

Designing durable steel structures

Recent changes to Building Code clause B2 *Durability* and the issuing of a technical advisory note and model specifications have helped clarify the requirements for structural steel and commonly used coatings.

BY RAED EL SARRAF, TECHNICAL PRINCIPAL - MATERIALS AND CORROSION, WSP NEW ZEALAND

OVER THE PAST 3 YEARS, several developments have addressed (in part) the concerns raised with items that were lacking in New Zealand Building Code clause B2 *Durability*. These items were discussed in detail in *Build 162, Concerns with B2 durability*, and the developments are summarised here.

Clause B2 Amendment 10

Effective from 30 November 2018, Amendment 10 of clause B2 saw the citing of two seminal documents:

- SNZ TS 3404:2018 *Durability requirements for steel structures and components*
- AS/NZS 5131:2016 *Structural steelwork - Fabrication and erection*.

These cover the criteria required when specifying and applying protective coatings on steel structures.

SNZ TS 3404:2018 has durability requirements

Technical specification SNZ TS 3404:2018 sets out the technical requirements to provide the required level of durability to steel structures and their component parts in New Zealand environments. It provides guidance for determining the surface specific corrosivity category for which various protective coatings may be specified to provide the required durable period of 5, 15, 25 or 40 years to first major maintenance.

Guidance is provided for both atmospheric and non-atmospheric environments. It supersedes NZS 3404.1:2009 section 5 *Corrosion protection* and satisfies the requirements of clause B2 and the Waka Kotahi NZ Transport Agency *Bridge manual*.

SNZ TS 3404 is currently being reviewed, with support from Steel Construction NZ and Engineering NZ. An Engineering NZ technical advisory note is expected to be issued in mid-2021 and will be an interim amendment to SNZ TS 3404.

AS/NZS 5131:2016 has construction requirements

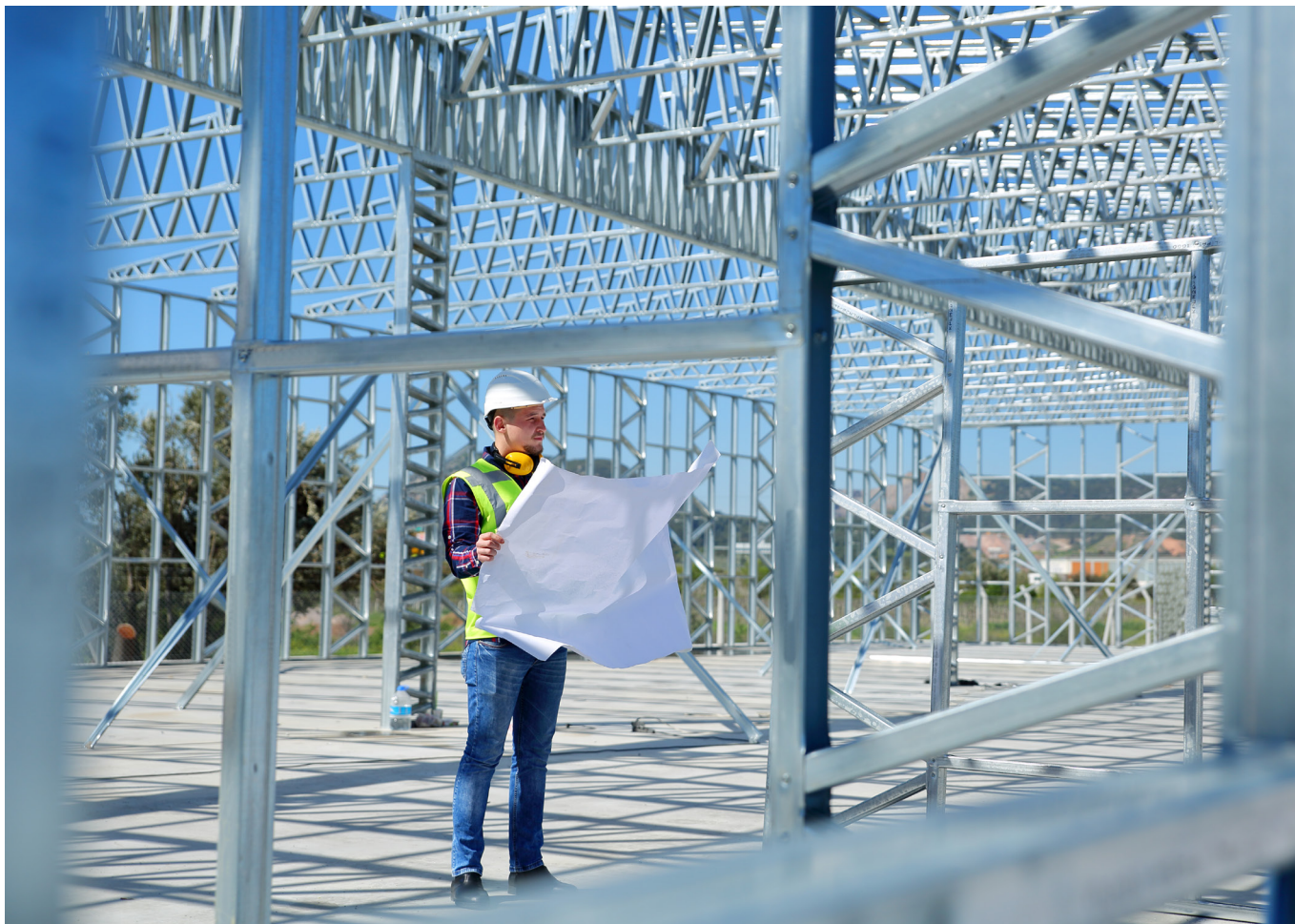
AS/NZS 5131:2016 sets out the minimum requirements for the construction of structural steelwork. It includes preparation treatment of steel surfaces for corrosion protection as well as the application of painting and galvanising. It covers the quality assurance and quality control requirements, based on the engineer specifying the coating quality level and the treatment grade. Both are based on the atmospheric corrosivity category exposure and the level of required surface preparation.

It also covers the additional requirements for architecturally exposed structural steelwork and includes five different categories of finish quality that can be specified.

Citing these publications in the Building Code will help reduce the risks associated with premature failures, commonly related to either the selection of the incorrect protective coatings or the poor surface preparation and/or application of the selected coating.

Changes to protective coatings specifications

In November 2020, Waka Kotahi NZ Transport Agency published Technical Advisory Note 20-21 (available at www.nzta.govt.nz). It outlined changes to its publication *Protective coatings for steel* ➤



bridges and announced the release of model specifications for coating steel highway structures and their protection using anti-graffiti coatings.

While the publication mainly focuses on the corrosion protection of steel bridges, it is the release of the model specifications NZTA S9 for protective coatings and NZTA S10 for anti-graffiti coatings that are of interest.

NZTA S9 and S10 go through in detail the requirements of AS/NZS 5131:2016 for the surface preparation and application of the most commonly used coatings. These are inorganic zinc silicate, organic coatings (epoxies, polyurethanes, polysiloxanes and moisture cured urethanes), hot-dip galvanising and thermal metal sprays.

The NZTA S9 specification also includes a model inspection and testing plan, providing clear guidance on Waka Kotahi's expectations from a quality assurance point of view. It also outlines the

responsibilities of the different parties involved, including the designer, contractor, fabricator, coatings applicator and coatings inspectors.

Signing producer statements

Unfortunately, even with these developments, the signing of producer statements remains a complex legal issue that is yet to be resolved. Advice from Engineering NZ and the Association of Consulting and Engineering (ACE) is that efforts are still under way to explore whether existing regulations allow engineers to show compliance for durability for all materials used and whether producer statements are suitable for showing compliance with clause B2.

In the meantime, it is recommended that what is now known as the in-lieu letters are to be used. In April 2020, Engineering NZ/ACE published the latest clause B2 practice advisory, which outlines the latest guidance on this matter. ◀