11.09.2019

Short Report

Subject: *Preparation of a grant application for a joint future research project in the scope of H2020-MSCA-IF-2019 (Marie Skolowska-Curie Fellowships) during the research stay at KIT from 01.July to 31. July 2019 under* ***Re-Invitation Grant for Research Alumni of KIT****.*

Objective: *Personal discussion and a closely cooperation with Prof. Dr. Lothar Stempniewski together to revise and improve the research project (proposal number 840202) submitted for MSCA IF-H2020 in 2018 for re-application on 11 September 2019. The project entitled as "****An Innovative Textile Earthquake Protection System for a Sustainable Rehabilitation of Masonry Buildings Including CO2 Reduction****".*

Abstract:
A major part of the masonry structures is at risk for possible future strong earthquakes due to insufficiency of the ductility, stability and low tensile stress capacity of their load bearing members, such as traditional brickwork structures in Anatolia, Balkan, and Southern European cities in seismic zone, most of which are integral part of the cultural heritage. The vulnerability of those can be decreased considerably by employing an efficient retrofitting method within the sustainable and resilience structural design goals. The proposed retrofitting consists of multi-axial hybrid fabric made of alkali-resistant glass-polypropylene fibers for increasing earthquake performance as well as plaster mortar obtained from recycling waste glass for improving insulating properties of the masonry buildings. The innovative aspect of this plaster mortar due to its mixture content is that the seismic performance, thermal insulation, acoustic isolation, waterproofing and the fire resistance is considerably high amongst the other used mortars.

The seismic deformation capacity of the hybrid fiber mesh developed by Karlsruhe Institute of Technology will be extensively investigated for the first time on pumice block walls with a lightweight mortar improved by Sakarya University, which is based on a mixture of expanded glass granules with a special resin. An overview of the proposed joint project is illustrated in Fig 1.

For this purpose, both the experimental and numerical tests in this research focus on the determining of the adhesion quality to the wall surface of the plaster mortar as well as to the fiber textile. It is expected to develop an anti-seismic textile grid combined with eco-friendly high-performance insulating plaster that can be implemented easily without any further engineering service on masonry members. This composite material will provide the best overall structural performance all in one application at an affordable cost for safe and sustainable living against severe earthquakes and lifetime unfavorable environmental effects.

This project will provide opportunity for collaboration of Karlsruhe Institute of Technology (KIT) and Sakarya University (SAU) to find innovative retrofitting solutions for earthquake-resistant and energy-efficient buildings in the context of long term resilience goals by transferring their know-how in the field of the earthquake engineering.

Event Schedule:
Meetings with Prof. Dr. Stempniewki at the institute of Reinforced Concrete Structures and Building Materials (IMB) at least twice a week,


Photo 1 *Working in the Office*

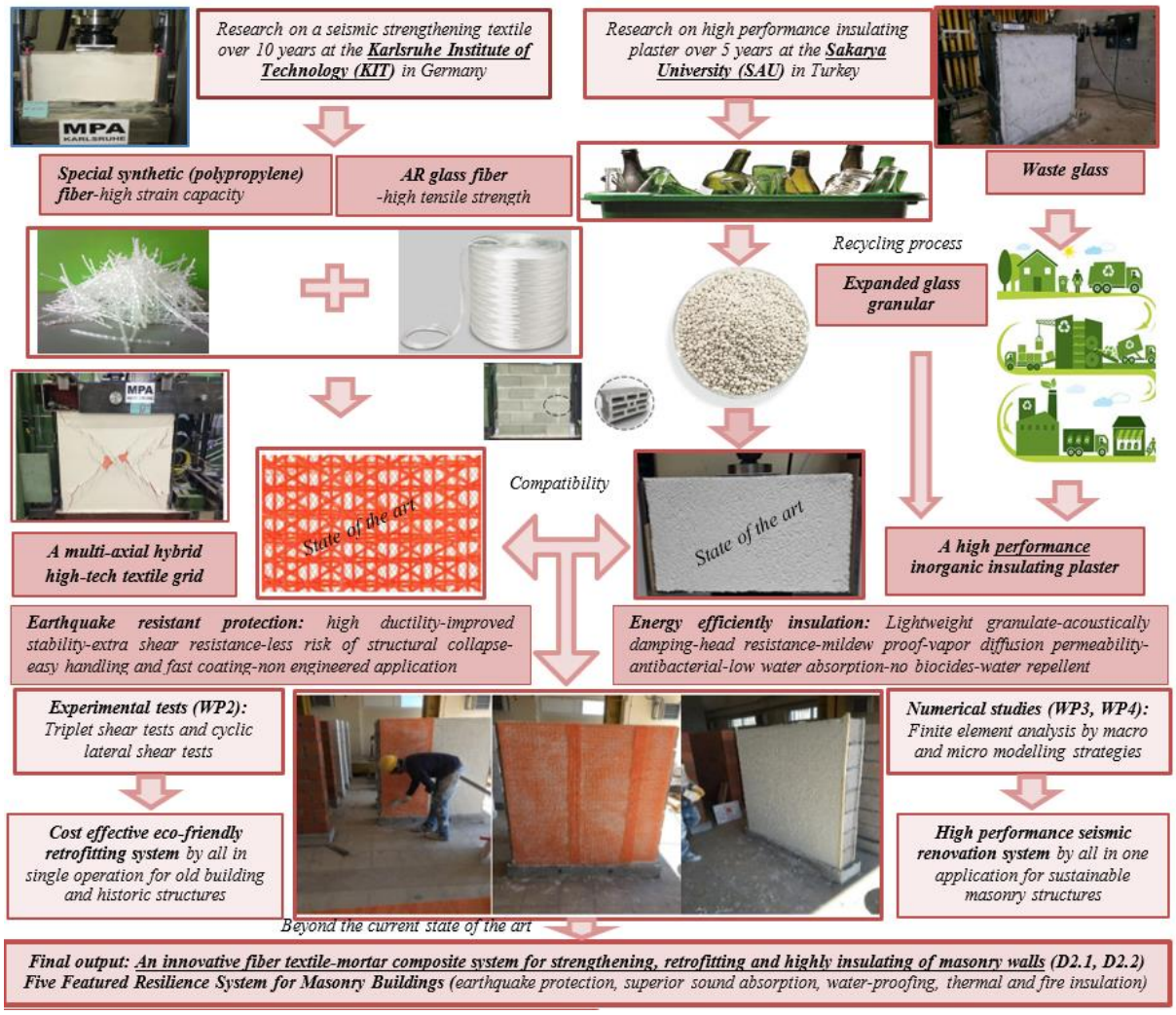

Figure 1 *Overview of the proposed joint project: An innovative rehabilitation system for masonry buildings including CO_2 reduction*

End Result:

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