

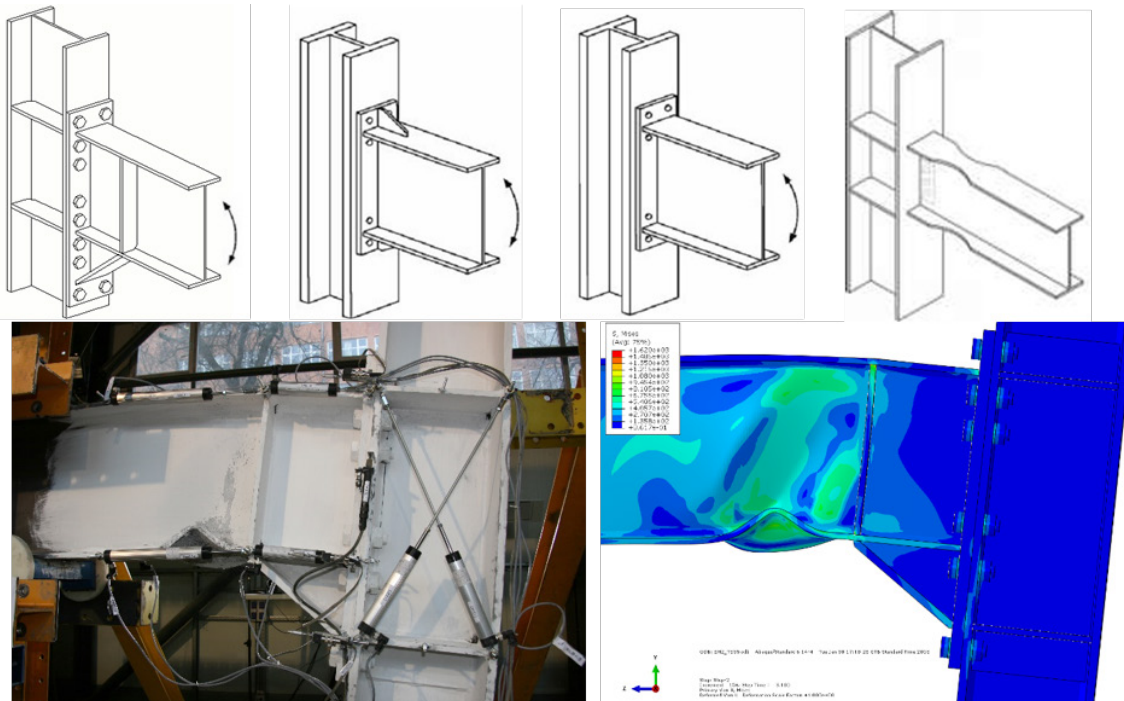
VALORISATION OF KNOWLEDGE FOR EUROPEAN PRE-QUALIFIED STEEL JOINTS

Goal of the project

The project aimed at valorization and extension of the seismic prequalification criteria of a set of steel beam-to-column joints by dissemination to a wide of academic institutions, engineers and architects, construction companies, and steel producers by producing informative documents, design guidelines and organizing seminars and workshops.

Short description of the project

The project developed design guidelines for seismically prequalified steel moment resisting beam-to-column.



Implementation period

01.07.2017 – 30.06.2019

Project implemented by

UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II (UNINA)
- coordinator
ARCELORMITTAL BELVAL & DIFFERDANGE SA (AMBD)
UNIVERSITE DE LIEGE (ULG)
POLITEHNICA UNIVERSITY TIMIȘOARA (UPT)
UNIVERSIDADE DE COIMBRA (UC)
EUROPEAN CONVENTION FOR CONSTRUCTIONAL STEELWORK (ECCS)
UNIVERSITA DEGLI STUDI DI SALERNO (UNISA)
IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE
(Imperial)

Centre Technique Industriel de la Construction Metallique (CTICM)
NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA)
CESKE VYSOKÉ UCENI TECHNICKÉ V PRAZE (CVUT)
TECHNISCHE UNIVERSITEIT DELFT (TU Delft)
UNIVERZA V LJUBLJANI (UL)
UNIVERSITET PO ARCHITEKTURA STROITELSTVO I GEODEZIJA (UASG)
UNIVERSITAT POLITECNICA DE CATALUNYA (UPC)
RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
(RWTH AACHEN)

Main activities

- Development of informative documents for the 4 beam-to-column joints qualified within the EQUALJOINTS project and translation of these documents from English to 11 additional languages
- Development of recommendations and criteria to be used in setting up limits of applicability between EN 1993:1-8 and EN 1998-1. A set of requirements within EN 1090-2 were defined. The documents were drafted as pre-normative design recommendation in English which were translated 11 additional languages
- Development of guidelines for design and analysis of seismic resistant steel structures accounting for the behaviour of beam-to-column joints. In addition, examples for different structural systems were presented which show the influence of different joint typologies.
- Enhancement of the EQUALJOINTS Matlab software for analytical prediction of the cyclic response of joints, allowing an easy application by users in practice. Moreover, an EQUALJOINTS-app for mobile phone was developed.
- Preparation of the material that was disseminated in English and translation in the mother tongue of the places where seminars/workshop were taken.
- Organization of 14 workshops and seminars where the pre-normative design guidelines were disseminated. In addition, the materials are available in printed forms and downloadable from the project website.

Results

The prequalification criteria for the 4 typologies of steel moment resisting beam-to-column joints from the EQUALJOINTS project (3 bolted connections and 1 reduced beam section – dog-bone) are being considered for the implementation in the next version of the European seismic design code. Informative documents and pre-normative design recommendations were developed, published and distributed during the project workshops, and downloadable from the project website (<https://www.steelconstruct.com/eu-projects/equaljoints/>).

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Research Centre

The Research Centre for Mechanics of Materials and Structural Safety – CEMSIG



Applicability and transferability of the results

- Use of the new versions of design codes with simplified procedures for designing steel moment resisting beam-to-column joints.
- The rotational capacity and ductility demand of the joints required by the current codes are assured using the prequalification seismic design criteria.
- Increased structural safety against the seismic hazard in large parts of Europe.
- Improvement in life cycle costs and sustainability due to the reduction of losses caused by seismic hazards.

Research Team

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