



Reducing the fire risk of incomplete roof systems during construction

Introduction

Recent roof fires which have occurred during the construction phase has highlighted the combustibility of certain unfixed extruded polystyrene insulation that are used within the construction of buried flat roof systems.

Polystyrene insulation is relatively difficult to ignite, especially when fire retardant chemical additives have been incorporated into the manufacturing process to reduce its flammability and slow the spread of fire. However, once combustion has occurred, fire can spread over the exposed surface of the insulation and will continue to burn until the insulation has been consumed or the fire has been extinguished. This underlines the importance of managing materials, including those on-site that have yet to be used or installed, or where they have been partly installed and remain exposed.

Roof Specification

The designer of the roof specification is one of the first stakeholders capable of integrating safe practices within the construction phase. They must consider the combustibility of any specified element, such as insulation, both singularly and in combination with other elements of the roof system and assess the potential fire risks and mitigation measures, which can change at different stages of the roof construction. For some individual components of flat roof systems, it is not feasible to substitute for non-combustible solutions. Therefore, as it is not reasonably practicable to eliminate the fire risk for individual combustible components, the designer must alleviate the fire risk by carrying out a suitable and sufficient design risk assessment. Designing in control measures, such as prioritising where practicable, the encapsulation of combustible elements within the specified roof system at the earliest opportunity, when planning the build sequence, can assist in mitigating the fire risk.

It is essential that the designer provides the right information, to the right people at the right time, in an appropriate format to enable them to make the right decisions that will underpin fire safety during the construction phase—information such as the Euroclass Classification of the individual elements—before they become an integral part of a completed roof system. It is reasonable for the designer to assume that these activities will be undertaken by competent and capable individuals.

Roof Construction

There are two elements to reducing fire risk.

Firstly, measures to stop a fire occurring in the first place by eliminating sources of ignition during the installation process.

Secondly, measures that will reduce the fire growth rate by minimising the quantity of insulation/materials stored on site in case a fire occurs. Stocks of material that could contribute to the fire load should be managed in order to balance site/programme requirements with the need to reduce the risk of a fire occurring or fire spread.

This can be achieved by:

- Use just-in-time ordering to limit the materials present on site.
- Restrict materials in the work area to those needed for half a day or a single shift and return the unused materials to the designated storage area at the end of the working day.
- Safe storage of materials appropriate to the hazard; for example, storing underneath flame-retardant sheeting and away from sources of ignition.
- Due consideration also needs to be given to the cumulative effect of materials being used or stored, or different processes in use. For example, having different trades working on site with different combustible materials may significantly increase the total amount of combustible material present in the work area.
- Planning, managing, and monitoring the work and giving workers clear instructions and information, as well as adequate training and supervision.

Additionally, the way the site is managed may affect the precautions that need to be put in place. There may be more than one duty holder with control over part of the works or areas on site. For example, during refurbishment work part of the site, outside the construction area, may remain occupied. It may be necessary to work with managing agents or building owners and, in multiple occupancy buildings, all those with some control must co-operate to reduce the fire risk to an acceptable level.

General Fire Precautions:

In the event of a fire, people must be able to escape in a safe manner. The measures that are put in place to allow people to escape are called General Fire Precautions (GFPs). These GFP requirements will vary depending on the stage of the installation of the roof system, the materials used and application methods.

The fire risk assessment should consider the impact of the work on existing GFPs and how requirements will need to change as the project progresses. The findings of the fire risk assessment will help to:

- develop the emergency plan
- identify the instruction, information and training that is required
- determine the co-operation and co-ordination arrangements that may be required with other responsible people; and
- establish the arrangements for maintenance and testing of the fire precautions.

Emergency plan for fire

All emergency plans need to be clear, unambiguous, and known to all who are on the site. When developing plans, consider the following aspects:

- The type of system required to sound a warning in the event of a fire.
- Ensuring the correct firefighting provision is provided in the agreed locations and there is a process in place for checking and maintaining.
- Having dedicated personnel trained in the use of firefighting provision.
- The safe evacuation route from the roof.
- Where the workers gather after evacuation.
- Who oversees the situation and their responsibilities.
- A system for confirming that everyone has reached the assembly point.
- Outlining who will contact the emergency services.
- Documenting how this information is communicated to the workers and ensuring changes to the plan are recorded.

Providing a 'fire emergency info pack', to give to the fire service, will help the lead fire fighter assess risks from gas cylinders and other flammable substances, such as insulation, primers and adhesives stored at roof level.

Conclusion

The relative fire load and the potential for fire growth and spread should be considered at all stages of the roof construction. A high degree of communication and co-operation is required between all relevant duty holders to ensure adequate controls are in place until any combustible elements are installed as part of a completed roof system, as per specification.



Further information

LINKS TO CONSTRUCTION FIRE SAFETY GUIDANCE:

- **The Construction (Design and Management) Regulations 2015:**
<https://www.hse.gov.uk/pubns/priced/l153.pdf>
- **HSG168 Fire Safety in Construction:**
<https://www.hse.gov.uk/pubns/priced/hsg168.pdf>
- **JCoP (10.1 Edition) Fire Prevention on Construction Sites:**
<https://www.thefpa.co.uk/resource-download/607>
- **HSE Fire References:**
<https://www.hse.gov.uk/construction/safetytopics/fire.htm>
- **HSE Process Fire Safety:**
<https://www.hse.gov.uk/fireandexplosion/workplace.htm>
- **HSE Construction Fire—Frequently Asked Questions:**
<https://www.hse.gov.uk/construction/faq-fire.htm>

LINKS TO NFRC SAFE2TORCH GUIDANCE:



- **Safe2Torch Guidance:**
nfrco.uk/docs/default-source/health-and-safety-guidance-publications/safe2torch-guidance.pdf
- **Safe2Torch Checklist:**
nfrco.uk/docs/default-source/health-and-safety-guidance-publications/safe2torch-checklistoct2020.pdf
- **Safe2Torch Safe System of Works for Gas Torches:**
nfrco.uk/docs/default-source/health-and-safety-guidance-publications/s2t-ssow-web.pdf
- **Safe2Torch Visual Checklist:**
nfrco.uk/docs/default-source/health-and-safety-guidance-publications/s2t-checklist.pdf

Published by

NFRC

020 7638 7663

helpdesk@nfrco.uk

www.nfrco.uk

@TheNFRC

May 2024

 **NFRC**
LEADING ROOFING EXCELLENCE

Note: Although care has been taken to ensure, to the best of our knowledge, that all data and information contained herein is accurate to the extent that they relate to either matters of fact or accepted practice or matters of opinion at the time of publication, NFRC, the authors and the reviewers assume no responsibility for any errors in or misrepresentations of such data and/or information or any loss or damage arising from or related to their use. Data and information are provided for general guidance only and readers must always take specific advice in relation to the use of materials, techniques and/or applications.