Update on the revision of the ASCE-8 Standard for the Design of Stainless Steel Structural Members

Kim J.R. Rasmussen

School of Civil Engineering, University of Sydney, Australia

Stainless Steel Experts Seminar, Ascot 2012
- ASCE-8 Committee met in May 2010 in conjunction with ASCE Structures Congress
  - Scope of revision discussed, including cold-formed only or both cold-formed and hot-rolled
  - Revision started in June 2010

- 1st draft of revised standard completed in June 2011
  - A rewrite of the Standard required because of poor conversion from Word Perfect to Word
  - Still with the ASCE Secretariat
  - Not yet circulated to Committee

- No completion date set at this point in time

- 2012 version of AISI-S100 Specification for Cold-formed Steel Structural Members to be published shortly. May require further revision of ASCE-8
Main changes

- Remains a cold-formed standard
- Recalibration to a target reliability index for member of 2.5 to be consistent with the AISI S100 Specification. Generally speaking, this leads to an increase in $\phi$ of 0.05.

Section 1 General Provisions:
- Additional ASTM Standards covering 1.4003 (3CR12) and 1.4462 (S31802)
- Loads and load combinations: replaced by reference to ASCE-7
- Analysis: Rules for 2\textsuperscript{nd} order analysis included in Appendix 2, (as per AISI S100-07)

Section 2 Elements:
- Multiple changes as per AISI S100-07
- Rules for unstiffened elements with stress gradient
- Effective widths rules for Stiffened Elements with Single or Multiple Intermediate Stiffeners or Edge Stiffened Elements with Intermediate Stiffener(s)
Main changes

- **Section 3 Members:**
  - Included rules for distortional buckling for both columns and beams
  - Explicit design approach for columns as per AS/NZS4673, expanded to cover flexural, torsional and flexural-torsional buckling
  
  \[
  F_n = \frac{F_y}{\phi + \sqrt{\phi^2 - \lambda^2}} \leq F_y \quad \eta = \alpha \left( (\lambda - \lambda_1)^\beta - \lambda_0 \right)
  \]
  
  - Values of \( \alpha, \beta, \lambda_0 \) and \( \lambda_1 \) provided for 1.4003 (3CR12) and 1.4462 (S31802)
  - Amended rules for tubes, including plastic moment capacity of SHS and RHS

- **Section 4 Structural Assemblies:**
  - Unchanged
Main changes

- **Section 5 Connections and Joints:**
  - Included rules for welded joints in SHS, RHS and CHS, as per AS/NZS4673 or CIDECT

- **Section 6 Testing**
  - Essentially unchanged

- **Appendix 1:** DSM for compression members (new)

- **Appendix 2:** Second order analysis (new)