



AUSTRALIAN STEEL INSTITUTE

## **Responsibility for safety in ‘as-built’ designs**

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A number of recent developments have emerged that put in question exactly where the responsibility lies for ensuring that what is designed is what is actually built downstream.

Australian standards have recently tightened up on certification and marking requirements in the Pipe and Tube Standard AS 1163 due the substitution of non-compliant product for compliant product.

Recently the ASI has released a Technical Note ASI TN005 on guidelines for designing to AS 4100 when imported materials are involved in order to address the question.

This issue is of long standing since 2006 when the ASI organised a seminar series on high-strength bolt assemblies and published a technical note on the requirements to have imported bolts correctly certified, based on a number of failures from poor quality imported bolts and poor or inadequate compliance certification.

Despite this, the ASI has been made aware of a number of cases where non-compliant bolts have been detected, usually after the bolts have failed to perform to the design requirements. The ASI has recently published a new Technical Note ASI TN001 to reinforce the responsibilities of all parties to ensure that the correct certification of bolts is supplied by bolt importers and obtained by builders, structural engineers and fabricators.

All these matters highlight the need for structural engineers to assess the risks involved when imported material is used on a project to meet their legal requirements by ensuring compliance of the final construction with their design requirements. When a full service engagement involving both design and construction services is involved, the structural engineer must satisfy himself that the materials used actually do comply with the materials standards specified.

A problem can arise when structural engineers are not contracted to provide construction services, being restricted to design services only. The issue that then arises is whose responsibility it is to check and ensure that the nominated materials as specified by the structural engineer are in fact used.

Is it the engineer's responsibility to inspect test certificates, do onsite inspections and undertake what constitutes 'duty of care'? In the case of full services, it certainly is but what of cases where only design services are contracted?

There are also issues concerning the substitution of foreign steels and their standards into AS 4100.

In the past where materials were only made in Australia to Australian standards, the matter was less of an issue because Australian standards provide the necessary guidelines to identify the quality of material and welding processes. What then happens if overseas materials manufactured to overseas specifications are substituted into the finished design?

There is no doubt that the responsibility for quality assurance in building construction is distributed amongst the whole design and construction chain. This includes project managers, architects, design engineers, purchasers, fabricators and builders and there is an obligation for all to be proactive in demanding documentation and certification in accordance with the standards nominated in the documentation, and in the relevant design standard.

The ASI has recently become involved in issues related to this allocation of responsibility because the percentage of imported materials and fabricated steelwork is increasing in Australia. A number of engineering consulting firms have raised this issue with the ASI and this has led to the recent publication of ASI TN005.

Recently published in the ASI's quarterly *Steel Australia* magazine was an example of a test certificate for imported angles to AS/NZS 3679.1 which actually failed the test but was recorded as being compliant on a verifiable certificate. If it had not been checked, it would have resulted in inferior (low ductility) material being used in a critical power structure.

There is obviously a requirement for the structural engineer to know if there is product substitution and to examine the test certificate closely. If there is doubt then the structural engineer has to fall back on the requirements of AS 4100 which down-rates unidentified steel material to a yield strength of 170 MPa.

ASI TN005 provides guidance, some of which is quoted here:

“It is essential to understand that the quality of the steel and its guaranteed mechanical properties and the distribution of these properties over a period of time are the basis on which the capacity factors of AS 4100 have been derived.” Similarly: “Section 9 of AS 4100 dealing with design of connection elements such as bolts, welds and connection components, is based on design expressions and capacity factors that are directly related to the bolt/nut/washer standards specified in Clause 2.3.1 of AS 4100 and the welding consumables/deposited weld metals specified in AS 1554.1.”

Engineering, Procurement, Construction Management (EPCM) proponents have increasingly been procuring fabricated steelwork overseas on the basis of cost and assuming that the necessary rectification work due to any poor workmanship can be done by Australian fabricators.

This is of concern to the ASI and should be of concern to the Australian design and certifying community, especially principal certifiers who issue occupancy certificates.

The ASI has been advised of cases of poor workmanship, defective welding and non-compliance to quality standards for imported material or fabricated steelwork. Unfortunately,

these matters are settled in legal terms and are invariably subject to non-disclosure as terms of settlement. Fabricators completing the rectification work are under pressure not to go public with the problems as they are commercially tied to the contractor. So we have a legacy of hiding the issues.

But what if there is a problem that is not found and is not rectified. This could result in serious safety concerns. For years we as Australian manufacturers completing quality assurance programs like ISO 9002, have been told that quality cannot be inspected back in and that it needs to be part of the process. Do we in Australia need to improve quality systems and training in those systems?

Why is it that Europe is not seeing the proportion of cheap imported steelwork from Asia that we are seeing here? Is it possibly because their quality systems are robust and the entire chain recognises its responsibility and would not allow inferior product and workmanship in structural applications?

The ASI believes that this is a matter that needs to be debated and addressed. That is, if fabricated steelwork is going to be sourced overseas then there needs to be an accompanying tightening of the quality assurance systems that accompany this action, to ensure that the decades of systems and standards built up in this country are not undercut on the basis that Australian rectification will save the day.

For these reasons the ASI has recently published ASI TN005 “Guidelines for designing to AS 4100 when imported materials are involved” and ASI TN001 “High Strength Structural Bolt Assemblies to AS/NZS 1252.” These are available on the ASI web site [www.steel.org.au](http://www.steel.org.au)