ACA BRANCH NEW ZEALAND BRANCH

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ACA NZ BRANCH
WELLINGTON MEETING

ACA Members and guests are invited to attend a tour of Perry Metal Protection's hot dip galvanizing plant to be followed by a technical presentation on the new AS/NZ galvanizing standard. This will be accompanied by drinks and nibbles at a nearby location.

Date: **Wednesday, 7th May 2025**

Venue: **129 Hutt Park Road,**
Gracefield, Lower Hutt 5010

Time: Meet for plant tour from 4:30pm.
Technical presentation to follow at location TBC.

Speaker: **Peter Golding,** CEO, Galvanizing Association of Australia

Chair: **Willie L Mandeno**

Subject: **The all new AS/NZS 4680, Hot Dip Galvanizing Standard**

RSVP to: wlmandeno@gmail.com or on 027 224 8353

ACANZ would like to gratefully acknowledge this month's sponsor...

7 IMPORTANT THINGS TO KNOW ABOUT STEEL CORROSION

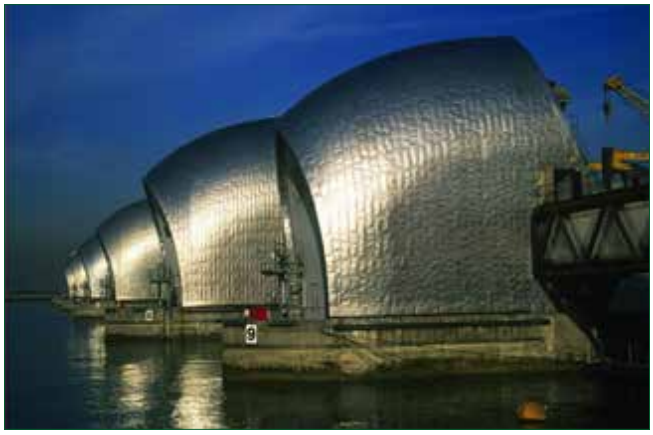
- A REFRESHER

When it comes to strength, durability and versatility there are few engineering materials that compare to carbon steel. However, to get the most out of this material it is important to have a sound understanding of the processes involved in steel corrosion.

Steel is an alloy of iron and carbon, and even small variations in the carbon content can affect the metallurgy, resulting in variations in the steel's performance.

As with most engineering materials, steel has its benefits as well as its limitations. By having a good understanding of steel corrosion, a designer will be better equipped to make critical decisions with regard to material selection for a project.

1. Steel is not selected for its corrosion resistance. When exposed to the atmosphere the iron in steel reacts with air (oxygen) and moisture to produce iron oxide-hydroxide, which we call rust. Rust is brittle and it offers no protection. Rust can flake off to expose more of the steel substrate to ongoing oxidation until the steel component is structurally weakened and likely to fail.



316 stainless steel cladding on Thames Barrier

2. Steel can be alloyed with other metals to improve its corrosion resistance. Stainless steel is a popular steel alloy. This material is made by alloying steel with chromium (at least 12% Cr) and varying amounts of other elements such as manganese (Mn), silicon (Si), nickel (Ni) and molybdenum (Mo). While stainless steel is considered to be corrosion resistant it can still suffer corrosion under specific conditions in aggressive environments.

3. Steels are vulnerable to corrosion in the presence of chlorides. Steels are often coated with protective coatings to minimise the effect of chloride-rich environments. Chlorides affect the ability of steel and stainless steel to form a protective passive film. As a result, passivation is diminished which can lead to the formation of pitting, crevice and uniform corrosion on steel surfaces. However, high-grade stainless steels with excellent resistance to localised corrosion can be considered for environments that have high-chloride levels.

Steel corrosion refresher - continued

4. Welded steel joints are more vulnerable to corrosion. When carbon steel and stainless steel are welded the joint develops a different metallurgy to the parent metal, which can make the welded joint more susceptible to corrosion. It is important to weld steels to a Welding Procedure Specification to ensure that the welded joint still has good mechanical properties and good corrosion resistance.

5. Contact between carbon steel and stainless steel may cause corrosion. Although steel alloys are iron-based, carbon steel and stainless steel do not work well together. In contact the stainless steel (cathode) may induce galvanic corrosion on the carbon steel (anode). In addition, during processing even a small amount of carbon steel (iron) residue can compromise the stainless steel corrosion resistance. It is important to ensure that the contact area is protected with a suitable protective coating, or better still to avoid any physical contact by design.

Coating failures lead to steel rusting

6. Uniform corrosion on steel may not always be bad. Despite its appearance, uniform corrosion (rust) generally does not indicate imminent failure. Uniform corrosion is defined as material loss over the entire surface of the material. Unlike localised corrosion, uniform corrosion is not considered to be critical. Deterioration from this type of corrosion usually progresses slowly at the steel surface, giving asset managers enough time to assess the structure and take steps to stop the corrosion process.

7. Steel is receptive to various corrosion protection systems. There is no shortage of corrosion protective systems for steel. Paint coatings, cathodic protection (CP), alloying and metallic coatings are some of the standard methods used to prevent corrosion of steel thereby increasing the lifespan of a steel structure. Hot-dip galvanising steel with a zinc coating is also a popular corrosion protection method. However hot-dip galvanising is suited specifically for carbon steel and not for stainless steel.

Acknowledgement: www.corrosionpedia.com

UCC ACA YCG THE AUSTRALASIAN CORROSION ASSOCIATION INC YOUNG CORROSION GROUP ACA FOUNDATION LIMITED

RAY OSBORNE MEMORIAL YCG SCHOLARSHIP

We are pleased to announce that Universal Corrosion Coatings Pty. Ltd have agreed to sponsor this new ACA Foundation award. This scholarship has been established to assist a member of the Young Corrosion Group, resident in New Zealand, attend the ACA Conference.

Applications for this and other ACA Foundation awards for 2025 will be invited in the near future via the ACA Foundation website, https://www.corrosion.com.au/foundation/

Q & A CORNER

Older ACA NZ members have probably seen a number of situations that may never have made it to a textbook.

If you have a question you'd like clarification on, email it to the Editor at lesboultonrust@gmail.com. We'll pose it to our panel of experts who will answer it in another Bulletin, so everyone can improve their knowledge.

Q: *What is a voltage gradient?*

& A:

When a voltage is put into the ground or into water from a voltage source, it dissipates into the ground or water. An analogy of this effect is when you drop a stone into a flat pond - waves are created in rings that spread out from the centre, getting smaller until the water is flat again. Think of each of those waves as a voltage gradient ring, with the height of the waves being the amount of voltage. Just as the waves' height reduce in size, so does the voltage drop in magnitude as it gets further from the source. Imagining these waves gives an idea of the invisible voltage gradient that could be in the ground should, for example, a power pylon short out as in the picture below, where something comes into contact with cables, or if lightning hits an above-ground structure.

Voltage gradients can be dangerous

When a power pylon in a farmer's paddock shorts out, some cows in the paddock may die. This is because the pylon put a voltage into the ground, creating a gradient in the ground at, say, 30kv 1m out and 29kv 2m out, 28kv another metre out and so on. Because cows' legs are two metres apart, they could have 2kv running through their bodies, which is fatal. This phenomenon is called "step potential". There are specialist engineers who design earthing systems to make the step potential voltage safe.

With cathodic protection, we are putting voltages into the ground. The voltage comes from the difference between the anodes and the structure being protected (the cathode). CP designs are limited in water to 3 volts' difference per metre. Generally, in areas where people may swim or are likely to fall into the water, sacrificial CP systems are used so that there is no chance of harmful voltages. When Impressed Current CP systems are used, and divers are working around wharfs or other marine structures, the CP system is turned off. Even low voltages can make the divers feel sick.

Explaining last month's issue with the fish repellent device, the fish pick up the voltage gradient in the water. The fish don't like having a voltage gradient difference between their heads and their tails, so they turn around. Obviously, eels are very sensitive to this. The shorter the fish, the lower the voltage gradient effect.

from Grant Chamberlain, Cathodic Protection NZ Ltd

Vale: “Stretch” Scretching

We are sad to record the untimely passing of ACANZ member, Leonard J Scretching (known to all as ‘Stretch’) of NZ Application Services on the 4th of March.

Stretch was a memorable character, who graduated from the Mississippi Valley State University before travelling as a drummer with some of the Greats (including Marvin Gaye, Roger Chapman, and Bo Diddley). While travelling he met his beloved Jill in London, and made the move to her home of New Zealand.

After starting a family, his priorities shifted and work took a different form. As a proud business owner of NZ Application Service Ltd, he was an acknowledged expert in the specification and application of polyurea foams and linings, who was generous in sharing his knowledge, complemented by gaining his certification as a NACE Level 2 Coatings Inspector in 2015.

Stretch completed many different projects ranging from secondary containment linings for oil depots and hazardous waste storage, to work on Lord of the Rings film sets. He is survived by his wife Jill, daughters Nadine and Kama, granddaughters Olive and Cleo and will be missed by many.

AS 3566-2 has been updated

from Peter Golding, CEO, Galvanizing Assn of Austtralia

AS 3566-2, titled Self-drilling screws for the building and construction industries, Part 2: Requirements for corrosion resistance of self-drilling screws and specifications for associated sealing washers for roofing and cladding, has now been updated.

The 2025 edition of AS3566-2 is proceeding to publication. The revised edition provides a major update to the previously withdrawn Standard with extensive committee discussions taking place over six years. The key changes to the Standard are:

1. The corrosion requirements are based on the corrosion rates of zinc for the different corrosivity categories as published in ISO 9223. As these corrosion rates for different corrosion categories are expressed as a range in ISO 9223, AS 3566.2 has set its corrosion performance requirement based on the maximum corrosion rate for each corrosion category in ISO 9223, so that a fastener conforming to AS 3566.2 provides a minimum of 10 years durability in a given corrosion category.
2. Exclusion of accelerated testing as a measure of proving conformance.
3. Introduction of a “Class” rating system for packaging and labelling.
4. Inclusion of stainless steel fasteners, including advice on avoiding bimetallic corrosion.
5. Additional product attributes for laboratory testing.

Importantly, this revised Standard provides different advice to that in the Metal Roofing Manufacturers code of practice (17.2.1A Product Performance Requirement), which requires that the fastener systems, including washer, must not deteriorate to the extent that their intended function is impaired, for a minimum of 15 years or the life of the cladding.

95TH AEC MEETING
MAY 2, 2025 9.00am – 4.00pm
ACA office, Preston, Victoria and online

Please note that in-person tickets are limited. There will be morning tea, lunch and afternoon tea break in the session as well.

The program at present is:

9:00AM to 9:10AM Opening session and welcome – Bruce Ackland

9:10AM to :9:40AM Update from the NSW Electrolysis group

9:40AM to 10:20AM Classic paper review - Cathodic protection of steel piled wharves- Bruce Ackland

10:20AM to 10:50AM Morning tea

10:50 to 11:20AM Field testing and demonstration of Closed-Loop Cathodic Protection technology – Deakin University

11:20 to 12:00 PM Managing DC stray current interference with computer modelling- Christophe Baete

12:00 PM to 1:00 PM Lunch

1:00PM to 2:30PM General Discussion and proposed topics:

- The proposed changes to the VEC – Peter Wade
- Backfill materials
- Electrolysis in different states; AC and DC trains and impacts
- Sharing knowledge for LFI/EPR studies, incidents in industry and solutions
- Remote data logger impact on the CP industry
- Technology of remote monitoring, permanent monitoring facilities such as reference electrodes/ ER probes/coupons

2:30PM to 3:00 PM Afternoon tea

3:00PM to 3:30PM Q and A Victoria Branch – Richard Brodribb

3:30 PM to 4:00 PM AGM and Closing session

Please register via : https://www.corrosion.com.au/victoria-hybrid-95th-aec-meeting-02-05-25/

ACA NZ BRANCH
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