Abstract

This study is to develop the specifications of the present cement products so as to comply with the quality and quantities requirements of the local market. The subject of this thesis is to present the results of a series of laboratory trials on a number of raw material mixtures prepared to produce moderate and high sulfate resistance cement at EL-Mergheb cement factory which currently produces ordinary Portland cement. At first, six different raw material sample mixtures were prepared from marlstone, marl and iron ore. The clinker (cement) produced from these samples was within the moderate sulfate resistance cement (MSRC) specifications which mainly requires the tri calcium aluminate (C3A) to be less than 8% by weight. The trial runs on other three raw material samples made that from mixing marlstone, clay, and iron ore produced clinker specifications that were out of those for MSRC namely, C3A is greater than 8%. This means that the addition of clay to the raw mix prevents the production of cement with MSRC specifications. This was due to the high percentage of Al2O3 in the clay. The specifications of the clinker products based on these results, MSRC was successfully produced at the factory from raw material mixtures (marlstone, marl and iron ore) without any clay addition. Finally, three raw mix samples were prepared from marlstone, marl, iron ore, and sand and tested in the laboratory to explore the possibility of producing high sulfate resistance cement (HSRC) which requires C3A to be less than 5%. The results of these laboratory trials showed that when the sand in the raw mix is kept under 1.80%, the produced clinker specifications are within those of HSRC. The permission to carry out these trials in the factory is underway. The expected economic benefits from producing both MSRC and HSRC is highly feasible. Both types will be sold in local market without any additional operating or capital costs.