OneSteel Manufacturing Pty Ltd
ABN 42 004 651 325

Level 40, 259 George St, Sydney NSW 2000
GPO Box 536, Sydney NSW 2000, Australia

P 02 9239 6666
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30 June 2014

Mr Adam Yacono
Manager
Anti-Dumping Commission
C/o Australian Customs and Border Protection Service
Customs House
1010 La Trobe Street
DOCKLANDS VICTORIA 3008

Public File

Dear Mr Yacono

Hot Rolled Structural Sections (HRSS) exported from Japan, Korea, Taiwan and Thailand – Independent opinion on grade equivalents

OneSteel Manufacturing Pty Ltd ("OneSteel") submits that the central issue in the current HRSS investigation is the identification of the goods sold in the various domestic markets that most closely resemble the goods exported to Australia.

To assist in improving the understanding of the relevant criteria for identifying domestic grades that closely resemble AS/NZS 3679.1 -300 ("G300"), OneSteel has commissioned an independent assessor to prepare an expert report on the products most properly comparable with the exported G300 complying with AS/NZ 3679.1.

The independent expert report is attached for the Commission's guidance. The qualifications of the independent assessor are also included in the attachment.

Briefly, the independent assessment confirms that:

1. Based on mechanical properties

   - The closest domestic grades of HRS to the exported G300 (compliant with AS/NZ 3679.1) include goods of Grade SM490A, SM490B and SM490C (to JIS G 3106), and SN490B and SN490C (to JIS G 3136).

   - Grade SS400 is not even the closest to the redundant grade AS/3679.1 – 250 (G250"), let alone G300.

   - Yield strength is a more important factor in evaluating design capacity of steel than tensile strength.

2. Based on chemical properties

   - There is no equivalent for SS grades such as SS400 or SS490 as JIS G3101 doesn't specify limits for carbon equivalents.

   - The closest domestic grades of HRS to the exported G300 (compliant with AS/NZ 3679.1) include goods of Grade SM490B and SM490C (to JIS G 3106), and SN490B and SN490C (to JIS G 3136). While these grades have the same requirement for the carbon equivalent, it is more difficult to achieve than the carbon equivalent for SM490A because of the less stringent limitation on carbon content in SM490A product.

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OneSteel submits that the independent assessment should provide the basis for preliminary dumping margin findings for Hyundai Steel Co, Tung Ho, TS Steel Co, Ltd, and Feng Hsin Iron and Steel Co., Ltd. The assessment will also impact yet-to-be-determined normal value assessments for SYS of Thailand.

If you have any questions concerning this letter please do not hesitate to contact OneSteel's representative Mr John O'Connor on (07) 3342 1921 or Mr Matt Condon of OneSteel on (02) 8424 9880.

Yours sincerely

Matt Condon
Manager – Trade Development
OneSteel Manufacturing Pty Ltd

Attachment – Independent Report

NZ Heavy Engineering Research Association
Structural Systems
Web: www.hera.org.nz
Tel: +64 9 262 2885
HERA House, 17-19 Gladding Place, PO Box 76-134
Fax: +64 9 262 2856
Manukau 2241, Auckland City, New Zealand
Email: structural@hera.org.nz

Mr Matt Condon
Manager Trade Development
OneSteel
Level 6, 205 Pacific Hwy
St Leonards NSW 2065
Australia

30 June 2014

Dear Mr Condon

Equivalency of steel grades specified in JIS G 3101, JIS G 3106 and JIS G 3136 with AS/NZS 3679.1 Grades 250, 300 and 350

Synopsis

The present author has been working in the field of steel construction for over 20-years. As well as assisting Clients in Europe, the Middle East, Singapore and Australasia in research and product development activities, Stephen has a long experience of developing industry-standard design guidance as well as national and international Standards. Currently, he is General Manager of Structural Systems at the NZ Heavy Engineering Research Association (HERA); prior to him taking his present role, between 1997 and 2008, he was Senior Manager of Building Engineering at the Steel Construction Institute (SCI) in the UK. For complete details of the present author, a Curriculum Vitae is presented in Appendix C to this letter.

It is understood that independent expert advice is required on the equivalency of Japanese Industrial Standard (JIS) steel grades specified in JIS G 3101[1], JIS G 3106[2] and JIS G 3136[3] compared to Grade 250 given in AS/NZS 3679.1: 1996[4] together with Grades 300 and 350 given in AS/NZS 3679.1: 2010[5].

JIS products equivalent to AS/NZS 3679.1 steel grades based on mechanical properties

To conform to the requirements given in AS/NZS 3679.1, test pieces produced according to AS 1391[6] are required to establish the following key mechanical properties for the nominal thickness of the part from which the sample was taken:

- Minimum yield stress of the steel defined by the upper yield point R_{eH} expressed in MPa.
- Minimum tensile strength of the steel R_m expressed in MPa.
- Minimum elongation of the steel expressed as a percentage, reported on a gauge length L_o equal to $5.65\sqrt{S_o}$ (known as a proportional test piece), where S_o is the original cross-sectional area of the test piece before testing. Conversion of results from non-proportional test pieces is permitted using ISO 2566-1[7] (i.e. when L_o is not equal to $5.65\sqrt{S_o}$).

[1] JIS G 3101: 2010. Rolled steels for general structure, Japanese Standards Association, Tokyo, Japan, 2010
[2] JIS G 3106: 2008. Rolled steels for welded structure, Japanese Standards Association, Tokyo, Japan, 2008
[3] JIS G 3136: 2012. Rolled steels for building structure, Japanese Standards Association, Tokyo, Japan, 2012
[4] AS/NZS 3679.1: 1996. Structural Steel – Part 1: Hot-rolled Bars and Sections, Standards Australia/Standards New Zealand, Sydney/Wellington, Australia/New Zealand, 1996
[5] AS/NZS 3679.1: 2010. Structural Steel – Part 1: Hot-rolled Bars and Sections, Standards Australia/Standards New Zealand, Sydney/Wellington, Australia/New Zealand, 2010
[6] AS 1391: 2007. Metallic materials – Tensile testing at ambient temperature, Standards Australia, Sydney, Australia, 2007
[7] ISO 2566-1:1984 Steel - Conversion of elongation values - Part 1: Carbon and low alloy steels, International Organization for Standardization, Geneva, Switzerland, 1984

For steel supplied to JIS G 3101, JIS G 3106 and JIS G 3136, the equivalent test piece standard that is required to determine the above mechanical properties is JIS Z 2201[8]. Given the similarities between AS 1391 and JIS Z 2201 (which appear to be because they are both based on ISO 6892-1[9]), equivalency between the different steel grades can be made by comparing the above key mechanical properties in the respective JIS standard and AS/NZS 3679.1. Comparisons of the impact energy for sub-grades are excluded from this study.

From a comparison of the above mechanical properties given in JIS G 3101, JIS G 3106 and JIS G 3136 (see Appendix A), it is concluded that the following products are closest to the steel grades given in AS/NZS 3679.1:

- **AS/NZS 3679.1-250**
  - JIS G 3101 SS490.
- **AS/NZS 3679.1-300**
  - JIS G 3106 SM490A, SM490B and SM 490C (≤ 100 mm).
  - JIS G 3136 SN490B and SN490C (≥ 16 mm).
- **AS/NZS 3679.1-350**
  - JIS G 3106 SM490YA (≤ 100 mm), SM490YB (≤ 100 mm), SM520B (≤ 100 mm) and SM 520C (≤ 100 mm).

It should be noted that, although the above products are closest to the steel grades in AS/NZS 3679.1, in some cases, they are not directly equivalent owing to the fact that they do not comply with the minimum elongation requirements given in AS/NZS 3697.1 (see Appendix A).

The standard that is used to design steel structures in Australia is AS 4100[10]. Like it's international counterparts, to ensure that steel structures possess adequately ductility when loaded (i.e. they are not susceptible to brittle/sudden failure), the key mechanical properties identified above need to satisfy additional performance requirements to enable the products to be used in design (see Appendix A). In the vast majority of cases, the yield stress f_y (or R_{eH}) is used to evaluate the design capacity of steel members to support the design loads. The only exception to this rule is in the design of tension members where both the yield stress and tensile strength f_u (or R_m) is considered. However, in circumstances where the design capacity of tension members is based on f_u, the calculated design capacity is down-rated in most international standards, reflecting the greater variability in f_u compared to f_y.

Weldability JIS products based on chemical composition

The present author's colleague, Dr Michail Karpenko (Manager of NZ Welding Centre at HERA and Member of the Standards Australia WD-003 Committee responsible for AS/NZS 1554.1[11] *et seq*.), has also considered the weldability based on the chemical composition of the JIS products. Weldability of steel is an important indicator for expected mechanical properties of the heat affected zone (HAZ) of a welded joint. It is essential to know weldability of the steel in order to develop a suitable welding procedure that includes preheat temperature, heat input and other relevant parameters. Weldability of Australian and New Zealand steel grades is defined in AS/NZS 1554.1 as a Weldability Group Number.

From the observations presented in Appendix B it is concluded that the following products are closest to the steel grades given in AS/NZS 3679.1:

- **AS/NZS 3679.1-250**
  - No equivalency, as JIS G 3101 does not specify limits for carbon equivalent of SS490.

[8] JIS Z 2201: 1998. Test pieces for tensile test for metallic materials, Japanese Standards Association, Tokyo, Japan, 1998
[9] ISO 6892-1: 2009. Metallic materials - Tensile testing - Part 1: Method of test at room temperature, International Organization for Standardization, Geneva, Switzerland, 2009
[10] AS 4100: 1998. Steel structures, Standards Australia, Sydney, Australia, 1998
[11] AS/NZS 1554.1: 2011. Structural steel welding - Welding of steel structures, Standards Australia/Standards New Zealand, Sydney/Wellington, Australia/New Zealand, 2011

- **AS/NZS 3679.1-300**
    - JIS G 3106 SM490B (≤ 50 mm) and SM490C (≤ 100 mm).
    - JIS G 3136 SN490B (6 mm to 50 mm) and SN490C (16 mm to 50 mm).
- **AS/NZS 3679.1-350**
    - JIS G 3106 SM490A, SM490B, SM490C, SM490YA, SM490YB, SM520B and SM520C
    - JIS G 3136 SN490B, SN490C

The basis for considering the above JIS grades to have similar weldability to AS/NZS 3679.1 grades above is from a conservative estimate of the maximum carbon equivalents (CE) based on chemical composition limits provided in the Japanese standards.

The equivalency of weldability of steels considered above is only valid for JIS grades with a maximum boron content of 0.0007%.

Conclusions

From the above review, taking both the mechanical properties and chemical composition into consideration, is concluded that the following products are closest to the steel grades given in AS/NZS 3679.1:

- **AS/NZS 3679.1-300**
    - JIS G 3106 SM490B (≤ 50 mm) and SM490C (≤ 100 mm).
    - JIS G 3136 SN490B (6 mm to 50 mm) and SN490C (16 mm to 50 mm).
- **AS/NZS 3679.1-350**
    - JIS G 3106 SM490YA, SM490YB, SM520B and SM520C

Should you have any queries on the results from the work described in this letter, please do not hesitate to contact me.

Yours sincerely

Dr Stephen Hicks
General Manager Structural Systems
E-Mail: stephen.hicks@hera.org.nz

Appendix A Detailed comparisons between JIS products equivalent to AS/NZS 3679.1 steel grades

To enable the conclusions presented in this letter to be independently reviewed, a comparison of the mechanical properties given in JIS G 3101, JIS G 3106 and JIS G 3136 with AS/NZS 3679.1 are presented in Table 1. The non-proportional values given in the JIS documents have been converted according to ISO 2566-1 to those based on a proportional gauge length, so that a direct comparison of the minimum elongation values can be made (see Fig. 1). As can be seen from Fig. 1, in some cases, the JIS grades do not comply with the minimum elongation requirements given in AS/NZS 3697.1 for a particular nominal thickness.

Table 1 Mechanical properties at ambient temperature according to AS/NZS 3679.1, JIS G 3101, JIS G 3106 and JIS G 3136

Designation	Minimum yield stress R_{eH} MPa Nominal thickness mm					Minimum tensile strength R_m MPa	Minimum elongation on a gauge length of $5.65\sqrt{S_o}$ %
	< 11	≥11 ≤16	>16 ≤17	>17 <40	≥ 40		
AS/NZS 3679.1-250	260	250	250	250	230	410	22
JIS G 3101 SS490	285	275	275	275	255†	490 to 610	See Fig. 1[a]
AS/NZS 3679.1-300	320	300	300	280	280	440	22
JIS G 3106 SM490A	325	325	325	315	295†	490 to 610	See Fig. 1[b]
JIS G 3136 SN490B	325	325‡	325	325	295†	490 to 610	See Fig. 1[c]
JIS G 3136 SN490C	-	-	325	325	295†	490 to 610	See Fig. 1[d]
AS/NZS 3679.1-350	360	340	340	340	330	480	20
JIS G 3106 SM490YA and SM490YB	365	365	355	355	335†	490 to 610	See Fig. 1[e]
JIS G 3106 SM520B and SM520C	365	365	355	355	335†	520 to 640	See Fig. 1[e]

Notes: † applies to > 40 mm, ‡ applies to ≥ 12 mm and <16 mm
a Does not conform to minimum elongation of 22%
b Conforms to minimum elongation for nominal thickness of: ≥ 5.1 mm and ≤ 8.6 mm; and ≥ 16.1 mm and ≤ 24.8 mm
c Conforms to minimum elongation for nominal thickness of: ≥ 6 mm and ≤ 8.6 mm; and ≥ 16.1 mm and ≤ 24.8 mm
d Conforms to minimum elongation for nominal thickness of ≥ 16.1 mm and ≤ 24.8 mm
e Conforms to minimum elongation for nominal thickness of: ≥ 5.1 mm and ≤ 7.4 mm; and ≥ 16.1 mm and ≤ 24.2 mm

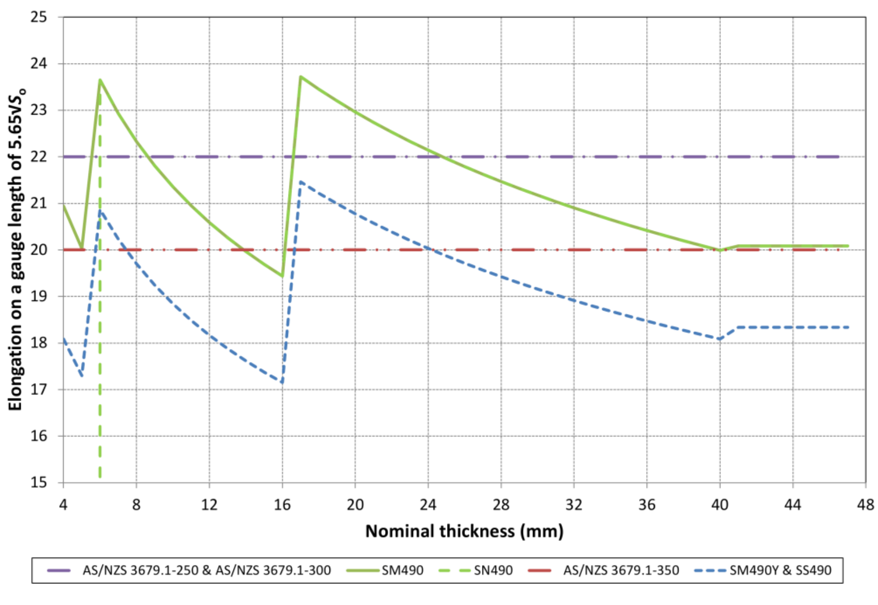

Fig 1 Elongation-nominal thickness relationship for JIS G 3101, JIS G 3106 and JIS G 3136 products compared to AS/NZS 3679.1

In order to ensure that structures designed to AS 4100 utilize steels that possess adequate ductility, the key variables identified in the body of the letter are used to satisfy the following requirements (in design R_{eH} is designated f_y, whilst R_m is designated f_u):

- $\frac{R_m}{R_{eH}} = \frac{f_u}{f_y} \geq 1.2$.
- elongation at failure ≥ 15% (on a gauge length of $5.65\sqrt{S_o}$).
- the stress-strain curve for the steel has a plateau at f_y extending for at least $6\varepsilon_y$, where ε_y is the yield strain.
- the steel exhibits a strain-hardening capability.

In the vast majority of cases in design, the yield stress f_y (or R_{eH}) is used to evaluate the capacity of steel members. The only exception to this rule is in the design of tension members where the design section capacity is taken as the lesser of:

$\phi N_t = \phi A_g f_y$; and

$\phi N_t = 0.85 \phi k_t A_n f_u$

where ϕ is the capacity (safety) factor which is given as value of 0.9 in AS 4100, A_g is the gross area of the cross-section, k_t is the correction factor for distribution of forces, A_n is the net area of the cross-section (accounting for holes for, for example, fasteners) and f_u (or R_m) is the tensile strength used in design.

The factor 0.85 in the second of the above two equations ensures that the effective capacity factor 0.85ϕ (≈0.77) for the limit state of material fracture is suitably higher than the value of ϕ (=0.9) for the limit state of yielding, reflecting the influence of greater variability in f_u and the reduced ductility of members which fail by fracture at bolt holes.

Appendix B Detailed review of the weldability of JIS products based on chemical composition

It is concluded that JIS G 3106 and JIS G 3136 apply the carbon equivalent equation C_{eq}, which is somewhat different to that used in AS/NZS 3679.1. Compared with C_{eq}, the Carbon Equivalent (CE) formula given in AS/NZS 3679.1 leads to more conservative results. However, the lower C_{eq} limits given for JIS G 3106-SM490 and JIS G 3136-SN400 appear to balance the difference in the carbon equivalent formulas. The crack sensitivity index, which also takes boron content into account, is not included in AS/NZS 3679.1.

It is not possible to accurately estimate the CE based on the chemical composition limits given in the JIS standards presently under consideration. As JIS steel grades are not listed in AS/NZS 1554.1, welding of these grades will require special considerations. To determine the pre-heat temperature, the weldability group number of the parent material should be identified based on the actual ladle analysis and the CE in accordance with Section 5.3 of AS/NZS 1554.1. Welding procedure qualification testing should comply with the Table 4.7.1 of AS/NZS 1554.1 or AS/NZS 1554.5, following the testing requirements for not pre-qualified welding consumables; this includes tensile, bend and impact tests. Material test certificates should report all elements listed in the CE formula plus total boron. For steels containing more than 0.0007% total boron, the weld heat affected zone (HAZ) Charpy testing should be considered in lieu of the parent plate Charpy tests.

JIS G 3106

JIS G 3106 gives the maximum value of the JIS Carbon Equivalent (C_{eq}) for SM 490A, SM 490YA, SM 490B SM 490YB SM 490C (SM490) grades as 0.38 max (50 mm plate thickness or under) and 0.4 max for (over 50 mm up to and incl. 100 mm). The C_{eq} for the steel plate over 100 mm in thickness is subject to the agreement between the purchaser and supplier.

The chemical composition of the steel shall be determined by the ladle analysis subject to an agreement between purchaser and supplier. The ladle analysis values of the Table 2, JIS G 3106 specify limits for five elements (C, Si, Mn, P and S) only. The maximum levels of S and P are more restrictive compared to AS/NZS 3679.1.

Sensitivity of Welding Crack Index (PCM) can be used as substitute for C_{eq} under the agreement between the purchaser and the supplier. Table 6, JIS G 3106 gives the maximum value of PCM for SM 490 grades as 0.24 max (50 mm plate thickness or under) and 0.26 max for (over 50 mm up to and including 100 mm). The PCM for the steel plate over 100 mm in thickness is subject to the agreement between the purchaser and supplier.

In contrast, AS/NZS 3679.1 specifies limits for some twelve elements including all those required to estimate Carbon Equivalent (CE). The maximum value of the carbon equivalent is given as CE 0.44 and 0.45 for the Grade 300 and 350 respectively. The corresponding weldability group number according to AS/NZS 1554.1 is 4 and 5.

JIS G 3136

JIS G 3136 gives the maximum values of the C_{eq} and PCM that should be calculated using actual heat analysis values. The standard specifies limits for five elements (C, Si, Mn, P and S) only. With the exception of the grade SN 400A, the maximum levels of S and P are more restrictive as compared to AS/NZS 3679.1.

JIS G 3101

JIS G 3101 species limits for four elements (C, Mn, P and S) only. It does not include C_{eq} formula. The maximum level of S and P are less restrictive for the Grades SS330, SS400, SS490 and SS540 as compared to AS/NZS 3679.1.

Appendix B Curriculum Vitae for Dr Stephen James Hicks

Curriculum Vitae

PERSONAL INFORMATION

Stephen James Hicks

Heavy Engineering Research Association, 2241 Auckland (New Zealand)

+64 92624841 +64 21 878457

stephen.hicks@hera.org.nz

http://www.linkedin.com/pub/stephen-hicks/25/825/b32

Skype stephen_hicks1

Sex Male | Date of birth 20/09/1969 | Nationality British

WORK EXPERIENCE

03/09/2012–Present

General Manager of Structural Systems

Heavy Engineering Research Association, Auckland (New Zealand)

As Manager plus:

Member of senior management team.

Business or sector Not-for-profit research organisation

09/07/2008–03/09/2012

Manager of Structural Systems

Heavy Engineering Research Association, Auckland (New Zealand)

Responsible for setting annual budget and financial forecast for the Structural Systems Division (annual turn-over NZ$1.200.000); Responsible for divisional business development; Contribution to the overall strategic management of HERA through attendance of management and executive meetings; Staff management and appraisal of 5 researchers and business development experts; Authoring journal papers, industry design guides and chapters in books; Lecturing at Universities, seminars and teaching at Continuing Professional Development (CPD) courses in NZ, Australia and Asia; Responsible for consultancy activities; Responsible for structural testing and management of Universities and research institutes; Answering questions from designers and providing interpretations of clauses within Standards; PhD mentor and examiner; Member of NZ and Australian Standards Committees on steel and composite construction.

Business or sector Not-for-profit research organisation

11/2013–Present

Director

Australasian Certification Authority for Reinforcing and Structural Steels (ACRS), Sydney (Australia)

Monitor business performance; Ensure financial viability and accountability; Act in accordance with ASIC company law; Develop with the Board and enact strategic policy and direction; Monitor the controls framework to ensure major risks are identified and managed; Develop alternative funding sources in conjunction with Board and management; Approve budgets, large investments and any major financial decisions; Appoint to the Executive Director and evaluate his or her performance.

Business or sector Conformity assessment body

09/2012–Present

Executive Councillor

Steel Construction New Zealand (SCNZ), Auckland (New Zealand)

As ACRS Director

Business or sector Steel construction marketing association

07/2008–Present

Director

National Association of Steel-framed Housing (NASH), Auckland (New Zealand)

As ACRS Director

Business or sector Light steel framing marketing association

01/10/2007–03/06/2008

Senior Manager of Building Engineering

Steel Construction Institute (SCI), Ascot (United Kingdom)

As Manager plus:

Member of Senior Management team; Responsible for setting annual budget and financial forecast for the Building Engineering Division (annual turn-over £700.000); Responsible for divisional business development; Contribution to the overall strategic management of the Institute; Staff management and appraisal of Manager of Fire Engineering, Manager of Tubular Construction together with 3 Principal and Senior Engineers.

Business or sector Research organisation

01/10/2004–01/10/2007

Manager of Building Engineering

Steel Construction Institute (SCI), Ascot (United Kingdom)

As Principal Engineer plus:

Responsible for setting annual budget and financial forecast for the Building Engineering Sub-division (annual turn-over £600.000); Responsible for Sub-division business development; Staff management and appraisal of 3 Principal and Senior Engineers; Responsible for the development of consultancy service in evaluating floor vibrations using finite element analyses; UK Member on CEN/TC250/SC4 Eurocode 4; Reported directly to the SCI Director: Dr Graham W Owens

Business or sector Research organisation

01/04/1999–01/10/2004

Principal Engineer

Steel Construction Institute, Ascot (United Kingdom)

As Senior Engineer plus:

Responsible for financial control and management of selected projects; Responsible for business development and preparation of proposals for funding from RFCS, ECSC, UK DTI and UK DETR; Supervision of Engineers; Lecturing at Universities and Continuing Professional Development courses for designers; Member of national standards committee for composite construction BSI B/525/4.

Business or sector Research organisation

03/03/1997–01/04/1999

Senior Engineer

Steel Construction Institute, Ascot (United Kingdom)

Research and development of steel and steel-concrete composite structures in multi-storey buildings; Responsible for managing individual projects; Preparation of reports and delivering internal presentations; Finite element modelling and software programming; Supervision of structural testing and management of Universities and research institutes; Answering questions from designers and providing interpretations of clauses within Standards; Preparation of technical papers for journals and external audiences; Public speaking; Reported to Dr Mark Lawson, Senior Manager of the Building and Construction Division.

Business or sector Research organisation

01/06/1987–21/09/1990

Civil engineering technician

Packman Lucas, London (United Kingdom)

Producing structural design calculations for office and residential buildings in reinforced concrete, timber, masonry and steel; Site supervision; Preparation of briefs; Site surveying and ground investigation; Organizing work for drawing staff; Hand and Computer Aided Drafting (CAD).

Business or sector Structural engineers

EDUCATION AND TRAINING

01/10/1993–21/03/1998

Doctor of Philosophy in Engineering (PhD)

GBR Doctorate

University of Cambridge, Board of Graduate Studies
4 Mill Lane UK-CB21RZ Cambridge (United Kingdom)

Title of dissertation: Longitudinal shear resistance of steel and concrete composite beams

27/09/1990–01/08/1993

Bachelor of Engineering with First Class Honours (BEng(Hons))

GBR Bachelors degree

University of London, Queen Mary and Westfield College, Department of Civil Engineering
Mile End Road UK-E14NS London (United Kingdom)

01/09/1988–01/06/1990

Business and Technology Education Council (BTEC) Higher National Certificate (HNC)

GBR Higher National Certificate (HNC)

Newham Community College
East Ham Centre, High Street South UK-E64ER London (United Kingdom)

01/09/1986–03/10/1988

Business and Technology Education Council (BTEC) National Certificate (NC)

GBR BTEC National Certificate

Barking College of Technology, Romford (United Kingdom)

PERSONAL SKILLS

Mother tongue(s) English

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
French	B2	B2	B1	B1	B2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Good ability to adapt to multicultural environments, gained through:

i) My current position in New Zealand, which has led me to serve as Chairman of the committee for first joint Australian and New Zealand steel and composite bridge design standard, together with committee memberships for other Australian and New Zealand Standards.
ii) UK member on European Committee for Standardization, “Structural Eurocodes”, Subcommittee 4, Eurocode 4 - Design of Composite Steel and Concrete Structures (CEN/TC250/SC4).
iii) Working with a wide variety of European Universities and Institutions on European Coal and Steel Community (ECSC) and Research Fund for Coal and Steel (RFCS) research projects.
iv) Teaching and consultancy activities in China, Singapore and Bahrain

Strong verbal and personal communication gained through:

a) Developing national and international Standards, authoring chapters in books, authoring national and international design guides and authoring journal papers.

b) Delivering presentations to national and international audiences together with teaching on Continuing Professional Development courses.

Organisational / managerial skills

- Leadership
- Staff management and appraisal

- Technical and financial management
- Long track record of relationship building and business development.
- Extensive experience of working with key stakeholders in the UK, European and International steel construction industry
- Extensive experience of international collaborative research.

Job-related skills

- Technical and financial management.
- Steel and steel-concrete composite structures.
- Structural dynamics.
- National and international collaborative research.
- Standards development
- Negotiating and contractual relationships.
- Public speaking.
- Education and training development.

Computer skills

Good command of Microsoft Office™ tools (e.g. Word™, Excel™ and PowerPoint™), including Visual Basic for Applications (VBA) programming.

Driving licence

C1, D1, B, C1E, D1E, BE

ADDITIONAL INFORMATION

Honours and awards

- Invited to deliver 2014 annual lecture to the Singapore Structural Steel Society
- Responsible for harmonizing New Zealand national standards for steel and composite construction with Australia and develop joint Australian/New Zealand design standards.
- Only non UK-based individual to be considered a 'Eurocodes Expert' by the British Standards Institution, which resulted in the Eurocode 4 contribution to The Essential Guide to Eurocodes Transition book and the web-based Eurocodes Plus tool.
- Led training on Eurocode 3 and 4 in three delegations to China (February 2012, July 2012 and March 2014).
- Invited by the Ministry of Housing, Bahrain to provide technical support for the introduction of light steel framing in residential buildings, Manama, Kingdom of Bahrain, 25 January 2010.
- Invited by European Commission Joint Research Centre to train the trainers from Member States on Eurocode 4 at: 'Eurocodes: Background and applications workshop', Brussels, 18-20 February 2008
- Engineering & Physical Sciences Research Council (EPSRC) Studentship Award – 1994 to 1997.
- W.G. Collins Fund Award, Cambridge University Engineering Department – 1996.
- The Institution of Civil Engineers Prize for Civil Engineering Students – July 1993.

Participation on National and International Standards Committees

- **Australasia**
  - **Member** of Standards Australia **BD-001** Committee: Steel Structures, from 2013 (responsible for steel structures design standard AS 4100 and fabrication and erection standard AS/NZS 109X and participation on ISO/TC167, ISO/TC167/SC1 and ISO/TC167/SC2)
  - **Member** of Standards Australia **BD-023** Committee: Structural Steel, from 2012 (responsible for steel product standards AS/NZS 1163, AS/NZS 3678, AS/NZS 3679.1 and AS/NZS 3679.2 and participation on ISO/TC17, ISO/TC17/SC3, ISO/TC71 and ISO/TC71/SC6)
  - **Member** of Standards Australia **BD-032** Committee: Composite Construction, from 2011 (responsible for design standards AS/NZS 2327.1, AS/NZS 2327.2, AS/NZS 2327.3 and AS/NZS 2327.4)
  - **Chairman** of Standards Australia **BD-032-4** Sub-Committee: Composite Construction -

Composite Slabs, from 2011 (responsible for design standard AS/NZS 2327.4)

- **Member** of Standards Australia **BD-090** Committee: Bridge Design, from 2011, (responsible for Design standards AS 5100.1, AS 5100.2, AS 5100.3, AS 5100.4, AS 5100.5, AS/NZS 5100.6, AS 5100.7, AS 5100.8 and AS 5100.9)
- **Chairman** of Standards Australia **BD-090-06** Sub-Committee: Bridge Design - Steel and Composite Construction, from 2011 (responsible for design standard AS/NZS 5100.6)
- **Member** of Standards Australia **MT-001** Committee: Iron and Steel, from 2010 (responsible for product standards AS 1397, AS 1448, AS 1444, AS 1450, AS 1442, AS 4738.1, AS 1447, AS 1448, AS 1830, AS 1831, AS 1832, AS 2027, AS 5052, AS 5054, AS 1988.1, AS 4314, AS 2338, AS 1443, AS 1770, AS 2074, AS 1472, AS 2266, AS/NZS 1594, AS 2423, AS 5049, AS 1833, AS 1394, HB 110.1, AS/NZS 1595, AS/NZS 4496, HB 12, HB 17, AS/NZS 1365, AS 1982, AS 2003, AS 1517, AS 2551, AS 2552 and AS 2028).

- **New Zealand**
  - **Member** of Standards New Zealand **P3404** Committee: Steel Structures, from 2008 (responsible for design standard NZS 3404.1)

- **Europe**
  - **UK Member** of European Committee for Standardization **CEN/TC250/SC4** Subcommittee 4: Eurocode 4 - Design of Composite Steel and Concrete Structures, from 2005 to 2008 (responsible for EN 1994-1-1, EN 1994-1-2 and EN 1994-2).

- **United Kingdom**
  - **Member** of British Standards Institution **B/525/04** Committee: Composite Structures, from 2003 to 2008 (responsible for UK National Annexes to EN 1994-1-1, EN 1994-1-2 and EN 1994-2 together with earlier National Standards, BS5950-3.1 and BS 5950-4).

Selected Collaborative Research Projects

COST TU0904, Integrated Fire Engineering and Response, MC Observer, New Zealand, from 2011

NZTA, TAR 09/08 Steel/Concrete Composite Bridge Design Guide, from March 2009 to September 2013

RFCS, RFS2-CT-2007-00033, Human-induced vibration of steel structures (Hivoss), from July 2007 to June 2008
RFCS, RFS2-CT-2005-00037, LWO+, large web openings for service integration in composites floors, from July 2005 to December 2006
RFCS, RFSR-CT-2003-00025, High quality acoustic and vibration performance of lightweight steel constructions, from September 2003 to December 2006
ECSC, 7210-PR/314, Generalisation of criteria for floor vibrations for industrial, office, residential and public building and gymnastic halls, from 1 July 2001 to 30 June 2004
ECSC, 7210-PR/315, Large web openings for service integration in composite floors, from 1 July 2001 to 31 December 2003

DTI, STBF/004/00053C, Holistic Assessment of the Vibration Sensitivity of Lightweight Floors for Various Use Patterns, from January 2004 to December 2005
DETR, 38/10/77, Design of flooring systems using pre-cast concrete slabs supported by steel beams, from April 1999 to March 2002
DETR, 38/10/53, Design guidance & interpretation of Cardington composite frame tests, from March 1997 to September 1999.

Memberships

- Elected for a 4-year term on the International Association for Bridge and Structural Engineering Working Commission 2 (IABSE WC2): Steel, Timber and Composite Structures, from 2011
- Corresponding Member of European Convention for Constructional Steelwork Technical Committee 11 (ECCS TC 11): “Composite Structures”, from 2011
- Chairman of New Zealand Sustainable Steel Council, from 2009

Publications - Books

El Sarraf, R, Iles, D, Momtahan, A, Easey, D and **Hicks, S**: Steel-concrete composite bridge design guide, 09/2013, New Zealand Transport Agency, ISBN: 9780478407693

Lawson, R.M. and **Hicks, S.J**: Design of Composite Beams with Large Web Openings: In Accordance with Eurocodes and the UK National Annexes. 01/2011; Steel Construction Institute., ISBN: 9781859421970

Feldmann, M, Heinemeyer, C., Lukic, M., Caetano, E., Cunha, Á., Goldack, A., Keil, A., Schlaich, M., **Hicks, S.J.**, Smith, A., Hechler, O., Obiala, R., Galanti, F. and Waarts, P.: Human-induced vibration of steel structures (Hivoss). Book : English 01/2010; Luxembourg Off. for Official Publ. of the European Communities 2010., ISBN: 9789279141461

Rackham, J.W., Couchman, G.H., and **Hicks, S.J.**: Composite slabs and beams using steel decking: best practice for design and construction. 01/2009; Metal Cladding & Roofing Manufacturers Association in partnership with the Steel Construction Institute.

Feldmann, M., Heinemeyer, C., Butz, C., Caetano, E., Cunha, Á., Galanti, F., Goldack, A., Hechler, O., **Hicks, S.**, Keil, A., Lukic, M., Obiala, R., Schlaich, M., Sedlacek, G., Smith, A. and Waarts, P.: Design of floor structures for human induced vibrations. edited by Gerhard Sedlacek, Christoph Heinemeyer & Christiane Butz, 01/2009; Luxembourg: Office for Official Publications of the European Communities, 2009, ISBN: 9789279140945

Müller, C., Hechler, O., Bureau, A., Bitar, D., Joyeux, D., Cajot, L. G., Vassart, O., Lawson, R. M., **Hicks, S.**, Johansson, B., Veljkovic, M., Feldmann, M.: LWO+, large web openings for service integration in composites floors. Book : English 01/2008; Publisher: Luxembourg Office f. Official Publ. of the Europ. Communities 2008.., ISBN: 9789279076060

Kesti, J., **Hicks, S.**, Rackham, J., Widman, J., Villot, M., Guigou, C., Rodríguez-Ferran, A., Poblet-Puig, J., Sipari, P., Talja, A., Ljunggren, F. and Ågren, A.: High quality acoustic and vibration performance of lightweight steel construction : final report. Book : English 01/2008; Luxembourg Off. for Official Publ. of the European Communities 2008., ISBN: 9789279083044

Smith, A.L., **Hicks, S.J.** and Devine, P.J.: Design of Floors for Vibration: A New Approach. 01/2009; Steel Construction Institute., ISBN: 9781859421765

Müller, C., Hechler, O., Bureau, A., Bitar, D., Joyeux, D., Cajot, L. G., Demarco, T., Lawson, R. M., **Hicks, S.**, Devine, P., Lagerqvist, O., Hedman-Pétursson, E., Unosson, E., Feldmann, M.: Large web opening for service integration in composite floors. Book : English 01/2006; Luxembourg : Office for Official Publications of the European Communities, 2006., ISBN: 9789279017230

Rackham, J.W., **Hicks, S.J.** and Newman, G.M.: Design of asymmetric slimflor beams with precast concrete slabs. 01/2006; Steel Construction Institute.

Sedlacek, G., Heinemeyer, C., Butz, C., Völling, B., Waarts, P., van Duin, F., **Hicks, S.**, Devine, P. and Demarco, T. Generalisation of criteria for floor vibrations for industrial, office, residential and public building and gymnastic halls. Book : English 01/2006; Luxembourg : Office for Official Publications of the European Communities, 2006.., ISBN: 9789279017056

Hicks, S.J., Newman, G.M., Edwards, M. and Orton, A.: Design guide for SHS concrete filled columns. 04/2005; Corus Tubes Structural & Conveyance Business.

Hicks, SJ and Devine, PJ: Design guide on the vibration of floors in hospitals. 01/2004; Steel Construction Institute.

Hicks, S.J., Lawson, R.M., Rackham, J.W. and Fordham, P: Comparative structure cost of modern commercial buildings. 01/2004; Steel Construction Institute., ISBN: 9781859421574

Hicks, SJ and Lawson, RM: Design of composite beams using precast concrete slabs. 01/2003; Steel Construction Institute., ISBN: 9781859421390

Publications - Chapters in books

Hicks, S: Eurocode 4: Design of composite steel and concrete structures. In: Roberts, J. (ed), *The Essential Guide to Eurocodes Transition*, British Standards Institution, BIP 2197, 05/2010: pages 105-122, ISBN: 978 0 580 69451 6

Hicks, S: Vibrations. In: *Steel Details*, British Construction Steelwork Association (BCSA) Publication No. 41/05, 11/2005: pages 59-64, ISBN: 0-85073-049-X

Publications - Journals

Hicks, S.J. and Pennington, A. Partial factors for the design resistance of composite beams in bending, submitted to Journal of Constructional Steel Research

Hicks, S.J., Pennington, A. and Jones, A.: Longitudinal shear resistance of composite slabs, Proceedings of the Institution of Civil Engineers - Structures and Buildings, accepted for publication 2014

Hicks, SJ and Smith, AL: Stud Shear Connectors in Composite Beams that Support Slabs with Profiled Steel Sheeting. Structural Engineering International. 01/2014; 24(2):246-253.

Hicks, SJ and Jones, A: Statistical Evaluation of the Design Resistance of Headed Stud Connectors Embedded in Solid Concrete Slabs. Structural Engineering International 08/2013; 23(3):269-277.

Hicks, S.J., Feeney, M. and Clifton, G.C.: Fire Performance of an Office Building with Long-span Cellular Floor Beams – Britomart East, Auckland, Structural Engineering International 11/12; 22(4): 533-540

Paton-Cole, V.-P., Gad, E,F., Clifton, C., Lam, N., Davies, C. and **Hicks, S.**: Out-of-plane performance of a brick veneer steel-framed house subjected to seismic loads, Construction and Building Materials, 28 (2012), pp. 779-790.

Hicks, S.J. and Smith, A.L.: Design of floor structures against human induced vibrations, Steel Construction - Design and Research, 4, No.2, July 2011, pp. 114-120.

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Lawson, R.M, Lim, J., **Hicks, S.J.** and Simms, W.I.: Design of composite asymmetric cellular beams and beams with large web openings, Journal of Constructional Steel Research 06/2006; 62(6):614-629.

Lawson, R.M. & **Hicks, S.J.** Developments in composite construction and cellular beams. Steel and Composite Structures 04/2005; 5(2):193-202

Hicks, S.J. Vibration characteristics of steel-concrete composite floor systems. Progress in Structural Engineering and Materials 01/2004; 6(1):21 - 38.

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McConnel, R.E. and **Hicks, S.J.** The testing of three full-scale stub-girder floor beams. Structural Engineer 01/1996; 74:289-294

Publications - Conference Papers

Uy, B., **Hicks, S.J.** and Kang, W.H.: Australasian steel-concrete composite bridge standard, AS/NZS: 5100 Part 6, Steel and Composite Construction, 7th New York City Bridge Conference, 26-27 August, 2013

Kang, WH, Uy, B, Tao, Z, **Hicks, S**: Statistical safety factor calibration of short concrete-filled steel tubular columns, From Materials to Structures: Advancement through Innovation, 11/2012: pages 953-958, ISBN: 9780415633185

Hicks, SJ, Jones, A: Statistical Calibration of Safety Factors for Headed Stud Shear Connectors in Composite Construction. 18th Congress of IABSE, Seoul 2012: innovative infrastructures--toward human urbanism, Seoul, South Korea; 09/2012

Khanlou, A, MacRae, GA, Scott, AN, **Hicks, SJ**, Clifton, GC: Shear performance of steel fibre-reinforced concrete, Australasian Structural Engineering Conference 2012: The past, present and future of Structural Engineering, 2012, pages 400-407, ISBN: 9780858258714

Hicks, S: Composite slabs. Eurocodes: Background and applications, Brussels, Belgium; 02/2008

Hicks, SJ: Resistance and ductility of shear connection: Full-scale beam and push tests. Steel and Aluminium Structures, ICSAS'07: Sixth International Conference on Steel and Aluminium Structures, St Catherine's College, Oxford, UK; 07/2007

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Hicks, SJ, Lawson, RM, Lim, J, Simms, WI: Design of composite asymmetric cellular beams. Eurosteel 2005 : 4th European conference on steel and composite structures, Maastricht, The

Netherlands; 06/2005

Hicks, SJ, Devine, P: Vibration Characteristics of Modern Composite Floor Systems. Eurosteel 2005 : 4th European conference on steel and composite structures, Maastricht, The Netherlands; 06/2005

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Hicks, S.J. and McConnel, R.E. The shear resistance of headed studs used with profiled steel sheeting. In: C.D. Buckner and B.M. Sharooz (eds), Composite Construction in Steel and Concrete III. American Society of Civil Engineers, New York, 1997, pp 325-338.

