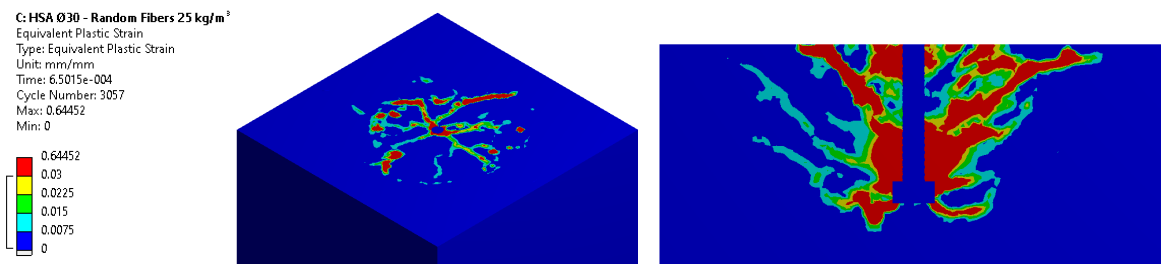


Master thesis

Realistic Finite Element Modelling (FEM) of concrete



Non-linear Finite Element Modelling (FEM) of concrete structures is nowadays an established analysis method in everyday engineering. This includes the prediction of damage in concrete based on plastic and fracture mechanics. This advanced structural analysis technology allows for more realistic and thus more efficient design of details, while it allows for design situations that are hardly captured by simple analytical tools. However, the modelling of localized details, such as anchorages to concrete, is currently not sufficiently understood, and it lies within a significant research scope worldwide.

In this thesis we will use laboratory experiments to identify concrete failure modes under various geometries, and then we will transfer these experiments into a virtual lab (i.e. finite elements platform). There, we will calibrate the constitutive material law for concrete against the available tests, and we will create a tool for the realistic modelling of the load bearing and damage development of anchorages to concrete, by the use of FEM.

The candidate will work on an actual problem with sophisticated tools and real scale experiments. He/she will then be able to set the basis for design solutions that are not - or only partially - covered in current design codes. He/she will advance their engineering skills and acquire new knowledge in FEM, material mechanics, and evaluation of laboratory tests.