

The compelling case for steelwork compliance

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Point 1

Non-compliant, fraudulent or counterfeit steel products are of international concern

Through the ASI's involvement with international steel associations we are being advised of a need to be vigilant on steelwork quality. There have been two recent reports that bring the point home that quality issues seen in Australia cross oceans - firstly from a highly regarded US engineering publication.

Extract from Engineering News-Record 2010 (ENR) article showing that steel is the top most counterfeit construction product imported into the US (fasteners, ie bolts second)

TOP 10 COUNTERFEIT CONSTRUCTION GOODS	
1	Steel
2	Fasteners
3	Valves
4	Pipe
5	Circuit Breakers
6	Rotating Equipment Parts
7	Electric Equipment
8	Pipe Fittings
9	Pressure Vessels
10	Cement
SOURCE: CONSTRUCTION INDUSTRY INSTITUTE	

Then more recently is an alert from the **Standing Committee on Structural Safety** in the UK (SCOSS) to be found on their website <http://www.structural-safety.org/>. SCOSS issued an alert for distribution in the UK as a result of many recent reports from the **Confidential Reporting on Structural Safety** body (CROSS) about non-compliance and falsification of certification from overseas steelwork supply mainly from non-European origin. An extract is as follows:

“SCOSS has become aware of a number of instances where certification accompanying proprietary products has stated compliance with standards or specified requirements, but the products have been found not to be in accordance with specification. On several occasions, this has led to premature structural failure of the component at loads well below the intended design.”

In Australia, concern on a number of significant steel projects by the state transit authority in Queensland prompted a National Structural Steel review in which the ASI assisted with an educational campaign in support of the findings. Quality issues prompted a tightening of compliance provisions for both the Queensland and NSW transit authorities. This focussed the ASI's attention to be alert to non-compliance in a whole range of steelwork and representations have been made on quality issues ranging from portal frames, guard rails, sheds, bridge trusses and building construction projects. Some of the issues uncovered go as far as fraudulent behaviour like falsified test certificates, silicon welds, attachment of bolt heads and water filled tube to increase weight.

Point 2

Australia is moving to global sourcing without a commensurate compliance regime

In recent years Australia has become exposed to the full ramifications of a global market in steel and steelwork supply. The lack of rigour in current Australian compliance regimes (compared with our equivalents overseas like the US, Canada, the UK) covering the supply of structural steel can lead to an unacceptable degree of non-compliant, unsuitable and often faulty steelwork for major development projects in Australia. Feedback from ASI members through having to rectify foreign product and deal with repercussions of field failures has raised awareness that there needs to be a tighter compliance structure within Australia. This has also been acknowledged by the Australian Procurement Construction Council (APCC), Queensland Transport and



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Main Roads and NSW Roads and Marine Services. There is little regulatory framework for independent testing of materials in construction contracts or onus on design professionals or procurers to take responsibility to check for product not meeting their specifications. The presence of a rigorous compliance regime and regulatory support will it is believed, balance the commercial pressures of cost and speed with compliance and safety.

Historically the Australian marketplace has been conditioned to good quality supply either manufactured by local manufacturers or imported and certified through Australian manufacturer networks. Local manufacturers are (rightly) subjected to the quality and OH&S regimes defined by local standards and mandated through such vehicles as the Building Code of Australia.

Internationally procured product is often not subject to these regimes and the overseas manufacturers are often beyond the reach of an Australian regulatory system that has historically focussed on Australian manufacture.

The fact that the regulatory framework has not kept up with these changes simply exacerbates these issues.

This leads to the question: should the Australian public be exposed to greater risk of a significant failure occurring involving loss of life or serious injury before we can drive regulatory change?

Point 3

Quality compliance is a process that needs to be 'designed in' and a purchasing environment to buy cheapest and then rectify problems as they are found is flawed

An example of needing control at the point of execution is seen in steelwork welding. As experienced fabricators and engineers would be aware, welding is a special process under ISO 9001. This means that there is no way to fully assess the properties of the weld during or after production without destroying the component being fabricated. To achieve compliant welds you need a compliant process.

Chairman of WD3 the AS/NZS 1554 Australian /NZ welding code, **Bruce Cannon** comments:

"The intent of AS/NZS 1554 is to produce a welded joint that will give a result that is fit for purpose as intended by designers. Therefore the process starts with a qualified welding procedure. The weld is then produced by a welder qualified to use the procedure which has been designed to produce the desired weld quality and properties in a repeatable manner under the guidance of a person (a welding supervisor) with sufficient skills and technical knowledge to understand the capabilities and limitations of the process being used and implications toward the properties of the material being fabricated, therefore meeting the requirements and intent of the standard. Quality can never be inspected in or rectified with absolute surety; it must be built in from the ground up therefore minimising the need for non destructive tests."

Point 4

Australian/NZ design standards rely on Australian/NZ welding and material standards as fundamentals toward achieving the design intent

The ASI is seeing a move toward the substitution of international steel material standards for product used under the Australian Design standard. We see pressure on specifiers to accept product complying with other material standards as acceptable on the basis of a limited number of tests. We also see regrading of a foreign material standard test certificate to an Australian standard based on a limited number of tests. This practice is not acceptable unless it is based on the full set of testing and testing frequencies provided in the relevant Australian Standard.

Point 5

The level of compliance and certification must be appropriate to the risk and safety of a structure

Advice the ASI is receiving from European technical bodies is that Australia should be looking to increasing the level of compliance with the risks associated with a structure. The European Standard EN 1090 is the guidance document under review by the ASI in formulating its compliance thinking. This standard refers to execution classes for manufacturing and design based on the type of construction or 'consequence classes' going from farm buildings to bridges for example. Part of this compliance regime needs to include third party product and qualification certification at the appropriate level of consequence of risk.

The ASI believes that compliance is an integral component of construction safety. Our platform advocates:

1. Use of relevant Australian Standard where available
2. Third party product certification commensurate with design risk/ execution classes
3. Prequalification of the steelwork contractor based on demonstrated capability and certification commensurate with the design risk

Point 6

The WORK HEALTH and SAFETY ACT 2011 reinforces the need for Australian product compliance

The new harmonised **Work, Health and Safety Act 2011** puts significant shared responsibility on all parties in the construction value chain, specifically manufacturers, importers, suppliers, designers and constructors.

The ASI believes and is supported by the safety authorities, that material and product compliance is a necessary component of the solution for safe design and construction.

Put bluntly, how can anybody warrant a structure is safe if they do not know that the material and workmanship involved in its construction is not compliant to the required codes. The ASI engages with members and industry around steel material and product quality as the advisory body, publishes technical journals and notes and organises training courses supporting the compliance imperative. The Institute is also represented on numerous Standards Australia committees.

**ASI Technote guidance documents for compliance are available on the ASI website.
Ref <http://steel.org.au/elibrary/asi-technical-notes>**

TN001	High Strength structural bolt assemblies to AS/NZS 1252 (PDF) (44 Kb) Version 3, Feb 2012. Author: T.J. Hogan
TN005	Guidelines for designing to AS 4100 when imported materials are involved (PDF) (47 Kb) Version 3, Feb 2012. Author: T.J. Hogan
TN007	Compliance issues and steel structures (PDF) (42 Kb) Version 2, Feb 2012. Author: T.J. Hogan
TN008	Welding consumables and design of welds in AS 4100-1998 with amendment 1, 2012 (PDF) (43 Kb) Version 1, Feb 2012. Author: T.J. Hogan
TN009	Documentation of structural steel (PDF) (74 Kb) Version 1, Apr 2012, Author: T.J. Hogan
TN010	Third party steel product certification (PDF) (78 Kb) Version 1, Jul 2012. Authors: T.J. Hogan and P.W. Key