

The need for research and innovation to facilitate upscaling of low-carbon concrete

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ABSTRACT

For decades, research has been carried out with a focus on concrete structures during curing to mitigate the risk of thermal cracking. Computer programs and aids/tools have also been developed to assess stress and cracking risk analysis of concrete structures during curing. However, today with the recent introduction of low-carbon concretes to reduce the environmental impact of constructions, the reliability of the tools and working procedures, i.e. concrete characterization, is questioned, and a roadmap for research and innovation is called for. The project's primary purpose is to investigate the need for research and innovation regarding upscaling the usage of low-carbon concrete. The nature of the study is based on an industry-focused workshop with specialists from Scandinavia. Increased knowledge of hardening concrete's cracking risk-related properties is of the utmost importance for the construction industry as the need for its understanding has recently increased.

Keywords: Low-carbon concrete; Material design; Construction, Lab testing; Concrete crack control.

Introduction

The construction industry faces challenges with adopting low-carbon concrete (LC-concrete). Challenges that become obstacles to a fast development and implementation rate are so much needed for the industry to meet the climate goals of Society. The challenges need to be understood from a sector-wide perspective, and consensus regarding the needs, driving forces (carrots and sticks), and risks is paramount for

finding a way forward. This study addresses these questions from an industry-wide and Scandinavian perspective.

A brief background to the research and development on concrete structures during curing and risk of thermal cracking in Scandinavia

The research area on concrete structures during curing and the risk of thermal cracking started in Sweden in the 1940s [1] by a project initiated by Vattenfall [2]. In the 60s and 70s, several projects