



A. Coricciati, P.A. Corvaglia, A. Largo, G. Fardin

Development and Testing of Uni-Directional Sensor-Embedded Reinforcing Textiles for Masonry Applications

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This paper deals with the development and testing of uni-directional sensor-embedded reinforcing textiles for masonry applications. Optical fiber sensors were utilized, both of distributed (POF OTDR) and point (FBG) type. The weaving process was properly adapted in order to allow the incorporation of the POF sensor or of a tube for successive FBG sensor insertion and protection. Preliminary tests were then carried out in order to select the proper geometry and materials for the tube, aiming at an easy subsequent insertion of the FBG sensor. The sensorised textile, conceived for strip-like application, was then combined with epoxy resin in order to obtain a reinforcing composite material; this was tested in tension in order to evaluate the reduction in mechanical properties due to sensor embedding and to verify the transfer function of the embedded sensor. The strain measuring behavior of the sensorised textile was then checked by applying it on the tension side of masonry beams loaded in flexure and comparing the data measured by the optical sensors with the ones obtained by reference strain gages. The validation in dynamic conditions is a further step of the work. The development of these sensor embedded textiles is the result of the EU funded project "Polyfunctional Technical Textiles Against Natural Hazards" (www.polytect.net).

Ключевые слова:

Содержание.

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