

## Brandteknisk projektopgave

**Titel:** Numerisk brandmodellering i efterisolerede konstruktioner i beboelsesejendomme

**År:** 2015

During the last 40 years the requirements to save energy has grown steadily. The old building, primarily build during the late fifties and into the late seventies – beginning of the eighties, have been a result of the transformation of society from a rural- to an urban based society. Together with a growing living standard and transformation of the old city centers from dense populated, into less dense populated areas, caused an explosive development of housing buildings in the suburban areas of the major cities and towns. These buildings are at the moment on the basis of present political agenda, in the process of being refurbished and thereby given a more up to date energy profile. This means that these essentially concrete buildings, are being insulated. This post insulation of the perimeter of the buildings is presumably changing the way the fire develops and is thereby affecting the structural basis of the buildings. Hereby primarily the concrete slabs and the supporting walls.

In order to develop a more precise image of the consequence of a post insulation of the perimeter of the old buildings, the object is to set up a numerical model, which can create an image of the potential consequence of a possible fire in a compartment.

The ventilation of the compartment is depending on the fall-out of the window, which is why an intense search for the parameters for the windows has been made. The results show so far, that the fall-out parameter is related to the temperature of the compartment gas and thereby the temperature of the glass. The model is made even more complicated, by the fact that the modern high insulating windows consist of multiple layers of glass with a diversity of gas between the glass panes. Furthermore, the size of the fall-out of the glass pane is happening in stages depending on the number of panes, and the amount of areas that which is affected. The ventilation of the compartment is also hard to determine with certainty.

The compartment ventilation depends on not only the fall-out of the glass in the windows, but also of the additional ventilation of the compartment in terms of leakage, and actual ventilation caused by the glass pane fall-out.

By setting up models, and validate those with the theory, a study is made, based on a representative and simple compartment.

The models show that there is a difference in the temperature development in the compartment, mainly depending of the materials the compartment have been made out of, the opening in the compartment.