

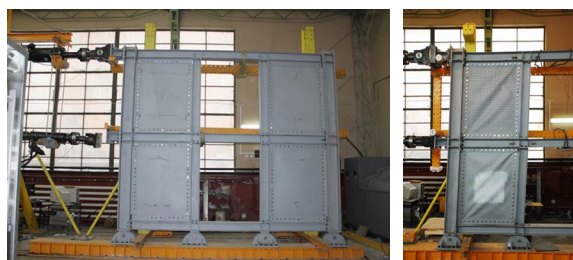
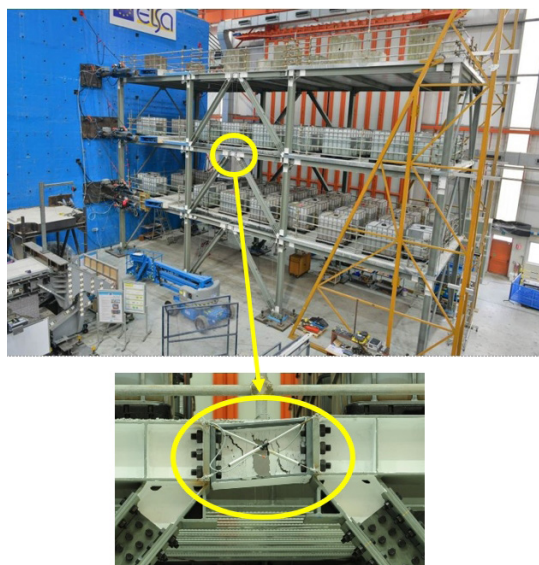
VALORIZATION OF INNOVATIVE ANTI-SEISMIC DEVICES (INNOSEIS)

Goal of the project

As a result of three RFCS-, one EU- and two nationally funded research projects, 12 innovative replaceable steel-based devices have been developed that improve the response of structures during earthquakes by enhancing their energy dissipation capacity. This project aims at transferring the relevant knowledge from research to practice by the production of several documents and the organization of seminars and workshops.

Short description of the project

UPT is responsible for valorization of removable bolted links and replaceable shear panels concepts.



Project implemented by

NATIONAL TECHNICAL UNIVERSITY OF ATHENS – NTUA, Institute of Steel Structures

Implementation period

01.07.2016 – 31.12.2017

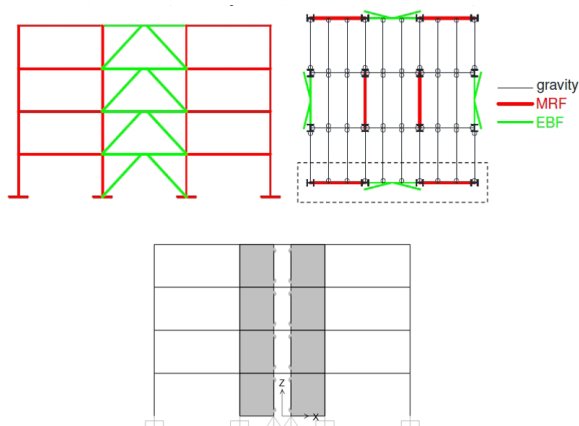
Main activities

The work to be carried out will be subdivided in 6 work packages.

- WP 1 will collect and critically review all material available for the anticipated devices. Information brochures will be produced separately for each innovative device and then put together to form a single volume.
- WP 2 will produce a document that defines a methodology for reliably quantifying values of the behavior factors q for use in seismic design.
- WP 3 will clarify which devices must be qualified in accordance with EN 15129 for anti-seismic devices.
- WP 4 will deal with detailed case studies of buildings in which the innovative devices are employed.
- WP 5 is devoted to seminars, workshops and other dissemination actions.
- WP 6 is the work package for management of the project.

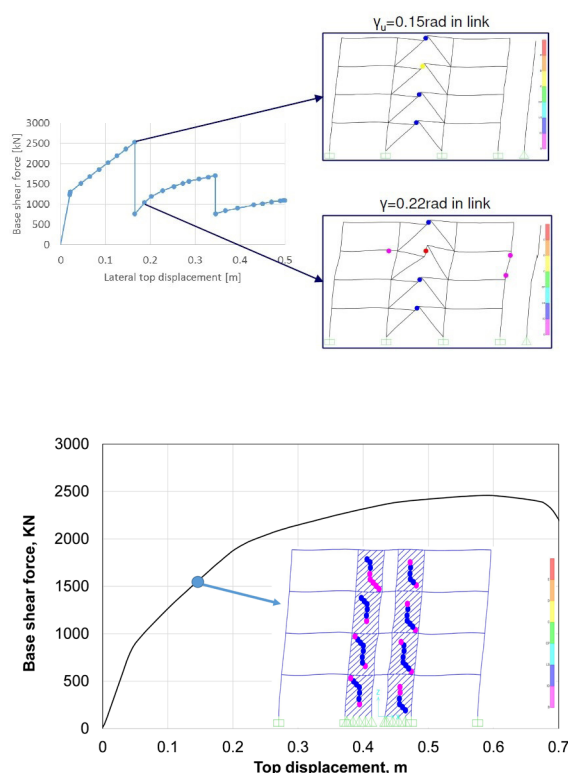
Results

4 stories buildings, in which replaceable bolted links and replaceable shear panels are employed, were designed (spectral analysis) by UPT, in two different design cases: moderate seismicity case ($a_g=0.15g$) considering Medium Ductility Class and high seismicity case ($a_g=0.30g$) considering High Ductility Class.



Additional to Eurocode current design, the structures were conceived as dual structures with re-centering capacity. The EBF building has very short removable links with connection kept elastic. The SPSW has two thin steel plates and stanchions as vertical boundary element in the interior span.

In order to verify the re-centering capability and to assess the seismic performance and feasibility of these structures, static nonlinear (pushover) analyses were performed.



Financed through/by

Research Fund for Coal and Steel, grant agreement RFCS-02-2015 number 709434

Applicability and transferability of the results

- Promotion of innovation in the design of buildings in seismic areas
- Enhancement of structural safety against the governing natural hazard in large parts of Europe.
- Improvement in life cycle costs and sustainability due to the reduction of seismic losses.
- Contribution to the increase in market share for steel, especially in areas of moderate to high seismicity where steel is underrepresented.
- Provision of more alternatives for architectural and structural design of new and existing buildings by increasing the number of code-approved structural systems for steel and composite structures.

Research Centre

The Research Centre for Mechanics of Materials and Structural Safety – CEMSIG, Politehnica University of Timisoara.

Research Team

- UNIVERSITATEA POLITEHNICA TIMISOARA (UPT)
- POLITECNICO DI MILANO (POLIMI)
- UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II. (UNINA)
- UNIVERSITA DI PISA (UNIP)
- RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN (RWTH)
- ISTITUTO SUPERIOR TECNICO (IST)
- UNIVERSITET PO ARCHITEKTURA STROITELSTVO I GEODEZIJA (UACEG)
- UNIVERSITEIT HASSELT (UHasselt)
- MAURER SOHNE ENGINEERING GmbH & CO KG (MSE)
- CONVENTION EUROPEENNE DE LA CONSTRUCTION METALLIQUE ASBL (ECCS)

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