



ACCELERATED TESTING OF THE DURABILITY OF FRP BARS - BOND BEHAVIOR AND MECHANICAL PROPERTIES

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Abstract: Fibre Reinforced Polymer (FRP) bars became viable alternative to the traditional steel as internal reinforcement of concrete elements especially when corrosion resistance and low self-weight is of high importance. FRP bars show good mechanical properties as well as adequate interaction with concrete during short term testing. However, lack of data for long term behavior can be observed. It is important to experimentally demonstrate that the FRP bars are able to adequately transfer the stresses into the concrete and vice versa over the full design lifetime of the structure, as well as to keep their mechanical properties and integrity. An experimental program was designed to investigate the time dependent behavior of FRP bars, as well as the bond between the FRP bars and concrete when subjected to different environmental conditions. Applied accelerated environmental conditions are: freeze-thaw cycles in air (FT-A) and immersed in saline solution (FT-W), positive temperature (PT) and wet-dry (WD) cycles. Length of conditioning consisted of 50, 100, 200 and 365 days. Glass (GFRP) and basalt (BFRP) bars were used. Results show that FT-W conditioning has the most severe effects. Furthermore, the length of conditioning also affects the mechanical and bond properties. For interpretation of the results SEM analysis, as well as failed surface analysis was performed. Results along with discussion on the effect of different parameters are presented in this paper

Keywords: BFRP bars, GFRP bars, Concrete, Bond, Pull-out test, Accelerated testing