عنوان مقاله:

Experimental Study of Mechanical Properties of Slag Geopolymer Concrete under High Temperature, Used in Road Pavement

محل انتشار:

نشریه بین المللی مهندسی حمل و نقل, دوره 11, شماره 1 (سال: 1402)

تعداد صفحات اصل مقاله: 15

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خلاصه مقاله:

Providing the mechanical properties of concrete used in road paving is of great importance. In the current study, Granulated Blast Furnace Slag (GBFS) based geopolymer concrete (GPC) was used with ۰-۲% polyolefin fibers (POFs) and ۰-۸% Nano Silica (NS) to improve its structure. After curing the specimens under dry conditions at a temperature of ۶۰ °C in an oven, they were subjected to Tensile Strength, Modulus of Elasticity and Ultrasonic Pulse Velocity (UPV) tests to evaluate their mechanical properties. All tests were performed at ۹۰ days of age under ambient temperature (۲۰) and high temperature (۵۰۰). The addition of NS enhanced the whole properties of the GBFS-based GPC. Addition of up to ۸% NS to the GPC composition at ۲۰% temperature improved the modulus of elasticity test results by ۱۳.۴۲%, tensile strength by ۱۵.۱۹% and UPV by ۱۱.۵۸%. Addition of up to ۲% of POFs to the composition of GPC improved the tensile strength up to ۱۱.۷۶%, modulus of elasticity ۰۷.۰۵% and UPV drop up to ۱۲.۰۲%. Applying high heat to GPC samples reduced the modulus of elasticity by up to ۴۲%, tensile strength by up to ۲۱% and UPV by up to ۴۶%. The effect of heat on the drop in results in control concrete is more than GPC. In the following, by conducting the Scanning Electron Microscope (SEM) analysis, a microstructure investigation was carried out on the concrete samples. In addition to their overlapping with each other, the results indicate the GPC superiority over the .regular concrete

کلمات کلیدی:

Geopolymer Concrete (GPC), Polyolefin Fibers (POFs), Nano Silica (NS), Granulated Blast Furnace Slag (GBFS), (Scanning electron microscope (SEM