

# PROJECT INFORMATION

## The Duration of Heating Phase (DHP) concept – Literature summary and Roadmap

### Purpose and goals

The Duration of Heating Phase (DHP) concept is the path forward to include in a pragmatic manner the importance of the cooling phase of structural elements in fire safety engineering<sup>1</sup>. This concept is a complementary measure to the standard fire resistance where elements are classified based on testing according to fire resistance standards. The standard fire resistance classification is a system for grading elements or structures based on the hypothesis that a higher fire resistance time will perform better in a real fire. In this standard classification system only the heating phase is evaluated, however, this approach does not provide a refined enough picture given that all real fires include a cooling phase during which heat is redistributed in the cross section. Previous studies and experience fires have shown that when including the cooling from phase in the evaluation we see substantially differences regarding performance of common structural elements with similar standard fire resistance. Important conclusion from this is that the level of safety in reality is very widespread despite the same fire resistance classification. The consequence is that some elements may have an unacceptable level of performance while other elements may be overdesigned. By introducing the complementary DHP concept we have an extra tool to be used to avoid (i) unsafe structures and (ii) resource-inefficient designs. By better harmonizing the level of fire safety, avoiding overdesign, the carbon footprint of the building process can be lowered.

### Research plan

1. Summarize the studies performed on the DHP: columns, beams, steel, concrete wood
2. A scientific report will be prepared to compile recent research data on the “DHP” method of addressing burnout resistance of structures.
3. Review broader literature on research on effects of cooling phases.
4. Specify a road map and a research plan for further studies needed for developing our knowledge and introducing the DHP concept for

Based on the reviews conducted in items 1) and 2), we will outline different research directions to address the needs and gaps on the topic.

<sup>1</sup> Gernay T., Franssen J.-M. (2015) “A Performance Indicator for Structures under Natural Fire”, *Engineering Structures*, 100, 94-103

### Project information:

**Project team:** Robert McNamee, Division of Fire Safety Engineering, Lund University, Sweden

Thomas Gernay, Department of Civil and Systems Engineering, Johns Hopkins University, USA

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