

Tomáš Vraný SDSS Award for experimental study on lateral torsional buckling of welded sections

The International Colloquium on Stability and Ductility of Steel Structures SDSS 2019 took place 11 to 13 September in Prague. The organizing committee led by Prof. *František Wald* and Associate Prof. *Michal Jandera* of Czech Technical University (CTU) in Prague together with Dr. *Bernhard Hauke*, Editor-in-Chief of *Steel Construction* journal, honored the best colloquium contribution with the Tomáš Vraný SDSS Award. The award commemorates the late CTU expert on stability of steel structures *Tomáš Vraný* (1965 – 2010).



Figure 1: *Tomáš Vraný* (1965 – 2010) was an expert on stability of steel structures at CTU Prague

Tomáš Vraný graduated at the Czech Technical University in Prague in 1988. After his graduation, he became a research student with the thesis “Behaviour of trapezoidal sheeting connected to non-structural floor-boards” under supervision of Prof. *Jiří Studnička*. In 1992, he became an assistant professor at the university. In 2002 he finished his research in “Rotational restraint of thin-walled Z-purlins” and became an associate professor. His findings were included in Eurocode 3 -1-3. He has translated several Eurocodes into Czech and was a National Technical Contact for Eurocode 3 - 6: Crane supporting structures. In ECCS TC7 “Cold-formed thin-walled sheet steel in buildings” he was very active in the sub-committee “Practical Improvement of Design Procedures”. His contributions were always very well developed, and his kind and friendly manner was positive to all discussions. *Tomáš Vraný* was one of the key persons at the department of steel and timber structures of CTU Prague and a favoured lecturer among students. He was a fair-minded, hard-working and modest person, an expert, always ready to help, and mainly and excellent friend.

The Tomáš Vraný SDSS Award went to *Lukas Schaper*, *Fabian Jörg*, Dr. *Rebekka Winkler*, Prof. *Ulrike Kuhlmann* and Prof. *Markus Knobloch* of Ruhr-Universität Bochum and Universität Stuttgart, respectively, for their contribution „Experimental study on the lateral torsional buckling behaviour and residual stresses of welded I-section members“.



Figure 2. At SDSS Colloquium in Prague Dr. *Bernhard Hauke*, Editor-in-Chief *Steel Construction* journal (left) and Prof. *Michal Jandera*, CTU Prag (right) honor *Lukas Schaper*, RU Bochum, *Fabian Jörg*, Prof. *Ulrike Kuhlmann*, Uni Stuttgart and Prof. *Markus Knobloch*, RU Bochum for the best contribution with the Tomáš Vraný SDSS Award (Photo: CTU Prague)

Based on the awarded colloquium contribution the authors have elaborated an extended paper: Schaper, L.; Jörg, F.; Winkler, R.; Kuhlmann, U.; Knobloch, M. (2019) The simplified method of the equivalent compression flange - Development based on LTB tests and residual stress measurements, *Steel Construction* 12, Issue 4, doi.org/10.1002/stco.201900033

Summary: The method of the equivalent compression flange simplifies the verification of lateral torsional buckling to flexural buckling of an equivalent compressed part of the cross-section. The current simplified method is based on outdated normative rules and the design results may be both, uneconomic and non-conservative. To remedy these short-comings the simplified method is fundamentally modified based on the basic structural behaviour of steel beams taking into account the effects of material, cross-sectional geometry and residual stresses. This paper presents a comprehensive experimental study on the lateral torsional buckling behaviour and residual stress pattern of welded doubly- and mono-symmetric I-shaped steel beams. Moreover, an improved simplified method of the equivalent compression flange is proposed for design purposes.

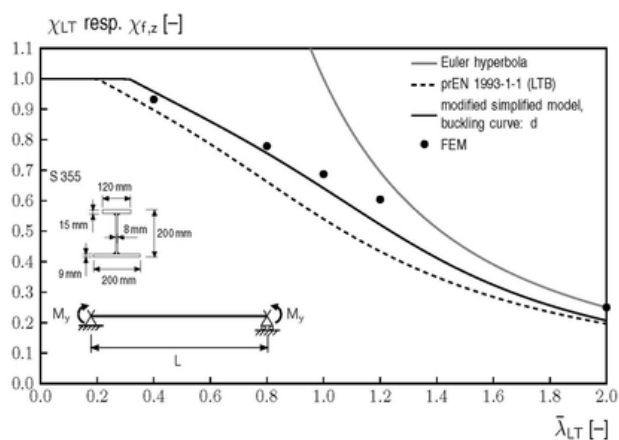


Figure 3: Comparison of load reduction factors of the modified simplified method of the equivalent compression flange, the lateral torsional buckling verification according to prEN 1993-1-1 and the numerical results for a welded mono-symmetric cross-section.