

# Research on measures to improve fire safety on construction sites

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*Abstract* – This article searches solutions to improve the fire safety on construction sites based on a Fire Safety Engineering approach.

*Keywords* – Fire Safety Engineering, Construction Sites, Risk Assessment

## Introduction

Fire Engineers tend to focus on the fire safety of the completed construction and so do most of the Fire Safety Regulations. The fire safety during the building process is often overlooked.

During construction most passive and active fire protection systems are not yet operational. Furthermore the fire prevention organisation that should cope with this lack of protection is often not in place.

Reasons enough to analyse the actual situation and to look for solutions.

In order to get a good picture of how construction fire safety is treated, several sources were examined: legislation, statistics, codes of good practice and safety co-ordination files.

## Legislation

In the European Safety at Work legislation, there is one directive that aims (*as a part of health and safety at work*) the fire safety on construction sites. This “*Directive on safety and health requirements at temporary or mobile construction sites*” [1], provides a good framework for fire safety as this is mentioned as one of the safety requirements.

A strong point of this directive is the safety co-ordination that starts during the design of the building. By doing so, the design can be adapted to improve the fire safety during the construction.

Especially for Fire Safety Engineers, the good news is that this legislation is performance based and relies on risk assessment.

## Fire Risks

A lot of publications and construction professionals acknowledge that fire is an important risk during the building process.

Unfortunately there is little statistical evidence to proof this point. In the US for instance [2], the available statistics combine construction and vacant buildings, thus limiting the possibilities to draw conclusions on the causes of fire during construction.

Others sources providing an insight on the construction fire risks are standards or codes of good practice like *NFPA 241* [3] or in the UK, the *Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation* [4].

To complete the picture a limited survey of how construction site safety co-ordinators assess fire risks was completed.

The conclusion at this point was that in spite of a good legal framework and some well developed standards, the reality shows poor fire risk assessments.

## Fire Protection

The next step towards a solution is an overview of the possibilities to provide fire protection on construction sites.

Both active and passive fire protection systems suffer from the typical limitations of construction sites: a rough and continuously changing environment with important risks to damage these systems. It is not impossible though to either temporarily or progressively install such protection. Amongst others “*The Fire Protection Engineering*” magazine No. 41 [5], discusses some solutions.

If active and passive protection are subject to limitations, a strong fire safety organisation needs to compensate these limitations.

Adequate organisations are described in *NFPA 241* [3] and the above mentioned *Joint Code of Practice* [4]. When integrated with the general safety co-ordination, a solid organisation can be build.

A key factor for success is to start preparing all those protections during the design phase.

## Checklist

The results of this research have been compiled into an open expert checklist using a Fire Safety Engineering approach.

The choice for a checklist is based on the need for a flexible and relatively fast methodology. Quantitative fire risk assessment is too time consuming to apply on the numerous situations to be analysed on a construction site. A quantitative approach would also suffer from the lack of statistical data.

The checklist provides a series of questions for the project in general and a shorter list of questions to analyse specific situations related to a certain location and time. Each item can be linked to a particular fire scenario.

Documenting the fire-scenario's is essential in a risk assessment. Without this key information, a reader can only guess what the author had in mind when he/she evaluated a risk e.g. as severe.

### **Conclusion**

The proposed methodology provides a general and structured framework to assess fire safety risks during construction in qualitative way.

The quality of the results can be improved by discussing the questions with a group of experts.

The resulting documents can be used to communicate the residual risks and proposed protective measures to other stakeholders or to demonstrate to the authorities compliance with the obligation to assess the fire risks.

### **References**

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