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THIRD-PARTY STEEL PRODUCT CERTIFICATION

INTRODUCTION

“The globalisation of the steel industry and the increase in the number of domestic suppliers and processors has created the potential for the supply of construction steels of unconfirmed origin and quality. Due to the strong focus on quality and safety in the Australian construction industry, local builders, specifiers, designers and customers expect construction materials to comply with all relevant Australian and New Zealand Standards.

However, with reinforcing, prestressing and structural steels now sourced from multiple suppliers both from within Australia and from other parts of the world, often even within a single project, designers, specifiers and contractors can no longer assume that the construction steel delivered to the construction site will necessarily meet their minimum requirements”.

The abovementioned quote from the Australian Certification Authority for Reinforcing Steels (ACRS) website sets the context and rationale for having third-party certification. The fact is that not all structural steel products sold in Australia actually comply with all the requirements of the relevant Australian Standards. Failures of products during erection and in service are known to have occurred with the cause being traced to non-compliant products.

This Technical Note is intended to provide guidance on the background to and process of third-party certification, which can provide confidence as to the quality of steel products supplied for Australian projects.

DEFINITIONS

ACRS – Australian Certification Authority for Reinforcing Steels

APCC – Australasian Procurement and Construction Council is the peak council of departments responsible for procurement, construction and asset management policy for the Australian, State and Territory governments and the New Zealand Government

ATIC - Australian Technical Infrastructure Committee, a technical group under the umbrella of APCC with endorsement from Austroads

Conformity assessment – demonstration that specified requirements relating to a product process, system, person or body are fulfilled. The concept of conformity assessment is concerned with the fulfilment of specified requirements, not with the wider concept of conformity. (From AS ISO/IEC 17000)

First-party conformity assessment – conformity assessment activity that is performed by the person or organisation that provides the object. (From AS ISO/IEC 17000)

Second-party conformity assessment – conformity assessment that is performed by a person or organisation that has user interest in the object. (From AS ISO/IEC 17000)

Third-party conformity assessment – conformity assessment activity that is performed by a person or body that is independent of the person or organisation that provides the object, and of the user interests in the object. (From AS ISO/IEC 17000)

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Conformity assessment body – body that performs conformity assessment services. (From AS ISO/IEC 17000)

Conformity assessment system – rules, procedures and management for carrying out conformity assessment. (From AS ISO/IEC 17000)

JAS-ANZ – Joint Accreditation System of Australia and New Zealand.

NEED FOR THIRD-PARTY CERTIFICATION

The construction industry and the specifiers need certainty in respect of the material supplied to Australian projects and need to minimise their risk with respect to steel quality. The reality is that most people in the construction industry and many specifiers are not familiar with the detailed requirements of material Standards and find it difficult to understand and interpret steel mill certificates.

Australia now operates in the global economy and many products used in Australia are imported. Variation in the quality of products from different sources and variation in reliability of product from any one source is therefore possible. Government authorities and private companies have all experienced quality issues at times with a variety of products being found not to meet the requirements of the Australian Standards. A method of managing the risks involved is required and third-party certification is suggested as a positive way forward.

Consumers and procurers benefit from third-party certification as they can have confidence that the products they purchase are fit for purpose and because they can seek appropriate remedies should the product fail to meet the specified requirements.

Although manufacturers pay for being part of a third-party certification scheme, thus adding to operating costs, they benefit because they can be satisfied that the products delivered comply and they will avoid the costs and embarrassment associated with non-compliance. (They may also get a competitive edge.)

DESCRIPTION OF THIRD-PARTY PRODUCT CERTIFICATION

Third-party certification represents world best practice conformity assessment and involves an independent specialist auditing organisation which may be accredited by JAS-ANZ or by a governing body to a programme, associated with, for example, a Product, Quality Management System or Occupational Health and Safety.

Product conformity assessment for a Product is the periodic assessment of a manufacturer to check that the products produced by that manufacturer meet all the requirements of the relevant product Standard. Conformity is measured against a number of compulsory requirements in each relevant Standard.

In the case of steel products, Product Certification Bodies are engaged to audit a supply/manufacturing facility for specific products (such as plate or rolled sections) made at that facility. Compliance is whether the supplier/manufacturer meets the conformity requirements to a satisfactory level and so can be certified.

In recent years, ISO/IEC has published a number of guidance documents on all aspects of product certification and conformity assessment.

PREVIOUS METHODS USED TO ENSURE PRODUCT QUALITY

Australian Standards for supply of steel products (such as AS/NZS 1163, 3678 and 3679 parts 1 and 2 and their predecessors) have typically always required mill certificates to be supplied to purchasers of the product. Since the testing was done by the supplier, this method is first-party conformity assessment in terms of AS ISO/IEC 17000.

Some purchasers or government agencies in the past had inspectors in factories inspecting the finished product. This method constituted second-party conformity assessment in terms of AS ISO/IEC 17000.

Once quality assurance programmes conforming to AS 9000 were introduced into Australia, more reliance was placed on these systems by purchasers which meant reversion back to first-party conformity assessment at best. In some instances, no conformity assessment was undertaken and complete reliance was placed on the quality assurance system. Product quality

verification through testing was overlooked and products were accepted with inadequate validation of manufacturer's claims of compliance.

Problems that have been identified in the past include:

- Inadequate product traceability
- Misleading or false supporting documentation/test certificates
- Excessive variation in material properties
- Inappropriate/incorrect product markings

INTERNATIONAL ACTIVITY

Over twenty countries now have third-party certification schemes.

Third-party product certification is probably at its most developed in Europe. In the steel product area, respected third-party certifiers of long-standing in Europe include:

- UKCARES (www.ukcares.com)
- Deutsches Institut für Bautechnik (www.dibt.de), and
- IGQ – Istituto Italiano di Garanzia della Qualità (www.igq.it)

All operate under different operational and legal frameworks.

Third-party certification schemes are generally structured around the requirements of the International Standard for such bodies – ISO/Guide 65 which has been published by Standards Australia as AS/NZS 3843. A new International Standard ISO/IEC 17065 will replace the ISO/Guide 65.

ISO/IEC Directives specify that the requirements for products shall be written in accordance with the neutrality principle such that conformity can be assessed by first-party or second-party or third-party conformity assessment. In addition, no Standard containing requirements for products shall make conformity assessment dependent upon a quality management system.

AUSTRALIAN ACTIVITY AND ORGANISATIONS

In Australia, very few materials Standards include conformity assessment requirements and where they do, they can be either 'Normative' (compulsory) or 'Informative' (non-compulsory). Unless the conformity assessment requirements are 'Normative' in the Standard, it is possible a manufacturer can claim compliance to the Standard without actually doing any testing, or only perform limited testing.

Australian governments are working to address the conformity issue with construction products via ATIC, which coordinates an agenda of technical issues relevant to infrastructure procurement for government agencies, including standard technical specifications. The current ATIC specifications relating to steel products, which are freely downloadable from their website, require third-party certification and mandate that the certifying body is JAS-ANZ accredited.

ACRS administers a specialist industry-based, independent, not for profit, third-party product certification scheme which certifies reinforcing, prestressing and structural steels to Australian Standards such as AS/NZS 1163, 3678, 3679 parts 1 and 2, 4671 and 4672 parts 1 and 2. This scheme has been in place for steel reinforcing and prestressing materials since 2003, and for structural steels since 2011. ACRS is currently working towards JAS-ANZ accreditation.

THIRD-PARTY PRODUCT CERTIFICATION AND STEEL MILL CERTIFICATES

Steel mill certificates supplied by the manufacturer as part of a first-party **attestation** have been the traditional method of checking quality for a customer. The requirements for the content of these certificates have been strengthened in the latest editions of AS/NZS 1163, 3678, 3679 parts 1 and 2. Appropriately obtained mill certificates provide documentation of the performance characteristics of the particular steel product that has been sourced. However, they only represent a snapshot of what has been manufactured at a certain point in time, with reliance still needing to be placed on the assumption that mill quality is consistent and reproducible. The third-party certification of a manufacturer for a range of products provides the surety that the manufacturing processes provide consistent and reproducible product quality.

Third-party certification provides a continuing level of quality assurance for manufactured steel which augments and extends that provided by a steel mill certificate. The manufacturer is audited by the certifying body, usually on an annual basis and, in the case of ACRS, with quarterly checks on production data. ACRS checks all production from a certified location to ensure that it complies with the requirements of the appropriate Australian Standard.

In many respects, third-party certification and steel mill certificates work “hand in hand” to provide a comprehensive solution to minimise risk and ensure quality. Whilst third-party certification should be considered the default and minimum requirement, steel mill certificates provide added surety and risk minimisation on specific steel product lots and may also provide a convenient mechanism to ensure that the procurement, distribution and delivery processes (as distinct from the production process) have been successful. Many government departments and procurers on projects with higher risk profiles are requiring mill certificates in addition to ACRS certification.

BENEFITS OF THIRD-PARTY CERTIFICATION

The benefits of third-party certification to the construction industry, its specifiers and clients include:

- Assured quality of product irrespective of source, provided the source is a part of a recognised third-party accreditation scheme;
- Increased confidence in material quality;
- Reduced risk for all parties to a project;
- Reduced possibility of failure;
- Certainty that the products meet the requirements of the relevant Australian Standard;
- Avoids the need for separate inspections at the manufacturer;
- Avoids the need for separate independent testing;
- Removes the need for customers to check every supplier's test certificate;
- Reduced possible need for remedial work or delay;
- Improved traceability and identification;
- Reduced likelihood of material substitution and/or misrepresentation.

RELEVANT PRODUCTS NEEDING COVERAGE

The following steel products are suggested for coverage under third-party certification:

- Steel reinforcing (AS/NZS 4671)
- Steel prestressing (AS/NZS 4672 parts 1 and 2)
- Steel sheet and strip (AS 1397)
- Hot-rolled steel flat products (AS/NZS 1594)
- Cold formed structural steel hollow sections (AS/NZS 1163)
- Hot rolled steel flat products (AS/NZS 3678)
- Hot rolled bars and sections (AS/NZS 3679.1)
- Welded I sections (AS/NZS 3679.2)
- Structural and pressure vessel steel – quenched and tempered plate (AS 3597)
- Bolts
- Welding consumables

A number of these products are already covered by a third-party certification scheme run by ACRS, as noted earlier.

IMPLICATIONS FOR DESIGN

AS 4100 'Steel structures' and AS 4600 'Cold-formed steel structures' both rely on guaranteed values for chemical composition, mechanical properties, methods of manufacture and tolerances as contained in the Australian Standards referenced in Section 2 of AS 4100. The design parameters, particularly the design capacity factors, have been calibrated against the requirements of the Standards and may not be applicable to products that do not comply in their entirety with the requirements of the relevant Standard. The full implications of the required activities to enable design to AS 4100 to be carried out on Australian sourced or imported material is contained in ASI Technical Note TN005 'Guidelines for designing to AS 4100 when imported materials are involved'.

ASI RECOMMENDATIONS

ASI recommends third-party certification of all steel products as an appropriate method of ensuring compliant product (whether locally produced or imported) is used on all Australian projects in order to ensure that all project stakeholders meet their duty of care responsibilities and legislated OH&S requirements.

This process involves material suppliers/manufacturers obtaining third-party certification from a certifying organisation which is named on the product documentation. All stakeholders in the process must ensure that their documentation includes the requirement that third-party certification is required on all specifications, drawings, tender and contract documentation.

ASI also recommends that consideration should be given to requesting steel mill certificates in addition to requiring third-party product certification.

SUGGESTED NOTE FOR STRUCTURAL DRAWINGS

The following wording is suggested for drawings and specifications:

'Structural steel shall comply with all requirements of the relevant Australian Standards. Manufacturers of structural steel shall hold a valid certificate of approval issued by an acceptable third-party compliance assessment body (such as the Australian Certification Authority for Reinforcing Steels (ACRS)). Evidence of compliance must be submitted when tendering and as part of the quality assurance process'.

REFERENCES

Standards Australia, AS ISO/IEC 17000-2005 [ISO/IEC 17000] 'Conformity assessment – Vocabulary and general principles'.

Standards Australia/Standards New Zealand, AS/NZS 1163:2009 'Cold-formed structural steel hollow sections'.

Standards Australia/Standards New Zealand, AS/NZS 1594:2002 'Hot-rolled steel flat products'.

Standards Australia. AS 3597-2008 'Structural and pressure vessel steel – Quenched and tempered plate'.

Standards Australia/Standards New Zealand, AS/NZS 3678:2011 'Structural steel - Hot-rolled plates, floorplates and slabs'.

Standards Australia/Standards New Zealand, AS/NZS 3679.1:2010 'Structural steel - Hot rolled bars and sections'.

Standards Australia/Standards New Zealand, AS/NZS 3679.2:2010 'Structural steel - Welded I sections'.

Standards Australia, AS 4100-1998 'Steel structures' (includes Amendment 1, 2012).

Standards Australia/Standards New Zealand, AS/NZS 4600:2005 'Cold-formed steel structures'.

Standards Australia/Standards New Zealand, AS/NZS 4671:2001 'Steel reinforcing materials'.

Standards Australia/Standards New Zealand, AS/NZS 4672:2007 'Steel prestressing materials'.

Standards Australia/Standards New Zealand, AS/NZA 3843:1998 [ISO/IEC Guide 65] 'Guide 65: General requirements for bodies operating product certification schemes'.

International Standards Organisation/International Electrotechnical Commission, ISO/IEC Guide 28:2004 'Conformity assessment – Guidance on a third-party certification scheme for products'.
(SAA HB18.28-1991 not updated – available superseded.)

International Standards Organisation/International Electrotechnical Commission, ISO/IEC Directives, Part 2:2011, 'Rules for the structure and drafting of International Standards'. (This Standard has been used to create a Standards Australia document 'Standardisation Guide 006: Rules for the structure and drafting of Australian Standards').