



Guide to construction phase fire risk mitigation white paper

June 2016



How to reduce the construction phase fire risk

The construction phase fire risk is a serious issue for all construction sites. The possibility of arson and accidental fires pose a risk not only to construction site employees and the building itself, but also nearby buildings and members of the public.

Construction sites have a risk of injury from the work processes involved and most risk management approaches are about protecting the workers on the site. Protecting persons outside the management of the site is an essential requirement of the CDM regulations and no more so than to stop fire spread from a site fire to a building or persons outside the site boundary. The choice of materials and how they are combined is a design responsibility which in turn can influence the fire spread risk out of a site. The publication of this whitepaper follows a court case where the Health and Safety Executive (HSE) fined an architects practice for not following the relevant available guidance on fire spread risk. It is therefore of significant importance that construction professionals are aware of the potential construction fire risks and how they can be mitigated.

Becoming an increasingly popular method of construction due to its energy efficiency and speed of build capabilities is structural timber frame. A structural timber frame building system, if left exposed, can provide conditions for a fire to spread and consequently, it is of importance to ensure the installation of fire protection cladding as soon as possible to mitigate the risk.

However, by identifying and designing in mitigation features to a building at the initial design phase, the risk and damage of a potential fire during the early period of the building's construction can be dramatically reduced.

Legislation and responsibility

Under the Construction (Design and Management) Regulations 2015 (CDM 2015) the responsibility surrounding fire safety and mitigation lies with the person who decides on the building material. This has led to confusion within the construction sector as to exactly where the responsibility lies, especially if the detailed and specific building design has been contracted out. For example in projects such as a design and build contract, where there is freedom for structural material choice.

In a standard design tender contractor build process, the structural material specification and in service fire safety lies with the project architect unless specially provided under contractor design proportion. In a project in which the design is contracted out (which typically is a design and build contract), the responsibility for structural material choice falls with the design and build contractor who typically appoints a design manager.

This fire mitigation during construction guidance specifically relates to CDM 2015 regulations 9, 11 and 29, as well as Health and Safety Guidance 168, surrounding using the principles of prevention, as far as reasonably practical, to remove or reduce the fire risk in choice of build materials, the risk to members of the public and to buildings outside of the site boundary.

For more information on the updates to the Construction (Design and Management) Regulations 2015, please read the Structural Timber Association (STA) CDM Regulations Advice Note.



Construction site on the site safety

Within the site boundary, the building itself and its component materials need to be evaluated with regards to their potential site fire risk.

By using the STA's 16 Steps to fire safety document, the responsible person can ascertain the site risks to be aware of and how they can be managed. Providing 16 simple steps with both an action and an explanation, fire safety can be achieved. For example, Step 6 is to promote a 'fire safe' working environment. This involves providing all workers with fire safe guidance, to fully ensure that all fire safety processes and precautions for the site are fully maintained and managed throughout the entire construction period.

Furthermore, when used alongside the STA members' mandatory Site Safe policy - which is accepted and recognised by the HSE, Chief Fire Officers Association (CFOA) and insurance companies - construction sites can ensure they have assessed the onsite fire risks thoroughly.

A three-stage process, the STA Site Safe policy separates guidance into the pre-construction planning stage (prior to site delivery), the structural timber system erection phase and the final stage, when the building system is erected and handed over for follow on trades to complete the building.

The STA has rolled out a mandatory site safe policy for projects that have a total floor area of 600m² or more. The principles in the guidance however are equally valid and recommended for smaller developments. The guidance is generic for all forms of timber frame panels, structural insulated panels (SIPS) and solid wood frames (engineered timber).

Through complying with the STA Site Safe policy, construction site hazards can be reduced. STA members can also purchase and display Site Safe posters providing essential safety advice on all registered Site Safe construction sites.

Outside of the site boundary

The propensity of fire to spread can in certain forms of arrangements be rapid and dangerous, especially when considering adjacent buildings and the risk posed to members of the public. With the potential to cause damage by radiating high temperatures of heat and by direct flame contact, risks outside of the construction site boundary need to be addressed. It's also important to keep in mind throughout this process that people within neighbouring buildings will not necessarily evacuate in the event of a fire.

As previously referenced, one of the most important factors to consider outside of the construction site boundary are the adjoining and nearby buildings. This should be considered throughout the construction process, with initial mitigation methods put in place at the planning stage.

At the planning and design phase of the construction process, the STA Design guide to separating distances during construction considers the different structural timber build methods and the safe distances required between each building. Due to the differing properties of each building material, each presents a different level of risk if on fire, for example some materials emit more heat than others. Therefore, within the design guidance, the various materials have been categorised to produce the most accurate safe distance result.

Calculated by using the building material, the storey height of the building and the size of the emitter face, the guide uses an easy to read table format to provide the safe separation distance for the building.

For example, a four-storey timber frame building with a 15m-emitter face (a building greater than 600m²) would require the following separation distances dependent on the specific building material chosen, see Table 1:

Table 1

Material	Seperation distance
Standard timber building system	18.5m
Reduced fire spread material	12.75m
Fire spread resistant material	7.00m

The guidance provides solutions where new buildings are constructed adjacent to the neighboring building. It also provides routes for a fire engineering solution to be adopted for bespoke and optimized solutions.

The benefits of working with an STA member

The UK's leading timber organisation, the Structural Timber Association represents a wide membership of businesses and construction professionals using structural timber. Leading the industry and raising standards surrounding quality, health and safety, education, technical knowledge and customer service, working with an STA member presents many benefits.

Members of the STA receive regular updates in legislation and the latest guidance, ensuring they have the most up to date technical knowledge at hand. In addition, membership provides access to the free STA technical advice line, where a dedicated team of Chartered Engineers is ready to provide specialist support.

Furthermore, as health and safety is a significant influence within the construction industry as a whole, the STA has implemented a mandatory Site Safe policy for all its members. Introduced to ensure the safety of all professionals onsite and in the surrounding area throughout a building's construction, complying with Site Safe demonstrates the STA memberships' commitment to high standards of practice.

In a sector currently undergoing an industry-wide skills shortage, STA membership ensures a member company has access to the latest training and educational documentation such as RIBA CPD seminars and CPD factory tours. With members throughout the structural timber supply chain; specified training schemes such as the Timber Frame Competency Award and the Erector Academy are also available, providing award-winning training in association with leading bodies such as the Construction Industry Training Board (CITB).

In addition, the STA regularly collaborates with the Local Authority Building Control and National House Building Council to produce useful pocket site guidebooks available to all STA members. Providing best practice advice for the construction of, for example, structural insulated panels, each guide provides technical diagrams and easy to follow steps throughout the installation processes.

Why use structural timber

Timber build solutions provide materials from documented sustainable sources and can be designed easily to achieve high energy efficient buildings, as well as offering a quicker speed of build when compared to wet trade, for example, brick and block methods.

Resulting in a build time that offers faster frame shell time (reports of 30% are not uncommon), more properties can be built, completed and handed over to residents in a shorter period of time. This can reduce onsite labour costs and help ensure that planned construction timeframes are adhered to – removing the risk of costly fines.

In addition, there is a range of cost benefits associated with building with structural timber. Manufactured offsite, architects' plans are strictly adhered to, presenting the trust likeness to the original plans. This in turn results in fewer modifications on site and less unexpected financial costs.

Furthermore, offsite construction also produces a significant reduction in onsite waste. Prefabricated timber frame, produced offsite, reduces the amount of waste generated onsite by up to 40%. The timber components are delivered onsite, cut to size with a detailed ancillary list, meaning less over-ordering of materials and onsite mistakes generating waste. Also, nearly 80% of timber waste generated onsite can be recovered or recycled offsite.

With a Government focus on producing more energy efficient properties, and members of the public hoping to save energy and money, the lifetime appeal of timber frame properties becomes apparent. A majority of heat is lost from a building by uncontrolled ventilation, by providing a more airtight building than both cavity masonry walls and solid masonry walls, structural timber frame can reduce this heat loss. Consequently, the superior airtightness means decreased energy use to maintain the buildings thermal comfort, increased air quality and a lower risk of moisture damage.

Finally, during a period in which the construction industry as a whole is experiencing an extreme skills shortage, with the Royal Institute of Chartered Surveyors (RICS) report revealing bricklayers were hard to find, and 61% of construction firms reported a sharp increase in wage costs, a shorter period onsite using a less labour intensive construction method is ideal.

Further reading and technical support

For all information referenced throughout this document and to view the accompanying Guide to Fire Risk Mitigation video, please visit <http://www.structuraltimber.co.uk/information-centre/technical-library/guide-to-fire-risk-mitigation/>

For further technical support or to become a member of the Structural Timber Association, contact:

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