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INNOVATIVE SYSTEMS FOR EARTHQUAKE RESISTANT MASONRY ENCLOSURES IN RC BUILDINGS

SME

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Timisoara, Romania

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 606229



Directions of research

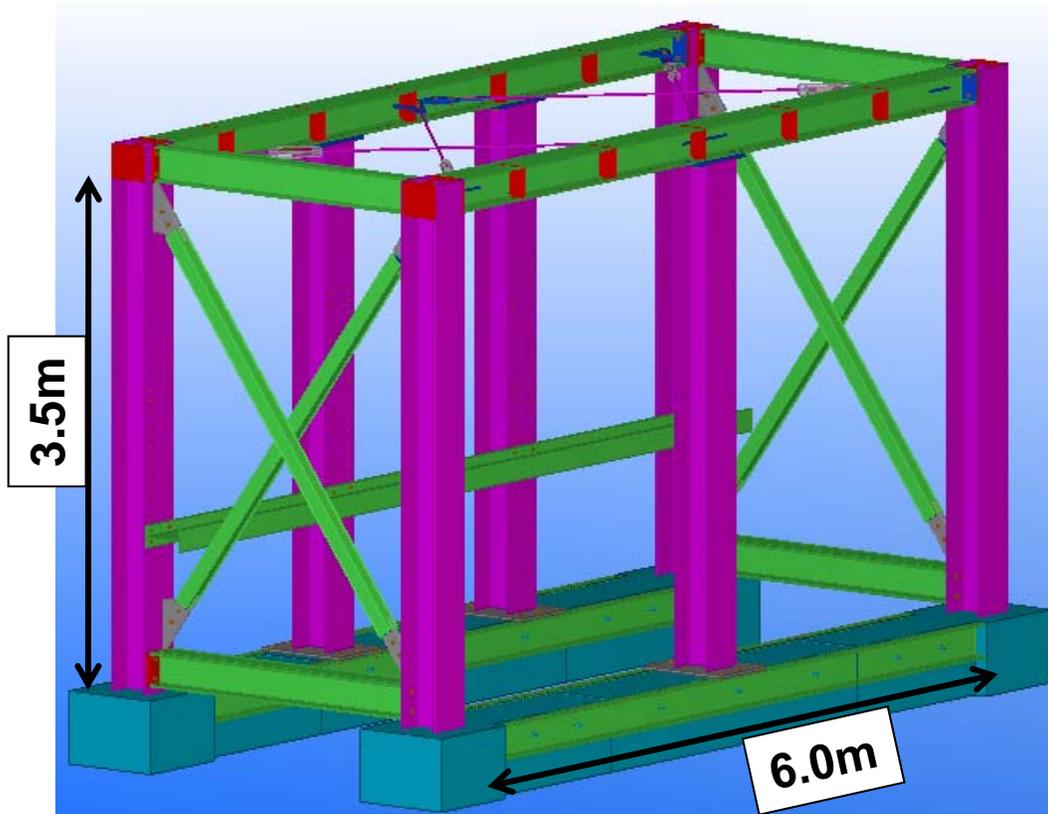
Team members: Dr. Eng. Marius MOSOARCA, PhD Student Cristian PETRUS, Prof. Valeriu STOIAN, Dr. Eng. Anthimos ANASTASIADIS



- A PhD thesis will mainly focused on the out-of-plane behaviour of the infill walls will be developed. In this direction several experimental tests will be carried out;
- A second goal will be the investigation of retrofitting methods on the damaged walls under consideration;
- An experimental stand is constructed that will aid HI STRUCT to achieve their goals in this aspect;
- Based on the experimental and analytical results, design recommendations and guidelines for practitioners will be proposed;
- Results of this study will be provided to the INSYSME Technical Committee;

Experimental stand

•HI STRUCT obtained a sponsorship from SBR Soletanche Bachy SRL for an experimental stand developed for out-of-plane testing of masonry infill panels.



- Full scale testing of masonry panels subjected to out-of-plane loads;
- Movable columns allow various configuration of panels to be tested;

Clear height of infill panel: 3.50m
Variable length: 1.00 - 6.00m

Experimental stand



Materials:

- Wienerberger Porotherm PTH25 ceramic blocks with vertical perforations;
- Baunit M5 predosed mortar – horizontal joints and vertical mortar pockets;

Infill panel

The ceramic blocks were installed as per producer requirements.

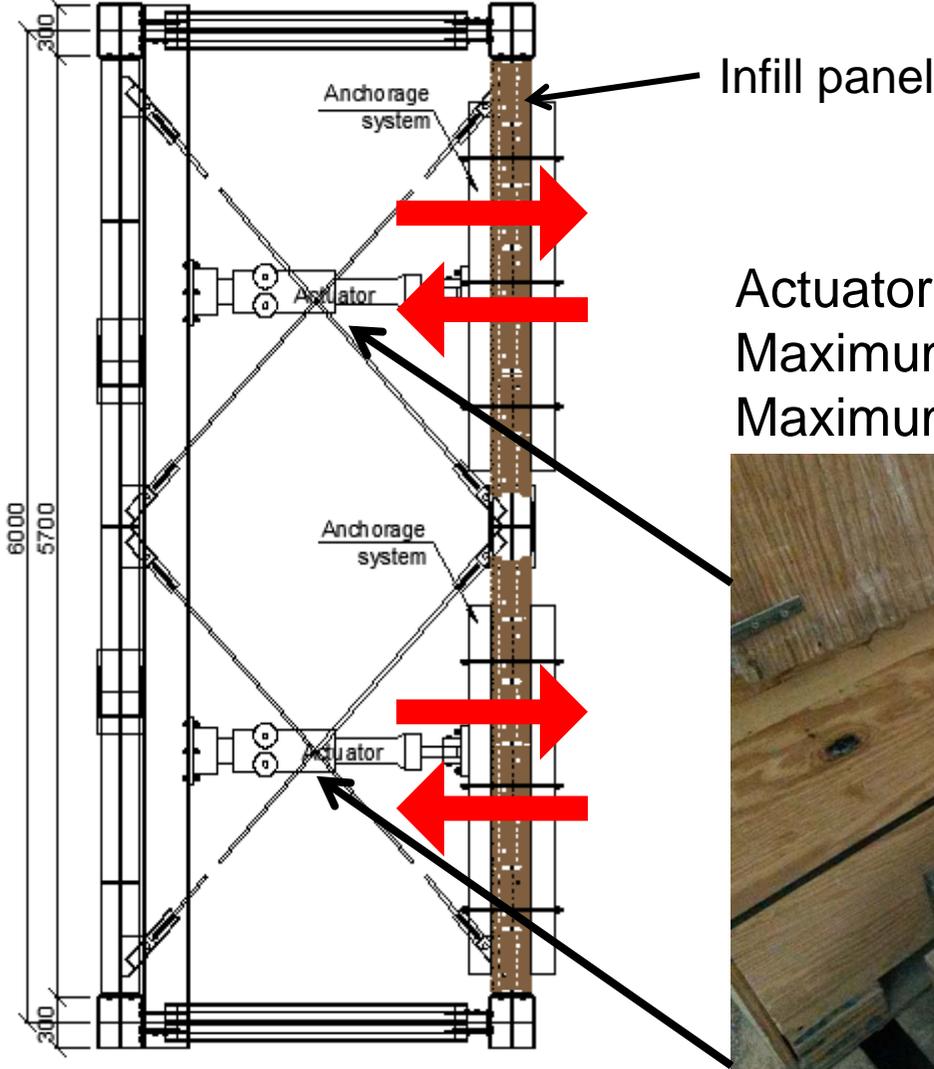


Infill panel

Progress of the infill panel.



Testing procedure

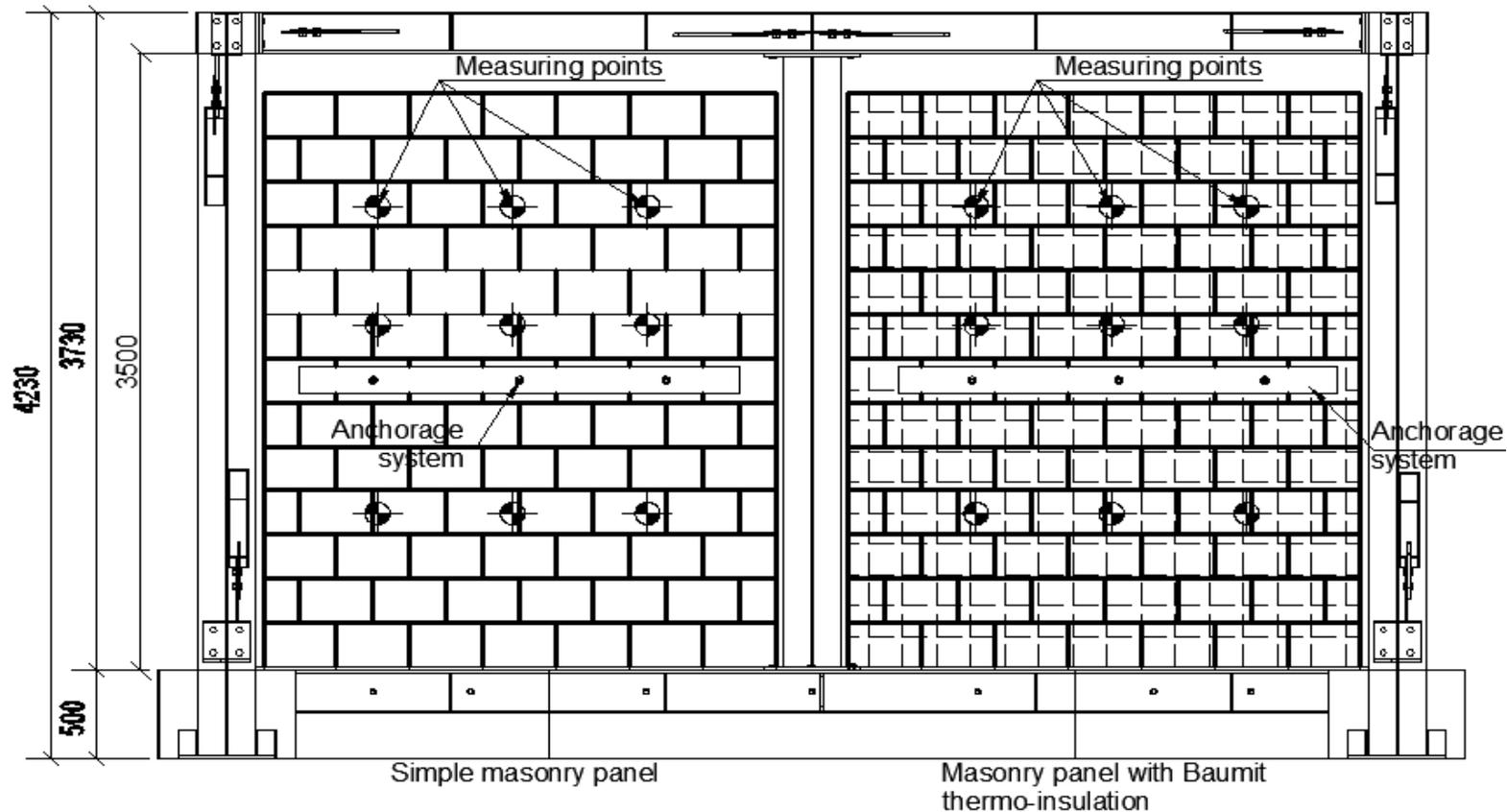


Actuator:
Maximum static compression capacity: 160 kN
Maximum static tension capacity: 100 kN



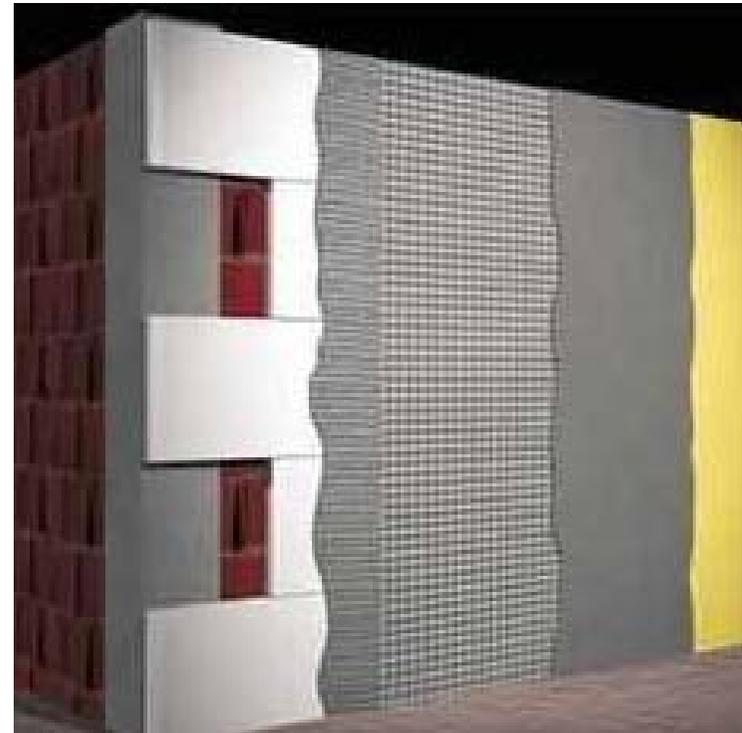
Testing procedure

- Monitoring the out-of-plane
- One infill panel will be simple;
- The other panel will have a thermal insulation system developed by BAUMIT.



Systems for new buildings

- In case of buildings with thermal insulation, the presence of the polystyrene and glass fiber mesh can have an influence on the out-of-plane behaviour of infill panels;
- The effect of 10-20cm polystyrene with various types of glass fiber meshes will be studied;
- The presence of polystyrene simulates real-life practice in case of passive houses.

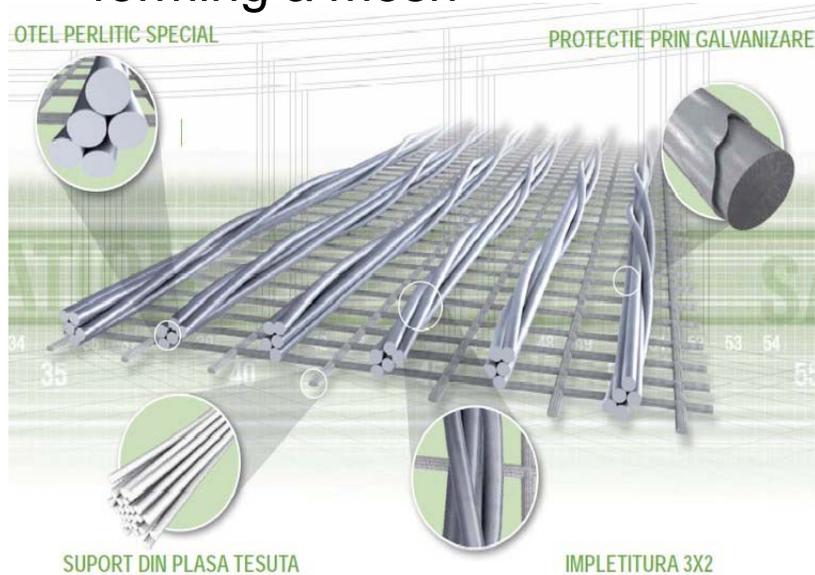


Consolidation solutions for damaged buildings



Using the Kerakoll technology, some consolidation measures for the infill panel can be implemented.

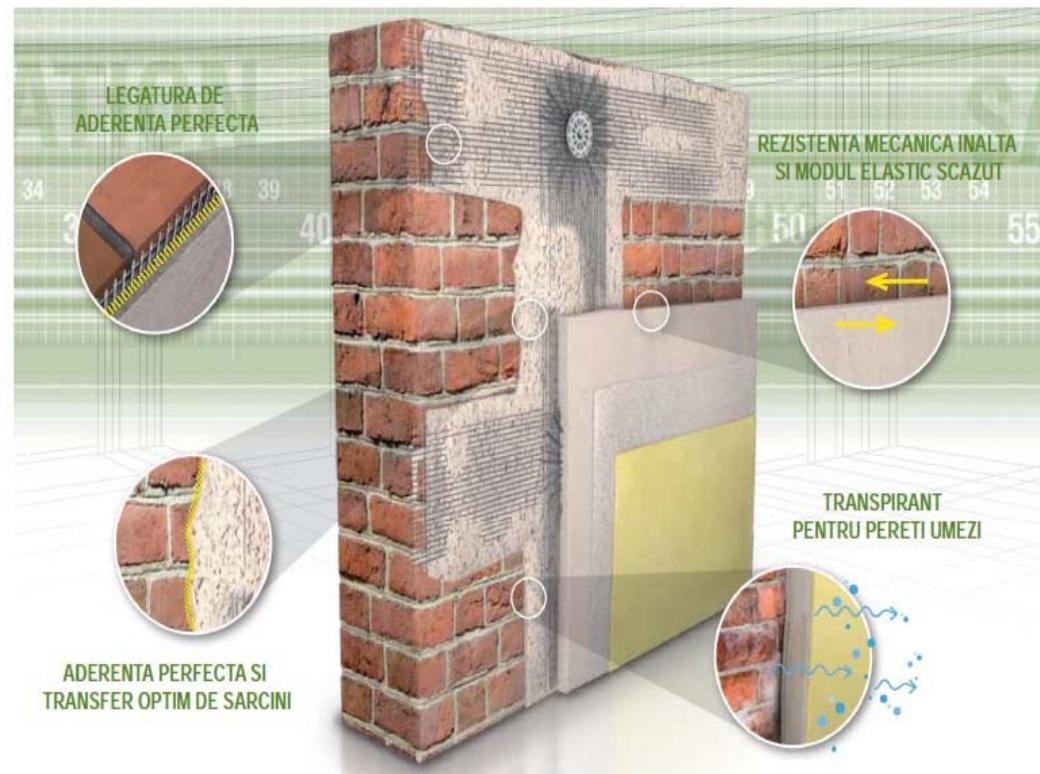
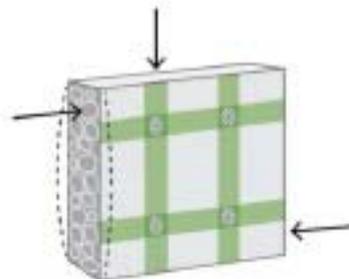
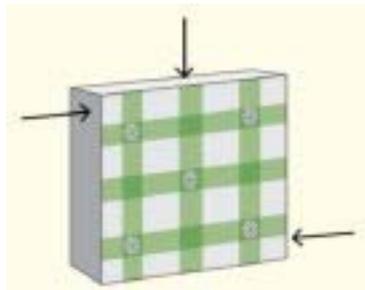
- GeoSteel Grid – using special weaved galvanized steel, forming a mesh



Consolidation solutions

Using GeoSteel Grid:

- good bond;
- high mechanical resistance and low modulus of elasticity;
- optimum transfer of loads;

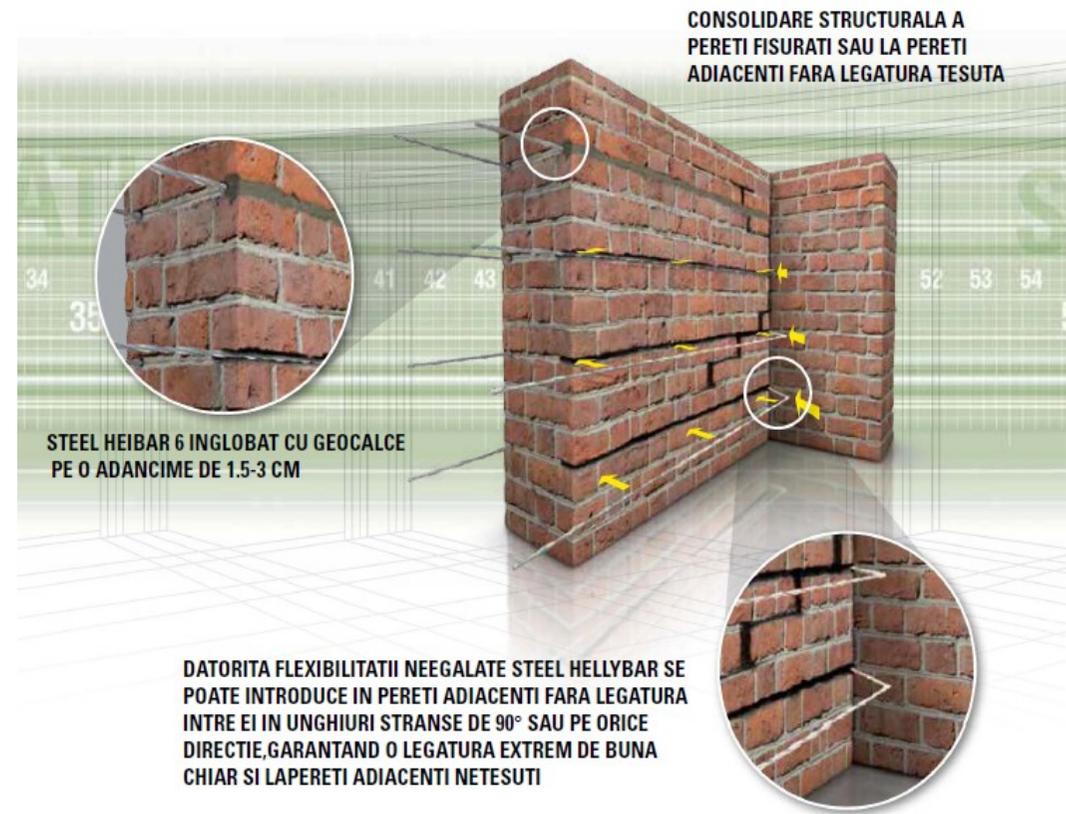
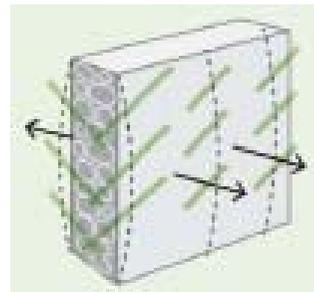
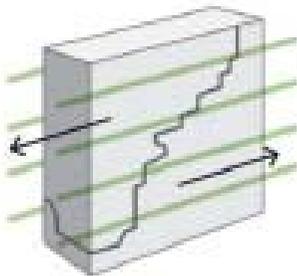


Consolidation solutions

- Helifix – helix fixing bars mounted in the horizontal joints or used to tie masonry blocks

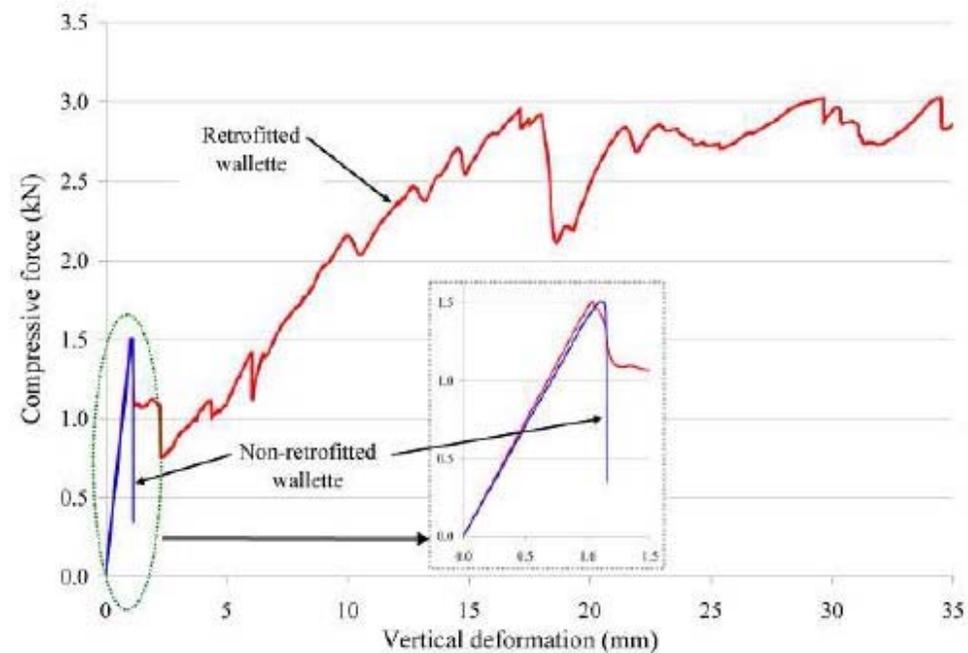
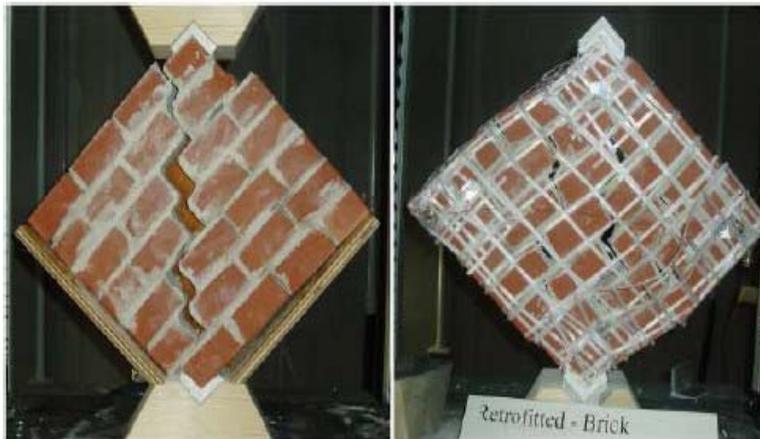


- Helifix bars:
 - structural consolidation of cracked walls;
 - capable to ensure good collaboration between adjacent walls



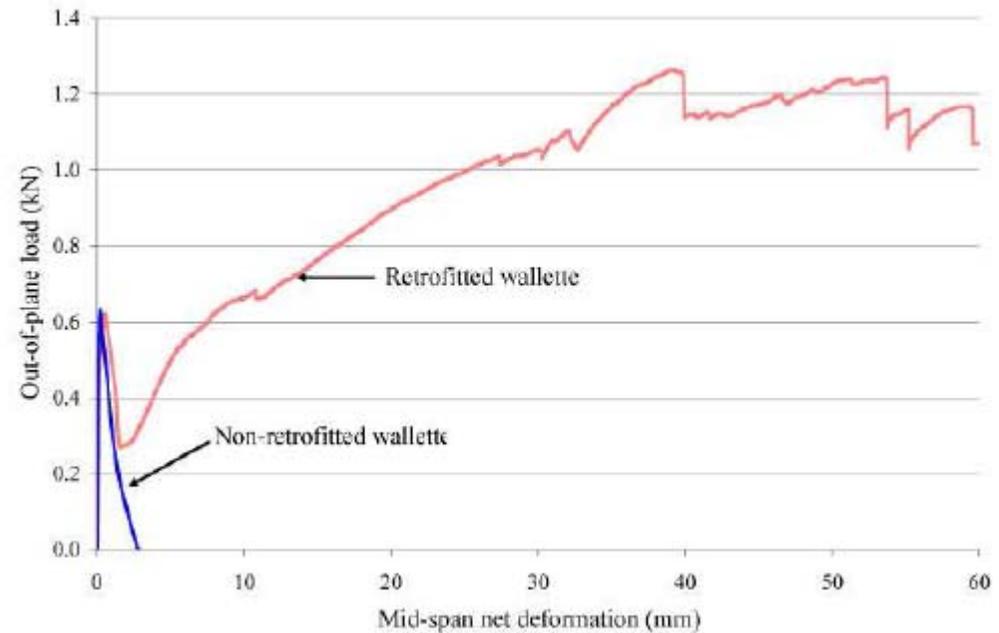
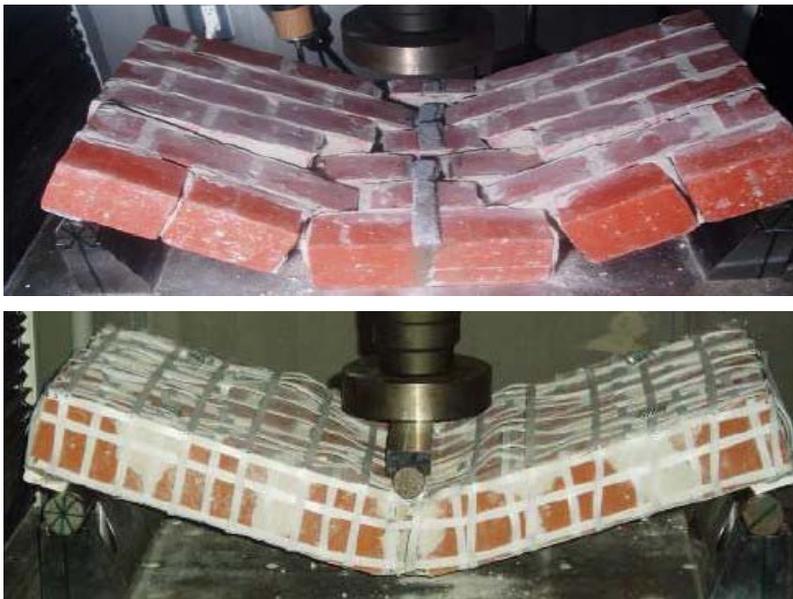
Improvement of infill panel behaviour

- Placement of various materials over the masonry infill panel can improve its out-of-plane behaviour;
- Polypropylene band mesh can be a viable and cheap solution in order to improve the behaviour of infills.



Improvement of infill panel behaviour

- This can be used as a solution in order to retrofit existing walls or improve the behaviour of new ones, in terms of out-of-plane displacement;





Thank you!

