Durability of FRPU Composite Components in Aspect of Timber Connections Strengthening – Mezeroe Project

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Abstract:

Timber structures manifest their drawbacks in connectors' zones when subjected to large deformations [1]. Loosing of strength and tightness are the most significant in envelopes of nearly zero energy buildings. Fiber Reinforced PolyUrethanes (FRPU) have been manifested their high efficiency in bonding and strengthening of structural elements for last years, assuring simultaneous transfer of high loads and high deformations, and also tightness [2]. They can be used in structural and non structural bonding of various structural materials. FRPU system is dedicated for quick repair interventions or strengthening as it uses high strength fibers and flexible polyurethane matrix for externally bonded composites [3]. Special polyurethanes using in FRPU can work safely under various loads (strong winds, earthquakes) and manifest stable properties in elevated temperatures [4]. They are dedicated to bonding of CLT panels, where they can replace steel connectors, providing thermal and humid problems and pure resistance to cyclic loads. Many research and in situ applications confirmed they innovative and unique characteristics in civil engineering. FRPU is considered in this paper as a testing product in frame of a MEZeroE project (MEZeroE - measuring envelope products and systems contributing to the next generation of healthy nearly-zero-energy buildings) funded by European Commission in Horizon 2020 program [5]. FRPU was tested at Cracow University of Technology in a Pilot Measurement and Validation Line (PM&VL), dedicated for evaluation of composites durability when subjected to ageing factors. Sun radiation and salt ageing influence on FRPU features is presented in this paper.

Keywords:

timber structural connectors, large deformations, FRPU composite strengthening, durability tests, sun radiation, salt solution.