



Media Release

Corrosion keynote creates classic rock

All structures—from domestic buildings and public artworks to commercial offices and harbour facilities—are affected by corrosion to varying degrees. This degradation has a major economic impact on industry and the wider community: each year, it is estimated that governments and organisations spend approximately three percent of GDP—the equivalent of billions of dollars—mitigating and repairing corrosion damage.

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

In order to promote a better understanding of corrosion, each year the Australasian Corrosion Association (ACA) stages the Corrosion & Prevention Conference that brings together corrosion practitioners and researchers, as well as asset owners and operators, from around the world.

C&P2015, held at the Adelaide Convention Centre in November, provided a forum for all corrosion stakeholders to meet and discuss a wide range of topics. In particular, the conference brought together a panel of industry experts to discuss the challenges and the importance of maintaining vital infrastructure. Attendees were able to participate in seminars and hear technical papers covering best practice in corrosion management, environmental protection techniques, public safety and economics.

In opening the 2015 conference, South Australian Independent Senator, Nick Xenophon, stated that education, training, compliance and Australian Standards are vital to the success of businesses operating in a diverse range of markets. Sen. Xenophon is a champion of Australian industry and supporter of local jobs. During his presentation, the Senator expressed a commitment to support the ACA to raise the profile of corrosion and its mitigation, as well as working to place corrosion control on the national agenda. “The through life cost of corrosion can potentially be



never ending,” Xenophon said. Such costs become a burden to industry because there is insufficient control on construction standards and corrosion coatings, especially on imported materials and products.

Public art is often overlooked when corrosion is discussed, but there are often monumental structures throughout a city that over time must be protected, repaired or rebuilt. The degradation of the artworks themselves, and their support structures, is exacerbated by the fact that many cities in the Australasian region are situated on the coast with maritime climates.

According to Les Boulton, Principal Consultant of Les Boulton and Associates in Auckland, few people give public art a second thought as to how it should be looked after or protected. “Artists have a vision as to how their sculpture or painting will look but often don't factor in the effect of the environment in which it is displayed,” he added

Boulton said he has been involved in a variety of public art conservation projects in New Zealand. “Unfortunately, very few conservators have a metallurgical or scientific background,” he said. “They may be experts in art or history but can fail to follow appropriate engineering procedures, especially when dealing with large *kinetic* sculptures (wind sculptures)”

One issue that is often ignored is the prospect of litigation if the structure of a public artwork fails and causes damage or injury to the public. There are an increasing number of large public artworks that have moving components and it is these joints and bearings that are often the weakest point and which pose a threat to public safety in the event of a failure occurring.

Information about the effects and impact of corrosion on public art should be widely disseminated. “Very little has been written about this topic as we could find no papers in the public domain dealing with the issue,” Boulton said. He added that his co-author on the paper he presented at C&P2015 once told him “the word "corrosion" wasn't even mentioned in art conservation training.”

One of the most common types of damage that is done to public art and infrastructure is graffiti. Some modern artworks include expanses of flat metal that attract vandals. Justin Rigby, coatings consultant at Remedy Asset Protection, said that there are various types of coating that can be used depending on the type of art and the material it is made from. Coatings are mostly classified as either sacrificial or non-sacrificial.



Sacrificial types are coatings which can be removed during cleaning to take away surface layers thus removing graffiti. Such a process can usually be repeated several times before a complete new coating needs to be applied. Examples are wax based coatings. Non-sacrificial coatings are extremely hardened materials that are much stronger than the harsh solvents that are used to dissolve and wash off the paint or ink used by vandals. The performance of the coating is only affected after many cycles of graffiti removal.

Rigby stated that some of the latest research involved 'nano coatings.' "Most surfaces are porous at the microscopic level so graffiti can leach relatively deeply into a surface layer," he added. "The material of a nano coating fills in all the tiny holes to create an essentially smooth, seamless surface that the ink or paint cannot penetrate."

Local councils and public transport authorities are most likely to seek advice from consultancies such as Remedy. Rolling stock for trains, trams and busses usually have a strong, non-sacrificial polyurethane coating that can be cleaned relatively quickly.

C&P2015 in Adelaide was a worthwhile event for Rigby. "Corrosion crosses a range of disciplines and the conference attracted a good mix of people including engineers and experts in addition to asset owners and managers," he said.

In the continuing efforts to minimise the impact of corrosion, new materials are being developed to build structures and procedures implemented that have been designed to protect both new and existing facilities.

Infracorr Consulting, a national engineering company, has been working on a project where PVC sheet piling has been used in the building of new wharf facilities. The polymer material was adopted to mitigate the future risk of accelerated low water corrosion, a microbially induced corrosion mechanism with reported corrosion rates in excess of 1 mm of material per year. Engineering Manager at Infracorr Consulting, Dean Ferguson, stated that there were examples of polymers being used in America and Asia, but the project he had been involved with in Melbourne was the first of its kind in Australia.

Some of the factors that should to be considered when choosing polymers were presented by Ferguson at C&P2015. The identified factors included structural properties such as the strength and stiffness of the material, and durability factors such as UV resistance and 'creep,' which is



defined as deformation under constant load. Other environmental factors include the effect of moisture or immersion, in addition to the material's response to chemicals and solvents.

Ways to mitigate these factors include restricting the design load on the material and to include UV stabilisers in the polymer mix.

Australian researchers from UNSW and Monash University recently reported the discovery of a magnesium-lithium alloy that is an extremely light-weight, high-strength alloy that forms a protective layer of carbonate-rich film on exposure to air, making it far less prone to corrosion.

Corrosion can be thought of as dull or uninteresting, but Dr Robert Francis' keynote address—the PF Thomson Memorial Lecture—was punctuated by the classic rock anthem “Smoke on the Water” by Deep Purple with Dr Francis “playing” the different concentrations of various corrosion solutions. The PF Thomson Memorial Lecture has been delivered at every C&P Conference since 1951. Dr Francis' lecture presented the latest research into galvanic corrosion and protection.

The ACA works with industry and academia to research all aspects of corrosion in order to provide 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.

Next year, the ACA will be saying “Haere mai” to delegates attending Corrosion & Prevention 2016 when the conference returns to New Zealand to be staged in Auckland's Sky City Convention Centre between 13-16 November 2016. As always, the conference will be the premier corrosion event in the Asia Pacific region and will feature a program of keynote speakers and technical presentations.

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[IMAGE CAPTIONS]:

<<ACA-Release-C&P2015 Review_1.jpg>> The Convention Centre reflected in Adelaide's River Torrens

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About the Australasian Corrosion Association

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

The vision of the ACA is to reduce the impact of corrosion.

For further information, please visit the web site:

<http://www.corrosion.com.au>

or contact:

Tracey Winn
Marketing & Communications Manager
Ph.: +61 3 9890 4833 Ext 242
Email: twinn@corrosion.com.au

Media enquiries

Relate Technical Communications Pty Ltd
Telephone: +61 3 9614 5599
E-mail: info@relatetech.com.au