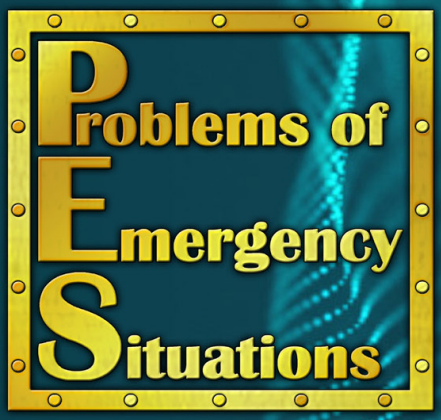

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Research of Properties and Rational Composition of Ecosafe Building Materials with Ash-and-Slag Waste from Masute Fuel And Coal Combustion

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Keywords: ash-and-slag, solid waste, building material, environment protection technologies, granules of bulk, cement-sand mixture, strength, density.

Abstract. The study evaluates the method for determination of the rational technical and economic indicators, namely the rational composition and flexural strength, of building materials containing ash-and-slag obtained from heat-and-electric power plant as waste from the combustion of masute and coal. Results of method application were obtained. The study is aimed on reduction of the negative technogenic impact on the lithosphere by developing an appropriate environmental protection technology for utilization of the mentioned above waste as a replacement of sand in building materials made of cement-sand mixture. The rational composition of the building materials containing ash-and-slag waste granules was selected basing on the results of two stages of experimental research – mechanical bending tests of straight two-support beams on a rupture machine. It was proposed to provide a complex index for assessment of the efficiency of ash-and-slag waste disposal in the building materials, which refers to relation of the strength limit to the density of the material per unit value. The results of calculation of the index magnitudes were obtained.

Introduction

Today there is an inextricable link between the level of ecological safety (ES) of environmental components due to their pollution by various factors of man-made (technogenic) origin and the necessity to ensure heat and electrical energy consumption of large urban ecosystems, including industrial enterprises, housing and more. Importance of the factors of the population life quality, produced by mentioned above objects of the technosphere, raises attention to the problem of interaction of the sector of energy generating enterprises (in particular the manufacturer of heat and electrical energy – heat-and-electric (H&E) power plant (PP)), especially high capacity ones, and environmental components from the standpoint of important management and technical and technological decisions. High priority was given to increase of the use of natural resources, streamlining the extraction and enrichment of fossil fuels, its processing and combustion, processes and technologies of energy generation (electrical, heat, mechanical, etc.), as well as to improvement of the facilities providing access to the final consumer before the use of such energy. At current stage of development of heat energy manufacturing in Ukraine, the global problem of interaction between the environment and energy generating enterprises is relevant. In particular, this happens due to the pollution of the lithosphere with products of the main technological processes – ash-and-slag (A&S) solid waste, which is produced in large quantities and therefore requires large areas for storage in the form of dumps. Therefore, represented above considerations determine the relevance of the topic of the article.