

Development of Light-Weight Fibre-Based Materials for Building Envelopes

Authors : René Čechmánek, Vladan Prachař, Ludvík Lederer, Jiří Loskot

Abstract : Thin-walled elements with a matrix set on a base of high-valuable Portland cement with dispersed reinforcement from alkali-resistant glass fibres are used in a range of applications as claddings of buildings and infrastructure constructions as well as various architectural elements of residential buildings. Even if their elementary thickness and therefore total weight is quite low, architects and building companies demand on even further decreasing of the bulk density of these fibre-cement elements for the reason of loading elimination of connected superstructures and easier assembling in demand conditions. By the means of various kinds of light-weight aggregates it is possible to achieve light-weighting of thin-walled fibre-cement composite elements. From the range of possible fillers with different material properties granulated expanded glass worked the best. By the means of laboratory testing an effect of two fillers based on expanded glass on the fibre reinforced cement composite was verified. Practical applicability was tested in the production of commonly manufactured glass fibre reinforced concrete elements, such as channels for electrical cable deposition, products for urban equipment and especially various cladding elements. Even if these are not structural elements, it is necessary to evaluate also strength characteristics and resistance to environment for their durability in certain applications.

Keywords : fibre-cement composite, granulated expanded glass, light-weighting

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