

Master thesis at Building Technology

Title

Bonding properties of concrete with steel and carbon fibre mesh under a long-term cathodic protection

Background

Corrosion of steel in reinforced concrete is one of the worldwide problems. The reinforcement steel can be protected by applying so called Cathodic Protection (CP) technique. Conventional CP system has some disadvantages, such as the need of expensive titanium mesh and continuous power supply. Nowadays the economically affordable carbon fibre mesh are available and can be used as node to prevent reinforcement steel from corrosion. With this economically affordable prevention system, it is possible to reduce cement content in concrete and cavour thickness, and as a consequence, to reduce CO₂ emission in cement production. There is, however, a lack of knowledge of the long-term properties, especially the bonding properties of concrete with steel and carbon fibre mesh after a long-term cathodic protection.

Aim/Purpose

The main purpose of this examination work is to investigate the bonding properties of concrete with steel and carbon fibre mesh after a long-term cathodic protection.

Method

Parallel to the literature study the following work may be carried out:

- Treatment of concrete specimens embedded with steel reinforcement and carbon fibre mesh under an external electrical field, simulating the cathodic protection process in an accelerated way.
- Investigation of the bonding properties of cover concrete by non-destructive as well as destructive tests.
- Analyzing the test results and giving suggestions.

Supervisor

Emma Qingnan Zhang, Division of Building Technology, Chalmers University of Technology, Tel: 031-7721997, e-mail: emma.zhang@chalmers.se

Examiner

Prof Tang Luping