"Gheorghe Asachi" Technical University of Iasi, Romania

ESTIMATION OF OPTIMUM FILTER CAKE IN PRODUCTION OF IMPERMEABLE LAYER USING FUZZY LOGIC

İlker Bekir Topçu[1], Murat Karacasu[1], Tayfun Uygunoğlu[2*]

[1]*Eskişehir Osmangazi University, Engineering Faculty, Civil Engineering Department, 26480, Eskişehir, Turkey*
[2]*Afyon Kocatepe University, Engineering Faculty, Civil Engineering Department, 03200 Afyonkarahisar, Turkey*

Abstract

Worldwide, waste materials are produced as a by-product of industrial manufacturing and placed in storage areas. One of the waste materials is filter cake (FC). FC is formed during the infiltration of cooling water in steel factories. The main aim of this research is determination of optimum usage of FC in the production of impermeable layer on ground by using fuzzy model approach. Because of this, in the study, FC as a waste material was hardened with cement and an impermeable layer was produced by using blast furnace slag as a coarse aggregate. The layers produced were then evaluated both in a laboratory and on-site, with compressive loads being applied to these samples in the laboratory. The laboratory test results were evaluated through the Fuzzy Logic (FL) approach. Optimum usage conditions were determined for impermeable layers made of FC material. The highest compressive strength values were observed at a temperature of approximately 20° C, approximate water content of 12.5 % and 20 days curing time. On the site, cracklings or spallings due to shrinkage were not observed. As a result, it is suggested that the use of FC material is both efficient in terms of its use in forming impermeable layers as well as in the protection of the environment.

---

* Author to whom all correspondence should be addressed: E-mail: uygunoglu@aku.edu.tr; Phone: 90(272)228 1423 Fax: 90(272)2281422