

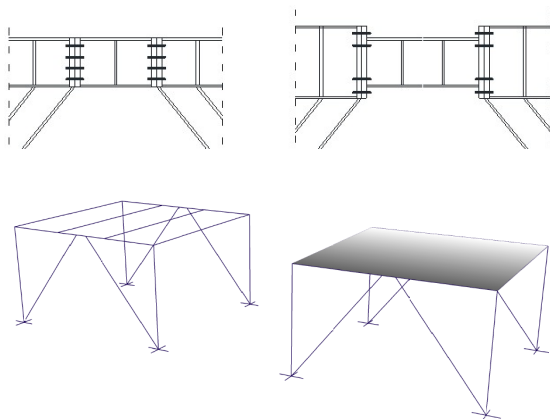
ADVANCING RE-CENTRING ECCENTRICALLY BRACED FRAMES: NEW LINK TYPOLOGIES AND INFLUENCE OF REINFORCED CONCRETE SLAB (ARNIS)

Goal of the project

To reduce the costs and downtime of a structure hit by an earthquake, removable links and re-centering capacity concepts may be implemented in a dual eccentrically braced structure. The project aims at extending the validation of re-centering capability and link replacement feasibility on extended end-plate typologies and also investigate more detailed the global and local influence of three-dimensional reinforced concrete slab panels, as well as reinforced concrete slab repair.

Short description of the project

It studies the re-centering capability using new link typologies and the concrete slab influence.



Project implemented by

Politehnica University Timișoara (UPT) – Civil Engineering Faculty – Steel Structures and Structural Mechanics Department

Implementation period

10.10.2018 – 09.10.2020

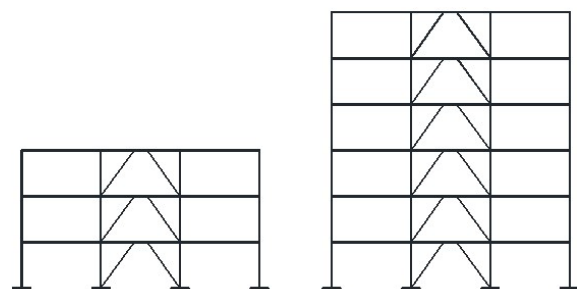
Main activities

- Designing prototype structures with two height levels: medium rise (P+2E) and higher rise (P+5E), with differently connected links (flush/extended end-plate), extending the bolted links removal procedure and re-centering capability – done in 2018;

- Experimentally testing isolated links assemblies in two solutions: flush end-plate bolted link and extended end-plate bolted link, at natural scale (1:1), both of them with and without concrete slab above the link (8 tests) – proposed for 2019;
- Experimentally testing a 3D portal frame, with/without concrete, with damaged/repared slab (4 tests) – proposed for 2020;
- Calibrating numerical models post-test – proposed for 2019 and 2020;
- Seismic performance and behavior factors numerical assessment – proposed for 2020.

Results

In 2018 – prototype structures design, re-centering capability validation and link removal procedure description.



Proposed for 2019 and 2020:

- Design of experimental specimens;
 - Material behavior curves;
 - Links experimental results – describe local behavior;
 - Frames experimental results – describe global behavior;
 - Calibrated numerical models for links;
 - Values of behavior factors for structures.
- Obtained results will be presented in project deliverables and scientific papers at international conferences/journals.

Applicability and transferability of the results

Increase the application potential of the system both at national and international levels: by improved connections (larger behavior factor obtained), improved knowledge on the effect of reinforced concrete slab and repair of the slab.

Solutions providing self-centering of the structure are technically demanded and require specialized knowledge, careful maintenance and high initial cost. Alternatively, a conventional design can be employed, but with the dissipative members realized to be removable allowing their replacement when damaged and reducing the repair costs.

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Research centre

Research Centre for Mechanics of Materials and Structural Safety - CEMSIG

Research team

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