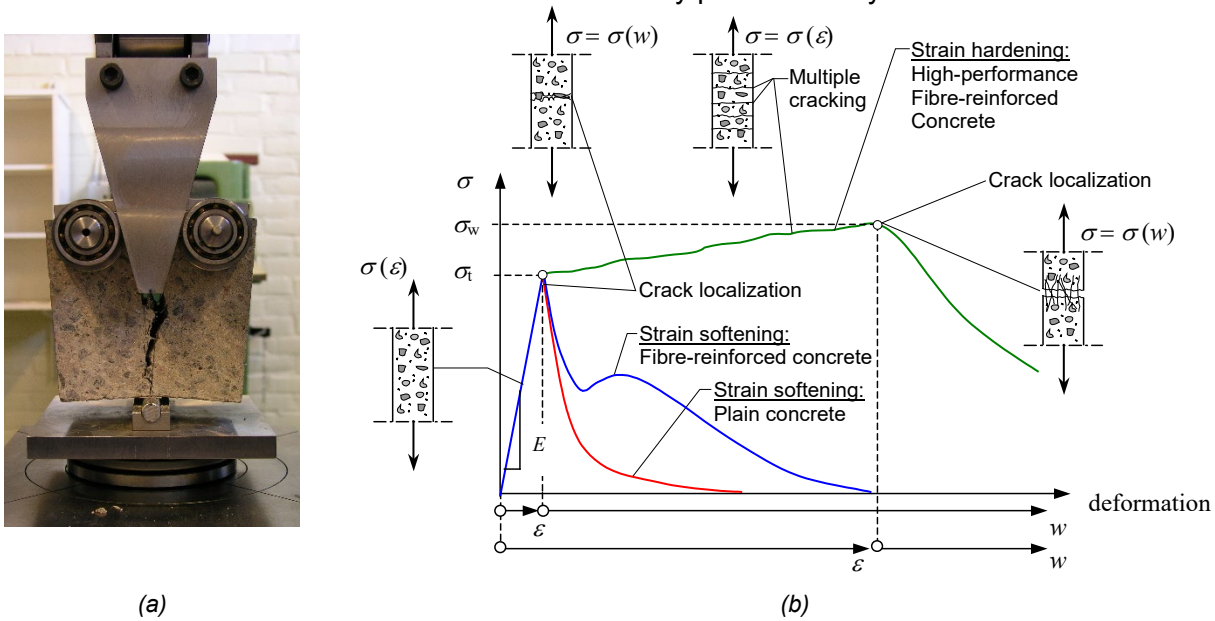
Basalt fibres in concrete

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

Background

Basalt fibers and reinforcement is an interesting material as it has good mechanical properties and is non corroding. However, there has been concerns raised about the basalt fibres alkali resistance, where the concrete basic solution (with pH above 12) may lead to degradation of the properties and impar the durability. For example, in the PhD thesis by Williams-Portal[1] tests were made on textile reinforcement and it was found that the basalt had very poor durability in alkaline solutions.



(a) (b)

Figure 1. (a) Wedge-splitting test. (b) Tensile response of fibre-reinforced concrete.

Purpose/Method

This master thesis proposal aims to investigate the effect of basalt fibers on the behaviour in tension (post cracking) and their alkali resistance. The alkali resistance will be done based on accelerated ageing in an alkaline solution at 60 °C and on concrete samples stored in water at 60 °C. The behaviour in tension will be determined by conducting wedge-splitting test (WST).

Impact

A better understanding of the effect of adding basalt fibers on the behaviour in tension and the durability of basalt fibres. This is a direct response to the growing need for material specialists who understand new materials and how and when these can be utilized.

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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[1] https://research.chalmers.se/publication/220895