

Master's thesis

Concrete under fire

A thermo-mechanical analysis with Abaqus

Supervisor: M.Sc. Simon Peters

Background: When exposed to fire or high temperatures, concrete shows a robust behaviour compared to other building materials. Nevertheless, its original properties, such as modulus of elasticity or mechanical strength, are affected during and after exposure to heat. Within the framework of a research project, the sensitivity of a concrete beam with regard to its thermo-mechanical structural response is required.

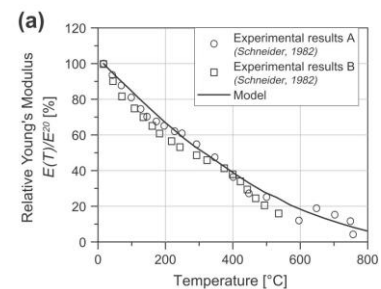
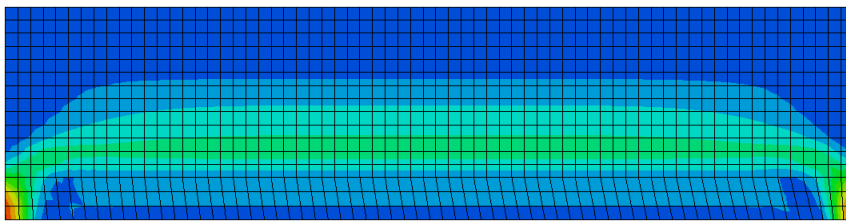


Figure 1: left: Induced Mises stresses due to thermal loading right: thermally depended Young's modulus

Task:

1. Familiarisation with the basics of thermo-mechanical analyses.
2. Transient thermo-mechanical FE-Analysis of a Benchmark with Abaqus.
3. Carrying out a sensitivity study of the mechanical parameters, modulus of elasticity (saturated and unsaturated), strength, coefficient of thermal expansion, with respect to the thermally induced stresses.

Contact:

Simon Peters

Room: IC 6/153

Lehrstuhl für Statik und Dynamik

Ruhr-Universität Bochum

Tel: 0234-32-29068

E-Mail: simon.peters@rub.de