**Editorial Content**

Prof. Markku Heinisuo, Tampere University of Technology, Finland

**Editorial** 13th Nordic Steel Construction Conference, 23-25 September 2015, Tampere

Michael Joachim Andreassen, Jeppe Jönsson

**Joint and column behaviour of slotted cold-formed steel studs**

Slotted cold-formed steel studs are used in load bearing external plasterboard walls. The cold-formed steel studs in these walls are supported by and joined to track profiles at the bottom and top level. In this paper the load bearing studs are tested in compression in order to observe the behaviour of the studs and the track joints. The experiments include a joint design with a special web stiffener used in practice. The studs are made of C-profiles and the tracks of U-profiles. Eight different test series are performed. The test series each have different column lengths, thicknesses, and are both with and without web stiffeners to see the influence of these on the joint behaviour and load bearing capacity of the slotted cold-formed steel studs.

Anton Stade Aarnæns, Hanna Nilsson, Nicolas Neumann

**Dynamic response of pipe rack steel structures subjected to explosion loads**

In the present paper a parametric study of the dynamic behaviour of pipe rack steel structures subjected to explosion loading has been performed. The pipe rack design is assumed to be a multi-planar lattice girder consisting of rectangular or square hollow sections. Numerical analysis with use of the finite element method is performed on a series of altogether 54 pipe racks, varying parameters such as mass distribution and aspect ratio. The study provides a deeper understanding, and form the basis for a more accurate prediction, of the dynamic response of multi-planar lattice girder structures such as steel pipe racks.

Matthias Braun, Renata Obiala, Christoph Odenbreit

**Analyses of the loadbearing behaviour of deep-embedded concrete dowels, CoSFB**

In this paper the development of CoSFB-Betondübel is presented. CoSFB-Betondübel is a deep-embedded concrete dowel connecting an in-situ concrete with a steel section assuring a composite action and allowing for composite beam design. The load bearing behaviour and parameters influencing this behaviour were determined through experimental tests. Special focus was given to the influence of the ratio of the resistance of the concrete dowel to the concrete compression class. The evaluation of the results is concluded in a National Technical Approval [1]. Further investigations will be performed via FE-analysis in ABAQUS. 3D mod-els with nonlinear material and geometry were prepared and validation is undertaken. In addition, a realized application example for CoSFB is shown.
Natalie Stranghöner, Dominik Jungbluth

**Fatigue Strength of Marked Steel Components – Influence of durable marking methods on the fatigue strength of steel components**

According to EN 1090-2 steel components have to be identifiable and traceable during the whole manufacturing chain. The choice of the identification method is not specified consistently in international rules and standards. In terms of durability and liability, markings should be resistant against particular manufacturing processes such as sandblasting, hot-dip galvanizing or coating. In detail these methods are hard stamping scribing, plasma marking and needling. The effect of the installed notch due to the marking process on the fatigue strength of the components has not been investigated in detail yet. As a result, a classification of the notched details in the European detail categories of EN 1993-1-9 is in principle not possible. For these reasons the influence of durable marking methods on the fatigue strength of steel components needs to be clarified by experimental fatigue tests which are actually performed at the Institute for Metal and Lightweight Structures of University of Duisburg-Essen. Within this investigation the different surface conditions hard stamped, scribed, plasma marked and needled are examined. The experimental investigations are carried out considering two different steel grades S355J2 and S460N and three different steel plate thicknesses 15, 25 and 40 mm.

Olli-Pekka Hämäläinen, Timo Björk:

**Fretting fatigue phenomenon in bolted high-strength steel plate connections**

Fretting fatigue is a major obstacle for bolted joints as an alternative for welding. Several studies of the subject have so far concerned aluminium or titanium joints, but due to the recently developed high-strength steels that can be challenging to weld also the steel industry would like to explore the field. This paper will present experimental fatigue test results of double-lap joints made of S355 and S960QC steels. The results will be compared and analyzed using SWT parameter and an FE model of the test specimen. The noticeable difference in fretting fatigue behaviour of these materials will be explained and the controversial crack initiation issue will be addressed.

Yvonne Steige, Klaus Weynand:

**Design resistance of end plate splices with hollow sections**

The paper presents a design approach to calculate rectangular hollow section (RHS) splices (bolted end plate connections) under tension forces or bending moments in accordance with EN 1993-1-8. Based on models available in the literature, an Eurocode conform model is presented by using the component method. The original model, based on experimental and numerical investigations, uses a three dimensional yield line method to predict the tension resistance of bolted splices with hollow sections considering the joint as a whole. The adapted model is fully compatible with EN 1993-1-8. Moreover, it also allows to predict the design moment resistance of such RHS splices.

Reports

Ewa Maria Kido, Zbigniew Cywiński

**The new steel-glass architecture of passenger service centres on expressways in Japan**

Nowadays, modern expressways became worldwide very important arteries for quick and safe transportation of people and goods. Along these roads, for the convenience of drivers and passengers service centres are located, which – consisting of buildings and other infrastructure – provide various services. Usually, buildings represent contemporary trends in architecture and structural engineering. Hereby, steel and glass are widely used. It happens also in Japan but, simultaneously, adequate approaches are being made to respect own traditions as well. This paper is a continuation of authors’ previous publications – devoted, respectively, to buildings, railway stations, and air terminals.
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