

Master thesis project at Building Technology

Title

Development of novel types of lightweight concrete using various experimental techniques

Background

Lightweight concrete has many advantages compared to normal concrete, especially in properties like fire resistance, sound absorption, and thermal insulation. In addition, lightweight concrete is relatively easy to handle (easily cut, sawn, and nailed or screwed). However, the lightweight concrete used today is in general based on ordinary Portland cement (OPC), which is not a very environmental friendly material. The challenge for the future is therefore to find other types of materials with cementitious properties and replace at least parts of OPC with them. For this purpose the group Building material at Chalmers has an ongoing research on such types of green cementitious materials that could be used as the replacement material.

Aim/Purpose

The main purpose of this master thesis work is to develop a material based on OPC and other materials with cement-like properties. The work, which mainly will be of experimental character, includes investigations on how to replace OPC with other green cementitious materials in order to produce the lightweight concrete that is planned to be used as a future non-bearing wall material.

Method

After a literature study the work is planned to be a systematic investigation of the properties of different compositions of OPC and other cementitious materials. The following experimental work may be carried out:

- Measure and evaluate the time it takes for the different compositions to start to harden.
- Introduce fiber and/or textile reinforcements into the materials.
- Introduce and test different kinds of lightweight materials into the cementitious matrix.
- Casting and evaluate the different compositions regarding hardened properties such as short and long term mechanical strength, thermal conductivity coefficient, water absorptivity, vapor diffusion coefficient, and ability for sawing, spiking, etc

Supervisor

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