



## STRUCTURAL RESPONSE WITH REGARD TO EXPLOSIONS

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### Presentation

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### Report

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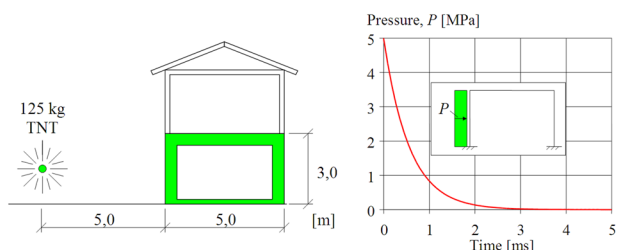
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### Background:

Explosions are accidental actions that need to be considered in the design of structures for various applications. Except from apparent cases, such as military installations and civil defense shelters, design with regard to explosions is required for instance in the processing industry and for tunnels. The knowledge of how to design buildings to withstand the effect of explosions and other impact actions is limited. Hence, the aim of this master's thesis is to put together information about available design approaches for impact loading on concrete structures. This project is a continuation of four previous Master thesis carried out 2006, 2009, 2010 and 2012, in which the behavior of concrete beams and slabs were studied.

### Objective and method:

Previous Master theses have dealt with the bending response of impulse loaded structures. The transformation factors have been derived for beams and slabs. The response of fragments hitting a concrete wall have been investigated and the response of a slab been determined.

The objective for this thesis is to check if the moment envelope is too big during the dynamic loading of a structure since it will react different from a statically loaded structure. The damping of the structure will also be dealt with briefly. Will the damping have a great impact of the results? When neglecting the damping one will be on the safe side. Shortened reinforcement will also be researched. Bomb shelters are always built with full reinforcement but what happens when the explosion hits a civil building? Will the moment capacity be enough? Possibly different cross sections and their reaction to a dynamic load will be researched.

With help from the FEM software ADINA a non-linear model will be made. This will be made for beam elements. The FE-model will be compared with a SDOF-model. An objective is to improve the SDOF-model so it can be reliable.