

Fire Safety Management – Sites Standard

(SHEMS-STD-GR-021)

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1 Introduction

The purpose of this standard is to set out the requirements to;

- Prevent fires during construction work
- Design to prevent fires during construction work
- Design to enable implementation of an emergency plan during construction work
- Assess fire risks
- Develop a Fire and Emergency plan prior to starting construction
- Implement the Fire and Emergency plan
- Periodic Review and update of fire risk assessments and Fire and Emergencies plan
- Review fire risk management at the close of the project

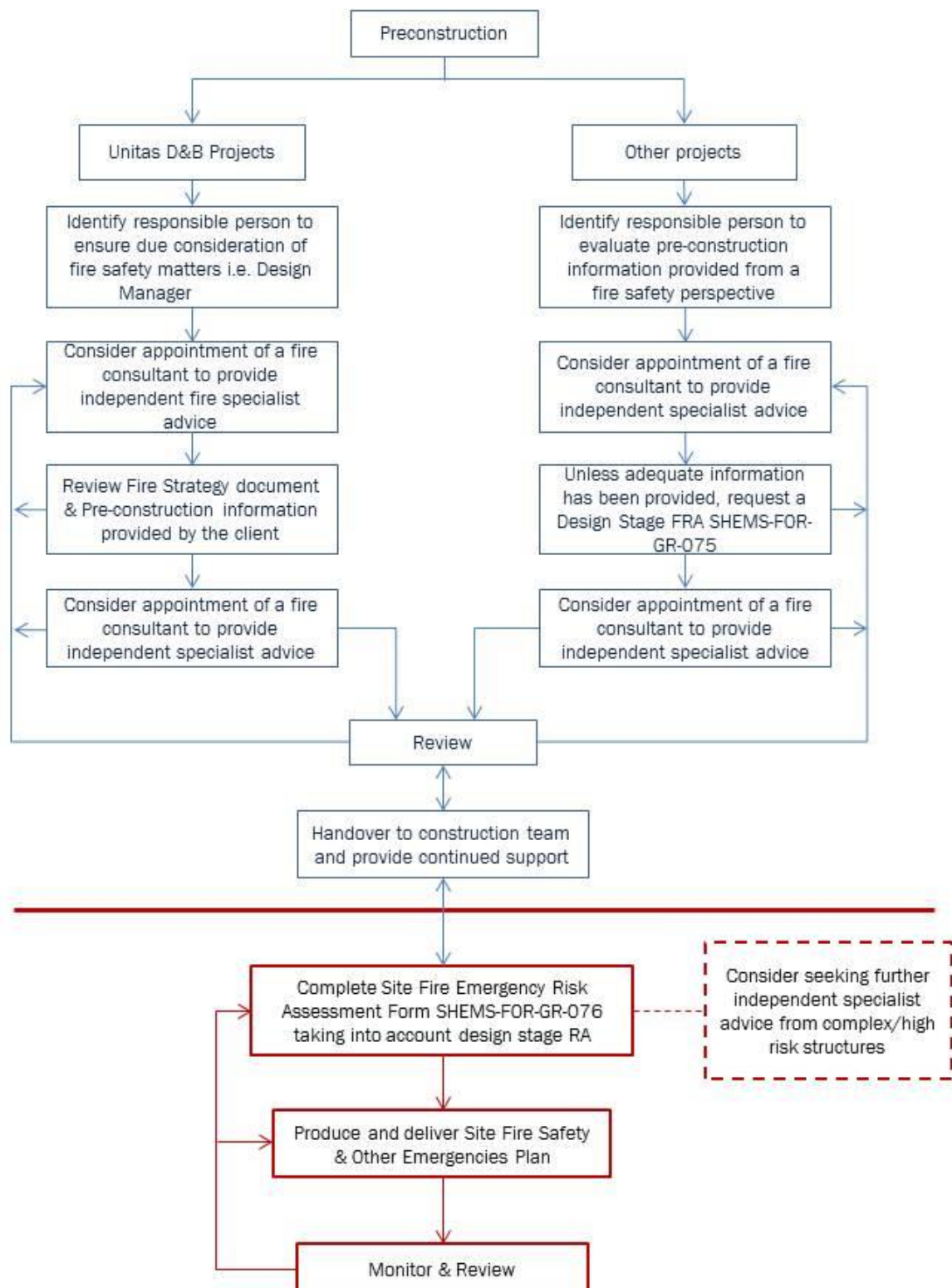
2 Scope

The scope of the SHEMS covers all persons, workplaces and Operations in the UNITAS business.

Exceptions will be documented through a SHEMS Appendix B process (SHEMS-FOR-GR-999), and authorised by the Director responsible for coordinating SHE.

Unitas SHEMS manual (SHEMS-STD-GR-003) provides guidance and signposting for the compliance, implementation, monitoring, audit and review of our systems, and demonstrating continual improvement.

3 Process Map



Unitas Requirements

3.1 Introduction

This standard focuses on the Fire and Emergency plan associated with construction and renovation as detailed/referenced within the Major Incident Response Plan (MIRP) Standard SHEMS-STD-GR-013.

Reference to the Joint Code of Practice (JCOP) on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation is essential when using this standard to develop or subsequently review a site specific Site Fire Risk Assessment (SHEMS-FOR-GR-076)

A model template is provided at Appendix H of the Construction Phase Plan (Form GR 080 – Fire and other emergency plan) this document to facilitate production of such a plan.

Compliance with the JCOP is a requirement imposed on Unitas by its Insurers.

The other primary source of guidance is the HSE's guidance publication *HSG168 Fire Safety in Construction Work*.

Refer also to the UK Timber Frame Association (UKTFA) guidance *16 Steps to Fire Safety on Timber Frame Construction Sites* where relevant.

The initial plan and relevant control measures are required to be in place prior to work commencing and be communicated to all concerned via induction. Subsequent amendments following review are to be recorded and similarly communicated.

A flowchart summarizing the actions to be taken is provided on page 4 of this document.

Refer also to the Design Stage Risk Assessment SHEMS-FOR-GR-075. This document should contain details of considerations and decisions taken during the design process which must be passed to the team e.g. fire engineered solutions which while having Building Control approval for the finished structure, result in travel distances exceeding those in table 1 of HSG 168, see section 4.2.1, during construction and therefore requiring consideration of additional precautions such as temporary fire partitions and early scheduling of elements of the permanent works.

The fire strategy document which is produced by or for the designer primarily for Building Control approval of the design, is also a useful document to refer to when producing the construction phase site Fire Risk Assessment SHEMS-FOR-GR-076. In addition to fire safety precautions, the plan shall be used to record control measures in respect of any additional hazards where risk assessment identifies a requirement for emergency controls e.g. tower crane or safety net rescue or hazards associated with the clients undertaking such as a bomb threat warning at MOD establishments, a chemical incident at a processing plant or environmental incident pollution control.

The plan should clearly identify the project by title, when it was produced, by who and the date and outcome of any subsequent reviews.

The completed plan, associated risk assessments and monitoring records should be filed in the *Construction Phase Plan*.

4 ORGANISATION

4.1 Responsible & Competent Persons

The responsible person during construction, demolition or refurbishment is the Project/Operations/Construction Manager, supported by the Site Fire Safety Coordinator and where appropriate Fire Marshals.

The responsible person is responsible for establishing and maintaining adequate fire safety and emergency precautions on site.

For design and build contracts a competent person (design), typically the Design Manager, is nominated for the design/pre-construction phase to ensure that due consideration is given to fire safety matters. For complicated or high risk projects, consideration should be given to the appointment of an external fire consultant early in the design development process. The competent person (design) ensures that a handover to the construction team takes place and that continued support is provided throughout the

construction phase.

For non-design and build projects, a responsible person is to be nominated, by Unitas to undertake an evaluation of the pre-construction information provided by the client under CDM from a fire safety perspective. Any identified shortfalls or concerns should be brought to the attention of the Principal Designer for resolution.

The following fire risk management process diagram summarises the required interface between design and construction:

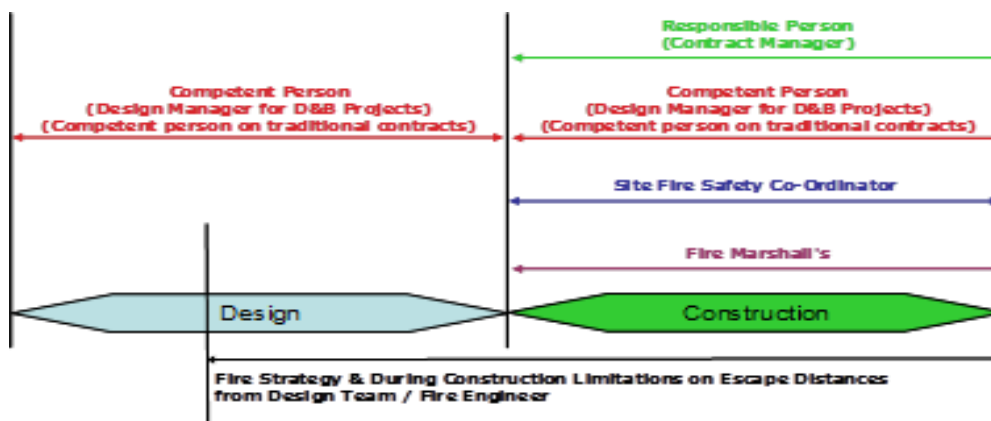


Figure 1: Fire arrangements within design & construction

Note that where the client maintains partial control of the premises e.g. during an occupied refurbishment, duties and responsibilities in respect of fire prevention and interface with the client's undertaking require to be clearly defined before construction work commences

4.1.1 Site Fire Safety Coordinator

The Site Fire Safety Coordinator (SFSC), typically the Project/Site Manager is to be appointed in writing by the Project/Construction Manager using SHEMS-FOR-GR-006. This form provides details of the role, responsibilities and training requirements for appointees. A deputy is also to be similarly appointed to provide sickness and holiday cover etc.

4.1.2 Fire Marshalls

Sufficient fire marshalls are to be appointed by the Project/Site Manager in writing using SHEMS-FOR-GR-005. This form provides details of the role, responsibilities and training requirements for appointees, with numbers being determined by risk assessment, to assist in the implementation and monitoring of the site Fire Safety and Emergency Plan including provision for sickness and holiday cover etc.

4.1.3 Emergency Contacts

Provide details and telephone contact numbers of appropriate emergency contacts and out of hours contact arrangements.

4.2 General Arrangements

The following are the general arrangements to be incorporated within the *site Fire and Emergencies Plan* which is to be subject to monitoring and review and be amended as appropriate throughout the construction phase.

4.2.1 The Current Fire Hazard Rating (Low/Medium/High)

The following extract from Table 1 of HSG 168, provides the definition of a low, normal or high fire hazard rating and the associated maximum travel distances for a person to reach a place of safety for both enclosed and semi-open structures. The default rating to be applied on Unitas sites is NORMAL, unless it can be demonstrated by risk assessment that a high rating is applicable. All work involving timber framed buildings

are to be rated as a high fire hazard. Where it can be demonstrated by risk assessment that selection of a low rating is appropriate, this must be signed off by a Director in consultation with the SHE Manager.

Travel Distances

	Fire hazard		
	Low	Normal	High
Enclosed structures:			
alternative	60 metres	45 metres	25 metres
dead-end	18 metres	18 metres	12 metres
Semi-open structures			
alternative	200 metres	100 metres	60 metres
dead-end	25 metres	18 metres	12 metres

Notes:

Semi-open structures are completed or partially constructed structures in which there are substantial openings in the roof or external walls, which would allow smoke and heat from any fire to readily disperse.

Alternative escape routes should, where possible, proceed in substantially opposite directions. The principle is that they are sufficiently apart that any fire should not immediately affect both routes. As such they should not be less than 45° apart.

Dead-end travel distances are significantly restricted. This is so people have time to negotiate their way past any fire between them and the exit, before it threatens their escape.

Low hazard areas are those where there is very little flammable or combustible material present and the likelihood of fire occurring is low. Examples could be steel or concrete clad framework or structures in pre-fitting-out stages.

Normal hazard areas will cover the majority of situations. Flammable and combustible materials are present, but of such a type and disposition that any fire will initially be localised.

High hazard areas are locations where significant quantities of flammable or combustible materials are present of such a type that in the event of a fire rapid spread will occur, possibly accompanied by evolution of copious amounts of smoke or fume. Examples of where they might occur are demolition or refurbishment work involving oil contaminated wooden floors or linings, and fixing floor and wall coverings using flammable adhesives.

Figure 2: Travel Distances.

Source HSE guidance, Table 1, HSG168 Fire Safety in Construction Work.

4.3 Design Stage Risk Assessment (FIRE)

This assessment (SHEMS-FOR-GR-075) is completed by the Design Manager and is handed over to the construction team for inclusion in the planning, procurement and construction processes. It should contain details of considerations and decisions taken during the design process which will impact on construction e.g. fire engineered solutions which while having Building Control approval for the finished structure, result in travel distances exceeding those in table 1 of HSG 168 during construction and therefore requiring consideration of additional precautions such as temporary fire partitions and early scheduling of elements of the permanent works such as the early installation of:

- Wet and dry risers
- Compartmentation
- Internal or external fire escape stairways
- Fire doors, especially in protected stairway escape routes

- Permanent fire detection and alarm systems

Note that for projects that are not design and build, the designer should be requested to complete SHEMS-FOR-GR-075, if the equivalent information has not been provided by other means. Any refusal to co-operate with this request is to be referred to the Principal Designer and brought to the attention of the SHE Manager/Advisor.

Appointment of an external fire consultant to provide independent advice should always be considered.

4.4 Construction Phase Fire Risk Assessment (SHEMS-FOR-GR-076)

This needs to be completed for the temporary accommodation and the site in general and should be completed taking into account the content of the Design Stage Risk Assessment SHEMS-FOR-GR-075 above, the interpretation and implementation of which may require input from various disciplines such as safety and health, planning, design, estimating, surveying, procurement. Complex or high risk projects may require input from independent fire safety consultants etc.

4.5 Records of Appointment

Copies of current appointments of the Site Fire Safety Co-ordinator, their deputy and fire marshals must be retained within the projects register and clearly displayed on the noticeboards.

4.6 Site Layout Plan

A sketch or drawing identifying the position of;

- Emergency services access
- Fire hydrants on or near site
- Wet or dry riser inlets
- Fire fighting shafts/lifts
- Lifts or temporary hoists
- Flammable gas/liquid storage areas
- Mains services gas and electric
- Fire points and alarm call points
- Sprinkler installations
- Emergency lighting provision
- Emergency escape routes and staircases
- Assembly points
- Waste and material storage areas
- Any designated smoking areas
- Any floor loading limitations
- Temporary buildings/accommodation
- Any additional identified hazards to emergency services personnel

4.7 Emergency Services Liaison

Provide details of any records of liaison with the emergency services during design.

At the commencement of construction liaise with the fire and rescue service providing them with a copy of the site layout plan and record the outcome of discussions, including confirmation of adequate ground bearing pressures and surfaces for fire appliances, supplies of water for fire fighting purposes, availability of lifts/hoists and any future update or site visit requirements. Invite them to undertake site inspections and familiarisation tours. Agree arrangements and nominate who will be responsible for briefing emergency services upon arrival at an incident regarding the nature and location of the incident and any current potential site hazards.

Note the JCOP requirement, item 9.4, regarding HIGH fire risk sites, to have the flow rate of water supplies for fire fighting purposes tested prior to work commencing and at three monthly intervals thereafter and to record results.

Where the site will have an impact on traffic movements, liaison with the local police should be established.

Provide details of the nearest hospital with an accident and emergency (A&E) department. Include

arrangements for notifying emergency services.

4.8 Fire Safety Emergency Precautions

The site fire safety emergency precautions are to include as a minimum the following;

- Fire Alarm – provision of an effective means of warning of fire audible above site background noise. Note that a visual and audible system may be required in noisy areas or where there are workers who suffer from hearing impairment. The default selection being for push button linked fire alarm systems, unless it can be demonstrated that a lower specification e.g. individual howler fire alarms, are an appropriate choice. Hand cranked “turn and burn” bells and hand held air horns **are prohibited** on Unitas sites.
- Automatic Fire Detection – systems, linked to the fire alarm system are to be provided for timber frame structures and should be considered in other high risk forms of construction or where there is potential for a fire to occur and develop unnoticed until it threatens peoples’ means of escape.
- Written emergency standards and plans clearly displayed detailing what to do in the event of;
 - Discovering a fire
 - Hearing the alarm
 - Process for calling the Fire Brigade, including who makes that call and who meets and briefs them on arrival.
- Clearly displayed sketch or drawing indicating current;
 - Designated escape routes and stairs
 - Assembly points
 - Fire points
 - Alarm call points
 - ‘You are here’ – position/location
- Standards for establishing and maintaining;
 - Clear access routes generally and specifically escape routes
 - Adequate access routes for emergency services
 - Signage of escape routes and where applicable provision of emergency lighting
 - Sufficient practicing and recording of the results of evacuation drills and accounting for all personnel on site. Frequency to be determined by risk assessment and changing circumstances/personnel, **but not exceeding 3 months.**
 - Liaison where appropriate with other interested parties e.g. the client when refurbishing occupied premises and the person in control of adjacent or adjoining occupied premises
 - Enhanced control measures in respect of any identified vulnerable persons e.g. the elderly or infirm, young or disabled persons, those with impaired vision or hearing. This may require provision of personal emergency evacuation plans
 - Nominated personnel e.g. security, to maintain clear access for emergency services
 - Nominated personnel to meet and brief emergency services upon arrival on site regarding the nature of the incident and any hazards currently on site presenting a risk to them
 - Preventing avoidable increase in fire loading e.g. build-up of combustible materials or waste
 - Informing the workforce of emergency plans and their responsibilities through induction and tool box talks
 - Adequate first aid provision, and the process for calling the emergency services
 - Effective monitoring and review

4.9 Fire Protection

Identify fire safety considerations and decisions taken during design which will impact on construction e.g. programming of installation of permanent or temporary firefighting systems, fire stopping material, compartmentation and protected fire escape stairs etc. These will require monitoring throughout the construction phase to confirm their installation and adequacy.

The maximum travel distances included in table 1 of HSG 168 should be complied with and maintained at all times.

Note that the lighting of bonfires is prohibited on Unitas sites.

4.10 Hot Work

Hot work presents a major fire risk and therefore alternative methods should be adopted where reasonably practicable. For instance, off site prefabrication of M & E/iron work.

When there is no reasonable alternative, where possible, the hot work should be undertaken in a designated area away from the building under construction and combustible materials.

All hot work is to be subject to a hot work permit which includes a requirement for post work fire checks. Fire extinguishers employed as part of a hot work permit are to be in addition to those distributed within fire points and are to be positioned in the immediate vicinity of the hot work. Refer to the JCOP section 16 for detailed requirements for hot work and the section below regarding fire extinguishers.

4.11 Portable Fire Extinguishers

An adequate number of appropriate fire extinguishers are to be provided and serviced as a minimum every twelve months by a competent person/contractor. **Each fire point should generally comprise of one foam and one powder extinguisher, however this is subject to a site specific risk assessment.** Refer to JCOP section 11 for detailed requirements regarding portable extinguishers. Water extinguishers are prone to misuse and freezing. Fire extinguishers should be:

- Sited in designated fire points in conspicuous positions near to exits on each floor or as determined by risk assessment
- Be subject to regular monitoring and review to confirm they remain serviceable and are adequate in numbers and type as the project develops

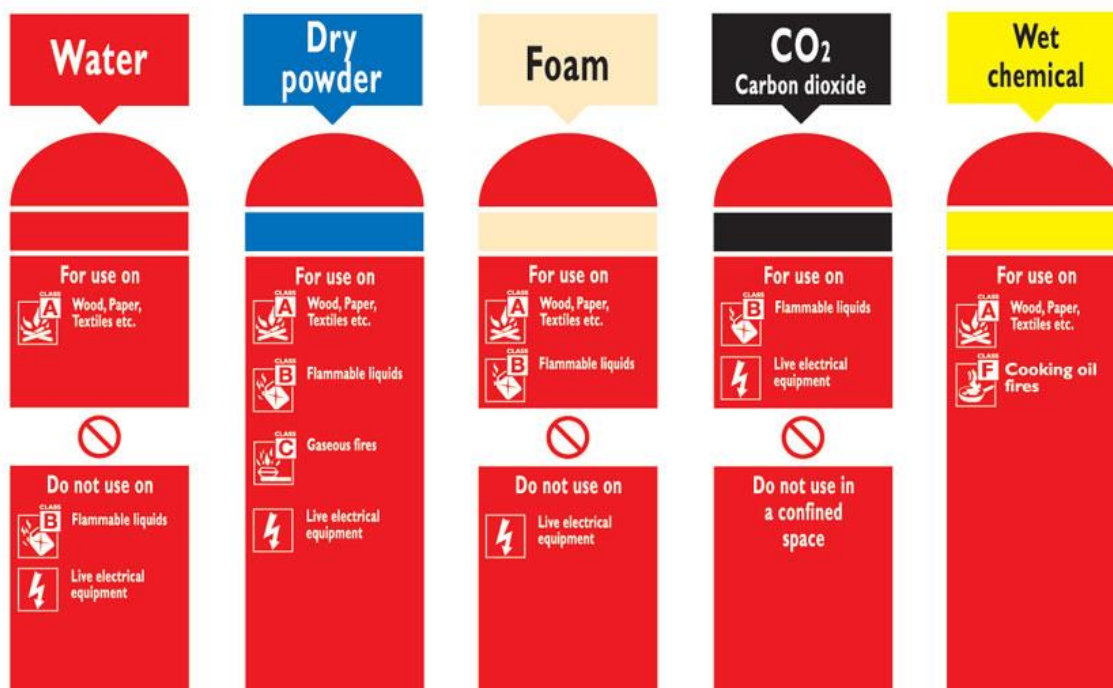
The primary purpose of fire extinguishers is to tackle small fires to prevent them becoming larger. Putting out larger fires is the fire service's role and should not be tackled by site personnel.

It is important that everyone on site knows how to use the fire-fighting equipment provided without putting themselves at risk. All fire-fighting equipment should include clear operating instructions which can be communicated via a tool box talk by a trained site fire safety co-ordinator SHEMS-FOR-GR-006 or fire marshal SHEMS-FOR-GR-005.

Guidance on which type of fire extinguisher to use on various classes of fire is provided below. Those carrying out higher risk activities, such as hot work, need to be competent in the use of the fire-fighting equipment provided and should be able to demonstrate attendance of training to achieve this.

Refer to buyers for details of national agreements regarding the procuring and servicing of fire extinguishers.

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4.12 Temporary Covering Materials

Temporary covering materials used to provide protection to finished surfaces and items of plant and equipment during construction or refurbishment are to conform to the requirements of LPS1207. Sheeting or debris netting used to clad scaffolds is to conform to the requirements of LPS1215.

4.13 Security against Arson

Provide details of measures to be taken to protect against arson e.g. effective perimeter hoarding/fencing, lighting, on site security, remotely monitored CCTV systems including loud halers and infra-red beam perimeter systems, securing of doors and windows on refurbishment projects, the protection of flammable liquid and gas storage areas etc. Refer to JCOP section 12 for detailed requirements regarding site security against arson. Timber framed buildings are more at risk to arson attacks and must have a higher level of security provided.

Ensure skips and waste materials e.g. pallets are stored away from buildings and combustible materials.

4.14 Temporary Buildings/Accommodation

Refer to the JCOP section 13 for detailed requirements regarding the selection and positioning of temporary buildings and accommodation

4.15 Storage of Flammable Liquids and Gas

Refer to the JCOP section 14 for detailed requirements regarding the storage on site of flammable liquids and gasses.

Acetylene at elevated temperatures and pressures, or following impact to the cylinder, becomes unstable and liable to spontaneous decomposition. Once suspected to be unstable acetylene cylinders constitute a serious fire and explosion hazard. **Fire service requirements include the setting up of a total exclusion**

zone of up to 200 metres around unstable acetylene cylinders and leaving them undisturbed for up to 24 hours or more, with significant potential implications.

It is therefore important that the use of acetylene is eliminated wherever reasonably practicable on construction sites and that alternative methods of cutting and welding are adopted.

Where no reasonable alternative exists, refer to section 15 of the JCOP for detailed requirements regarding acetylene.

4.16 Waste Materials

Good housekeeping is essential, waste material if allowed to accumulate provides an excellent starting point for fire. All combustible materials are to be removed from in and around the building at least once a day. Provide a summary of the controls contained within the Site Waste Management Plan to avoid unnecessarily increasing the fire loading on site. Ensure that any combustible waste skips are located as far as reasonably practical away from the building under construction, temporary accommodation, smoking shelters, stores and equipment.

4.17 Plant and Vehicles

Refer to the JCOP section 19 for specific requirements relating to the positioning and refuelling of plant and equipment powered by internal combustion engines.

4.18 Stored Materials

Where reasonably practicable combustible materials should be stored in a secure area outside of buildings under construction or refurbishment, and should not be so close to it that fire is able to spread from it to the building. Storing combustible materials in locked metal containers is recommended.

Where combustible materials are stored within the building the storage area should;

- Have controlled access
- Not be in an escape route
- Not be in the area of any hot works
- Be in the area covered by the site fire detection system, where provided
- Have fire extinguishers located close by

Where ever practicable remove combustible packaging to reduce the risk of fire.

4.19 Smoking

A no smoking policy should be established throughout the site, with the exception of any designated smoking areas. Refer to the JCOP section 21 for guidance on setting up "smoking areas."

4.20 Environmental Pollution Control

Refer to the Environmental Management Standard Pollution Prevention (SHEMS-STD-GR-064) when establishing an environmental incident response plan to control spillages or unauthorised discharges of potential pollutants to air, water or land. Potential pollutants include oil, silt, cement, plaster, building chemicals and water/foam (fire-water) used by the Fire Authority to extinguish a fire.

As part of the above response plan, the site must have in place a 24 hour emergency call out arrangement with specialist spill contractor capable of responding quickly to an oil or chemical spill. Veolia and contact telephone number, (Emergency Response Helpline on **08000 282 821**), must be clearly displayed on the plan and be included in the site Fire and Emergencies Plan.

In the event of a fire, site management must notify the EA if there is a risk of fire-water entering the surface water drainage system/controlled waters. Similarly, the local sewerage authority must be notified of any risk of fire-water entering the foul drainage system. The SHE Manager must be informed of all such notifications as soon as possible.

4.21 Additional Site Specific Emergency Arrangements

Control measures in respect of any additional hazards where risk assessment identifies a requirement for emergency controls must be recorded, e.g. tower crane or safety net rescue or hazards associated with the clients undertaking such as a bomb threat warning, a chemical incident at a or environmental pollution control.

4.22 Monitoring and Review

Regular monitoring and review of fire and other emergency precautions is essential as the project progresses and circumstances change. The following are the minimum standards to be applied:

Weekly Fire Safety Monitoring undertaken by the fire safety co-ordinator, with findings recorded on SHEMS-FOR-GR-089 Combined SHE Weekly Monitoring.

Monthly review of the Construction Stage Fire Risk Assessment SHEMS-FOR-GR-075 and Site Fire Safety and Other Emergencies Planning using SHEMS-STD-GR-021 by the site fire safety coordinator, with findings recorded on the record sheet.

5 Specific Arrangements

5.1 High Rise Construction Sites

High rise construction sites are defined as sites where the workforce is at risk by being outside the distance by which the fire and rescue service can affect a rescue by mechanical means (currently 30 metre reach from the position where a fire appliance may be parked).

Refer to the JCOP section 22 for requirements in respect of high rise construction sites which will impact on both design decisions and construction.

5.2 Timber Frame Construction

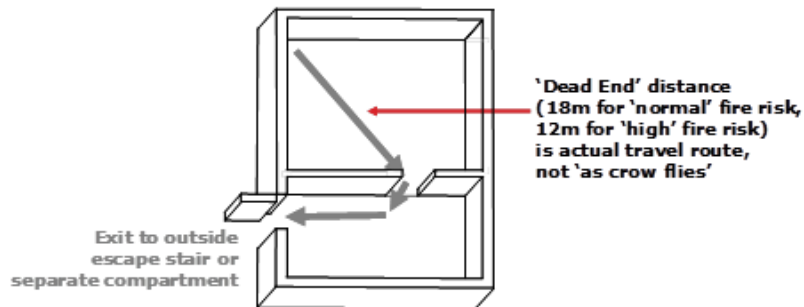
Refer to the JCOP section 22 for specific measures to be implemented during the construction of large timber framed structures (four or more storeys). See also the UK Timber Frame Association *16 Steps to Fire Safety on Timber Frame Construction Sites*.

In addition to the requirements of the JCOP Unitas's insurers also have additional guidance for working on timber framed construction, contact the Insurance department for further details.

Extreme caution must be applied where the use of timber frame construction is being proposed in built up populated areas. Agreement to proceed must be sought from your SHE Manager. Further advice is available from the HSE, Fire Brigade, Unitas insurers and Unitas SHE department.

Appendix 1- Travel Distance Examples

Fig. 01
Single Means of Escape – 'Dead End'

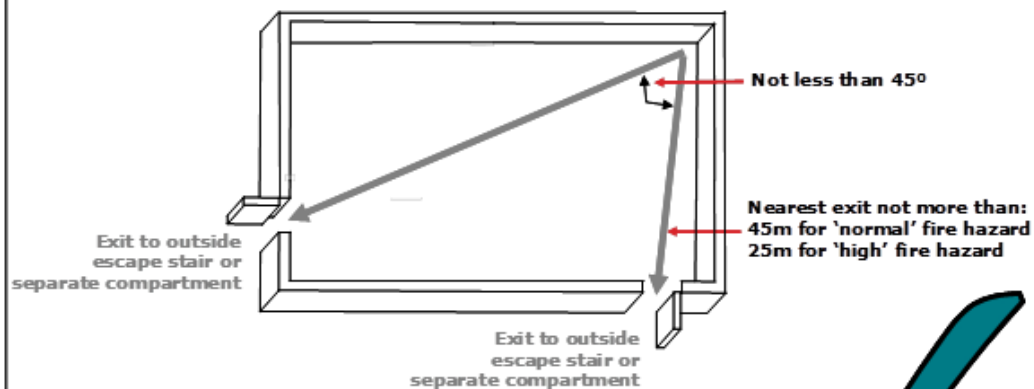


Maximum Travel Distances
(Table 1, from HSG 168)

	Fire Hazard		
	Low	Normal	High
Enclosed Structures:			
Alternative Escapes	60m	45m	25m
Dead End	18m	18m	12m
Semi-Open Structures:			
Alternative Escapes	200m	100m	60m
Dead End	25m	18m	12m



Fig. 02
Two 'Alternative' Means of Escape

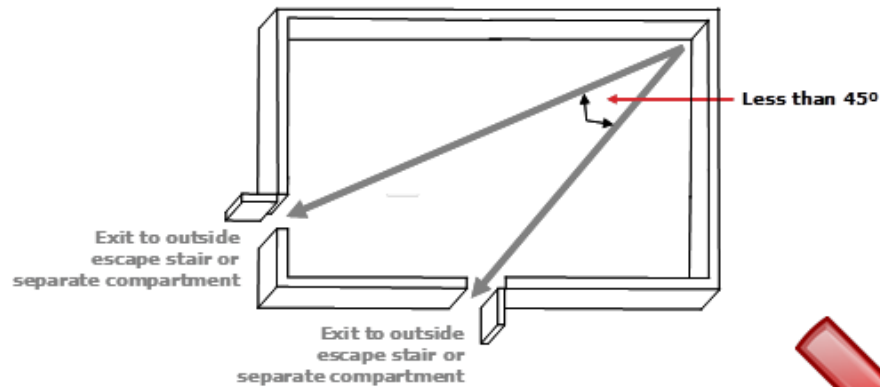


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Dead End	25m	18m	12m



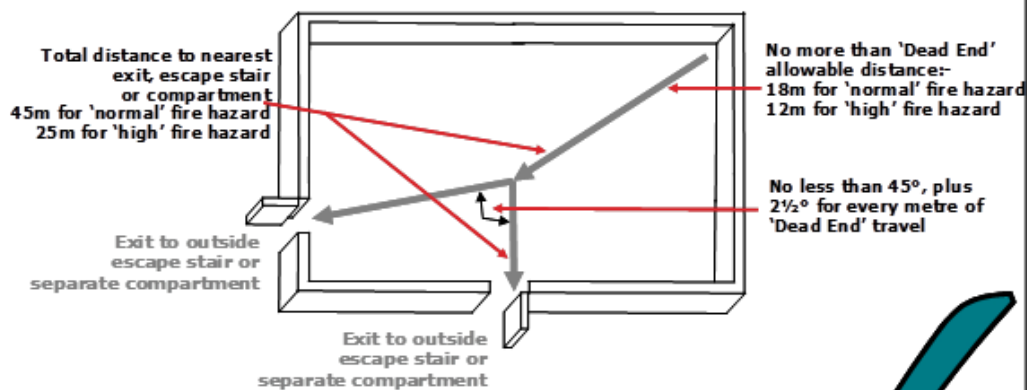
Fig. 03
Two 'Alternative' Means of Escape – Escapes Close Together



Maximum Travel Distances
(Table 1, from HSG 168)

	Fire Hazard		
	Low	Normal	High
Enclosed Structures:			
Alternative Escapes	60m	45m	25m
Dead End	18m	18m	12m
Semi-Open Structures:			
Alternative Escapes	200m	100m	60m
Dead End	25m	18m	12m

Fig. 04
Two 'Alternative' Means of Escape – Escapes Close Together



Maximum Travel Distances
(Table 1, from HSG 168)

	Fire Hazard		
	Low	Normal	High
Enclosed Structures:			
Alternative Escapes	60m	45m	25m
Dead End	18m	18m	12m
Semi-Open Structures:			
Alternative Escapes	200m	100m	60m
Dead End	25m	18m	12m

Fig. 05
Escape Routes When Partitions Constructed

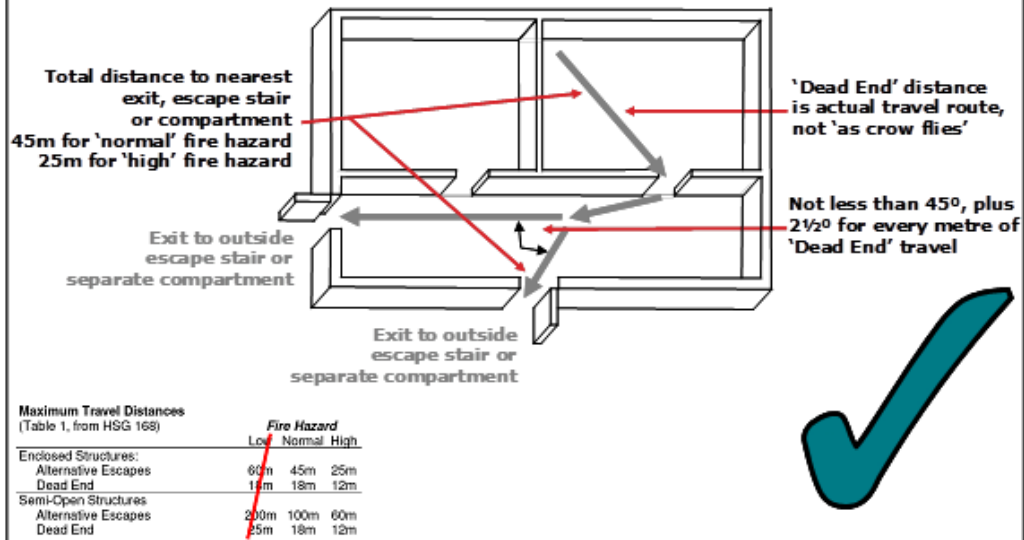


Fig. 06
Another Potential 'Dead End' Situation

