

Why do some small fires grow large?

Assessment of fire protection Measures

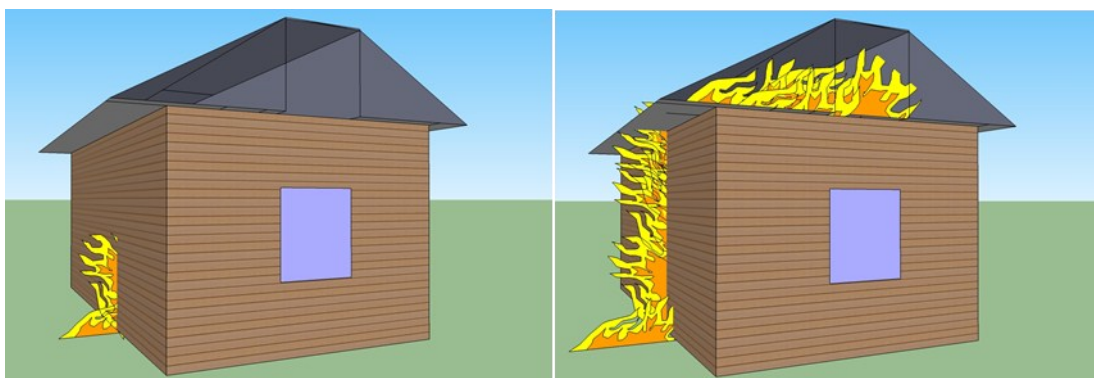
Approximately 1% of all fires contribute for nearly 50% of total cost of fires in Sweden. In many cases it is unknown which factors cause these large fires.

The aim of this project has been to develop knowledge about such factors and investigate whether there are specific characteristics for large fires in different types of objects. Fire protection in these buildings could possibly be improved with more knowledge of these factors and therefore the number of large and costly fires could be reduced. The project has resulted in three major reports dealing with three different types of objects (buildings).

- Schools and preschools (school buildings)
- Attics in apartment buildings
- Nuclear power plants (NPP)

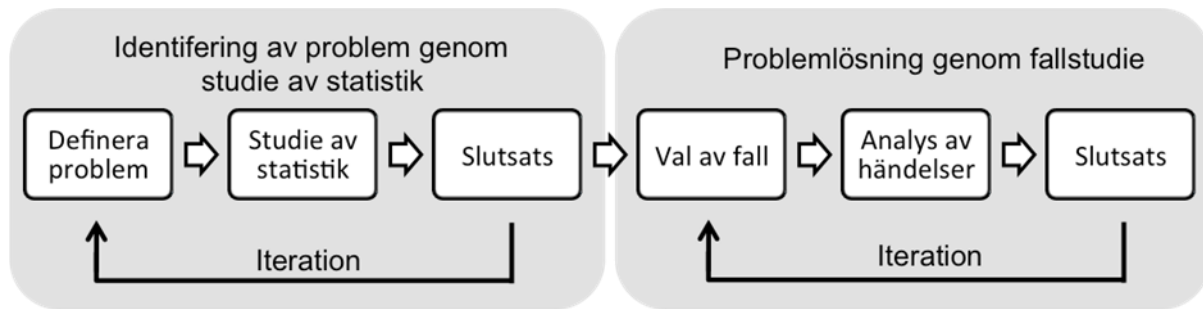
Fire development in most compartment fires can be described with the following three steps: fire in the first object ignited, fire in the room of origin and finally fire in several rooms. The three different objects studied in this project have involved a detailed study of these three steps. The focus was on different steps in the different reports because the objects are different with regard to the building structure, fire load and fire equipment. The focus of the studies on school fires and fires in attics has been on factors that control how a fire in one room can develop into a fire in several rooms or even in several fire compartments. In the case of fires in NPP:s, the focus has been on a fire in a room and how it can affect the conditions in an adjacent space. The focus on the different stages of fire development gives a width to the overall analysis.

In addition to the findings related to the three studied objects, the project has resulted in a methodology on how statistics and case studies can be combined in a systematic way to present, analyse and find common conclusions of several fires. The methodology is published in the Journal of Fire Technology.



The most expensive school fires starts on the outside of the building, the fire spread up to the attic, where it spread quickly and can cause a total damage.

The six different steps of the developed methodology.



The entire project was funded by: The Fire Research Board (Brandforsk), the Swedish NPPs Fire Safety Group (NBSG) and Trygg Hansa.

Reports from the project

The project (101-071) is reported on the following documents:

- Van Hees, Patrick & Johansson, Nils. (2010). Case Studies - What technical factors play a role in arson fires in schools buildings. Report 3148. Lund: Fire Safety Engineering, Lund University. (in Swedish)
- Johansson, Nils & van Hees, Patrick (2010). A study of attic fires based on statistics and fire investigations. Report 3152 Lund: Fire Safety Engineering, Lund University. (in Swedish)
- Johansson, Nils & van Hees, Patrick (2012). A methodology for assessing fire damage scenarios in nuclear power plants. Report 3158. Lund: Fire Safety Engineering, Lund University. (in Swedish)
- Johansson, Nils van Hees, Patrick & Särdekqvist, Stefan (2012). Combining Statistics and Case Studies to Identify and Understand Deficiencies in Fire Protection. Fire Technology, Volume 48, Issue 4, pp. 945-960.

A detailed summary of the project can be found in the following report:

Johansson, Nils & van Hees, Patrick (2012). Final report: Why do some small fires large? Report 3167 Lund: Fire Safety Engineering, Lund University. (in Swedish)

Download the reports at www.brandforsk.se.