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Effect of glass and carbon fibres on the compressive and flexural strength of the polymer concrete composite

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ABSTRACT

This article is focused on testing the mechanical properties of polymer concrete testing samples. After a thorough literature search, the basic conditions of the research were determined and under the standards, three types of samples of special new concrete mixtures were created as a building element for special CNC machines. The samples were subjected to the research of the influence of used fillers, binders and additives on their properties. Testing was carried out in a certified laboratory and included checking the dimensions of the test bodies, weighing on the calibrated weight, determining the volumetric weight, determining the maximum load of the testing samples using special devices and then determining the compressive strength, or flexural tensile strength according to the relevant formulas. The final part of the testing also examined the morphology and mapping of the chemical composition with a focus on carbon, oxygen and aluminum using an electron microscope. The obtained results clearly show an increase in tensile and compressive strength using dispersed carbon fibre reinforcement of approximately 4 MPa. The conclusion of the article provides an overall summary of the results obtained and a summary of the features.

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Izvirni znanstveni članek

Vpliv steklenih in ogljikovih vlaken na tlačno in upogibno trdnost polimerno-betonskega kompozita

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POVZETEK

Članek se osredotoča na preizkušanje mehanskih lastnosti vzorcev polimernega betona. Po pregledu literature so bili določeni osnovni okvirji raziskave. V skladu s standardi so bili ustvarjeni trije tipi vzorcev novih betonskih mešanic, primernih za gradbeni material za posebne CNC stroje. Raziskan je bil vpliv uporabljenih polnil, veziv in dodatkov na lastnosti vzorcev. Testiranje je bilo izvedeno v pooblaščenem laboratoriju in je vključevalo preverjanje dimenzij testnih vzorcev, tehtanje na kalibrirani tehtnici, določanje prostorninske teže, določanje največje obremenitve preizkusnih vzorcev s posebnimi napravami in določitev tlačne, upogibne ali natezne trdnosti v skladu z ustreznimi formulami. V zaključnem delu testiranja je bila s pomočjo elektronskega mikroskopa proučena tudi morfologija in izvedeno je bilo kartiranje kemične sestave vzorcev s poudarkom na ogljiku, kisiku in aluminiju. Pridobljeni rezultati jasno kažejo povečanje natezne in tlačne trdnosti pri vzorcih z razpršenimi ogljikovimi vlakni za približno 4 MPa. Zaključek članka vsebuje splošen povzetek rezultatov in povzetek značilnosti materialov.

PODATKI O ČLANKU

Ključne besede:
Betonski kompozit;
Polimerni beton;
Tlačna trdnost;
Upogibna trdnost;
Steklena vlakna;
Ogljikova vlakna

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