



16 Steps to Fire Safety on Timber Frame Construction Sites

UKTFA Guidelines and Recommendations



**UK Timber
Frame Association**



wood for good



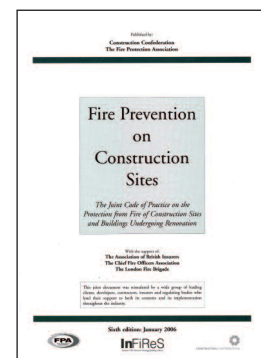
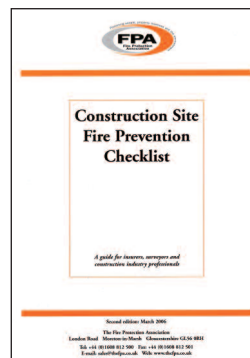
Guidance to Good Practice – an introduction

This guidance to good practice relates to timber frame sites under construction where materials will be exposed and where methods of working and security factors may increase the risk of fire. Although it has been designed for timber frame sites, it is also relevant to other methods of construction.

Jointly funded by the UK Timber Frame Association and wood for good, it is intended to promote best practice for the safety of site workers, the public and for the mitigation of loss from construction site fires.

IMPORTANT This guidance should be taken in conjunction with the 'Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation' published by the Construction Confederation and the Fire Protection Association.

This work has benefitted from wide stakeholder consultation. We would like to thank all those who participated in the working group. Particular thanks to the London Fire Brigade and Health & Safety Executive. We also wish to acknowledge the expert input from our specialist advisers, Dave Berry (Fire & Risk Management Support Services Ltd), Ian Loughnane, Andrew Allison and International Fire Consultants Ltd (IFC). We also thank the Fire Protection Association (FPA) and Construction Confederation for their co-operation in the dissemination of this guidance and their permission to reference their excellent publication, the 'Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation'.



Putting fire in perspective

Fires on construction sites

- The HSE estimates there are around 11 construction fires every day
- The construction industry suffers losses estimated at £400 million a year – £1 million every day
- 2 out of 3 fires in construction industry premises are started deliberately
- Motives range from revenge to fraud, crime concealment and vandalism.



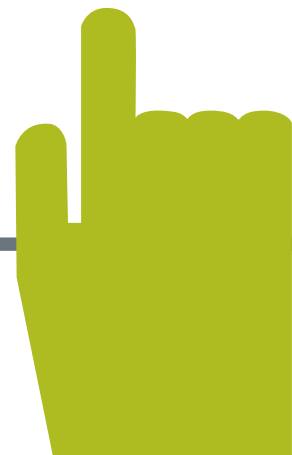
All buildings under construction are vulnerable

- Fire can occur no matter how simple or complex a project, and no matter what the construction material
- Brick and stone flakes and disintegrates
- Concrete can be subject to explosive spalling
- Steel can buckle in severe heat
- Exposed timber frame structures can burn rapidly and generate radiant heat.



Fire in timber frame projects

- Incidents are rare, but fire in multi-storey timber frame has recently hit the headlines
- Timber frame will burn faster and more completely when panels are incomplete
- But timber frame construction is fast, so full fire protection is reached quickly
- The key is to reduce the possibility of a fire event by strict site management and good site security
- This applies to all sites and to all construction methods.





Comply with CDM 2007

Fires on construction sites

- The Construction (Design & Management) Regulations 2007 (CDM 2007) came into force in Great Britain on 6 April 2007
- CDM 2007 applies to all construction projects where people are at work
- It places legal duties on virtually everyone involved in construction work
- On every construction project, the Employer must ensure that all members of the appointed team comply with the CDM 2007 Regulations
- Those with legal duties are commonly known as 'dutyholders'
- Compliance includes:
 - producing a risk assessment for the site, its design and construction, covering the use of any building material
 - assessing the fire risk and potential for damage, to ensure these are kept to a minimum during construction
- Alternative ways of working should be sought if the activities of the main contractor or follow-on trades present a clear risk to the unprotected timber frame.

Step 1





Step 2

Appoint a Fire Safety Co-ordinator

- It is best practice for a Fire Safety Co-ordinator to be appointed for all construction sites
- Large projects should also have a Fire Marshal(s) and Deputy Fire Marshal(s)
- Under CDM Regulations every construction project should have one dutyholder, who is responsible for creating, and regularly updating, the Site Fire Safety Plan, in close liaison with the planning supervisor
- We recommend that this person is also the Fire Safety Co-ordinator, whose role includes liaison with the local emergency services and other duties.





Produce a Fire Safety Plan

- A written plan must be produced, setting out everything to be done on the project to minimise the risk of fire and to protect people working on site
- It must be updated at regular intervals during the construction process and whenever significant design changes occur
- During construction it is the responsibility of the principal contractor, or Fire Safety Co-ordinator, to ensure that all the procedures, precautionary measures and safety standards in the plan are clearly understood and complied with by everyone working on the project
- To understand what must be included in the Site Fire Safety Plan, refer to the 'Joint Code of Practice'.



Step 3





Step 4 - Check, inspect and test throughout construction

- The principal contractor, or Fire Safety Co-ordinator, is responsible for checks, inspections and tests throughout the construction of the site
- The checks may be weekly, daily, or at the end of each shift
- Where 24 hour security is provided, fire checks should be done throughout the night, as well as during holiday periods and weekends, times when sites are most vulnerable to arson
- Written records must be maintained on training, fire drills and other procedures
- For detailed guidance, refer to the 'Joint Code of Practice'.

Step 4

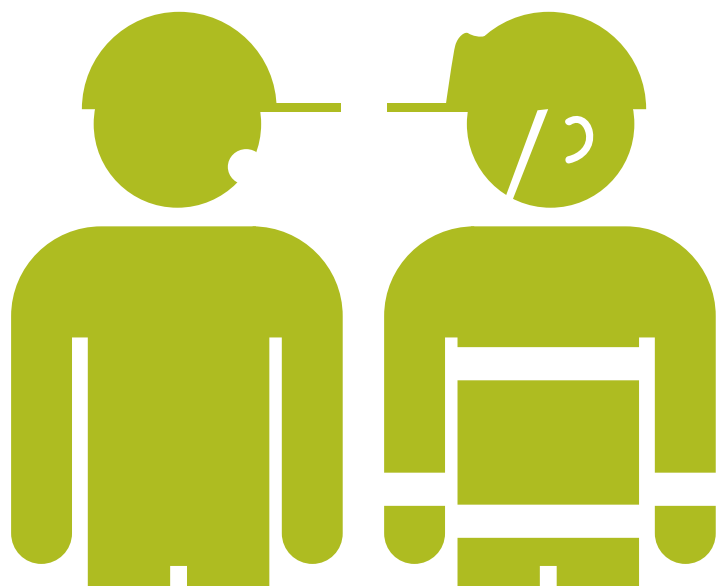




Step 5

Step 5 - Communicate and liaise

- Effective communication and regular liaison with other parties, such as emergency services and security personnel, is extremely important in assessing and managing potential risks during construction
- The principal contractor, or Fire Safety Co-ordinator, on any site should liaise with the local fire service at an early stage and invite them to undertake site inspections and familiarisation tours (see 'Joint Code of Practice')
- For large timber frame projects there must be a specific discussion with the fire service to verify and maintain the source and capacity of water for firefighting
- Provision of firefighting water is a fundamental requirement.





Step 6

Promote a fire-safe working environment

- The principal contractor, or Fire Safety Co-ordinator, must ensure fire safety processes and precautions for the site are fully maintained throughout the entire period of construction, and must promote a 'fire safe' working environment, working in close partnership with the site management and sub-contractors
- For example, once the structure has been erected and handed over by the timber frame supplier, the principal contractor must ensure sub-division fire walls are not compromised by subsequent work such as the installation of services
- Guidance on managing fire drills and fire alarms etc. on site is contained in the 'Joint Code of Practice'.





Make sure your fire detection and warning systems work

- If a construction fire occurs the primary aim is to make sure everyone on site reaches safety as soon as possible, not to save the building
- An automatic fire detection alarm system designed to allow the safe evacuation of the building and site must be installed
- It must be maintained
- Fire alarm devices must be clearly audible for all site operatives on multi-storey construction projects to alert them to a fire before it can compromise their escape route – handbells or whistles are unlikely to be loud enough
- Electrically operated fire warning devices must always be used in timber frame projects, unless it can be clearly demonstrated that other systems are effective
- These devices should be linked to detection devices strategically placed around the structure to provide the earliest possible detection of fire
- Section 8 of the 'Joint Code of Practice' gives further advice on emergency procedures.



Step 7



Step 8

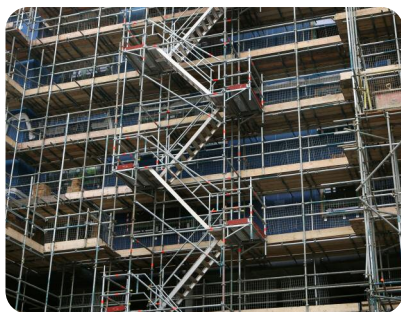
Protect emergency escape routes – the 35 metre rule



- A minimum of 2 emergency escape routes should be maintained at all levels until completion of the internal plasterboard
- For example, a fire escape window in each apartment provides an alternative escape route as long as it is also possible to escape the building via nearby scaffolds or stairways
- Each escape route must be no longer than 35 metres (combined horizontal and vertical travel distance) from
 - either the outside air at ground level
 - or a 30 minutes fire protected stair (either internal or external)
- For internal stairs, fire protection must be provided on all sides to form a protected stair shaft
- For external stairs, the fire protection need only be on the building side of the stair.

A two storey building

- At ground level the maximum distance from any place of work to the outside of the building cannot exceed 35 metres
- Assuming a 3 metre high unprotected stair (from first floor level to ground level), the maximum permitted distance of travel on the first floor to the stair is 32 metres (35 metres less the 3 metres' travel down the unprotected stair)
- Adding fire protection to the stair would increase the permitted travel distance to the stair at first floor level back to 35 metres.



A five storey building

- Assuming a 12 metre high unprotected stair from fifth floor to ground level, the maximum distance at the fifth floor would be 23 metres (35 metres less the 12 metres' travel down the unprotected stair)
- Adding fire protection to the stair would increase the permitted distance to the stair at the fifth floor back to 35 metres.

Additional information

- Once a stair shaft requires fire protection at a particular level, this fire protection must be provided all the way down to ground floor level
- This guidance means that the position and number of escape stairs is determined on a site-specific basis dependent upon the building shape, layout and stair protection
- All means of escape and escape routes must be maintained free of obstructions at all times to ensure efficient escape in the event of fire
- For lighting and signage of escape routes, refer to the 'Joint Code of Practice'.



Build-in fire protection from the beginning



- All buildings should have appropriate fire protection built-in as early as possible, maintained throughout the entire construction phase
- Vertical containment measures within timber frame buildings are considered one of the most logical and practical solutions for high risk sites, once all the usual site security, fire detection and suppression measures have been adopted
- The 'Joint Code of Practice' gives advice on fire compartments within buildings under construction and other fire protection measures
- For smaller, or low risk, sites general good housekeeping and a standard approach may be appropriate (and proven in practice)
- For other sites, the sub-division of the frame by fire-resisting barriers (offering a minimum 30 minutes' fire resistant insulation, integrity and stability) must be considered as part of the strategy for minimising the risk of fire spread during construction
- There is a wide range of options available to designers and builders; the choice of barrier will depend upon the specific characteristics of the development site
- Containment measures may be applicable to all types and height of buildings; if necessary, start from the ground floor level (or other areas most at risk from an arson attack), depending on the outcome of the fire risk assessment
- There may also be alternative means of fire suppression which could influence the degree and nature of compartmentalisation required in the building.



Additional information

- To assess how frequent such barriers should be, refer to the risk assessment flowchart
- For additional guidance on protective covering materials for surfaces, fittings, plant, and scaffolding etc. refer to the 'Joint Code of Practice' (section 10)
- For guidance on portable fire extinguishers, refer to the 'Joint Code of Practice' (section 11)
- For timber frame structures, fire points (with portable fire fighting equipment) must be provided at each floor level and at intervals no greater than 50 metres.

Step 9



Secure the site against arson

- The structural timber used in construction is not easy to set alight; almost all the major construction site fires involving timber frame are known or suspected to be the result of deliberate, determined malicious damage
- Additional guidance should be sought at the earliest stage from the local fire service and police on the risks of any particular location
- As a general rule, timber frame sites must be kept secure at all times
- Access ladders, or stairs to upper levels, must be made secure at the end of each day
- Other possible access points, such as windows, should be made secure as early as practical in the construction programme
- Early plasterboarding and fire-proofing of the ground floor level is also recommended
- Use the UKTFA new risk assessment process, which is proportional to the size of site, the location and proximity to well-known problem areas, and the time and speed of build
- Recommendations can be given on a range of security solutions, including the safe storage of materials and site staff training, CCTV and overnight lighting
- To help assess what security features are most appropriate for a timber frame site, refer to the risk assessment flowchart
- For guidance on basic measures to prevent arson refer to the 'Joint Code of Practice' (section 12)
- Further advice is also available from the Arson Prevention Bureau (www.arsonpreventionbureau.org.uk)

Step 10





Step 11

Protect temporary buildings and accommodation

- All temporary buildings and accommodation such as site huts, offices and materials stores should be protected to ensure they do not create an additional fire risk
- There should be a 10 metre fire break between each temporary building, and between them and the building under construction
- On timber frame sites, the fire break should be 20 metres, or it should comply with the additional criteria referred to in the 'Joint Code of Practice'.



Step 12

Store equipment safely

- Safeguards must be put in place for the safe storage of all combustible materials, flammable liquids and LPG cylinders
- Highly combustible materials must not be stored in the building construction
- The 'Joint Code of Practice' gives details of how and where to store these materials, the appropriate signage etc.
- Storage areas on all timber frame sites must be at least 15 metres from any building (not just from the timber frame building), and containers and drums must not be stored within 6 metres of any building or boundary fence unless the boundary is a wall with at least 30 minutes' fire resistance
- If 'soft-landing systems' are being used to mitigate falls from height, they must have fire retardant covers and must be removed from the frame when they are no longer needed.

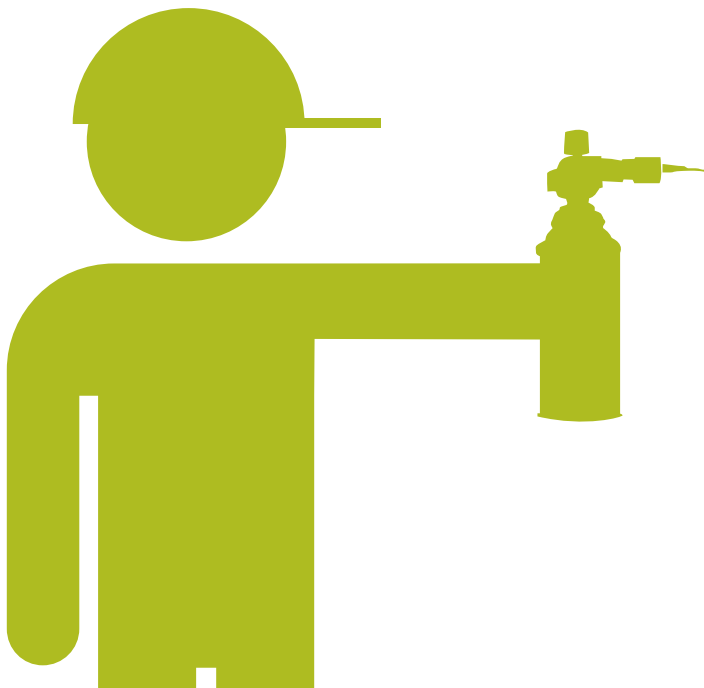




Step 13

Design out hot works

- All designers and trades should aim to design out the need for hot work, such as blowtorching
- Where this is not possible, all site workers must comply with the 'Joint Code of Practice' guidance on hot work
- Any area of hot work must be actively monitored for at least one hour after completion and the area must be re-visited two hours later
- This means that any such work must not be carried within two hours of the end of the working day or when the site is vacated.

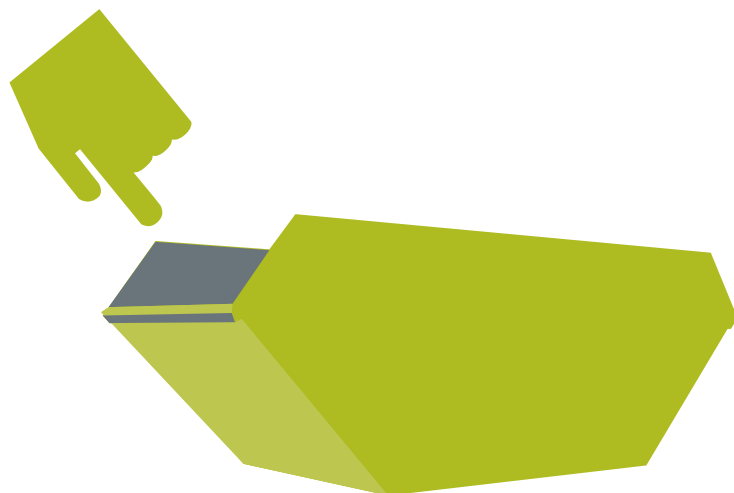




Step 14

Keep the site tidy

- Good housekeeping is essential on all construction projects; untidy sites are usually unsafe sites
- Structural timber does not catch fire easily, but is more vulnerable in the presence of waste materials, such as timber shavings, paper and other flammable materials
- It is the responsibility of the principal contractor, or Fire Safety Co-ordinator, to ensure all areas are cleared of rubbish daily into skips
- Open-topped skips should not be placed within 10 metres of a timber frame building under construction.





Step 15

Keep plant and equipment safe

- Stationary plant, like compressors and generators, as well as petrol or diesel powered vehicles, create a fire risk
- Petrol or diesel powered plant should not be used inside a timber frame building during construction unless absolutely necessary
- If unavoidable, strict controls on fuel storage and refuelling must be observed
- Spillages must be cleaned up and removed from the building at once
- A timber frame building must be protected from any heat generated by working plant
- Commonsense guidance on how to reduce this risk is contained within the 'Joint Code of Practice'.





No smoking

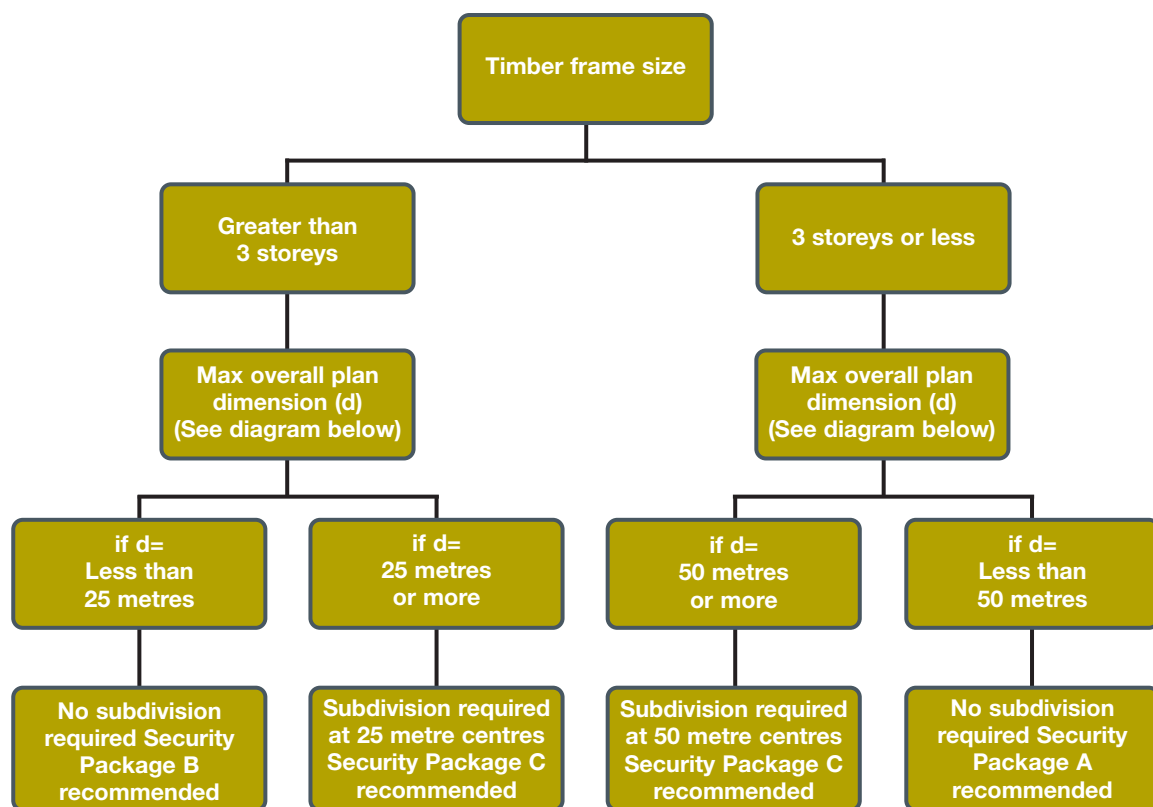
- All timber frame developments must be 'no smoking' sites throughout the construction period
- A smoking ban must be vigorously enforced by the principal contractor, or Fire Safety Co-ordinator
- On high-risk sites, it is best to ban any smoking materials being brought on site
- Alternatively, ensure any smoking materials are kept safely away in a locker room, or provide a smoking area well away from the frame construction.



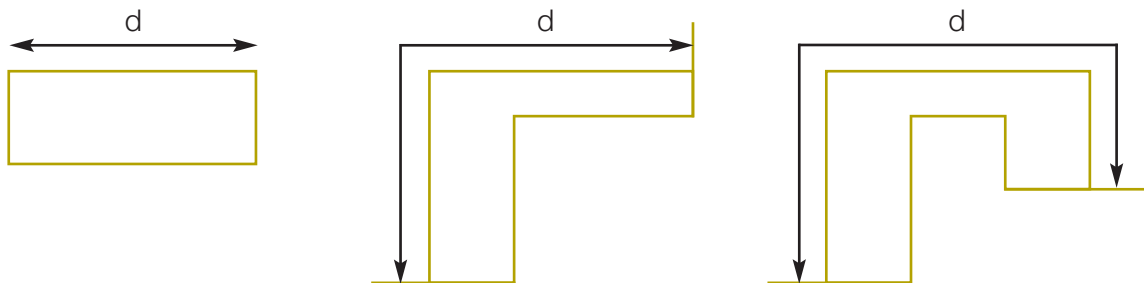
Step 16

Risk Assessment Flowchart

A guide to fire-resisting subdivision and security measures



Definition of maximum overall plan dimension:





Minimum security specifications

Security level	Security features
Security Package A	Non-climbable perimeter fencing Locked site & building access outside site hours
Security Package B	Security Pack A + out of hours watchman Movement-sensitive security lighting
Security Package C	Security Pack B + CCTV + permanent security lighting All ground floor openings secured