas longer span structures built during the past century are now required to carry substantially more load than they were originally designed for.

In New Zealand, Mandeno stated that many of the older timber rail bridges nearing the end of their useful life are being replaced by 'weathering steel' girder bridges which should provide a longer operational lifespan.

Officially known as "structural steel with improved atmospheric corrosion resistance," weathering steel is a high strength, low alloy steel that, in suitable environments – those not exposed to high levels of salinity and pollutants – may be left unpainted allowing a protective rust "patina" to form and minimise further corrosion. Alloy components such as copper, chromium, silicon and phosphorus form less than two per cent of the steel but it retains appropriate strength, ductility, toughness and weldability so that it can be used for bridge construction.

All structural steel rusts at a rate determined by the amount of moisture and oxygen to which the metallic iron is exposed. As this process continues, the oxide (rust) layer becomes a barrier restricting further ingress of moisture and oxygen to the metal, and the rate of corrosion slows down.

The rust layer that forms on most conventional carbon-manganese structural steels is relatively porous and flakes off the surface allowing a fresh corrosion cycle to occur. However, due to the alloying elements in weathering steel, a stable rust layer is produced that adheres to the base metal and is much less porous. This layer develops under conditions of alternate wetting and drying to produce a protective barrier which impedes further access of oxygen and moisture. It is possible that if the rust layer remains sufficiently impervious and tightly adhering, the corrosion rate may reduce to an extremely low one.

It can be relatively simple to calculate loads and stresses on bridges when weights are distributed evenly across the structure, but road authorities also have to deal with heavy and over-dimension loads. Movement of such vehicles requires special planning as there are some roads and bridges that are physically unable to support massive weight concentrated into a small area.

Modern technology can assist in managing some structures sensitive to vibration from heavy vehicles. Electronic sensors can be set up to monitor vibrations and other stresses on structures so that a large number of data points are logged that can be downloaded for analysis. Sensors can also be connected to remote cameras that are triggered whenever a threshold vibration level is exceeded to identify which vehicles are producing these effects.

It is strongly recommended that a durability plan be developed which then becomes a critical tool in supporting an overarching asset management strategy. The plan should clearly outline likely corrosion-related risks and agreed mitigation approaches as early as possible in an asset's lifecycle, ideally during the planning and design stage.

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.

Challenges of installing a new pipeline

By Eric S. Langelund and Kimberly-Joy Harris

Each year hundreds of miles of pipeline are installed. During the installation of a new pipeline, corrosion engineers must consider many different aspects of the pipeline and its corrosion protection. On the surface it may appear simple, thinking only of coatings and cathodic protection (CP), but once construction is underway , the tasks are many.

Pipeline installation is accomplished through the efforts of multiple teams of personnel, all of whom have their own duties and concerns. Safety, transportation, materials, equipment, and construction are some major components of pipeline installation. Corrosion engineers must address all of these areas to ensure the corrosion protection system is installed and functioning to meet the requirements of the federal, state, and local regulatory agencies as well as the company's requisites and timelines.

Once construction has commenced several tasks are required to ensure a safe and successful pipeline installation with effective cathodic protection and mitigation of interfering current.

The position of a pipeline is generally marked above ground level for safety purposes.

Pipeline coating

The coating is the first line of defense against pipeline corrosion, and most pipelines are coated. Selecting a coating system that is appropriate for the pipeline's route, or right-of-way (ROW) conditions is very important. Some coatings are petroleum based and may not be suitable for soils with existing hydrocarbons. Other coatings are pliable and are ideal for filling voids along the surface of the pipe, but are not compatible with clay soils that exert stresses onto the coating. If the ROW environment is rocky, a thicker coating may be preferred. If the ROW requires horizontal directional drilling to install a pipeline underneath a river or other obstacle, a thick, abrasion-resistant overcoat may be selected. Common coatings used for cross-country pipelines are fusion-bonded epoxy or two-part epoxy coatings with a standard layer that measures from 19- to 24-mils (482- to 610-μm) thick.

Once a coating is selected, it is recommended that the pipe coating process is inspected at the mill. This helps to ensure the surface is properly prepared and the pipe is handled appropriately.

During pipeline installation, welded joints must be coated in the field. It is crucial to select a coating that is compatible with the mill coating and also suitable for use in the field.

Inspecting the application of the field coating at the pipeline joints is important as well. This ensures that the appropriate surface preparation, pipe preheating (if necessary), and specified coating application is taking place. Additionally, the joint coating should be tested for holidays (i.e., coating flaws) and repaired if necessary.

Cathodic protection system design

The CP system is the second line of defense for protecting the pipeline from corroding. Although most pipelines have an effective coating, the CP system is essential for protecting areas of the pipeline where the coating has a holiday or may be deteriorating. Since the demand put on the CP system is determined by the coating quality, the condition of the coating should be the best it can be when the pipe is installed.

Many factors are involved when designing the CP system for a new pipeline. Apart from the actual current calculations, environmental conditions along the ROW must also be addressed.

Many new pipelines will cover a lot of terrain with varying soil types. Supplemental CP may be required in areas where the soil has high resistivity.

Additionally, CP designs for new pipelines must consider any existing CP systems for other nearby pipelines (known as foreign pipelines). In some instances, there isn't an easy way to establish an electrical bond between pipelines. This means the CP system for the newly installed pipeline would need to overcome the influence of any other CP system.

Right-of-way

The first thing to review for CP of a new pipeline installation is whether there are foreign pipelines crossing the new pipeline's ROW. Existing pipelines in the ROW of the new pipeline can pose many obstacles when designing a CP system. New pipelines in crossings may experience interference from stray current – which is current from another voltage source, such as a CP system for a nearby foreign pipeline or current from an adjacent electrified railway – or shielding of CP currents. Often the extent of stray current interference is unknown until the new pipeline is fully installed. CP design allowances for pipeline crossings and stray current interference should be made, as much as possible, on the front end of a project.

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Fusion bonded epoxy coatings are often used on pipelines.

Stray current interference

CP systems from foreign pipelines can cause depressed structure-to-electrolyte (S/E) potentials (i.e., potential readings that are more electro-positive than the accepted criterion of –850 mV vs. a copper/copper sulfate [$Cu/CuSO_4$] reference electrode) for the newly installed pipeline. In this case, the electrical current picked up by the affected pipeline will be discharged from that same pipeline. The discharge site on the affected pipeline is where the depressed S/E potentials appear and where corrosion occurs. One way to mitigate this interference is to establish an electrical bond between the newly installed pipeline and foreign pipeline. The bond provides a path that allows electrical current involuntarily pickedup on the affected pipeline to be returned to the pipeline with the CP source. Most operators and the corrosion consultants who support them participate in regional electrolysis committees that meet periodically to set up pipeline interference tests to determine the impact, if any, of a pipeline's CP system on other cathodically protected structures in the vicinity.

Another way to address stray current interference is to install supplemental CP at the current discharge location on the affected pipeline. Often this involves installing sacrificial anodes so that the current discharge takes place at the anodes instead of the affected pipeline's surface. There are many configurations for this type of stray current mitigation.

Stray current interference can also originate from rail systems powered by direct current (DC). The DC used to power the trains inadvertently leaks into the earth. The current then finds the path of least resistance back to its source. Often this path is a nearby pipeline.

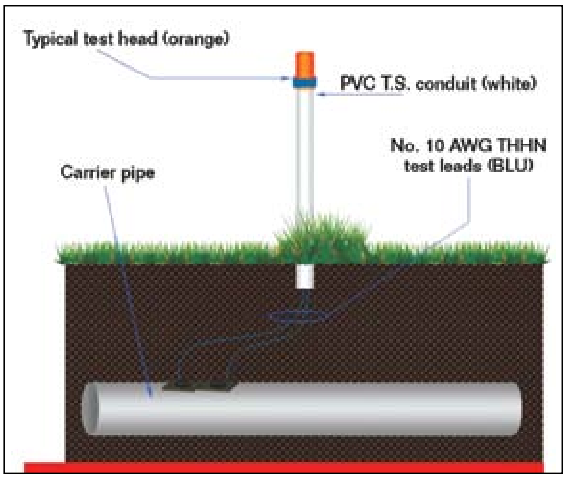
Where the current is picked up on the pipeline, there is free CP for the pipe. However, corrosion occurs where the current is discharged from the pipe. For a carbon steel pipeline, 1A of DC over the course of a year takes ~20 lb (9 kg) of iron with it. Mitigation of stray current under these conditions may involve an electrical bond back to the rail power source or the installation of supplemental CP.

Within the last 30 years, induced alternating current (AC) voltage has been identified as a pipeline safety concern. Pipelines that parallel overhead high-voltage AC (HVAC) transmission lines pick up induced AC voltage from the magnetic fields produced by the overhead wires. The induced AC voltage has been found to be dangerous to field personnel, and NACE International set a safe limit of 15 VAC. When testing pipelines beneath HVAC transmission lines, it is recommended to measure and record the AC voltage of the pipe in addition to the S/E potential. Where pipelines exceed 15 VAC, grounding mitigation is recommended, such as grounding mats at test stations and valves where personnel come into contact with the pipe, or linear grounding along the length of a pipeline where it is positioned beneath HVAC transmission lines. Such grounding is typically connected to the pipeline through an electrical isolation device, which conducts AC to effectively ground and discharge the induced AC voltage and blocks DC voltage so the CP system is not adversely affected. The magnitude of induced AC voltage is based on many factors, including distance between the pipeline and the HVAC transmission line towers, routing of the pipeline, number of HVAC transmission lines, and pipeline coating system. Typically, the AC voltage is higher where the pipeline enters and leaves the power corridor.

More recently, induced AC voltage has been found to cause AC corrosion, which is due to improved pipeline coatings. This phenomenon is the result of induced AC voltage being discharged from the pipeline surface at a coating holiday. The effect of a large amount of AC being discharged from a small, focused holiday location can result in aggressive corrosion. This corrosion is so destructive that there have been instances where a pipe has experienced through-wall penetrations in a matter of months. Soil resistivity, induced AC voltage, and AC current density are all factors that influence AC corrosion.

Identification and mitigation of AC corrosion is imperative. Coupon test stations and remote monitoring are good tools in areas where AC corrosion may be a concern.

Corrosion protected pipes ready for installation.



Schematic of a typical pipeline test station.

Typical CP rectifier station set-up.

Test stations

Test stations are used to measure S/E potentials so the effectiveness of the CP system can be monitored and evaluated. Although there are different types of test stations with different materials of construction, their purpose is the same. They simply house test lead wires that are connected to a buried pipeline to provide an easy connection to the pipe for testing the CP system. The best time to install test stations is when the pipeline is being installed. Test lead wires (normally two) are attached to the buried pipeline and routed up to grade into a protective housing (test station).

Selecting the proper locations for test stations is important. Typically test stations are installed at each road crossing as the pipeline is routed from Point A to Point B. Additional test stations are often placed at fence lines when there is a large distance between roads, at or near crossings with foreign pipelines, and at any other location identified as a concern for the effectiveness of the CP system. Typically, one test station is installed every mile along a pipeline.

A permanent reference electrode may be buried near the pipeline to provide good earth contact for measuring S/E potentials in an area where soil conditions for measuring S/E potentials are not ideal (e.g., the ground is very dry, susceptible to freezing, or covered with asphalt or concrete). The permanent reference electrode test lead wire is routed into and terminated within the test station with the other pipe wires.

Where stray currents or poor soil conditions exist, a test station with coupons may be installed. A coupon is a small metal sample, installed adjacent to the pipeline, that represents a holiday in the pipe coating. Ideally the coupon size is selected based on estimations to represent the worst-case holiday on the pipeline. The S/E potentials of the coupon are used to evaluate the effectiveness of the CP system, with the theory being that if the coupon is being protected by the CP system, so is the pipeline.

Since foreign pipeline crossings can result in stray current interference between pipelines, test stations with test lead wires on all pipelines should be in stalled at foreign pipeline crossings to allow comprehensive testing of all pipes. This would include interference testing to ensure that one pipeline's CP system is not hindering the effectiveness of the other pipeline's CP system.

Test stations at foreign pipeline crossings often include permanent reference electrodes and coupons to facilitate thorough testing of the pipes at pipe depth. Additionally, a bond may be established between pipelines to alleviate the influence of one CP.

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Protecting concrete wharves with cathodic protection

By Kathy Riggs Larsen

The Port of Brisbane (Brisbane, Queensland, Australia), Queensland's largest seaport, is located near the city of Brisbane at the mouth of the Brisbane River on Queensland's southeast coast. With 29 operating berths and more than 7 700m of quay line, this port is one of Australia's fastest growing multi-cargo ports. Every year, the Port of Brisbane handles ~AUD$50 billion in international trade, which includes around 95% of Queensland's containers, more than 90% of its motor vehicles, and about half of its agricultural exports.[1]

In 1999, an impressed current cathodic protection (ICCP) system was installed and commissioned on several steel-reinforced concrete structures that support the Port of Brisbane's Wharves 4 and 5. Atef Cheaitani, managing director of Remedial Technology Pty., Ltd. (Gladesville, New South Wales, Australia), designed the ICCP system that was installed there more than 18 years ago. About three years ago, after the ICCP system had been in service for 15 years, the port's management company commissioned a comprehensive audit of the Wharves 4 and 5 to assess the status of the concrete structures and ICCP system, and to determine if any renovation work was needed to sustain the ICCP system and extend the service life of the wharves for another 30 years.

An impressed current cathodic protection system was installed and commissioned in 1999 on Wharves 4 and 5 at the Port of Brisbane in Queensland, Australia.

The original cathodic protection system

Cheaitani notes the total combined length of Wharves 4 and 5 is 600m and the approximate area protected by the ICCP system is 8 000m². When the initial ICCP system was installed, he says, the area being cathodically protected – the wharves' substructur – was in an advanced state of deterioration. Major concrete repair work was being done on the wharves' abutment, front and rear crane beams, relieving slab, and the fenders, an area that totalled ~5 000m.

Although chlorides had permeated the concrete to a depth beyond the steel reinforcing bar (rebar), the repair methodology included concrete removal only to the level of the rebar, which left the steel exposed to chloride-contaminated concrete. Approximately 2 000 metric tons of dry sprayed gunite were used to replace the contaminated concrete. For corrosion protection of the reinforcing steel, CP was determined to be the most effective long-term solution.

The ICCP system was divided into 13 sections; 12 sections were ~48m long and one section was 24m long. Each section was divided into 14 separate electrical zones that incorporated tidal areas (abutment wall and slab, relieving slab, and fender wall) and atmospheric areas (relieving slab, landward crane beam, and seaward crane beam). Issues such as variations in concrete resistivity, corroding conditions of the elements to be protected, tidal variations, and structural geometry were considered when zoning the system, Cheaitani says.

Two installation methods were used to install ~30km of mixed metal oxide titanium ribbon anode (10mm wide by 0.9mm thick with a current capacity of 5.28mA/linear meter).

In the first method, 10mm wide by 30mm deep slots were cut into existing concrete, and the ribbon anode was placed in the slot and backfilled with grout material. Where the contaminated concrete had been removed, the second method, the ribbon anode was placed between two layers of gunite that was compatible with the existing concrete.

The ICCP system included a total of 365 embedded titanium and silver/silver chloride (Ag/AgCl) reference electrodes, with their locations determined with

It took a crew of six people, accessing the structure by boat and land, about two weeks to hammer test the entire concrete surface underneath the wharf. Photo courtesy of Atef Cheaitani the results of a detailed potential and resistance mapping survey carried out during construction for every element of the structure. Additionally, 183 reference electrodes were installed in concrete as spares. For each reference electrode, a dedicated steel connection cable was installed to obtain accurate readings.

All cables from the various elements of the structure were routed to a total of 192 junction boxes with an IP67 rating (meaning fully protected from dust and can withstand submersion in 1m of water for up to 30 min), which were located on the front crane beam and the abutment wall. All cables from the junction boxes were terminated in 13 IP67-rated control units affixed to the abutment wall every 48m. Each control unit included a multiple number of transformer/rectifier units and components to allow potential measurement with reference electrodes, including "instant off" measurements, current adjustment, and remote communication to the main control unit. A total of 172 transformer/rectifier units (2 A/15 V) were used in the original installation.

These substations were connected to the main control unit near Wharf 4 via telephone line and power supply cable. Due to space restrictions on the wharf deck, all the junction boxes and control units were installed underneath the wharves.

Cheaitani notes that the original control system was one of the most advanced control systems for CP in concrete at that time. It included remote access, a remote alarm function, graphical user interface, remote monitoring and adjustment, and many other advanced features so the system could be controlled from a distance. Based on the adopted NACE International criteria[2] at that time for assessing a CP system (i.e., a 100-mV polarization development/decay criterion), the ICCP system was operating satisfactorily.

Reviewing the cathodic protection of the wharves

After 15 years of system operation, following flooding from the Brisbane River that impacted the water level underneath the wharves, Cheaitani performed an audit that included an inspection of the wharf's concrete structures and an assessment of the ICCP system components. He notes that since the original commissioning of the system, various measures had been undertaken to prevent water ingress into the control units and junction boxes from tidal action and flooding, such as periodically resealing the junction boxes and control units. Although these measures kept the ICCP system functioning, the water ingress from the harsh marine environment and high humidity could not be fully prevented. The long-term performance of the electronics was impacted and resulted in a higher rate of electronic component failure as well as increased maintenance costs.

The approximate concrete area underneath Wharves 4 and 5 that is protected by the ICCP system is 8 000m². Photo courtesy of Atef Cheaitani

A control unit installed underneath the wharf as part of the original ICCP system. Photo courtesy of Atef Cheaitani

Results of the audit indicated that the CP protection criteria at nearly all embedded reference electrodes had been achieved based on the applicable present-day Australian standard.[3]

Except for a very small localized ~6m² area where the concrete had deteriorated, the areas protected by CP were free from spalling and reinforcement corrosion. The primary cause of the localized deterioration was related to the CP system not operating in this area because of a localized short circuit between the anode and steel.

Delamination

Hammer tests were performed to check for concrete delamination. The entire concrete area – 8 000m² – was tested. Some areas (usually in the front and rear crane beams) produced a hollow sound when struck by the hammer, and were marked as potential delamination areas. "If you don't have concrete spalling or cracking, the only thing you can do is hammer testing to detect delamination by hearing a hollow sound. This is an indication that there is a problem in the concrete." Cheaitani explains.

A detailed inspection at areas where delamination was suspected revealed that the gunite material encapsulating the ribbon anode was fully sufficient to pass the CP current to the embedded steel reinforcement. The suspected delamination proved not to be associated with any corrosion of the steel reinforcement.

Grout acidification

Where the ribbon anodes were installed in slots cut in the original unrepaired concrete, there was missing grout and evidence of grout acidification at various locations in the splash and tidal zone areas. Cheaitani notes that the acidification of the grout was related to the encapsulation of the ribbon anodes in the cut slots.

"The repair encapsulation wasn't sufficient for areas subjected to tides and continuous water spray," he comments, noting that as the tide came in and wet the areas, there was minor shrinkage cracking over time between the grout and the original concrete.

As the water penetrated the material surrounding the anode, acidification occurred.

"At the time of installation, this problem wasn't really known," he adds.

The system audit didn't determine any evidence of a correlation between grout acidification and a reduction of anode current density, Cheaitani says. The ribbon anode was operational while immersed in water. Based on the audit results, initiation of reinforcement corrosion and concrete deterioration was not observed in the tidal and splash zones because of grout acidification, which indicated that grout acidification had no impact on the ICCP system's performance.

Water damage

Components with varying degrees of water damage were noted for many of the junction boxes and control units located at the abutment wall underneath the wharf. At the time of system installation, enclosures rated as IP67 were thought to be sufficient for providing protection to all components within the enclosures against moderate water exposure at high tide. However, ~50% of the control units and 50% of the junction boxes located at the abutment wall in an area with water exposure had some sort of water damage to terminals and electronics inside. The audit found, though, that 96 junction boxes located at the front crane beam and away from the water were in excellent ondition.

Overall, Cheaitani says, the performance of the original ICCP system since its commissioning was very satisfactory. Locating the control units underneath the wharf, which made them susceptible to water and moisture exposure and increased the failure rate for some system components, was the main drawback of the system that needed to be addressed.

ICCP system renovation

The scope of the renovation work was to move the junction boxes and control units to locations above the wharves while maintaining and utilizing all embedded CP system components in the concrete (ribbon anodes, reference electrodes, and cabling). While developing the configuration for this task, Cheaitani explored increasing the size of the ICCP zones and reducing the number of circuits in the existing system. This could be possible because an analysis of system data showed a similar level of current requirements between similar zones in different sections.

In theory, he explains, smaller zones in a CP design provide more control of the CP current. Doing this, however, requires more cabling, reference electrodes, and power supply units. “After analyzing more than 15 years’ worth of data, we noticed a big similarity in the level of current going to each zone within different sections, and because of this similarity we understood that small zones are not really necessary,” he says. “There is no advantage to having local zones because they all use about the same amount of current.”

The guidelines he used to reduce the number of circuits was to combine zones that had similar steel density, corrosion status, and exposure conditions, as well as maintain a similar voltage drop in current delivered via the cabling.

The new design called for combining smaller circuits with the same exposure conditions and CP current requirements, merging certain zones in each section, and changing the system layout from a local distributed system, where the power supply is distributed to the individual sites of the control units, to a global supervised system, where the power is supplied to all control units in one location above the wharf.

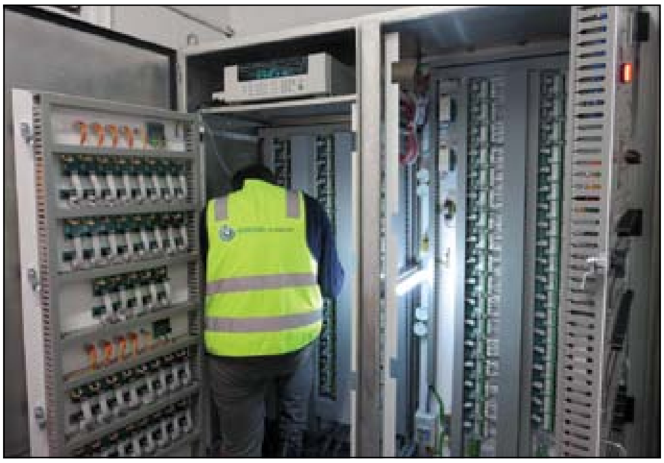
To test the system reconfiguration, a trial application was carried out using a small number of junction boxes in Section 12, a 24m length of the wharf.

“We replaced junction boxes and did full testing of the trial area, including external mapping of potential measurements using the embedded and portable reference electrodes, to get a better understanding of the current distribution within the area,” Cheaitani says.

“Basically, this verified that the new ICCP design – the combination of zoning – wouldn’t affect the systems performance.” Evidence gathered during the trial demonstrated the CP system performance for Section 12 was not negatively impacted when CP circuits with similar exposure and geometry were combined and the cabling was simplified. The conclusion, he comments, was that fewer large CP zones provided the same level of corrosion protection as many smaller zones.

Impressed curren anodes vs. sacrificial anodes

After 15 years of system operation, the current requirement for the original ICCP to achieve corrosion protection of the



New control units were installed in a climate-controlled room above the wharves. Photo courtesy of Atef Cheaitani

Acidification of the grout encapsulating the ribbon anodes. Photo courtesy of Atef Cheaitani

wharves, based on the applicable Australian and global standards for CP, was ~11.25 mA/ m^2. Cheaitani comments that a sacrificial anode-based CP system would not, under any circumstances, have the capacity to deliver this level of CP current and provide the required corrosion protection of the wharves. The typical size of a galvanic zinc anode for concrete (18mm diameter by 113m long) will deliver between 0.4 and 0.8mA. Even if that amount of current could be delivered continuously for a sustained period of time, it would require between 14 to 28 anodes per square meter of concrete to obtain the required level of current using sacrificial anodes, he says. This is practically impossible to achieve based on cost, practicality, and engineering considerations.

"We believe sacrificial anodes have their own applications in certain areas. For wharf structures that are always subjected to a very harsh marine environment, an impressed current system is really the only practical and cost-effective CP application to stop corrosion," he adds.

The new system design eliminated the installation of electronics underneath the wharf, and required less cabling. The overall number of circuits was reduced from 14 to 8 in each typical section, and the number of sections was decreased from a total of 13 localized control units underneath the wharves to six control units all located in a central climate-controlled room above the wharves. This resulted in a total reduction in the number of circuits – from 172 to 48. Cable design and voltage drop calculations were performed for all cables between the structure and the new location of the controller units, and different sized cables, from 4 to 16mm, were used between the junction boxes at the wharves and the new locations of the control units to ensure proper current delivery to all system zones.

The repair work and CP trial took about a year to complete, and the redesigned system has been performing very well since it was brought online about two years ago.

"The whole idea is to build CP systems that require minimal maintenance – that is the key lesson we've learned over the years," Cheaitani says.

"The less maintenance you need to keep the technology viable, the more cost-effective the system is for the client. We believe future ICCP systems will have a simple design with larger zones, and use heavy-duty equipment that will not be negatively affected by the environment. If we can build a system like this, it will cost less, deliver the same CP protection, and will be extremely low maintenance, which is very important for the client."

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This article originally appeared in the March 2018 issue of Materials Performance magazine. Reprinted with permission.

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Success requires teamwork (Part 2)

By David Blackwell Engineering Director of Belzona Polymerics Ltd. Harrowgate N Yorks.

After taking a closer look at the necessity for communication within industry, concerning equipment design and its impact on application and inspection, the other important factors for success will be explored. In continuation from the previous post, the experience surrounding applications and some of the tools put into place by product manufacturers will be discussed. In addition, the common expectations and misconceptions of coatings will be examined, alongside the protocols for ensuring that the most suitable solution is chosen to complete an application.

Validated training improves application standards.

Application contractor experience

It should be obvious that the application company and its employees are critical to the successful installation of any coating or lining project and yet many clients still tend to choose contractors based on price. That's like buying a bicycle because it is less expensive than a car, even though you are planning a journey from one end of the country to another! They say that you get what you pay for and, for the most part, experience has shown this to be true – certainly when applied to the successful installation and consequent longevity of internal linings.

In recent years, many oil and gas industry asset owners and operators have begun to object to the investment required for application of specialist internal lining materials, only to have them fail prematurely. This could be due to less than perfect application technique, or deliberate corner cutting by contractors, who are desperate to maintain or increase their profit margins.

There is thankfully an increasing realisation that careful selection of both the lining and the contractor is essential, if the completed project is to reach its expected operational life. Clients are now, as a result, beginning to insist that the contractors' personnel must be trained and validated by the linings manufacturers if they are to be eligible to even bid for a project. Most coatings and linings manufacturers would consider this to be a positive move within the industry, as it helps to set and underscore minimum standards. Furthermore, it benchmarks acceptable practice and contractor performance directly to the lining product specified.

However, specific training such as this comes at a cost. For the linings manufacturer, this presents as manpower, facilities, and product and administration costs, whilst affecting the contractor in terms of training fees; release of manpower and a loss of chargeable days during the training course. Conversely, the more enlightened clients realise that the cost of the lining application, when compared to the cost of the overall project, is minimal. Therefore, the contractor is allowed to include the cost of training within their bid for the work – in effect paying for training, themselves.

The philosophy is simple; better to increase the known costs up front than have to cope with the possibility of much larger unknown costs at a later date following a premature failure.

Client expectations and misconceptions

For many years, problems have arisen, in part, due to the approach adopted by the manufacturers' sales personnel in their interactions with clients. Being, for the most part commercially oriented, their primary interest is directed towards achieving the sale. Historically speaking, their interests did not take into consideration what the client expected the product to achieve. Consequently, this resulted in the client buying what the salesmen thought they needed, not what the client actually required.

To counter this problem, manufacturers introduced Technical Sales personnel who were trained to ask the right questions in order to correctly specify a product to match the needs of the client. That said, the problem still occasionally occurs when certain crucial questions are overlooked. This is simply because Technical Sales personnel, although considered professional and capable, can wrongly assume certain critical facts, probably basing their assumptions on "experience" of similar applications.

It should also be said that the cause of this problem cannot all be laid at the feet of the Technical Sales personnel. The clients themselves need to educate themselves of the idiosyncrasies of the various lining products on offer. As indicated above, this problem is now being addressed by the wide range of acceptance testing that is now mandatory for coating inclusion in client specifications. However, the client also needs to realise that so far no manufacturer has been able to produce a lining product capable of coping with limitless service conditions. It is difficult to even imagine that there ever will be such a product available and as a result, there are many occasions where the client needs to be very specific with respect to actual service requirements.

Consider for a moment the specification for a vessel. The client will usually quote a service temperature, pressure and, in most cases, they would additionally quote a design value for both. Common additional information would include a breakdown of the process fluids in terms of chemical constituents and their concentrations; dissolved gasses and the type and quantity of any entrained solids. This of course leaves the coatings manufacturer with a dilemma. Do they specify a product that will meet, or even exceed, the service condition, or do they specify a lining that will meet the design criteria?

The easy option for the client is to specify that the lining is required to meet the design criteria, since the design criteria is the maximum condition that the vessel should be expected to tolerate. This is always higher than the actual continuous operational condition, to which the vessel would be exposed, under normal operational circumstances. Similarly, the same principals apply to coatings and linings. They also have their maximum design and continuous operational limits, but unfortunately clients do not always understand the implications of this fact.

When asked the question, most clients would say that they specify to design criteria in order to embrace the possibility that the process condition may change over the operational life of the equipment. This would appear to be quite a rational assumption based on their experience of the operation of such equipment. Assumptions can, however, lead to problems if they are not correct; so clients also need to be educated to understand the vagaries of coating characteristics.

Coating characteristics

There are two critical aspects to consider when faced with this situation. Firstly, and by way of illustration, if you had to drive your car over roads with a coating of black ice and you had the choice of your existing road tyres or winter tyres, which would you choose? Hopefully you have reasoned that there would be much more chance of an accident if you continued driving on your normal road tyres, so you chose to change them for winter tyres.

The same philosophy applies to process vessels. If the process changes drastically then the vessel will more than likely have to be modified internally to cope with the new conditions, just as the vehicle required modification to operate safely in new conditions. With respect to a vessel, however, any modifications would probably cause damage to the internal lining; in which case, it would have to be reinstated. So, there should be little reason to specify for the design criteria knowing that the coating can be upgraded at the same time,

Technical Sales personnel can provide assistance with coating selection.

as any internal modifications are done to accommodate the new operating condition. Therefore, in most cases, specification of a coating which exceeds the normal operating condition by a comfortable margin, rather than the ultimate condition, should be a reasonable compromise.

Secondly, if you gave a client a recommendation to use a lining with a maximum service temperature of 100°C (212°F), knowing the maximum service condition is 150°C (302°F), would the client accept it? Probably not, since they would reason that at the operating temperature, the coating would be damaged. This is because the client has correctly deduced that the product has been formulated to work up to a maximum temperature of 100°C (212°F) and that it would not be acceptable to expose it to temperatures above this limit. However, if we reverse this scenario and offer a product which is formulated to work continuously at 150°C (302°F), but will only ever see 40°C (104°F) in operation, generally the client would accept this solution without question, assuming it was an economical solution. In fact, they may have just signed up for a premature failure of the coating. Notably, products formulated to work at high temperature do not necessarily perform well at lower temperatures, unless they can be force cured before service. Experience tells us that this is not easily, or economically, accomplished in most cases.

Significantly, personnel employed in all the major industries, particularly the oil and gas industry, are becoming less and less aware of the capabilities of modern high value coating and lining systems. Furthermore, this situation is set to become worse since the oil industry is losing its experienced workers faster than it can recruit and train replacements. According to Mr John England, Vice Chairman and U.S. Oil and Gas Leader for Deloitte LLP, it is probable that 50% of skilled workers within the industry will be eligible for retirement by 2017. As the price of oil falls, the situation will only worsen, as more and more skilled workers are laid off and find jobs in other industries.

This loss of skills appears to be across all disciplines, which from the coatings manufacturers' point of view, is a serious problem affecting every aspect from specification to application of their products.

Together everyone achieves more

Clearly, for coatings and linings to become a viable, long-term solution to the damaging effects of erosion and corrosion within the industry, then it is vital for everyone involved to work together. Currently, projects begin with an idea. This idea evolves into a design which, if accepted, is fabricated and coated if required. At this point contractors will be supplied with a specification and asked to bid for the work. Often, in the case of new build, this means the site is unseen. At no point do all of the parties involved get together to discuss the project. In the technological world we live in today, surely this should be possible? Certainly, it is more possible than it was before the advent of the internet and its channels of communication?

Ideally the client, lining manufacturer and design authority need to be in communication from the outset so that a suitable and compatible design and lining combination can be agreed. As soon as possible, the chosen lining manufacturer should be able to liaise with the fabricators and be able to recommend trained reliable contractors to bid for the application of their product. Lastly, as soon as it is possible, all parties should meet to discuss the application Method Statement, Quality Control plan and Specification. Only if this is achieved, can we truly say that risk has been minimised and that the applied lining has been given the best possible opportunity to give optimum performance.

Coatings need to be matched specifically to the conditions at hand.

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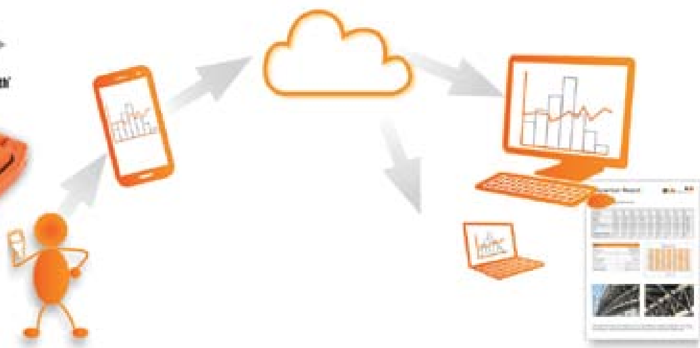
ElcoMaster® is a fast, intuitive, easy to use software and mobile app for all your data management, reporting and quality assurance needs. It's not just taking measurements but what you do with the collected data that matters. As inspectors can spend up to 30%, more in many cases, of their working week producing reports, ElcoMaster® saves time and money by producing professional bespoke reports in seconds - even when out on site. ElcoMaster® is your data storage and reporting solution that will set you apart from your competition.

Coating inspection regimes require data to be collected on many of the parameters of the coating process like surface profile, surface cleanliness, climatic conditions, film thickness, adhesion and appearance. All of these inspection regimes generate a large amount of data. Elcometer have designed a series of data management software packages that will link directly with the data collection devices (gauges) and instantly produce professional reports, offering full traceability of the inspection proving compliance to the relevant standard being followed. Our free software package, ElcoMaster® is the most flexible data management software on the market. Designed to meet the demanding needs of the quality inspector whilst offering the ultimate flexibility for managing data into 'projects' for ease of use. Producing professional reports is easily achieved using the standard report templates within the software package or by using the customisation options to produce customer specific reports from customer specific templates. Making full use of data transfer technology – Bluetooth® and Cloud applications, Elcometer provides fast and efficient means of transferring and sharing data and allows fully comprehensive project reports to be generated. Any document (even hand-written notes) can be scanned, converted to .pdf and then stored in the project file within ElcoMaster®. For those users wanting to transfer data into other software applications ElcoMaster® can be configured to export data directly, there is no need to use the data management aspect of the software. As with Elcometer's gauges, this software is dynamic, in that Elcometer are always adding new features as their customers require them. Updates to the software are freely available over the internet and it is also possible to upgrade Elcometer inspection gauges when they are connected to ElcoMaster®. ElcoMaster® and ElcoMaster® Mobile are the complete solution for all your needs.

Whether it be Surface Profile, Salt Contamination, Climatic Conditions, Coating Thickness, Adhesion Testing or Gloss Measurement, ElcoMaster® import and combine measurements via Bluetooth® or USB from a full range of Elcometer gauges. There is no need to learn different software for different gauges, all Elcometer products use the same expert platform. Data can be stored in a simple file tree, by project and by inspection type, with easy on screen analysis with histograms, statistics, measurements, limits, notes, diagrams and photographs.

Data can easily be exported directly to Microsoft Excel. csv. txt. formats, etc to save time and prevent keying in errors. ElcoMaster® generates reports instantly using standard or pre-designed templates in seconds. No need for data manipulation. Simply connect the gauge, download data and drag & drop, and you can combine multiple inspection parameters (such as DFT, profile, salt, climate, adhesion and gloss) together with images, notes and other project specific information in bespoke quality reports to set you apart from the competition. In many industries multiple sites/locations/ production lines are used to fabricate the product components which are brought together at the final assembly line. Different inspection parameters all need to be combined to approve the final product. Using Cloud technology ElcoMaster® gives you real time quality control monitoring inspection projects in any location.



The ElcoMaster® Mobile App brings the office to where you are. You can connect Elcometer Bluetooth® enabled inspection gauges directly to iPhone, iPad and iPods or Android™ mobile phones and tablets via ElcoMaster® Mobile App.

When out in the field or on site, you can review data instantly using our free ElcoMaster® Mobile App which supports a live reading function. Simply press 'Generate PDF' and watch the ElcoMaster® App produce a professional report instantly. You can email the report to your client seconds after you have finished inspecting, or upload it via cloud technology, so it can be accessed anywhere in the world.

With data transferred to mobile devices whilst out in the field, the Elcometer gauge does not have to be returned to the office for data download. Inspection work can continue without interruption.

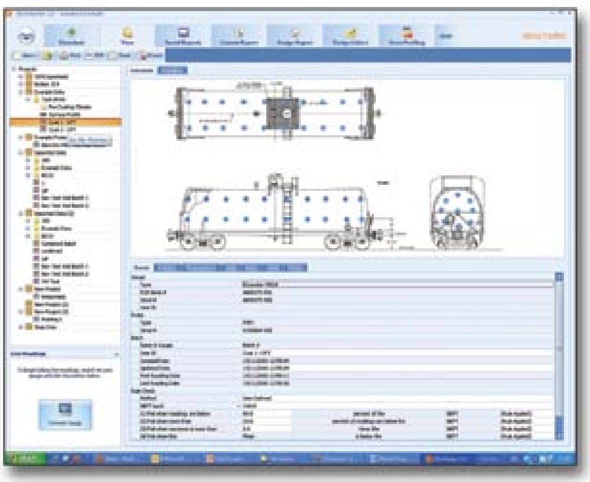
ElcoMaster® Mobile App shares many features of ElcoMaster® for PC like download batches from Elcometer, Bluetooth® enabled gauges, add notes, photographs and diagrams, Pdf. and email reports, using the phone's GPS feature (add this data to batch files), use collection batch measurement location, and points on photos or images to indicate to users where each measurement needs to be taken. Readings can also be linked live to a mobile device so readings are stored on the device as you take them.

ElcoMaster® Data Management Software is easy to connect, using ElcoMaster's® gauge wizard. Connecting a gauge & downloading data (via Bluetooth® or USB) is fast and easy. Both packages provide one standard platform for all gauges. Data is organised in to Projects/ Folders/Batches – all details of the batch readings can be seen. Reports are generated as PDF or editable ElcoMaster® Files, and Customer specific report formats are widely used. Simply import existing reports by scanning your report into ElcoMaster® and drag & drop all your data where you want it, save and print. A variety of reports can be produced, from a one-page summary, to a full multi-page Project Report. You can export, print or send .pdf or email directly from ElcoMaster® at the click of a button, and you have multi-site access through secure cloud computing. Data can be stored on Cloud, Server, Host Unit and Email.

Real time collaboration for multi-site projects is key when working with manufacturers of sub-assemblies across the globe. ElcoMaster® can collate all inspection data from each site, assembly line and project into one shared location. Contractors can then, accept or reject parts before shipment from sub-assembly plants. They can Combine all data from sub assembly and final assembly inspection to generate Project Inspection Reports for quality management, both during the project and after completion of the project. Contractors can have real time in progress visibility across the whole project, no matter where the sub-assembly manufacturing is in the world, and have multi-site collaboration, real time dialogue and decision making to improve efficiency and quality throughout the production process. Featuring instant messaging the ElcoMaster™ Mobile App lets you add messages to inspection data, projects and files, allowing you to immediately discuss key points with your colleagues, managers or clients, send work instructions and store messages within the project file, thus giving you real time communication. ElcoMaster® allows you to decide which Cloud service provider to use. It is your data, it is secure as only approved users can have access, no third parties can see your data. ElcoMaster® Mobile App is compatible with a range of cloud service providers and FTP servers including: Google Drive, FPT Server and Dropbox.

Future plans for ElcoMaster® include Bespoke Report Format, Two way communications with Gauge and Bespoke Customer Specific Packages. Elcometer is also able to generate your own customer specific templates.

How to get started: You can download ElcoMaster® **FREE** from *www.elcometer.com*, and the ElcoMaster® Mobile from Android and Apple Play Stores have been available since April 2017.



From the KETTLE

The role specifiers and end-users have in selecting a corrosion control coating, suggests that all aspects of a hot dip galvanized coating be highlighted and if necessarily de-mystified. The intension of this series of surface conditions is to ensure that the customer or specifier has a greater understanding of the coating so that it is not necessarily rejected or accepted for the wrong reasons, resulting in wasted time for all personnel. See F18 and F19.

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.

F18

DESCRIPTION:

Stains caused by weeping.

CAUSE:

While there are times when zinc almost seals an unwelded crevice and no weeping occurs, in most instances, salts from acid or flux can penetrate porous welding or overlapped contact surfaces of two pieces of steel where construction or subsequent bolt holes have been drilled. After hot dip galvanizing and quenching or when exposed to the weather, these salts can leach out onto the surrounding surfaces and produce a staining in the immediate area.

EFFECT / REMEDY:

The stains can be easily removed by means of bristle brushing. Should the component be destined for a corrosive area, the crevice should be sealed with a sealant or appropriate repair material after cleaning.

Where a hot dip galvanized bolt and nut will fill the hole besides cleaning of the surface stain, sealing of the crevice is unnecessary.

ACCEPTABLE TO SANS 121:

A

ACCEPTABLE FOR DUPLEX AND ARCHITECTURAL FINISH:

A – (D)
R AND C/REP – (A)

F19

DESCRIPTION:

Burrs on plate edges or at drilled or punched holes.

CAUSE:

Burrs will be over coated by hot dip galvanizing but removal or breaking off of a burr after galvanizing may result in the presence of a small

F19 continued...

uncoated surface and for this reason and good fabrication practice, they should be removed prior to hot dip galvanizing.

EFFECT / REMEDY:

For quality hot dip galvanizing remove all burrs prior processing.

ACCEPTABLE TO SANS 121:

A

ACCEPTABLE FOR DUPLEX AND ARCHITECTURAL FINISH:

R

Director's Message

Greetings to all *Corrosion Exclusively* readers.

Thank you for giving me this great opportunity to introduce myself to you in the new dawn of our country with great opportunities. My name is Hendrick Rasebopye, I've been appointed as the Director at CorrISA as of 1st June 2018.

I wish to take this opportunity to submit a brief synopsis of my background in the industry that we strive to excel in.

I am a B.Eng Mechanical Engineering graduate from the North-West university and I also posses the Certificate in Management Development Programme from GIBS.

I gained experience in the Engineering industry through Nuclear (PBMR) where I started my career as an Engineer in Training involved with the auxiliary group, Defence & Acquisition (Armscor) with the Naval Systems projects, Power Generation (Eskom – Camden Power Station) with the boiler engineering and maintenance group, Petrochemical (Sasol) Mechanical Engineering Inspection Services (AIA), and Pulp and Paper (Mondi) Power and recovery engineering and maintenance.

To begin with, and in looking ahead on the all-encompassing changes we anticipate for the future, we are set to deliver on our strategy as a more efficient and effective organisation.

I look forward to taking a leadership role in a dynamic company such as CorrISA, overseeing a profitable growth, and further broadening the company's unique world class training portfolio.

I´m enthusiastic about joining this team and look forward to meeting everyone in person.

Regards
Hendrick Rasebopye

Comment – Chairman of the Cape Region

The Corrosion Institute Cape Region continues to thrive, and a lot of thanks must go to the committee for their team spirit and hard work in making our region such a success. We welcome Daryl Livesay who has been co-opted onto the committee and we value his input and new ideas. If anyone else in our region feels that they can contribute to the success of The Corrosion Institute, please feel free to approach us.

Since my last report we have had three different but all interesting presentations. Peter de Rouwe from Storm Machinery brought us up to speed with new options that their company has in measuring Salts as well as Surface Profile, David Goldblatt shared some very interesting case studies of scenarios that he has been exposed to in his consultancy business, and then in May we had our first double header, which was exceptionally interesting. Simon Norton, a previous winner of the best presentation award, shared some thought-provoking ideas about stainless steel before Craig Woolhouse from Elcometer advised us of current methods of Surface Profile methods and their limitations and then a still to be released solution to the issues which each method has.

We are all very excited by the next get together which takes on quite a different format and is entitled: "A fireside chat with stalwarts in the industry". By the time you read this, it would have taken place, but I am sure the stories which no doubt will be both humorous and interesting, will feature in future editions of this magazine. While on the subject of the magazine, a huge congratulations must go to Terry Smith and his team for continuing to produce a world class magazine of this quality, which is of great interest to all who have the opportunity of reading it. Hopefully we can expand our database to include a readership that does justice to the benefit that this mouthpiece adds.

Congratulations to the Hendrick Rasebopye on his appointment as director of the Corrosion Institute and we are sure that along with his team, the exec and council, as well as everyone involved, the Corrosion Institute will continue its upward progression from strength to strength.

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.

By the way we have changed Cape Town to Cape Region in CE for convenience purposes.

Yours in Corrosion, Graham Duk on behalf of Tammy Barendilla, Leonie du Rand, Thinus Grobbelaar, John Houston, Sieg le Cock, Daryl Livesay Indrin Naidoo, Terry Smith, Gilbert Theron, Flippie van Dyk and Pieter van Riet

Comment – Chairman of KwaZulu Natal

The numbers of people attending our technical presentations are slowly increasing, I guess perseverance does pay-off in the long run... As already mentioned we have been experimenting with running the presentations as morning breakfast sessions, when appropriate. This has been positively received and we'll continue to utilise this format when presenter availability and/or venue allows.

Two great presentations were run in the past few months. Thanks to Mr. Peter de Rouwe from Storm Machinery for a talk on DeFelsko measuring instruments and Mr. Christoph Wygand from Monti (Blastrite) for a presentation and demonstration on tensioned wire blasting (Bristle Blaster).

I have re-connected with both SASSDA (South African Stainless-Steel Development Association) and OCCA (Oil & Colour Chemists Association).

In future KZN CorrISA will endeavour to further partner with these associations and in so doing broaden our membership/networking base. This will also allow CorrISA members the of opportunity of attending "other" technical presentations.

Lastly, Marco Ashburner from ASP Rope Access has joined our rapidly growing committee. Marco, thanks for the support.

Again, please make sure your contact details are correct with CorrISA so that notifications and adverts get to the correct end-user. We have planned several presentations/events for the last half of 2018 – please keep a lookout, either on the CorrISA website or your mail-box. If you have any ideas, please contact us.

Regards
Mark and Karyn

Corrosion Awareness Day: April 20, 2018

The morning had arrived for set-up and the mist lay thick where our exhibitors were going to mark out their stands. It had rained the previous day and we had experienced thunder showers, around 16:00 at each of the previous year's events causing us to be a little sceptical as to the length of the day.

Exhibitors began setting up as the mist had dissipated by the time they arrived. Isinyithi Cathodic Protection set out their workshop display of tables, jars and gadgets to show how corrosion destroys different elements. In no time people were walking through and participating.

SGB Cape had set-up their scaffolding the day before and to everyone's delight hoisted people into the air as if they were part of a rope access demonstration.

Blastrite brought their equipment on sight and gave everyone a demonstration and presentation.

All the exhibitors were showcasing and demonstrating their products at their stands and the day ended at 16:00 without a thunderstorm. A number of people were still milling around our tuckshop which had been run by our very own CorrISO (Corrosion Institute Student Organisation) and the food was kindly sponsored by Quicklab. We wish to thank Stoncor for sponsoring the paint to paint the inside of the outbuilding that was used for this venue.

Our programme set-up throughout the day on the introductions to the "Corrosion Not Just Rust Course", "Corrosion Engineering Course" and the "Economics of Corrosion Course" were fully attended. This event was a huge success and we thank both Neil Webb and Louis Pretorius for giving up of their time to wet everyone's appetite on what the Institute had to offer.

Khaya Mbaba, Katlego Koetle, Alwande Majola and Bonga Yende strike a pose after the corrosion awareness presentation.

Corrosion awareness

LUNGILE DUBE
lungiled@caxton.co.za

In a celebratory spirit of the upcoming Worldwide Corrosion Awareness Day on 24 April, the Corrosion Institute of South Africa hosted 30 children from the Midrand Christ Church College to educate them about corrosion and its effects.

The Grade 7s were given a presentation by a paint specialist and assessor, Bob Millsman, at the institute's premises in Glen Austin on 5 April.

Course administrator at the institute, Linda Hinrichsen said that because of the school holidays, few schools were available to attend the presentations. However, she has invited more schools to attend the celebration, which will be held on 20 April instead of the actual day which is on 24 April.

"The aim is to raise awareness about corrosion as it also costs the country a lot of money," she said.

Teacher of the Grade 7 class, Jeremy Frost said although corrosion was not part of their studies, it was a good experience for the youngsters.

"It was good for them to be introduced to the industry – to give them an idea of a career path they may want to follow," he said.

Daniel Beyleveld said it was a good lesson which taught him more about corrosion. "They explained it in detail and got into the basics, including the more serious aspects of corrosion."

Daniel Naidoo said he liked the fact that there were demonstrations which made it easier for him to understand. "The demonstrations were self-explanatory and easier than doing theory. I got to understand about corrosion a lot better."

Schools that would like to attend the Corrosion Awareness Day may contact 010 224 0761.

Seth van Wijk, Bryce Lepaterel, Daniel Naidoo, Daniel Beyleveld and Matthew Blake

We wish to thank our exhibitors, Kansai Plascon, University of Johannesburg, Quicklab, MacSteel/Grafted Polymer, Mintek, Isinyithi Cathodic Protection, Stopac, and SGB Cape as they were crucial in keeping this day memorable.

TECHNICAL EVENT: Presentation by Terry Smith, Gauteng


ELCOMETER PRESENTATION: Presentation by Craig Woolhouse, Gauteng


TECHNICAL EVENT: Presentation by David Goldblatt, Cape Region


TECHNICAL EVENT: Presentation by Storm (POSITECTOR), Cape Region


TECHNICAL EVENT: Presentation by Simon Norton then Craig Woolhouse, ELCOMETER, Cape Region



NACE Corrosion Conference 2018 – Phoenix, Arizona

Linda Hinrichsen (NACE Course Convenor CorrISA) and Donovan Slade (President of CorrISA) holding the award which has the following inscription – "MAKING A DIFFERENCE Awarded to Corrosion Institute of Southern Africa - for your loyal dedication and unwavering commitment. Thank you for your significant contributions towards our goals and your indispensable support of our mission."

Every year the Corrosion Institute of Southern Africa gets an invitation to attend the Annual NACE Corrosion Conference and this year it happened from 15 to 19 April 2018 in the city of Phoenix, Arizona, USA.

Aaron Raath who is on Council and has been a member of CorrISA for a number of years was selected for the fourth time to represent CorrISA.

The Annual NACE Corrosion Conference is the largest corrosion conference with over 6500 delegates attending from 60 countries from all over the world.

There were a number of activities including opportunities for attending forums and symposiums, learning about global developments and advances in corrosion mitigation, and meeting other delegates and fellow members. The exhibition with 419 exhibitors who offered products and services valuable to every industry sector was on display each day of the conference.

Aaron with the 75 year History of NACE book alongside Jim Feather, Bob Chalker (President and CEO of NACE) and Terry Greenfield.

A starting highlight of the conference for Aaron was the NACE Race 2018. This takes place for all who are interested Sunday morning 16th April, before the conference week starts. All entrants are bussed to the start in a local park. The race is over 5km and concludes with a breakfast. Aaron is proud to have finished the race in 5th position.

Sunday afternoon at the conference centre the organisers hosted the annual forum for the - African Corrosion Professionals where senior officials met to discuss the plight of Corrosion and African awareness, etc. Aaron was however, unable to attend.

The first day of the conference / exhibition (Monday 16th) Aaron received an invitation to the NACE Alliance Dinner. He attended this function as it is a good networking tool to meet other corrosion related leaders from around the world. 60 countries were represented. The dinner is primarily a social event and raised discussions from all over the world. A short speech from the president and CEO of NACE (Bob Chalker) made it an informative dinner.

Second day of the conference / exhibition (Tuesday 17th) Aaron was fortunate to attend the NACE Partner / Licensee Lunch. The Luncheon is for the Partners and Licensees from around the world. They are primarily South American based in most instances but include India and South Africa.

An award "MAKING A DIFFERENCE" was presented and received by Aaron on behalf of CorrISA at the Partner Breakfast. The main object of the breakfast was operational based and informative to the CORRISA/ NACE relationship.

Aaron (circled) is proud to have finished the NACE Race 2018 in 5th position.

Aaron and Pamela Nicoletti

Aaron also had discussions with Pamela Nicolleti (NACE Director of Education). Pamela expressed her excitement in terms of the relationship being built between NACE & CorrISA and expressed a wish to pursue a better business plan and strategy for NACE to understand, support and align with CorrISA in a better way.

Linda Hinrichsen (NACE Course Convenor CorrISA) and Donovan Slade (President of CorrISA) holding the award which has the following inscription – "MAKING A DIFFERENCE Awarded to Corrosion Institute of Southern Africa - for your loyal dedication and unwavering commitment. Thank you for your significant contributions towards our goals and your indispensable support of our mission."

The third day of the Exhibition / Conference (Wednesday 18th) the Global Partner Meeting was arranged for the afternoon. Aaron presented the fundamentals of CorrISA as did the other Continental members from Brazil, Europe, Germany, Australia, China, England, & NACE. They discussed their successes, Interesting Facts, structures & Governance, backgrounds, views, World trends, problems, suggestions etc.

Two main outcomes were brought to their attention

1. Aging workforce in the Corrosion Industry, Skills and Education.
2. Lobbying with Governments and forming Legislation. Assistance on this in the future could be provided by NACE for facts, figures and methods of support to lobby government for regulations.

At the conclusion of the Global Partner Meeting, Aaron on behalf of CorrISA received a copy of the 75 year History of NACE BOOK as a gift.

The CorrISA Council members with a few visiting committee members from the Cape Region.

MAKULU – AfriCORR SPONSORSHIP PACKAGE

Kansai Plascon – taking the corrosion out of the equation

Going above and beyond to ensure excellent service delivery, Plascon's 360 degree partnership pledge assures customers will have corrosion protection suitable to their needs. From conducting assessments to providing technical site support while adhering to strict standards, Plascon offers all-round service.

Kansai Plascon is the largest coatings supplier in South Africa and Africa. Their 129 years of experience in the industrial coatings industry means they are able to provide the most innovative solutions to combat corrosion in the harshest conditions. Their high performance coatings provide exceptional corrosion, abrasion and chemical resistance in the most aggressive environments and are designed for every industrial application – from heat and abrasion resistant coatings to fire protection and durable coatings.

Kansai Plascon's 360 degree partnership pledge means that they will assess sites for asset owners, compile reports on their findings, and then provide corrosion protection solutions specific to each scenario. This includes comprehensive guarantees, as well as full monitoring of all progress, technical site support and strict adherence to ISO standards. They also partner with applicators that are provided applicator training through their experienced technical team.

The company works across multiple sectors, engineering leading products for highly specialized applications. They offer internal and external corrosion protection solutions including high-performance corrosion protection coatings, chemical and abrasion resistant coatings, fire protection coatings and tank and pipe linings across the food and beverage, mining and metal processing, infrastructure and oil and gas industries.

Plascon's high performance coatings provide phenomenal corrosion, abrasion and chemical resistance in harsh environments. Engineering leading products for highly specialised applications, the company offers solutions across multiple sectors.

Infrastructure projects

Kansai Plascon supplies a wide range of epoxy and polyurethane coatings products covering various substrates from mild steel to aluminium. Their corrosion protection solutions are all in line with ISO 12944 which covers exposure conditions C1 – C5 environments. Ideal for both new construction and ongoing maintenance, their coatings provide fast turn-around and cost-effective solutions in the infrastructure industries. Their waterbased cellulosic offers passive fire protection for up to 120 minutes while their UV resistant topcoats offer protection up to 20 years.

Oil and gas

This industry sector requires highly specialised products. Kansai Plascon has risen to the task and has developed a range that addresses all protective coatings needs – from chemical resistant epoxy coatings and tank linings to protection for CUI (corrosion under insulation) up to 650°C. Their corrosion protection solutions and tank linings have a proven track record and are approved by ARAMCO and other major asset owners. Kansai Plascon's Aleschar U has been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With 129 years experience in hand, it's no wonder Plascon is a renowned market leader in the industrial coatings industry. Their engineered products range from heat and abrasion resistant coatings to fibre protection and durable coatings.

designed to provide passive fire protection for hydrocarbon and jet fires.

Mining and metal processing

Kansai Plascon is known for its corrosion protection solutions for equipment within the mining industry. Within the sector's immensely harsh environments they have a proven track record in solutions that offer both abrasion and chemical resistance. Their extensive track record in providing chemical resistance coatings in the most aggressive environments includes splash and spills of alkalis and acids and their high build surface tolerant epoxy series offer abrasion resistance in immersed conditions and is ideal for slurry tanks.

Food and beverage

Corrosion prevention in this highly regulated sector is essential. When equipment corrodes it can be both costly and dangerous (as it can lead to contamination). Kansai Plascon is very aware of what's at stake and their range boasts water-based epoxy floor and wall coatings specially designed for the industry. They also supply superior epoxy tank linings and coatings with food and potable water certification.

Corrosion is a considerable problem in industries that operate in harsh and aggressive environments – the wear and tear of equipment can have massive safety implications as well as bottom line impact. By keeping infrastructures serviceable, technical and sensitive operations are able to run continuously, with no costly stoppages and downtime, which translates into constant production rates and increased value for customers.

Coatings for Africa Symposium and Expo

The Coatings for Africa Symposium and Expo was held from 29th to the 31st May at the Sandton Convention Centre in Johannesburg. The event showcased various products and services related to automotive, construction and building sectors and we were, once again, given a stand at no charge.

On arriving at the event to set-up between two stands (we didn't have a stand number) we were gently asked to halt set-up and were excitedly escorted to a stand due to a cancellation. We were stunned as we had not informed them as to when we would be arriving. The event organisers were amazing in looking after their exhibitors and we experienced this all through the 3 days.

We had the pleasure of meeting our members and putting a face to a name. Our greatest joy was hearing "I didn't know the Corrosion Institute existed" which meant we had accomplished our goal in getting our name out into the industry.

The show was very well attended considering an article by Jannie Rossouw, June 7th 2017 *"...South Africa has been rocked by news that it has slipped into a recession after its gross domestic product (GDP) declined 0.7% during the first quarter of 2017 after contracting by 0.3% in the fourth quarter of 2016."*

Bruce Trembling, past President of CorrISA (2013 to 2015) agreed to chair their CEO Focus Day on the 29th of May.

We are looking forward to meeting you, our members and subscribers, at our next event.

Brenda Maree

CIP1 THEORY AND PRACTICAL TRAINING COURSE: 5 -10 March 2018 (All training below Gauteng)




CIP1 TRAINING COURSE: 14 - 19 May 2018

CP2 TRAINING COURSE: 9 - 13 April 2018

CORROSION ENGINEERING COURSE: 7 - 11 May 2018

CIP2 TRAINING COURSE: 4 - 9 JUNE 2018

ELCOMETER TRAINING: Gauteng

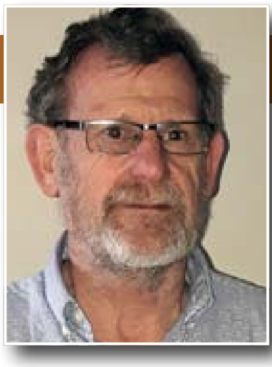

ELCOMETER TRAINING: Cape Region


ELCOMETER TRAINING: KwaZulu Natal


Editor apology: In Vol 4 Issue 1 on page 25 we captioned the two NACE courses as CIP Training Course and CIP2 Training Course – Johannesburg. Correction: They should be CIP 1 Jan 2018 (top) and CP 1 Feb 2018 bottom.

The RUST Spot...

in conversation with Wally Kohlmeyer



Briefly explain your background and how you came to be involved in the Corrosion Institute. What year did you join?

A career with the Department of Water Affairs necessitates an interest in corrosion protection due to the environment of the installed plant. After a few years in the design office and subsequent time as Regional Engineer the need for reliable corrosion protection was absolutely necessary.

Initially I accepted membership in the early eighties under the DWA umbrella. I at a later stage registered as an individual member.

What was the state of the industry then and what role did you play within the institute?

The corrosion protection systems that were generally used in the seventies were epoxy tar with bituminous aluminium and galvanizing with various minor uses of other systems. Very little was known of the subject and inspection of corrosion protection was not done on the required level.

From the late seventies on the department made a concerted effort went into improving the standards of corrosion protection with assistance from members of the Corrosion Institute. Training programmes were attended and put in place to improve the knowledge of the subject.

The outlook on the coating systems that were used was improved. The diligence during preparation and application as well as attention to detail was corrected. The departmental corrosion protection teams were upgraded resulting in better final results.

My role in the institute was limited to promoting and attending the conferences and lecture sessions. I focused my attention to improving the standards of corrosion protection by upgrading the standard specification of corrosion protection and the implementation thereof. The importance of corrosion protection was brought to the attention of all involved in DWA.

Talk about your years with the institute and what changes you've seen over that time?

The Corrosion Institute was initially only vaguely noticed as it was not well publicised. The initial contact with the institute during the time that I was stationed in the outside offices was rather limited. The institute has in my opinion, due to it being more accepted and valued grown to serve a larger portion of the industry.

What successes did you enjoy during your time with the institute and what role do you play now?

In the late seventies metal spraying was considered a long life system with the synergistic effect of the sacrificial protection with the additional protective top coat. An extremely competent team was built up with the help of the institute put together and various projects were successfully completed.

The corrosion protection of amongst others valves and pumps was considered to be inadequate. The deficiencies were addressed in the departmental standards that have after acceptance by the industry at large, even by most of the overseas suppliers, causing vastly improved products.

The insistence on the application of the upgraded specification together with upgrading of the inspection was the largest contributor to final superior results. The extended life, before maintenance or recoating had to be performed, compensated the increased cost of the item or project costs.

The successful application of the more stringent requirements resulted in a general acceptance of the more stringent requirements with respect to corrosion protection in the associated field.

If you could go back, what things would you do differently?

The need for corrosion protection to be included in the curriculum of especially mechanical engineers as well as young graduates, as the group with the closest exposure to the results of corrosion should get more attention.

What advice do you have for the industry going forward?

A good working knowledge by all concerned (including management) is an absolute requirement. Mandatory attending on at least the basic theory could go some way to achieve this. The ability to realise that corrosion protection must be attended to and the level of expertise that must be employed must be accepted by management.

Anything else you feel would benefit our readers?

One of the extremely important conditions is that of an informed client. Specifying and providing a service by outsiders, that may result in a product not be totally suitable to the specific requirements of the client. The produced results may be technically correct but in the long run not optimum wrt in house refurbishment and to service.

Something about yourself: your family, sports, hobbies, pets, travel, passions...

I have after postponing my retirement for two years retired from the department in 2015. I have since then assisted with various consulting projects on dam and water supply plant and the putting together of a standard corrosion protection specification with a group consisting of mainly other concerned users.

I have spent time doing a bit of travelling and when time allows I am building upon two old Alfas that are in bad need of repair. On the relaxation front I am a member of a men's choir as well as a brass band.

OBITUARY

ARTHUR ROBIN BYRNS

1936 – 2018

Arthur Robin Byrns, born in Durban on the 22 November 1936 passed away peacefully in Port Elizabeth, his home town from 1981, on the 2 September 2018.

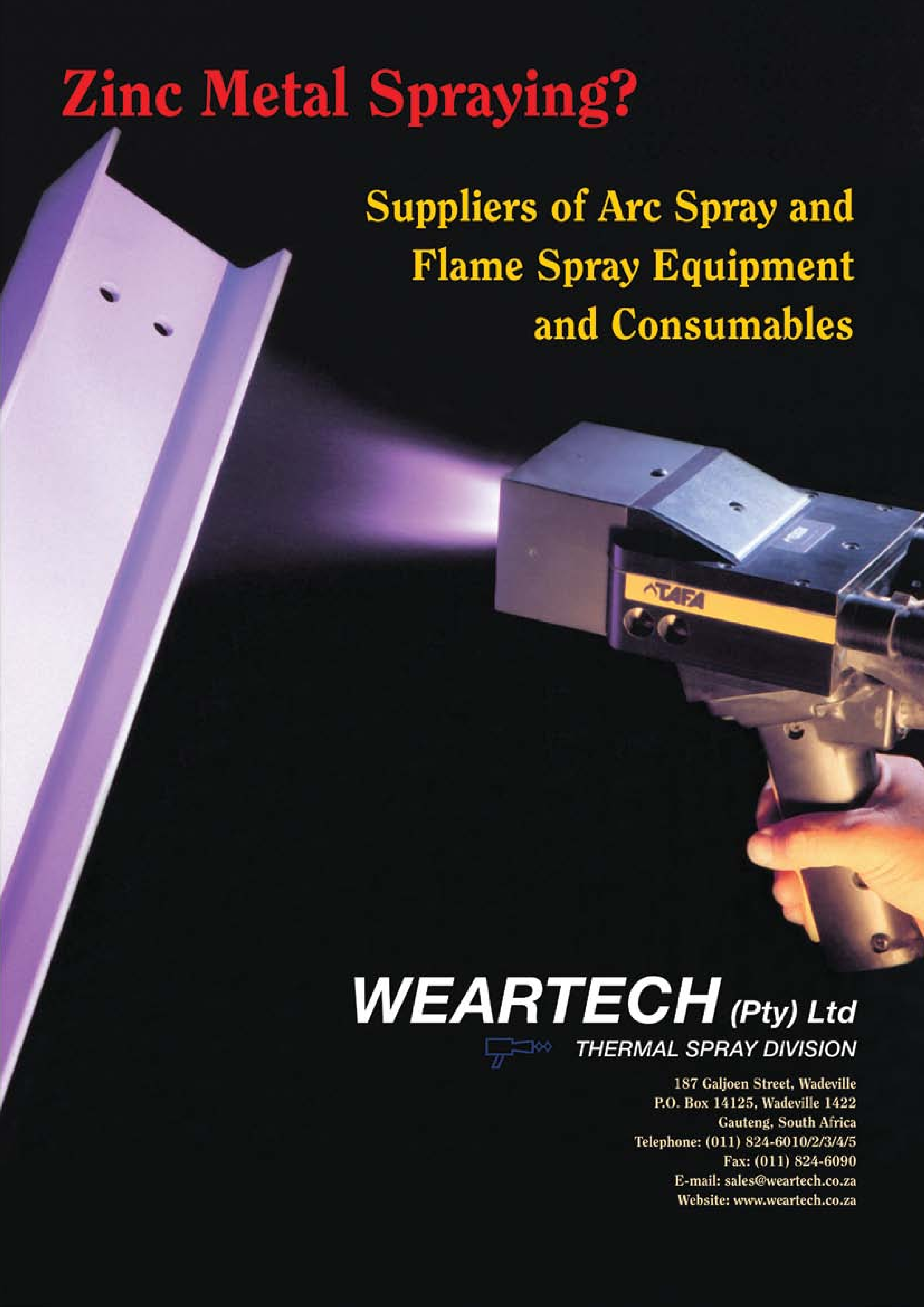
He leaves behind his 3 daughters, Fiona Byrns, Kim Tucker and Caren Hauptfleisch and their families.

Arthur loved life and all the good things that it brings. For him his family and friends were the centre of his life. His passion for his chosen field of expertise being Paint Chemistry, was also central to his life. He was always available to friends and colleagues and enjoyed his time with them immensely.

We know that his love for his colleagues and his passion for his profession will work it's way into the Chemical Paint Industry and the stories of his many adventures with his colleagues and time spent with his students, will keep us all smiling and remembering the happy times together.

Rest in peace Dad. All our love Caren, Fiona and Kim

Arthur Byrns featured in The RUST Spot Vol 3 Issue 1



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