Realization and Testing of Textile Reinforced Concrete Panels Sensorized with Distributed Fiber Optic Sensors

International Workshop on Civil Structural Health Monitoring

CSHM 2021: Civil Structural Health Monitoring pp 747-759 | Cite as

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Conference paper
First Online: 25 August 2021

Part of the Lecture Notes in Civil Engineering book series (LNCE, volume 156)

Abstract

The paper presents the realization and testing of Textile Reinforced Concrete (TRC) panels sensorized with distributed Fiber Optic Sensors (FOS). Proper procedures for fastening the sensor to the textile before its insertion as panel reinforcement, as well as for protecting the sensor during and after concrete casting were investigated. Two samples were then realized, one reinforced with traditional steel mesh, one reinforced with sensorized textile mesh. FOS and reference electrical strain gages were applied to both. The panels were tested in flexure up to failure, in order to investigate the effect of mesh substitution and of strain monitoring by means of the embedded distributed FOS, interrogated with Brillouin technique with enhanced spatial resolution. The paper discusses the samples preparation and the test results, which confirm the feasibility of the proposed set-up, though evidencing the need of few enhancements to the sensor embedding technique.

Keywords

Textile reinforced concrete (TRC) Fiber optic sensors (FOS) Strain Monitoring Brillouin

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Cite this paper as:

Corvaglia P., Lirza E., Brancato M., Nucci M., Lanticq V. (2021) Realization and Testing of Textile Reinforced Concrete Panels Sensorized with Distributed Fiber Optic Sensors. In: Rainieri C., Fabbrocino G., Caterino N., Ceroni F., Notarangelo M.A. (eds) Civil Structural Health Monitoring. CSHM 2021. Lecture Notes in Civil Engineering, vol 156. Springer, Cham. https://doi.org/10.1007/978-3-030-74258-4_47

- First Online 25 August 2021
- DOI https://doi.org/10.1007/978-3-030-74258-4_47
- Publisher Name Springer, Cham
- Print ISBN 978-3-030-74257-7
- Online ISBN 978-3-030-74258-4
- eBook Packages Engineering Engineering (R0)

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