

UTILIZATION OF BORIC ACID WASTES AS AN ADDITIVE IN LIGHTWEIGHT CONCRETE

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EXTENDED ABSTRACT

Approximately 60% of the known world boron reserves are found in the western part of Turkey. Boron reserves involve various borate minerals.

In Turkey boric acid production is made from colemanite mineral ($\text{Ca}[\text{B}_3\text{O}_4(\text{OH})_3] \cdot 2\text{H}_2\text{O}$). During the process, filtration treatment is applied in order to separate the undesired solid compounds before the crystallization of boric acid. After the filtration stage, some of the boric acid solution remains in filtration cake.

Over 120.000 tones per year of solid wastes are produced from boric acid factories of Etibank Foundation in Turkey and causes various environmental and storage problems. It consists of mainly gypsum crystals, B_2O_3 and impurities.

One of the ways to evaluate the boric acid wastes, is using them as borogypsum instead of gypsum in the production of structural lightweight concrete. Keramzite, which does not have any application before, is used as an aggregate for producing lightweight concrete. Its sieve, unit weight, specific gravity, water absorption and chemical analysis are done.

The calcination temperature and changing structure of borogypsum is determined by differential thermal analysis (DTA), thermogravimetric analysis (TG) and X-Ray Diffraction (XRD). Thermal experiments were carried out at ambient temperature and 500°C in air atmosphere for natural gypsum and borogypsum.

And finally, effects of borogypsum which is a industrial by product of boric acid manufacture, on the setting time and pressure strength properties of the lightweight concrete have been studied.

Key words: Light Weight Concrete, Boric Acid Waste, DTA, Keramzite