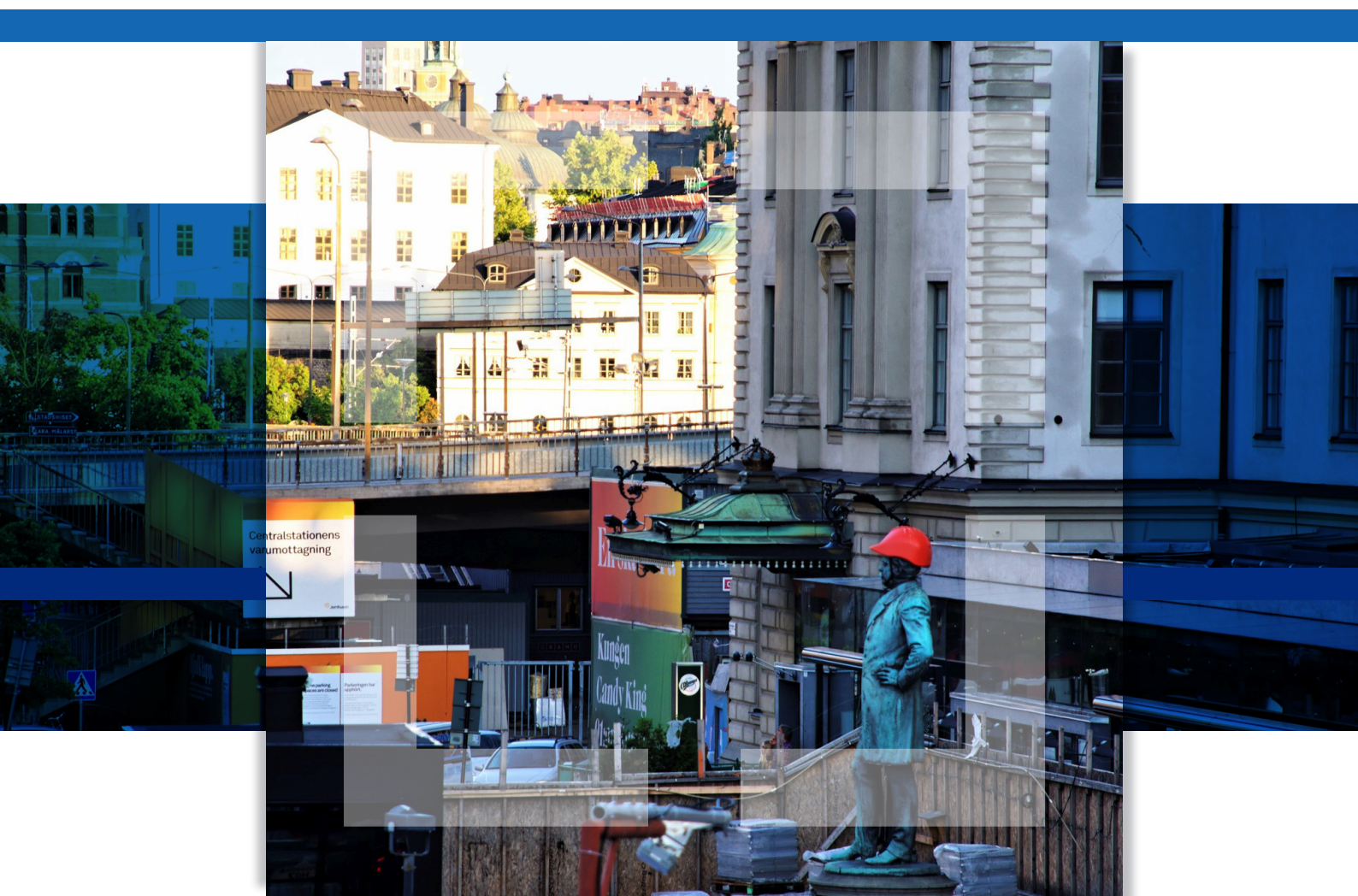


Fire prevention on construction sites

CFPA-E Guideline No 21:2012 F





FOREWORD

The European fire protection associations have decided to produce common guidelines in order to achieve similar interpretation in the European countries and to give examples of acceptable solutions, concepts and models. The Confederation of Fire Protection Associations in Europe (CFPA E) has the aim to facilitate and support fire protection activities across Europe.

The market imposes new demands for quality and safety. Today fire protection forms an integral part of a modern strategy for survival and competitiveness.

The guideline is primarily intended for the public. It is also aimed at the rescue services, consultants, safety companies and the like so that, in the course of their work, they may be able to help increase fire safety in society.

The proposal for this guideline was presented by The UK Fire Protection Association and the author is Adair Lewis from the UK.

This guideline has been compiled by the Guidelines Commission and adopted by all fire protection associations in the Confederation of Fire Protection Associations Europe.

These Guidelines reflect best practice proposed by the members of CFPA Europe. Where the Guidelines and national requirements conflict, national requirements must apply.

Copenhagen, 22 March 2012
CFPA Europe

Jesper Ditlev
Chairman

Stockholm, 22 March 2012
Guidelines Commission

Tommy Arvidsson
Chairman





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1 Introduction

Every year there are many fires throughout Europe on construction sites and in buildings undergoing refurbishment. As a result of these, people are killed and injured, property is irretrievably lost, including structures of historic interest, and commercial and industrial organisations suffer severe disruption to the smooth running of their businesses.

The purpose of this document is to prevent as many fires on construction sites as possible and to reduce the severity of those that do occur. Most fires can be prevented by reducing the number of hazards present, both in terms of potential sources of ignition as well as the fire load. The measures need not be onerous or result in major changes to the patterns of work or the processes and procedures that are undertaken. In most cases there will be no impact on the timescale of the construction process.

All parties concerned in a project, of whatever size, should work together to ensure that adequate but practical measures are introduced during the design and planning stages to achieve the highest standard of general fire precautions are introduced to ensure the maximum level of protection to the contractors and the structure during the construction or refurbishment operations.

This guide applies to construction sites, including those where demolition, alterations, fitting out, renovations, refurbishment or repair work is being carried out. As well as minimising the occurrence of accidental fires, compliance with the measures set out in this guide will also assist in reducing the incidence of malicious fire raising.

The measures in this guide apply to the design, planning, procurement and construction processes, not to the completed structure, which will be subject to other codes. This guide must be read in conjunction with relevant national legislation and the terms of insurance contracts that apply during the relevant period of operations.

This guide presents best practice regarding fire safety on construction sites and its adoption is recommended in all cases. On certain sites, however, its adoption may be a requirement of the insurers. While this requirement may apply in the case of 'large projects', it may also apply where predominantly combustible structures or high rise buildings are under construction due to the high fire risk nature of a project. All parties must check with their insurance advisers at the commencement of each project regarding the application of this guide.



2 General requirements

Planning for fire safety must include making available adequate resources, in terms of time, materials and money for the provision and maintenance of suitable and sufficient general fire precautions for the duration of the project.

A management ethos should be adopted such that suitable procedures and standards are laid down and adopted by all parties concerned in the project regarding the prevention of fires.

The fire prevention and protection measures to be adopted must be set out in the fire risk assessments undertaken in compliance with national legislation implementing relevant European Directives.

The principle contractor shall require sub-contractors to observe their duties relevant to national fire safety legislation to ensure that the fire risk and potential for damage have been properly assessed and are kept to a minimum during construction.

The fire risk assessments in respect of all construction sites must be reviewed periodically in compliance with national legislation. This is important and necessary due to the rapidly changing nature of the hazards on all construction sites.

Fire safety must be recognised as an integral part of the management strategy for every construction site. In each case, therefore, a designated person must be responsible for the fire safety management system and inspections.

Because of the increased risk to personnel on high rise construction sites and other locations where the means of escape may be compromised in the event of a fire, these sites should be identified in the fire risk assessment and in these instances the individual who is responsible for the fire safety management system and inspections should be permanently based on the site.

3 Definitions

Predominantly combustible structures: a building or structure having more than 35% of its elements of construction composed of combustible materials. (For example, some large timber framed buildings.)

High rise construction site:

As defined in national legislation, otherwise:

- Where an upper storey is beyond the effective reach of the fire brigade, or
- Where, because of the height of the structure, the fire brigade have to fight a fire from within the building.

Large project: A project where compliance with this guide is a mandatory requirement of the insurers.



Refurbishment: the alteration, renovation or repair of an existing building or structure;

Temporary buildings: includes prefabricated cabins, site huts, cargo containers, caravans, portable and sectional buildings brought onto site for use as offices, stores, workshops, welfare facilities etc during the course of the works.

Temporary accommodation: a segregated part of the building under construction or undergoing refurbishment that is occupied as offices, stores, workshops, welfare facilities etc for the duration of the works.

4 Site fire safety plan

In compliance with national fire safety legislation the person responsible for the fire safety management system and inspections must ensure that a fire risk assessment is undertaken and is reviewed and updated regularly as construction proceeds. This document forms a key element of the site fire safety plan.

The plan must detail, as a minimum:

- the organisation and responsibilities for fire safety;
- the arrangements for recording fire safety training given to all site operatives;
- general site precautions, fire detection and alarm systems, temporary emergency lighting and portable fire extinguishers;
- the locations of designated smoking areas where they are provided in compliance with no smoking legislation;
- the requirements for a hot work permit regime;
- the location, construction and maintenance of temporary buildings and temporary accommodation;
- an effective evacuation plan and procedures for calling the fire brigade;
- fire brigade access, facilities and co-ordination;
- the instructions given to those on site of the required actions in case of fire;
- security measures to minimise the risk of arson;
- the regime for the storage and control of waste materials;



- the regime for the storage and control of flammable liquids and compressed gases.

5 The role of the person responsible for fire safety

The person responsible for the fire safety management system and inspections on a construction site must:

- ensure that all procedures, precautionary measures and safety standards as laid down in the site fire safety plan are clearly understood and complied with by everyone on the site;
- ensure that a system for the issuing of hot work permits is established and monitored;
- conduct weekly inspections of escape routes, fire safety signage and temporary emergency lighting (where applicable);
- carry out weekly tests of the site fire detection and alarm devices installed on site;
- carry out weekly checks of fire fighting equipment, fire brigade access and fire fighting facilities;
- carry out weekly checks of the routing of temporary electrical cables, the housekeeping on site and the storage of combustible waste materials;
- conduct periodic fire drills to ensure that everyone on site is aware of the procedures and reacts appropriately. This includes rehearsing the procedure for alerting the fire brigade;
- liaise with the local fire brigade and invite them to undertake site inspections and familiarisation tours where appropriate;
- liaise with site security personnel where they are employed;
- ensure that a proper maintenance regime for fire protection equipment is instituted, including the keeping of a written record of all checks, inspections and tests;
- maintain a written record of training of site operatives and of all fire patrols and fire drill procedures;
- where appropriate, appoint a sufficient number of fire marshals who should be properly trained to assist in the evacuation of the site and take first aid fire fighting measures where it is safe to do so.
- during an emergency, execute those duties required for the safe evacuation of everyone on site, ensuring that all staff and visitors report to the assembly points;
- take action to promote a fire safe working environment at all times.



6 Liaison with the emergency services

Liaison should be established with the local fire brigade and an initial site plan should be provided. Thereafter, updated site plans should be available at the entrances to the site for fire brigade use, detailing the following:

- fire brigade access points to the site, fire fighting shafts, fire lifts and temporary hoist facilities;
- dedicated emergency escape routes and staircases;
- sprinkler installations and the location(s) of their stop valves;
- floor loading limitations;
- positions of hydrants on or near the site, dry riser inlets and wet risers;
- the location of temporary buildings and temporary accommodation;
- the location of hazardous items including (but not restricted to) flammable liquids, gas cylinders, gas mains, electrical risers and temporary holes in floor slabs.

Where work on the site may have an impact on traffic movements in the vicinity, liaison should be established with the local police.

The location of suitable medical facilities should be recorded on site.

Where emergency rescues are not undertaken by the local fire brigade details and locations of appropriate rescue services should be kept on site.

6.1 Water supplies

In the case of large projects, or those where structures are being constructed predominantly of combustible materials (such as timber) the fire brigade should be informed and provisions for water supplies agreed before work commences on site.

Adequate water supplies for fire fighting must be available.

- Rising and temporary mains must be provided where planned;
- Water supplies should be tested periodically;
- It may be necessary to move the fire brigade inlet point to rising mains as work progresses.



In the case of large projects and those where the construction is predominantly of combustible materials, following the agreement for water supplies with the fire and rescue service, on-site water flow should be tested and recorded before work commences and thereafter every three months, at which time all valves should be exercised.

Should water supplies fall short of the pre-determined requirements at any time on large projects and those where the construction is predominantly of combustible materials, no hot work shall be undertaken until adequate flows have been restored.

All hydrants must be kept clear of obstructions and be suitably marked.

6.2 Fire brigade access

Fire brigade access routes to the site and buildings must be maintained clear and unobstructed at all times.

Significant changes to the access to the site should be discussed with the fire brigade before being implemented

7 Emergency procedures

On all sites a means of giving warning of fire must be established. Manual devices may be utilised provided that:

- they are clearly audible above background noises in all areas;
- they are distinctly different from any other warning devices on site and can be readily identified as being a fire alarm;
- there are multiple provisions of these devices to ensure that they can be accessed at all times.

Written emergency procedures must be displayed in prominent locations and given to all employees on site.

Nominated personnel such as the security guards must be briefed to open gates or barriers and provide ready access to the site for the fire brigade in the event of an emergency or their other visits to the site.

Clear signs must be provided and maintained in prominent positions indicating the locations of fire brigade access routes, escape routes, positions of dry riser inlets and the fire extinguishers provided for use by trained staff. Signs should be reviewed regularly and replaced or repositioned as necessary.



In the event of a fire, contractors should determine that all of their personnel on site have been accounted for and pass this information to site security staff at the earliest opportunity.

8 Fire protection

The contractor should ensure that the project is designed and planned in sequence to achieve the installation and operation of the following as early as possible and economically reasonable in all cases where they are to be provided:

- permanent fire escape stairs, including compartment walls;
- fire compartments within the building under construction, including the installation of fire doors, and the provision of temporary fire stopping to prevent the passage of heat and smoke;
- fire protective materials to structural steelwork;
- planned fire fighting shafts;
- lightning conductors;
- automatic fire detection systems;
- automatic sprinkler and other fixed fire fighting installations;
- automatic fire detection and extinguishing systems, where these are to be installed to protect large or costly items of equipment or plant.

To protect distribution panels and items of electrical equipment, appropriate extinguishers (such as those containing carbon dioxide) must be provided close to the equipment concerned.

At the end of each working day or shift a fire check must be undertaken, particularly in areas where hot work has been undertaken. Where 24 hour security is provided, fire checks should be undertaken throughout the night, during holiday periods and at weekends.

Costly equipment such as large items of plant should not be installed until the fire protection systems have been commissioned.

When finished surfaces, fittings or expensive items of plant and machinery are to be temporarily protected during construction or refurbishment then care should be taken to select a protective covering material that will not contribute to the fire load or the potential for fire growth and spread.

When flexible materials are used to clad scaffolding these materials should not contribute to the fire load or the potential for fire growth and spread



Where not controlled by the local authority, occupancy of any part of a building site by tenants should not be permitted until all fire protection measures (especially all fire stopping in relevant compartment walls and ceilings) and installations are complete and, where appropriate, have been commissioned.

Construction workers must not live on site. Caravans or similar purpose-built accommodation should be separated from the building under construction or refurbishment and be enclosed by a palisade, fence or hoarding such that there is no interconnecting route between the two areas.

9 Portable fire extinguishers

Personnel must be sufficiently instructed to be able to use the portable fire fighting equipment provided on site.

There should be an adequate provision of appropriate portable fire extinguishers, approved and certificated by an independent, third-party certification body, in accordance with national standards.

Where structures are being constructed predominantly of combustible materials, additional portable fire extinguishers must be provided in accordance with a specific fire risk assessment. This assessment should be recorded as part of the site fire safety plan.

Extinguishers must be located in conspicuous positions near exits on each floor. In the open they should be suitably protected from the environment and prominently signed pictogram.

All portable fire fighting equipment must be serviced annually by a qualified person in accordance with national standards and the maintenance service date recorded, including marking on the appliances.

As work progresses, the adequacy of portable fire fighting equipment must be reviewed as part of the periodic review of the fire risk assessment for the site.

All fire fighting equipment which is not designed to come into use automatically must be easily accessible

Wherever reasonably practicable, 'ride-on' mechanically-propelled site plant should carry an appropriate fire extinguisher.

10 Site security against arson

Arson protection should be a feature of the site fire safety plan and must be addressed as part of the fire risk assessment for the site.



Buildings must be suitably protected against theft and deliberate fire raising in accordance with the fire risk assessment.

The most effective method of deterring trespassers, as well as helping to prevent malicious fire, is to ensure, as far as reasonably possible, that the site is secured against unauthorised entry. This may be achieved by erecting a suitable hoarding around the perimeter of the site or securing all access points such as windows and doors on refurbishment sites.

Flammable liquid stores, liquefied petroleum gas cylinder storage and combustible material stores must be fenced or otherwise suitably protected.

Illumination of the site is an effective deterrent to unauthorised access and is recommended.

The installation of CCTV cameras should be seriously considered on sites where arson, vandalism or theft may occur.

The recruitment of security personnel should be considered on all sites, especially for employment on site outside normal working hours.

A permanent security presence must be provided on sites where the construction is predominantly of combustible materials.

The installation of intruder alarms in temporary buildings and temporary accommodation is strongly encouraged.

11 Temporary buildings and temporary accommodation

The site fire safety plan must include a suitable and sufficient fire risk assessment for all temporary buildings and temporary accommodation. The assessment should be reviewed periodically.

Temporary buildings should be separated from the building under construction or refurbishment and other permanent buildings to provide a fire break, which, where possible, should be at least 10 metres, and 20 metres in the case of sites where the structure under construction is predominantly of combustible materials. Similarly, rows of temporary buildings should be separated in a similar manner to provide a reasonable fire break.

Glazing must be fixed shut and provide a degree of fire resistance as determined by a risk assessment where the glass is within 20 metres of another building or structure.

Where floors of temporary buildings are raised above ground level, the space beneath must be enclosed to prevent accumulation of rubbish, while still allowing under-floor ventilation. No combustible materials should be stored under a temporary building.

Temporary buildings must not be constructed within a building or structure under construction or refurbishment.



Automatic fire detection systems must be installed in temporary accommodation and in temporary buildings when these are:

- within 6 metres of a building under construction or refurbishment;
- used for the storage of flammable liquids or compressed gases;
- used for the drying of clothes.

Temporary buildings or temporary accommodation where cooking (including the use of toasters) is undertaken should have automatic fire detection installed.

Heaters for use in temporary buildings and temporary accommodation must:

- have enclosed elements,
- be fixed in position, preferably above floor level,
- be fitted with securely fixed metal guards,
- be thermostatically controlled
- be maintained in a sound condition.

Carelessly drying of clothes causes fires. Coat stands and drying racks must be firmly positioned at a safe distance from heaters.

All heaters and cooking appliances must be properly installed with adequate ventilation provided. Microwave ovens are preferable to proprietary electric or gas cookers.

Consideration should be given to the installation of automatic sprinkler systems in temporary buildings on sites where construction is predominantly of combustible materials.

Temporary accommodation should not be provided in structures composed predominantly of combustible materials.

Temporary buildings and temporary accommodation should not contain more than the minimum of combustible furniture and fittings.

12 Site storage of flammable liquids and gas cylinders

Flammable liquids, compressed gases and/or LPG must not be stored together.



Containers of flammable liquids, gas cylinders and LPG cylinders should preferably be stored in open compounds which are securely fenced, shaded from the sun and remote from pits, drains and low lying areas.

Appropriately worded warning signs such as 'HIGHLY FLAMMABLE LIQUIDS', 'NO SMOKING' and 'NO NAKED LIGHTS' must be boldly displayed at the entrances to flammable liquid and gas cylinder stores.

Any electrical fittings, e.g. lights and switches, within these stores must be suitable for an environment where a flammable or explosive atmosphere may be present and be selected and installed by competent persons.

Adequate numbers of extinguishers appropriate to the hazard should be sited at the entrances to storage areas.

12.1 Flammable liquids

Stores of liquid fuels must be situated on an impervious base and surrounded by a bund sufficient to contain the maximum contents of the largest drum stored, plus 10 per cent. The bund must not be allowed to accumulate water or waste material.

Where it is necessary to store flammable liquids inside a building under construction or renovation the quantity so stored must be the minimum necessary and no more than a day's supply. The containers must be kept in a store, cupboard or bin which is of fire resistant construction.

Ideally, storage areas should be sited at least 10 metres from permanent and temporary buildings and 20 metres from structures fabricated predominantly from combustible materials. Containers must not be stored within 4 metres of any building or boundary fence unless the boundary is a wall with at least 30 minutes fire resistance and at least 2 metres high. In the latter case, containers and drums should be at least 1 metre below the top of the wall.

Products which could add to the intensity of a fire, such as acetylene or oxygen, or to the toxic hazard in the event of fire, such as chlorine, must not be stored in the same compound as flammable liquids and LPG.

12.2 Gas cylinders

The floors of LPG and other cylinder stores should be paved or compacted level with a suitable hard standing provided for the delivery and dispatch of cylinders. The area must be kept clear of all combustible materials, weeds and rubbish.

The provision of automatic flammable gas detection equipment should be considered for enclosed storage locations.

All permanent LPG and natural supplies and their connections to gas/LPG fuelled appliances must be installed by a competent gas fitter.



Gas supply to appliances should be by fixed piping or armoured flexible tubing.

Gas cylinders should be located outside buildings and be secured and protected from unauthorised interference.

Gas appliances must be fitted with control taps.

13 Acetylene

Acetylene is serious hazard on construction sites and elsewhere. It is a flammable gas that at elevated temperatures and pressures, or following impact of the cylinder, becomes unstable and liable to spontaneous decomposition. As a result, acetylene in cylinders, once suspected to be unstable, constitutes a serious fire hazard.

In these circumstances fire brigade safe working practices include the establishment of a hazard zone of up to 200 metres around the incident and leaving the cylinders involved undisturbed for a period which may be up to 24 hours or more prior to removal. All activities in the designated hazard zone have to cease and the area is evacuated, with significant implications for construction operations and other businesses operating in the area.

The use of acetylene on construction sites should therefore be eliminated wherever possible and alternative methods of cutting and welding be adopted. Where the use of the gas is unavoidable, its presence must be minimised.

Where the use of acetylene is unavoidable, spare cylinders must not be kept on site.

Acetylene cylinders should be removed from the workplace and returned to the storage area as soon as the period of work has been completed. The cylinders should be removed from the site as soon as their use is complete.

Gas cylinders should always be adequately supported, preferably by mounting on purpose built trolleys.

Equipment, hoses and flashback arrestors used with oxyacetylene and similar equipment should be in good condition, set up in accordance with the manufacturer's instruction and be subject to a visual inspection before each period of use.

Gas welding and cutting procedures should only be carried out by trained personnel.

The use of acetylene cutting and welding equipment must be subject to a hot work permit once fitting out work has commenced on site and in all buildings which are being refurbished.



14 Hot work

Alternative methods to hot work should be adopted wherever possible. Where hot work cannot be avoided, the guidance set out in CFPA Europe Guideline 12 should be followed.

Hot work should only be undertaken by suitably trained staff.

When there is no alternative to hot work, the hot work should be undertaken, where possible, in a dedicated area away from the main area of construction work or storage of materials.

A 'permit-to-work' system must be adopted where hot work is being undertaken unless there is no risk of damage to any surrounding property.

Advice is also given in CFPA Europe Guideline 12 concerning the use of tar boilers. Tar boilers and similar equipment should be placed at ground level wherever possible. Only if a risk assessment shows that overall it is a greater hazard to have the boiler on the ground, may it be placed in another location convenient for the works.

15 Electrical supplies and equipment

Electrical supply installations, both temporary and permanent, must be installed in accordance with national standards.

All electrical installations must be undertaken by a competent electrician.

A competent electrician should inspect all installations, especially those of a temporary nature, regularly and test them at intervals not greater than every three months and following all alterations. The results of tests and inspections should be recorded.

Electric cabling, especially temporary installations, should be protected against damage from construction site activities in the vicinity.

Portable electric equipment used on site shall carry durable labels which display that it is subject to periodic inspection and testing.

Where portable or temporary lights are required, these should be located well away from combustible materials.

Where possible, main switches, other than those controlling security and automatic fire detection systems, should be turned off when work ceases and all equipment be unplugged when not in use.

16 Plant and vehicles

Stationary plant powered by internal combustion engines, such as compressors and generators, should, wherever practicable, be positioned in the open air or in a well-ventilated non-combustible



enclosure. They must be sited so that exhaust pipes and exhaust gases are kept clear of combustible materials.

Air intakes must be situated so that the air is cool, uncontaminated and free from flammable gases or vapours.

Fuel tanks must not be filled whilst engines are running. (If fuel is to be stored for site plant, see section 11.)

Compressors should be housed singly away from other plant and in separate enclosure(s).

Plant and equipment must be protected against accidental impact.

Where appropriate, sand trays should be provided to absorb drips of fuel or lubricant. The trays should be changed at regular intervals.

As a general rule the long-term parking of vehicles should not be permitted within 10 metres of the building under construction and, if possible, a separate car park should be available for workers' vehicles.

Under no circumstances should long-term parking be permitted within the building under construction without a suitable and sufficient fire risk assessment being undertaken.

When equipment and materials are being unloaded from or reloaded onto contractors' and subcontractors' vehicles, such vehicles may be permitted to park on site within 10 metres of the building, but for no longer than the duration of unloading or reloading.

17 Stored and waste materials

Where it is reasonably practicable to do so, combustible materials should be stored outside the building under construction or undergoing refurbishment, and should not be so close to it that fire is able to spread from the materials to the building. Wherever possible, stored combustible materials should be at least 10m away from a partially complete structure, and 20m in the case of a predominantly combustible structure.

Waste materials must not be stored within a building under construction or refurbishment.

Where combustible construction materials are stored inside the building the area used for storage should:

- Have controlled access;
- Not be in an area where hot work is being carried out;



- Either be within the area covered by the site fire detection system or be included on the route of regular fire checks;
- Have fire fighting equipment located close by.

Protective covering materials should be available to cover combustible construction materials during storage. (As indicated above, protective covering materials should not contribute to the fire load or the potential for fire growth and spread).

Good housekeeping is essential on all sites as waste material, including all non-essential combustible wrapping and packaging, if allowed to accumulate, provides an excellent starting point for fire. Therefore the introduction of combustible waste should be minimised and all combustible waste, packing materials, wood, shavings and oily rags must be regularly removed from the buildings and disposed of at the earliest opportunity.

Where rubbish chutes are to be used they should be constructed outside the building and be of fire resisting construction. Combustible materials should not be allowed to accumulate in or near the chute.

Where practicable, all collected waste materials awaiting disposal must be kept in an area at least 10m away from the structure upon which work is being undertaken, temporary accommodation, smoking shelters, stores and equipment. (On a site where a predominantly combustible structure is being erected, waste materials should be at least 20 metres from the structure.)

Separate metal bins, with close-fitting metal lids, must be provided for flammable materials, for example, oily rags.

All dry vegetation must be cleared regularly from within 20 metres of all buildings or structures.

Rubbish must not be burned on site.

18 Smoking

A 'no smoking' policy must be established on the site with the exception of designated areas where smoking will be allowed.

Where a smoking shelter is provided it must be:

- Subject to a specific fire risk assessment;
- Constructed of non-combustible material;
- Where practicable, sited at least 10m away from any building or structure (20 metres on a site where a predominantly combustible structure is being erected);



- Provided with suitable metal ashtrays and a separate metal waste bin with a fitted metal lid;
- Provided with a suitable fire extinguisher.

The immediate area around the shelter and the shelter itself should be kept clear of combustible materials including windblown debris and vegetation.

Raised, slatted floors or decking should not be used and concealed or semi open spaces should be sealed to ensure combustible debris cannot accumulate beneath the shelter.

Combustible curtains, canopies and drapes must not be used to protect smokers from the elements.

In no circumstances should the shelter be sited near:

- Windows;
- Ventilation intakes or extracts;
- Entrances and exits from the premises;
- Hazardous materials;
- Waste storage containers (such as skips or bins) or
- Beneath a canopy or low slung eaves.

Areas where smoking is allowed but no shelter is provided must be free of combustible materials and be equipped with fire fighting equipment, metal ash trays and a separate metal waste bin with a fitted metal lid.

No smoking must be permitted in outside areas where fire hazards exist. Such areas will include refuse and storage areas containing combustible materials, flammable liquids (including refuelling supplies), gas cylinders, foam plastics, fibreboard and timber. 'NO SMOKING' notices must be displayed prominently in these areas.

19 High rise construction sites

There are a number of sites where construction progresses at heights such that the time taken to escape from the upper levels to a place of safety away from the building in an emergency is excessive and rescue by the fire brigade using conventional ladders and hydraulic platforms may not be possible.



The problem may be compounded by inadequate water supplies to fight a fire at a high level and the incomplete compartmentation of the building leading to an inordinately rapid spread of the flames. In these circumstances additional provisions are required to ensure the safety of staff as well as minimising the extent and cost of the damage.

In addition to observing the other requirements set out in this guide, when work on a site reaches a height such that the 'high rise construction site' level as defined in paragraph 2.2 has been reached:

- A wet riser should be provided fed by duplicate pumps.
- Fire doors with self closers must be fitted to protect the escape stairs and, where applicable, access to the shaft in which the crane is situated.
- The building should be horizontally fire compartmented at intervals not exceeding 10 floors, to prevent the spread of smoke and flames. This should be done at the earliest opportunity after construction of each of the relevant floors, using temporary fire-stopping materials having not less than one hour fire resistance until the permanent fire-stopping arrangements can be put in place.

20 Sites where construction is of predominantly combustible materials

Where the construction is predominantly of timber, the wood used must have received an appropriate fire protection treatment.

Where a predominantly combustible construction is of four or more storeys or the floor area is in excess of 2500m² in total:

- The building should be compartmented at the earliest stage possible. To accomplish this, fire resistant sheeting to the full height of the compartment walls, to form compartments at a maximum of 20m centres horizontally, should be fixed in place during the erection of each storey.
- The proximity of the incomplete structure to the site boundary and to surrounding buildings should be considered as part of the fire risk assessment.
- Serious consideration should be given to mitigating fire damage by facing exposed timber construction and combustible insulation with non-combustible materials at the earliest opportunity. The use of such materials may be extended to protect windows and door openings not required as means of escape. This approach also provides significant security benefits.
- Even when the perimeter of the site is secure, access to the building under construction should be denied when work is not in progress.



Consideration should also be given to adopting the points outlined above in the case of smaller structures or those not predominantly constructed of combustible materials.

Where multiple large structures constructed predominantly of combustible materials are being built in close proximity to each other the hazards of fire spread from one to another must be considered and minimised as part of the fire risk assessment.

In order to retard the spread of fire up a building through unstopped ducts and shafts, consideration should be given to fitting temporary horizontal fire retardant boarding as work progresses. Permanent fire resisting doors, panels and fire stopping should be installed at as early a stage in the construction process as possible.

21 References

Fire safety basics for hot work operatives, CFPA E Guideline No 12, CFPA Europe, 2006
(Downloadable from the CFPA Europe web site www.cfpa-e.org)

Temporary Buildings, CFPA E Guideline No xx, CFPA Europe (In course of preparation).

22 European guidelines

- Guideline No 1:2002 F - Internal fire protection control
- Guideline No 2:2007 F - Panic & emergency exit devices
- Guideline No 3:2011 F - Certification of thermographers
- Guideline No 4:2010 F - Introduction to qualitative fire risk assessment
- Guideline No 5:2003 F - Guidance signs, emergency lighting and general lighting
- Guideline No 6:2011 F - Fire safety in care homes for the elderly
- Guideline No 7:2011 F - Safety distance between waste containers and buildings
- Guideline No 8:2004 F - Preventing arson – information to young people
- Guideline No 9:2012 F - Fire safety in restaurants
- Guideline No 10:2008 F - Smoke alarms in the home
- Guideline No 11:2005 F - Recommended numbers of fire protection trained staff
- Guideline No 12:2012 F - Fire safety basics for hot work operatives
- Guideline No 13:2006 F - Fire protection documentation
- Guideline No 14:2007 F - Fire protection in information technology facilities
- Guideline No 15:2012 F - Fire safety in guest harbours and marinas
- Guideline No 16:2008 F - Fire protection in offices
- Guideline No 17:2008 F - Fire safety in farm buildings
- Guideline No 18:2008 F - Fire protection on chemical manufacturing sites
- Guideline No 19:2009 F - Fire safety engineering concerning evacuation from buildings
- Guideline No 20:2012 F - Fire safety in camping sites
- Guideline No 21:2012 F - Fire prevention on construction sites
- Guideline No 22:2010 F - Wind turbines – Fire protection guideline
- Guideline No 23:2010 F - Securing the operational readiness of fire control system



- Guideline No 24:2010 F - Fire safe homes
- Guideline No 25:2010 F - Emergency plan
- Guideline No 26:2010 F - Fire protection of temporary buildings on construction sites
- Guideline No 27:2011 F - Fire safety in apartment buildings

- Guideline No 1:2012 N - Protection against flood