

MARCH 2026 Volume 69 Issue 02. Online: www.corrosion.com.au

ACA NZ Branch Annual General Meeting and Technical Event

To be held: Friday 27 March 2026

Venues:

AGM and Presentation: Clarus, 42 Connett Rd, Bell Block, New Plymouth - and online

Site Visit: Methanex Motunui

Programme:

2:45pm Site Visit - Methanex, Motunui - registration essential

4:15pm Tea, coffee, and finger food at Clarus.

4:30pm Presentation: Laser Cladding Basic Theory & Applications, Matt Vercoe, Metal Spray Suppliers (NZ) Ltd

5:00pm AGM

5:30pm The Corner (brewery) and Smoking Comrades BBQ.

AGM Agenda:

1. Opening
2. Minutes of Previous AGM held 14 March 2025 (available on request)
3. President's Report
4. Financial Report
5. Election of Auditors
6. Announcement of Officers and Executive
7. Special Resolution: That the revised ACA NZ Branch Rules be adopted.
8. General Business
9. Closure

The Special Resolution is for adoption of new ACA NZ Rules.

The proposed Rules have been modified to meet the new requirements of the Incorporated Societies Act 2022, to align with the new ACA Ltd Rules and Bylaws, and addresses the dissolution of ACA NZ Divisions. For the

Branch to remain an Incorporated Society, the Rules must be accepted by membership and registered with the NZ Companies Office before 5 April.

All members are encouraged to attend the AGM either in person or remotely, or to send a proxy form. The proxy form should indicate either a vote for or against the resolution to adopt the new rules, or give the member's vote to the meeting chair or other nominated member, and be emailed to the Secretary no later than 5pm, Wednesday 25 March.

Send RSVP, Proxy Form, and Apologies to: Mark Sigley, Branch Secretary, at acanz.mail@gmail.com or Ph: 027 706 7739.

In the RSVP, please:

- State whether attending the AGM in person or remotely, or
- If unable to attend the AGM, send your apology and attach your Proxy Form (template on page 8)
- Request registration for inclusion in the Site Visit.

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ACA CEO David Roche and Conference Manager Rachelle Rigby visit New Zealand

As part of their introduction to New Zealand members, approximately 40 attendees were at the Saint Alice bar and restaurant at Viaduct Harbour Auckland, on Wednesday, February 25 for a 'meet and greet' with our new ACA CEO and the conference manager. Nibbles and drinks were sponsored by Carboline NZ.



Heritage-listed Skippers Bridge near Queenstown has been closed indefinitely

Popular Queenstown tourist attraction Skippers Bridge could be abandoned, according to a recently released engineer's report. First closed following a safety inspection in October 2025, the Queenstown Lakes District Council (QLDC) has announced that the 124-year-old bridge would stay closed indefinitely due to safety risks. The report warned the bridge should not be re-opened to either pedestrians or vehicles until damaged suspension cables could be repaired or replaced, which it said would be "difficult and neither cheap nor quick to implement".

The report noted "extensive brittle failure" of wires in the bridge's cables made it impossible to test load capacity, but that testing would not necessarily prove the bridge's capacity because of the risk of the cables failing unpredictably, and that testing itself could cause a sudden, catastrophic collapse. Excavation of the portion of cables buried underground had revealed "severe brittle failure" of wires on the left side of the bridge.

Engineers had found around one-fifth of cable cross-sections were lost in some locations but there was no visible damage to the cables above ground. It was thought that the damage was caused by stress corrosion cracking exacerbated by bending of sections of cable over a 'roll-over' plate. Stress corrosion cracking can result in "a disastrous failure" occurring unexpectedly, the report said.

Three options were presented to maintain access: reaffixing the existing above-ground cables into new or extended anchor blocks on both sides of the bridge, replacing the cables or abandoning the existing bridge and constructing a new, shorter, lower pedestrian bridge about 300m downstream. Plant and materials, including concrete, excavators and drill rigs, would have to be flown to the site by helicopter. Either of the two repair bids would be likely to cost more than a million dollars, the report said.

The report noted a number of issues relating to the rest of the bridge that would have to be taken into account when considering whether to attempt to repair the damaged cables. These included that the 120-year-old towers at either end were unlikely to be earthquake safe, that the timber trusses and deck planks showed signs of decay, and concerns about



Above: The heritage-listed Skippers Canyon suspension bridge opened in 1901

Below: A photo showing snapped steel wires making up some of the cables on the historic bridge



the suitability of the site. An earlier report had already noted there would need to be a significant increase in maintenance and upgrades just to keep the bridge open going forward.

In a statement, the QLDC said the report contained a number of options for the future of the structure that would require further investigation and development before they could be properly costed and presented for a decision by the council.

The 96m long, single lane bridge is the country's highest suspension bridge, suspended on wire cables 91 metres above the Shotover River. The bridge is the only route from Queenstown to Skippers Canyon, and forms part of the Heritage New Zealand Category 1 historic places listing for Skippers Road. It is "one of the most outstanding of New Zealand's surviving nineteenth century roads," and one of the country's "most enduring tourist attractions", according to the Heritage New Zealand listing. The bridge provides the only access to the historic Skippers Point School - the only significant building which remains from the settlement established in Skippers Canyon following the 1862 gold rush.

Source: Radio NZ, January 2026

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: *How do polymeric materials fail?*

A: *Polymeric materials (plastics) can fail by different mechanisms to those observed for metals and alloys*

Parameters that impact the degradation of plastics include the type of polymer, the effectiveness of stabilising additives, the operating temperature, the type and strength of aggressive service environment, and applied or residual component stresses. Identifying the cause of polymer degradation requires a complex materials analysis.

A plastic (polymer) is a synthetic material consisting mainly of long-chain repeating units or monomers that are carbon-based. Common examples include polyethylene, polystyrene, polyvinyl chloride, urethane, and nylon.

There are two basic types of plastics:

1. **Thermoplastic** materials soften at elevated temperatures and can be moulded to a specific shape that is retained upon cooling. Polyethylene, terephthalate and polycarbonate are common examples. Although plastic materials may have similar repeating units, unlike metals, they can differ with respect to molecular weight, additives, plasticisers, UV stabilisers, flame retardants, and colouring pigments. Since thermoplastic materials consist of long hydrocarbon chains, at room temperature they can be crystalline or non-crystalline (amorphous). How the plastic resins are formulated can significantly impact their properties and the failure mechanism.

2. **Thermoset** plastics are irreversibly hardened when heated and subsequently cannot be reshaped. At that temperature, thermosets undergo cross-linking reactions that make them more heat-resistant than thermoplastics. Typical examples include bakelite, epoxy resins and vulcanised rubber. Thus, how the plastic resins are formulated, such as by the inclusion of additives, can significantly impact their properties and the failure mechanism.

Mechanical Degradation

Thermoplastics can fracture by rapid, brittle crack propagation or by a ductile mechanism with significant deformation. For a given plastic, the ductile failure mode can occur at a temperature above what is referred to as the glass transition temperature (T_g), where there is increased polymer chain flexibility. The T_g can be increased with the addition of a plasticiser, decreased with the incorporation of fillers, or changed by processing conditions. The failure mode at a temperature below the T_g will be brittle. Thus, the mechanical properties of plastics are determined by the visco-elasticity of the specific plastic, as well as the included additives.

Environmental Stress Cracking

One of the most common failure modes is environmental stress cracking (ESC), caused by the simultaneous and synergistic combination of chemical and stress exposure. ESC is a form of accelerated creep rupture. Specific molecules that have a certain affinity for the plastic can preferentially absorb into the plastic and increase the free volume of the polymer network, which promotes polymer chain mobility. Polymer chains can then realign in the direction of the strain at the defect/crack front. Subsequently, micro-voids emerge between the highly oriented chains, forming a craze zone. The voids then coalesce to form crazes that initiate the crack. This continues until the crack propagation reaches a catastrophic size, causing ultimate failure. Further absorption of the molecule into the plastic can produce swelling that further facilitates the crazing. Non-crystalline plastics are the most susceptible to ESC.

Chemical Degradation

Although plastics do not corrode like metals,

How do polymeric materials fail? cont'd from page 4

aggressive environments can cause changes in the properties and structure of the polymer chains. For example, acetone can soften and even dissolve polyvinyl chloride and polystyrene plastics. To varying degrees, plastics are permeable to organic chemicals. This sorption can cause swelling, plasticisation, dissolution, or leaching of additives. These changes may involve a decrease in molecular weight by chain scission or the incorporation of a new chemical group into the polymer chain. Chain scission can cause a reduction in tensile strength and fracture toughness of the plastic which can make it more brittle.

Thermal Degradation and Thermal Oxidation

Thermal degradation occurs when plastics are exposed to high temperatures that cause the polymer chain to break via chain scission. Embrittlement, loss of ductility, chalking, colour change, or cracking will result.

Thermal oxidation is a type of ESC, but the aggressive agent is oxygen. Oxygen is absorbed into the plastic and reacts via free radicals to break the polymer chains into smaller fragments, which reduces the molecular weight of the polymer chain. This mechanism will accelerate with time since the reaction tends to be autocatalytic. Polyethylene tends to be the least resistant to thermal oxidation, while polytetrafluoroethylene (PTFE) is the most resistant. Antioxidants are added to minimise any thermal oxidation.

UV Degradation

UV degradation of plastics is caused by exposure to intense sunlight in conjunction with air that breaks down the polymer chains. This results in a loss of physical properties, such as impact strength, with the plastic becoming brittle, changing colour, chalking, and cracking. UV degradation is similar to thermal oxidation because it is driven by chain scission

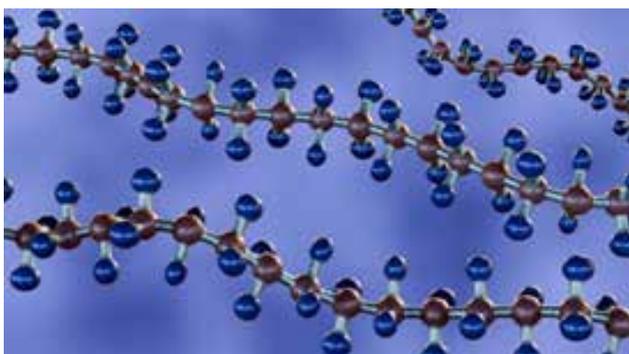
reactions. Short-wavelength UV radiation is the most severe. Degradation damage is usually limited to the surface layer that is exposed to the UV radiation. This degraded surface layer will then become very brittle.

Polypropylene and low-density polyethylene have greater susceptibility to UV degradation, while high-density polyethylene and polycarbonate have better resistance. Although nylon is susceptible to degradation, nylon 6 is more resistant. Various additives are added to improve resistance to UV degradation. Fillers such as TiO₂ and carbon black pigments can act as radiation blockers. Organic absorbers like benzophenones and benzotriazoles can absorb UV radiation and convert it into heat. On the other hand, some additives, such as flame-retardant agents, biocides, and plasticisers, can make the plastic more susceptible to UV degradation.

Microbial Degradation

Since most plastics are derived from petroleum, they are inherently not biodegradable. However, many of the additives are biodegradable, and these are the components that can be attacked by microorganisms that negatively modify the properties of the plastic. For microbial attack to initiate, bacteria and fungi must colonise the surface and then produce exo-enzymes that metabolise the susceptible constituents. Some polymers, such as polylactic acid, are biodegradable. However, even with these plastics, the biodegradation process is quite slow.

Understanding how plastics degrade under mechanical and environmental stress is the first step toward effective plastic failure analysis. The techniques and analytical instrumentation used for determining the cause of a polymer failure mechanism are specialised and require an expert to interpret the results.



References:

- (1) *Corrosionpedia*, article by S. Bradley, January 2026.
- (2) *Degradation of Plastics – Causes and Mitigation*, by A. C. Kennett, published by ACA NZ Branch (1982).

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Heat changes everything: Stainless steel at high temperatures



ASSDA Webinar on Zoom

24 Mar 2026, 11:30am–12:30pm AEDT

Presenter: Gary Coates
ASSDA Technical Consultant

What we'll cover:

- How mechanical and metallurgical properties shift at elevated temperatures
- Selecting the right stainless steel for high-temperature environments
- Why welds and castings can behave differently from wrought products
- Key design considerations for reliable performance
- A brief look at high-temperature corrosion risks

Attendees are encouraged to submit any specific questions in relation to the topic for consideration in the webinar by Friday 20 March 2026 to assda@assda.asn.au.

Cost

- FREE for ASSDA Members
- **AU\$45/person NZSSDA and ACA members**
- AU\$85/person non-members

Register at: <https://webinar-stainless-steel-at-high-temperatures.lilregie.com/booking/attendees/new>

Designing with stainless steel for high-temperature service requires a completely different approach than selecting materials for corrosion resistance. This webinar explores how the properties of various stainless steel families change at elevated temperatures, why certain alloys perform better within specific temperature ranges, and how welds and castings can behave differently from wrought materials.

Update on ACA's new governance structure

Since Members approved the establishment of ACA Ltd as a new company limited by guarantee under the Australian Securities and Investments Commission (ASIC), and the approval of the new Constitution at the Special General Meeting on Sunday 9 November 2025, much has been happening in the background. We are pleased to advise that:

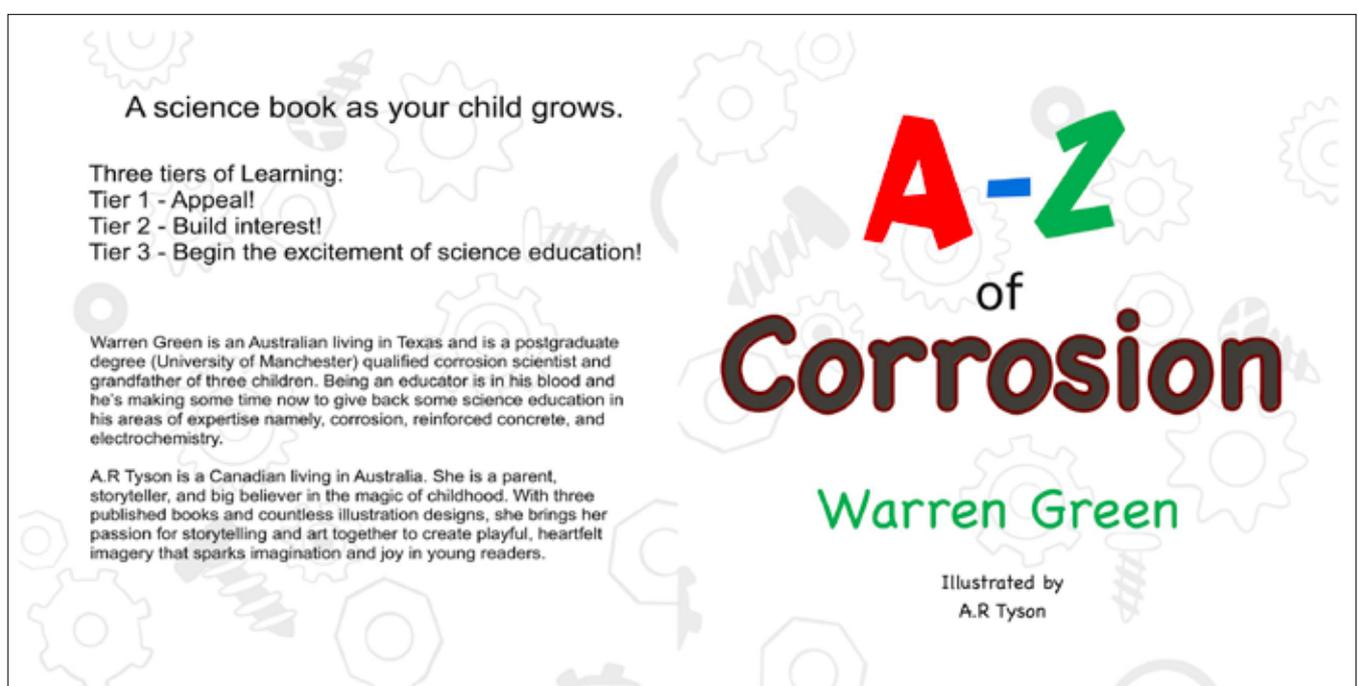
- Australasian Corrosion Association Ltd was successfully registered by ASIC on 25 November 2025. We have an Australian company number (ACN) which is 693 179 243.
- We have been issued with an ABN by the Australian Business Register, and that is ABN 13 693 179 243
- Deregistration of the Australasian Corrosion Association Incorporated with South Australia
- Consumer and Business Services will occur on 27 February 2026, and the transfer of all assets to the new company will happen at the same time.
- We are working with our lawyers who are overseeing the conveyancing of the land we own in Middleborough Road to also be transferred to the new company on 27 February.
- New bank accounts are being set up to take effect also on 27 February.
- The Governance page on the ACA website has been updated to reflect our structural changes. You can access this page via this link.
- We have also amended our logo slightly. The revised logo is basically the same, with the "Inc" removed.

Corrosion book for children

from Warren Green (ACA Life Member)

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Warren Green is an Australian living in Texas and is a postgraduate degree (University of Manchester) qualified corrosion scientist and grandfather of three children. Being an educator is in his blood and he's making some time now to give back some science education in his areas of expertise namely, corrosion, reinforced concrete, and electrochemistry.

A.R Tyson is a Canadian living in Australia. She is a parent, storyteller, and big believer in the magic of childhood. With three published books and countless illustration designs, she brings her passion for storytelling and art together to create playful, heartfelt imagery that sparks imagination and joy in young readers.

A-Z
 of
Corrosion
 Warren Green

Illustrated by
 A.R Tyson

SYNTECH and GRACO The perfect partnership

Advertorial

With the cost of coatings today, it is more important than ever to ensure you have the right spraying equipment.

The choice of spraying equipment has a significant impact on both the quality of the coating and the efficiency of the application process. Here are a few key factors to consider when selecting the right spraying equipment:

1. **Type of Coating:** Different coatings (e.g., paints, primers, stains, specialized coatings) may require specific types of sprayers, such as airless, HVLP (high volume low pressure), or conventional spray guns.
2. **Application Area:** The size and complexity of the area to be coated can influence your choice. For large surfaces, airless sprayers are often more efficient, while smaller jobs might be suited for handheld HVLP sprayers.
3. **Material Viscosity:** Thicker coatings may require more powerful sprayers that can handle higher pressure, whereas thinner materials can be sprayed with less powerful equipment.
4. **Finish Quality:** If a smooth finish is crucial, choosing an HVLP sprayer can help reduce overspray and improve control over the application.
5. **User Skill Level:** More complicated equipment may require a higher skill level to operate effectively.

It's essential to choose equipment that matches the experience level of the operator.

6. **Cost Efficiency:** Investing in quality equipment can lead to savings in materials and time. Quality sprayers can reduce overspray and waste, making them more cost-effective in the long run.
7. **Maintenance:** Consider the maintenance requirements of the equipment. Some sprayers may require more frequent cleaning and parts replacement than others.
8. **Environmental Considerations:** If working in areas with strict environmental regulations, it may be necessary to choose equipment that minimizes VOC (volatile organic compounds) emissions.

Ultimately, the right spraying equipment can optimise the application process, minimize waste, and produce high-quality results, making it a critical consideration for any project involving coatings.

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