Automatically Produced (Pultruded) FRC Profiles with Embedded Fibre-Optic Strain Sensors for Loadbearing Structures

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Abstract

New very smart composite structures have often to be monitored to evaluate their load-bearing behaviour. Multifunctional girders or fibre-reinforced materials (FRC) are therefore equipped with embedded optical sensor fibres. These composite materials are used as structural members for bridges or in different industrial applications. In the presented case, fibre Bragg grating sensors (FBG) were embedded into composite profiles during the production process. The poster describes the embedment process and investigation of the reliable sensor function. The most important part is to ensure the reliable strain transfer from the pultruded profile to the embedded sensor element (FBG sensor). Another important part of the development project concerned the coupling of the embedded fibres after production of the endlessly manufactured profile and cutting it into pieces. Micromechanical tests and analysis were carried out to evaluate the performance of the sensor. As a model, a test bridge war manufactured and the sensor function was tested.

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