



IX CONNECTIONS

AISC – ECCS Workshop on Connections in Steel Structures

6-8 June 2022

Coimbra, Portugal

Connections IX 9th International Workshop on Connections in Steel Structures

1st Edition, 2022

Editors:

Aldina Santiago

Luís Simões da Silva

František Wald



Connections IX
9th International Workshop on
Connections in Steel Structures

1st Edition, 2022

Published by:

ECCS – European Convention for Constructional
Steelwork

publications@steelconstruct.com

www.steelconstruct.com

All rights reserved. No parts of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, re-cording or otherwise, without the prior permission of the copyright owner

ECCS assumes no liability regarding the use for any application of the material and information contained in this publication.

Copyright © 2022 ECCS – European Convention for
Constructional Steelwork

ISBN: 978-92-9147-195-9

TABLE OF CONTENTS

Technical Opening of Workshop

Keynote Lecture: The practical challenges of modern steelwork connection design	3
<i>G. Simmons</i>	<i>Available soon</i>

Standardization of steel connections

Joint design in revised EN 1993-1-8:202x.....	15
<i>M. Veljkovic, M. Couchaux, A. M. Girão Coelho, P. Može, A. Stratan, and F. Wald</i>	<i>Available soon</i>
International standardization of bolted connections made of stainless steel.....	25
<i>N. Stranghöner, D. Jungbluth, C. Abraham and N. Afzali</i>	

Bolting, welding, connectors and grouting

Fillet weld model for component-based finite element method	39
<i>M. Kuříková, F. Wald and P. Jehlička, M. Vild and J. Kabeláč, A. Taras</i>	
Deformation behavior of bolted bearing-type connections	49
<i>P. Može</i>	
Resistance of different perforated steel strip shear connectors according to design guidelines, simulations and experiments	59
<i>A. Petřík and R. Ároch</i>	
Experimental and numerical study of stainless steel bolted connections subjected to shear	71
<i>G. C. Batista, A. T. da Silva, M. C. Rodrigues, P. C. G. S. Vellasco, L. R. O. de Lima and J. G. Henriques</i>	
A practical fracture toughness specification for large cast steel pinned lug connections	81
<i>L. Borges, A. de Castro e Sousa</i>	
An experimental study of the use of extra-long slots for slip-critical bolted connections	91
<i>B. E. Wollenslegel, G. A. Rassati, J. A. Swanson, William P. Jacobs</i>	
Butt-welded connections in innovative high-strength steel constructions	101
<i>U. Kuhlmann, M. von Arnim and J. Spiegler</i>	

Block shear failures in i-shape tension members connected by bolted flange plates	111
<i>D. Pizzuto and C. A. Rogers</i>	

Slip resistance between thermal-sprayed aluminium-coated steel plate and blast-cleaned steel plate for slip-critical bolted joints	121
<i>K. Azuma, S. Matsuo and R. Kanno</i>	

Column base connections

New developments in column base connections for steel moment frames.....	133
<i>A. M. Kanvinde, A. S. Hassan</i>	

Column base plates.....	141
<i>U. Kuhlmann, J. Ruopp and M. Ziwes</i>	

Resistance of column base plates under 3D loading	151
<i>L. S. Seco, M. Couchaux, M. Hjjaj and L. F.C. Neves</i>	

Behaviour of beam-to-upright and base-plate joints for industrial steel storage pallet racks	161
<i>N. Baldassino, M. Bernardi and R. Zandonini</i>	

Design of rotational rigid steel column bases on a concrete building.....	171
<i>A. M. Gresnigt</i>	<i>Available soon</i>

Moment resisting joints

Using sketchup to evaluate yield-line patterns	183
<i>C. R. Lini</i>	

An innovative mechanical model to characterise structural joints	193
<i>T. Golea, A. Corman, J. Mathieu, J-F Demoncea and J-P Jaspart</i>	

Experimental investigation of steel t-stub macro-components with four bolts-per-row.....	203
<i>D. L. Nunes, A. Ciutina and D. Grecea</i>	

Experimental evaluation of a continuous slim-floor beam-to-column joint	215
<i>A. Ciutina, R. Don, C. Vulcu and A. Stratan</i>	

Assessment of the limit states of multi bolts end-plate connections	225
<i>P. W. Kawecki and A. Kozłowski</i>	

Seismic performance of buildings with steel special moment frames using strong frame moment connections	237
<i>J. Judd, S. Pryor, B. Chi and F. Charney</i>	

Cyclic and seismic loading

Seismic performance of tall steel framed buildings built between 1960-1994	249
<i>J. O. Malley and R. Pekelnicky</i>	

Cyclic behavior of composite connections in composite floor diaphragms	265
<i>N. E. Briggs, R. B. Bond, M. Madhavan, D. A. Padilla-Llano, K. K. Coleman, C. Hug, B. W. Schafer, M. R. Eatherton, W. S. Easterling and J. F. Hajjar</i>	

Seismic design of friction-sliding brace connections	275
<i>L. Tirca, D. Millichamp and Y. Wang</i>	

The role of slab continuity in the behaviour of composite-steel beam-to-column connections under cyclic loading	285
<i>H. El Jisr, A. Elkady and D. G. Lignos</i>	

Analytical and experimental investigation of steel seismic collector connections	295
<i>R. B. Fleischman, R. Sause, J. M. Ricles, C-M Uang, J. Moya, G. Dongzhi, C-H Li, J. Duke</i>	

Monotonic and cyclic behaviour of the beam-to-column joints of the “FUTURE” mockup	305
<i>R. Landolfo, M. D’Aniello and R. Tartaglia</i>	

Performance under cyclic loading of double built-up t (DBT) moment connections ..	315
<i>R. Herrera, C. Salas and E. Nuñez</i>	

Additive manufacture and fabrication traceability in steel connections

Automated minimum cost design of steel connections	327
<i>K. Mela, M. Garifullin and L. Hietaharju</i>	

Industry 4.0 technologies for connection design	337
<i>T. Tankova</i>	<i>Available soon</i>

Cross-platform integration for realizing efficient steel connections	347
<i>P. Biswas, G. Petrov, S. Wilson, J. Carrion and J. Wang</i>	

Modal FEM substructure analysis and machine learning to characterize steel joints with beams of unequal depths	357
<i>E. Bayo, J. Garcia, M. López and A. Loureiro</i>	

Robustness and accidental actions

The response of steel friction connections under different deformation rates 369
A. F. Santos, A. Santiago, M. Latour and G. Rizzano

Influence of connection properties on the robustness of steel storage racks
under forklift truck impact 379
D. Dubina, F. Dinu and I. Marginean

Fillet welds subjected to impulsive loading 391
E. L. Grimsmo, A. H. Clausen, A. Aalberg and M. Langseth

Design of simple shear connections for fire – linking research and codes 399
E. C. Fischer, R. Chicchi and L. Choe

Fire behaviour of concealed connections for steel gravity frame construction 409
R. Gilsanz, E. C. Fischer, D. Gleave, A. Dolan and S. Ropert

Tubular and welded joints

Numerical assessment of SHS T-joints subjected to chord axial loads 421
T. P. Correia, L. R. O. de Lima, M.C. Rodrigues, P. C. G. S. Vellasco and A. T. da Silva

Numerical study of laterally offset RHS X-connections in branch compression 431
X. D. Bu and J. A. Packer

Wrapped FRP joints for circular hollow sections 441
M. Pavlovic and M. Veljkovic

Hybrid connections in jacket structures of offshore wind turbines 451
M. Albiez, J. Damm and T. Ummenhofer

Theoretical and experimental analysis about the stiffness of 3D cut welded
connections with circular hollow columns and through I-beams 463
S. Di Benedetto, M. Latour and G. Rizzano

Modelling of plug-and-play joints between RHS columns and CFS trusses 473
L. S. da Silva *Available soon*

Three-dimensional macro-modeling of beam-to-rectangular hollow section
column joints by extending component-based approach 483
Y. Harada and L. S. da Silva

Extending experimental testing of transverse plate to RHS connections 493
M. L. Ammons, J. P. McCormick

An approach to estimate the crack driving force from the load-deformation curves
for surface cracked CHS joints503

X. Qian

Design of welded joints between tubular members and webstiffened H section
chord members.....513

B. Aasen