

4. CONCRETE CREEP IN TENSION AND COMPRESSION

Description

If concrete is subjected to sustained loads, it continues to deform further with time. This phenomenon, discovered around 1900, is now commonly referred to as creep. Creep, along with the instantaneous (or initial elastic) strain, is defined as the strain difference between loaded and load-free specimens. After many years, creep strain typically attains values 2 to 6 times larger than the initial elastic strain. After unloading, a partial creep recovery takes place. Despite numerous studies and investigations, the physical mechanism and modelling are still being debated.

Aim and objectives

The aim of this project is to investigate concrete creep in tension and compression under sustained load. To meet this objective, wedge split test specimens will be placed in customized test-rigs, which allow for creep measurements in tension and compression. The following objectives are defined in this project:

- 1- Summarize and categorize the existing literature on concrete creep (in tension and compression).
- 2- Preparation and testing of concrete specimens under sustained load.
- 3- Analysis of test results.
- 4- Preparation of report.

Methodology

In order to fulfil the abovementioned aim and objectives, the study will comprise the following tasks:

- 1- Literature review: Identification, classification and summary of scientific literature
- 2- Preparation and testing: Casting of concrete specimens in concrete lab and testing of specimens in a customized test-rig in building 119
- 3- Analysis of results: Descriptive statistics of the experimental data, mechanical analysis of experimental (tutorials will be provided).

Minimum requirements

The project is oriented towards BSc education level, preferably a group of 2 students. The students are expected to be able to work independently on theoretical, organizational and practical level (introduction to tasks will be provided). The specific requirements for accessing this project are:

- 1- Proficient English level on a technical basis: understanding of scientific and technical literature
- 2- Intermediate-level programming skills (e.g. Matlab, Python) and intermediate-advanced informatics skills (text processing, excel etc.)
- 3- Intermediate-level on statistics (exploratory statistics at BSc/MSc level)
- 4- Basic understanding of electronics and mechanical components
- 5- Advanced understanding of concrete technology and mechanics of materials