

Desiccation and moisture transport of concrete

Master's project for the Master Program Structural Engineering and Building Technology

Background

The use of supplementary cementitious materials, such as fly ash and ground granulated blast furnace slag (GGBS) (see Figure 1), is increasing due to a number of reasons such as reduced environmental impact but also improved durability. The supplementary cementitious materials causes a change in the hydration and the hydrates formed which in turn leads to modified properties with respect to desiccation and moisture transport.

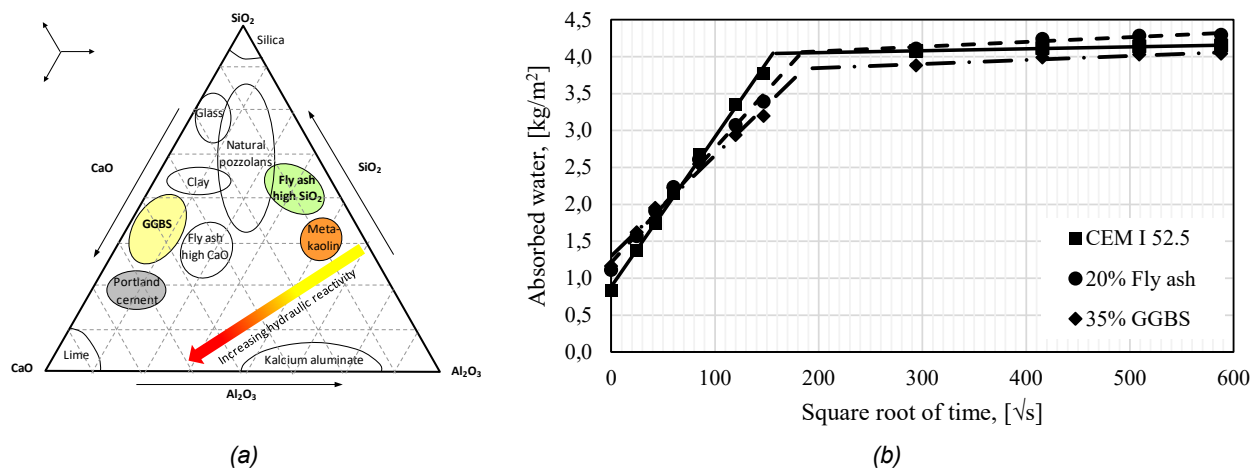


Figure 1. (a) Chemical composition (main components) of different binders. (b) Capillary absorption.

Purpose/Method

This master thesis proposal aims to investigate self-desiccation and moisture transport properties of concrete/mortar with different cements and mixes containing mineral additives, such as fly ash and slag. The outcome of this project will be used to improve models used for predicting moisture profiles in concrete.

Experiments involving self-desiccation, diffusion and capillary absorption will be combined with analytical and numerical models for assessing moisture transport and desiccation of concrete.

Impact

A better understanding of hydration of supplementary cementitious materials and how they influence moisture transport properties. This is a direct response to the growing need for material specialists who understand cementitious materials and with moisture modelling capabilities.

Thesis setup information

The master thesis will be carried out at Thomas Concrete Group in collaboration with Chalmers University of Technology. This Master Thesis work will be part of an ongoing project and is suitable for students interested in concrete technology, experimental work and theoretical modelling.

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