

**CONSTRUCTION PROJECT
PROPERTY RISKS**

**RISK DIRECTORY
2021/2022**

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RISK DIRECTORY 2021/2022

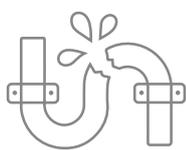
INTRODUCTION

Every year there are a large number of major losses on construction sites and buildings undergoing refurbishment, costing the insurance industry millions of pounds. Major incidents can result in damage to buildings and equipment leading to consequential losses from delayed projects along with serious injury and loss of life.

Property damage losses during construction projects commonly include:



FIRE



WATER DAMAGE



VANDALISM



THEFT

This guidance seeks to provide a summary of key legislation and risk reduction and control measures throughout construction projects.

KEY LEGISLATION

THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015 (CDM)

These Regulations apply to all construction work in Great Britain and its territorial seas, in respect of both employers and the self-employed. The key aim of the Regulations is to make health and safety integral to the management of construction projects and encourage all those involved to work together to improve the planning and management of projects from the outset. It also enables hazards to be eliminated or reduced at the design or planning stage and the remaining risks can be properly managed. Further information on this and other construction-related health and safety legislation is available from Griffiths & Armour upon request.

THE REGULATORY REFORM (FIRE SAFETY) ORDER 2005

The Order applies to most non-domestic premises and workplaces including construction sites within England and Wales with similar legislation in place in both Scotland and Northern Ireland. Before considering specific duties under the Order, it is worth noting that several sections make reference to a responsible person. A responsible person is defined as:

- '(a) in relation to a workplace, the employer, if the workplace is to any extent under his control;*
- (b) in relation to any premises not falling within paragraph (a)*
 - (i) the person who has control of the premises (as occupier or otherwise) in connection with the carrying on by him of a trade, business or other undertaking (for profit or not); or*
 - (ii) the owner, where the person in control of the premises does not have control in connection with the carrying on by that person of a trade, business or other undertaking.'*

Specific areas covered by the Order include:

- General fire precautions.
- Risk assessment.
- Principles of prevention.
- Fire safety arrangements.
- Fire-fighting and fire detection.
- Emergency routes and exits.
- Procedures for serious imminent danger and danger areas.
- Maintenance.

DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS 2002 (DSEAR)

DSEAR places duties on employers and the self-employed to protect people from dangerous substances in the workplace. Dangerous substances under the Regulations are defined as substances used or present at work that could, if not properly controlled, cause harm to people as a result of a fire or explosion or corrosion of metal. Dangerous substances include: solvents; paints; varnishes; flammable gases, such as liquid petroleum gas (LPG); dusts from machining and sanding operations; pressurised gases; and substances corrosive to metal.

The Regulations require that dangerous substances are identified and appropriate measures taken to either remove them or control them. This includes the removal of ignition sources where explosive atmospheres may occur. There must also be appropriate emergency plans in place and employees must be provided with information instruction and training.

THE ELECTRICITY AT WORK REGULATIONS 1989

This legislation covers the requirements for temporary electrical installations on construction sites including in relation to inspection and testing.

THE SMOKE-FREE (PREMISES AND ENFORCEMENT) REGULATIONS 2006

This legislation prohibits smoking in most public buildings and workplaces in England. Similar legislation applies in Scotland, Wales and Northern Ireland.



RISK

RISK REDUCTION AND CONTROL MEASURES

Risk management should be considered at each stage of the construction project including the design, pre-construction and construction phases, which are now considered in turn.

DESIGN PHASE

The design phase provides the opportunity to eliminate or reduce many of the risks to the project. This can include fire and water damage risks, which are detailed below:

FIRE PREVENTION

This highlighted section needs to be replaced with:

A key element of the Fire Prevention in Building Design is the use of non-combustible materials, such as those products approved by the Loss Prevention Certification Board (LPCB). Details of these products are available here:

[CLICK HERE](#)



In recent years, Modern Methods of Construction (MMC) have become increasingly common. These methods involve a move away from traditional on-site construction methods in favour of increased production of component parts off-site which are then assembled on site to create the finished structure. Irrespective of the method of construction, the materials used should be non-combustible whenever possible. The key component parts of a building structure to consider include:

- Structural framework, which is usually concrete, steel or timber.
- Curtain glazing.
- Exterior cladding products.
- Roof and wall insulation materials.



Combustibility of building materials is classified by EN13501-1 Fire Classification of Construction Products and Building Elements with ratings ranging from A1 & A2 (non-combustible), to F (combustible – easily flammable). Ideally A1 or A2 rated products should be used.

The environmental performance of buildings is an important consideration in the design phase, and this is often improved with the use of insulation materials, some of which can be combustible/flammable, such as polystyrene, polyurethane and polyisocyanurate. These products do not have an A1 or A2 classification and increase the combustibility of a building. Use of non-combustible insulation, such as mineral wool, can be designed into the project, although this may need to take into account the need for thicker and heavier insulation.

Other considerations include:

- The extent of structural timber in larger buildings, particularly those over three storeys in height or with a floor area over 2500m². Further information is available from the Structural Timber Association, by clicking here:

[CLICK HERE](#)



- Preventing fire and smoke spreading throughout a building during the construction phase by fire compartmentation, usually achieved by the early installation of fire doors and fire stopping.
- The provision of adequate water supplies for firefighting purposes, such as the provision of dry or wet risers in high-rise projects.
- Reducing the amount of hot work required, in particular on site during the project, for example by selecting materials that do not require fabrication or grinding.

Special consideration needs to be given for high-rise construction projects, which are defined as those buildings which are outside the distance by which the fire and rescue service can effect a rescue by mechanical means. This is currently 30 metres from the position a fire appliance may be parked. Once a building reaches this height, a wet riser should be provided.



In addition, high-rise projects may have incomplete fire compartmentation as the construction progresses, or there may be inadequate water supplies to fight a fire. To address this the building should be horizontally fire compartmented at no more than 10 floors. Risers, shafts, ducts and similar openings between floors should be closed off with doors or dampers having 30-minutes fire resistance. Electrically operated fire alarms must be provided throughout the height of the building.

During the design phase, the Principal Designer should contact the local Fire Brigade to identify their requirements for access to the site.

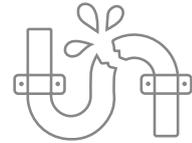
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WATER DAMAGE

As part of the design phase, it is essential to have a full understanding of the risk of flooding and any flood risk assessment that may have been undertaken as part of a planning application. The Environment Agency Flood Map for Planning should be used to identify where a site may be at risk from flooding. The map is available here:



[CLICK HERE](#)



A risk assessment should also be undertaken to cater for other possible types of water damage, such as burst pipes, leaks and poor drainage. Areas to consider include:

- Different types of plumbing systems and installation methods.
- The susceptibility of the building under construction to water damage.
- Height of the building.
- Classification and certification of building materials.
- The design of drainage systems and the presence of drainage points.
- The presence of in-built system safeguards.
- Temporary water supplies during the construction period.
- Isolation and shut off valves.

The design should also aim to exclude those features which can increase the extent of water damage, such as:

- Combined service risers or open risers, and riser design to prevent vertical water flow.
- Concealed pipework routes.
- Poorly positioned water tanks, for example directly above an electrical switchroom.
- Electrical cables laid directly onto floor slabs.
- Excessive elbow joints.
- Lack of hanger supports, thrust blocks and free-supporting pipework.

OVER 300 FIRES
ON CONSTRUCTION SITES
IN UK EVERY YEAR



SECURITY

A number of key security features can be specified at the design phase, which whilst intended for the finished project, can still be of benefit during the construction phase. These can be broken down into two broad categories:

- Physical protections, such as in relation to doors, windows and the site perimeter.
- Electronic protections, such as CCTV and intruder alarms.



PRE-CONSTRUCTION PHASE

FIRE

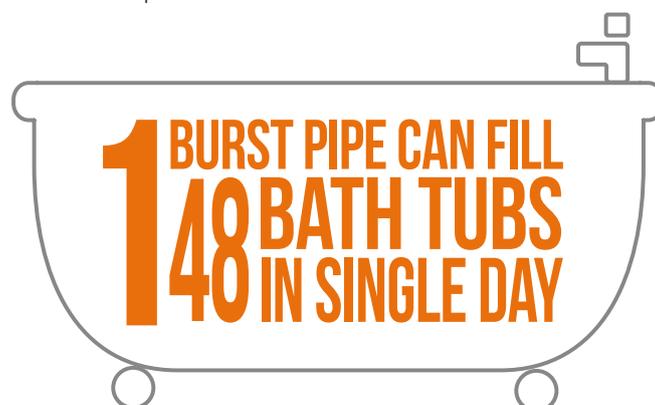
The CDM Regulations stipulate that a suitable construction phase plan is produced by the Principal Contractor, within which there should be a fire safety plan. This document must be prepared before the construction phase commences.



The fire safety plan should be based on the findings of the fire risk assessment and should include the following:

- The responsibilities in relation to fire safety and the provision of fire safety training to site operatives.
- General site precautions, such as fire detection and alarm systems, firefighting equipment etc. Early installation of such systems is preferable.
- Provision of clear access to the site and buildings for firefighting purposes.
- Arrangements for fire escape and emergency procedures.
- Location of designated smoking areas, if provided.
- Requirements for a Permit to Work system, including hot works.
- Temporary buildings and accommodation, such as cabins, containers, welfare facilities etc.
- Liaison with the local Fire Brigade, particularly in relation to prevention of fire spread from the site.
- Storage of materials, particularly flammable and highly flammable substances, such as fuels, paints, thinners and LPG.
- Maintenance of temporary electrical installations.
- Arrangements for waste minimisation and management.
- The use of fire retardant coverings and sheeting materials.
- Any proposed use of photovoltaic solar panels and safety measures during installation.
- Security measures to reduce the risk of arson.

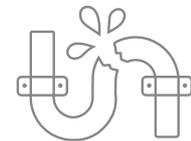
For all projects, there is a requirement for a 'responsible person' to be appointed under The Regulatory Reform (Fire Safety) Order 2005. The responsible person must have received appropriate training and be competent in the role.





WATER DAMAGE

A water management plan should also be drawn up as part of the pre-construction phase, including the completion of a water damage risk assessment. The plan should detail the responsibilities and procedures to be followed, both in advance of work commencing and in the event of an incident. The plan should include the following considerations.



- Roofing and cladding should ideally be completed and the envelope made water-tight before internal works commence. If this is not possible, internal fit-out works should be appropriately phased to reduce the risk of water damage.
- Permanent drainage should be installed at the earliest opportunity or means put in place to allow the discharge of water from the building.
- Avoiding filling water systems before frost protection measures are in place during colder periods.
- Bunding to be in place before water tanks are filled.
- Installing and commissioning water management devices, leak detection and alarms at an early stage.
- Emergency procedures including location of and access to water shut off valves.
- Temporary water services routed to minimise potential damage due to escape of water. These should ideally be routed outside of the building.
- Valve labeling should differentiate between Main, Primary and Critical valves.

Further guidance, including a template Water Management Plan, is available here:

[CLICK HERE](#)





SECURITY

It is important that the construction phase plan takes into account the need for ongoing site security as the construction phase progresses. The setting up of the construction site is a key stage in establishing appropriate levels of security and forms the basis to allow security enhancements to be made as the security risks increase. Areas to consider as part of the construction phase plan include:



- Site perimeter security.
- Access control arrangements, both for vehicles and personnel.
- Location and secure storage of items considered attractive to thieves, such as tools, copper pipe and electrical goods. The quantity and duration of such items on site should be minimised.
- Secure storage of fuels, flammables and gas cylinders.
- Procedures for receiving, storing and monitoring quantities of construction materials and fittings.
- Arrangements for the storage and removal of combustible waste.
- Arrangements for the parking and storage of vehicles, plant and keys on the site.
- Installation of security lighting.
- CCTV systems including off-site monitoring.
- Manned guarding.
- Intruder alarm protection within both the building under construction or renovation and also to temporary site buildings and accommodation.



CONSTRUCTION PHASE

Whilst the risk control measures within the construction phase follow the same categories of fire, water damage and security, these are covered below in the following specific topics:.

GENERAL FIRE PRECAUTIONS

During the construction phase, the responsible person is required to take such general precautions as will ensure the safety of their employees and others. These precautions include:



- Ensuring that all persons working on the construction site understand and comply with the fire safety plan.
- Where appropriate, establish a hot work permit system and monitor compliance.
- The undertaking of weekly fire alarm tests as determined by the risk assessment.
- Completing weekly inspections of fire escape routes, firefighting facilities, routes of electrical cables and other work areas.
- Maintaining liaison with the local Fire Brigade and inviting them to undertake site inspections.
- The provision of the initial site plans to the local Fire Brigade and updated ones as the construction phase develops.
- Ensuring firefighting equipment is maintained and records retained.
- Providing fire safety training to site operatives and keeping records of fire drills undertaken.
- Ensuring safe evacuation of the site during fire drills and correct use of assembly points.
- Appointing at least one competent person to assist the responsible person.

FLAMMABLE LIQUIDS AND LPG

The storage and use of all dangerous substances on the site should be subject to a DSEAR risk assessment. The general principles to follow in relation to flammable liquids and LPG are:



- All flammable liquids and LPG containers should be stored in a secure open compound, ideally shaded from the sun and away from basements, pits and excavations. Bulk flammable liquid storage areas should be bunded to a minimum capacity of the largest container plus 10%.
- Storage locations should be as far as possible from permanent and temporary buildings, ideally at least 20 metres away.
- Where such storage is not possible, the minimum amount should be held on site.
- Storage of other cylinders which would increase the intensity of a fire, such as oxygen or acetylene, should be stored separately. The use of acetylene on construction sites should be eliminated where possible, and if not, the number of cylinders on site should be kept to the absolute minimum.
- Appropriate warning signs should be displayed.
- Any electrical fittings in storage areas must be suitable for such environments and be installed and inspected by competent persons.
- Designated areas should be provided for fuelling plant and vehicles

HOT WORKS

Whilst the Design Phase should eliminate as much hot work as possible, there should be a hot work permit system in place to manage all such activities. It is important that the permit procedures are in place from the commencement of the project, and all staff involved in the issue and sign-off of hot work permits are suitably trained. The key risk control measures for hot work are:



- All hot work must be undertaken in a dedicated area away from storage areas and free from combustible materials.
- Any combustible materials which cannot be removed must be covered with non-combustible material.
- Where work may cause sparks, such as welding, cutting or grinding, non-combustible screens must be used.
- Any gas cylinders used in the work must be supported in a vertical position.
- Welding and cutting procedures should only be undertaken by trained and competent operatives.
- Specific precautions should be taken for tar boilers, for example keeping the lid on the boiler at all times and not leaving the boiler unattended.
- Fire extinguishers must be on hand for use in the event of fire breaking out.
- A fire watch of at least 30 minutes (60 minutes in high fire hazard areas), should be maintained from at least 60 minutes after hot work is completed.



TEMPORARY BUILDINGS AND ACCOMMODATION

The presence of portacabins, containers, welfare facilities etc. should be considered as part of the fire safety plan. They should be constructed of materials which do not contribute to the growth of a fire and ideally provide 30-minutes' fire resistance.



Key considerations are:

- Structures should be located at least 10m from the building under construction or refurbishment and the area between kept clear of combustibles.
- Where the temporary building is raised above ground level, combustible materials or waste should not be stored or allowed to accumulate beneath.
- Fire escape routes from temporary buildings should lead away from the structure on which work is being undertaken.
- Temporary buildings should not be installed within large timber framed structures.
- Portable heaters should not be used within temporary buildings and fixed heaters should be fitted with fixed metal guards.
- Wet clothes must not be located close to or on top of heaters.
- Any cooking appliances should be properly installed with adequate ventilation provided. Ideally, naked flame cooking and the use of deep fat fryers should be avoided.
- Automatic fire detection and intruder alarms should be installed within temporary buildings.
- On new build sites, site operatives must not occupy a part of the structure as living accommodation.

ELECTRICITY

Both temporary and permanent electrical installations must be in accordance with the Electricity at Work Regulations 1989 and BS7671: Requirements for Electrical Installations. The key risk control measures include:



- All electrical work to be undertaken by a competent electrician.
- Installations should be inspected regularly and tested at least every three months.
- Electrical cabling should be protected from damage by site activities.
- Temporary lighting should be located away from combustible materials and should not be unprotected quartz halogen lighting.
- Installation of photovoltaic (solar) panels should be in accordance with relevant guidelines and the panels should be isolated during the construction phase.

43% INCREASE IN ARSON ON CONSTRUCTION SITES BETWEEN 2015 & 2017

WASTE MATERIALS

Good housekeeping is essential on construction sites to ensure that all combustible waste materials are not allowed to accumulate. Typically, combustible waste includes packaging materials, timber, sawdust and oily rags, each of which should be removed from the workplace at least daily. Separate lidded metal bins must be provided for oily rags.



Where rubbish chutes are required from upper floors of a construction project, they should be of non-combustible materials and located outside the building.

The increased recycling of materials on construction sites does lead to an accumulation of materials, so recycling collection points should be kept as far as possible from buildings.

The burning of vegetation and waste on site should be prohibited unless absolutely necessary. Environmental permits for waste burning are issued only in rare circumstances, and where burning is permitted, it should be subject to a fire risk assessment and be subject of a permit to work.

PLANT AND VEHICLES

Items of stationary plant, such as compressors and generators, should be located in the open air or a well-ventilated location. They should also be kept clear of combustible materials. The refuelling of plant and vehicles should be undertaken in designated areas and the engines are switched off and cooled down.



Vehicles should be parked at least 10 metres from buildings and ideally a separate parking area should be provided for operatives' vehicles.

SMOKING

A 'no smoking' policy should be introduced throughout the construction site with the exception of designated areas, if provided. Designated smoking areas should be located as far from structures as possible and if a smoking shelter is provided, this should be constructed of non-combustible materials. Metal bins and ashtrays should also be provided and a suitable fire extinguisher in place.



STORED MATERIALS

Combustible materials should be stored externally wherever possible and far enough from buildings to prevent fire spread. Storage within metal containers is recommended, particularly on high risk sites. Where storage within the building is unavoidable, the following precautions should be taken in respect of the storage area:

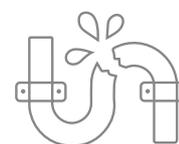


- Controlled access arrangements established.
- Hot work prohibited in the area.
- Fire detection to be in place.
- Firefighting equipment available.
- Regular fire checks undertaken.

Stored materials may also be vulnerable to water damage and where possible, these should be stored off the ground and protected by waterproof non-combustible coverings.

WATER DAMAGE

All contractors should work to a range of industry recognised codes, including BS6700:2006 in relation to water supplies to buildings. All installation work of water systems should be undertaken by competent operatives.



During the construction phase, the following measures should be considered:

- Any temporary water supplies should be switched off outside business hours.
- A water management device to be installed on the incoming riser which should shut down when water flow exceeds pre-set parameters. The water management device should have integral battery power back-up.
- Leak detection to be installed in vulnerable areas, such as bunds, base of risers, vulnerable cable trays etc.
- Site security guards to be trained to provide an early emergency response including shut down of water systems. Unmanned sites should have personnel cover for emergency out of hours' response.
- Use of a Water Work Permit for any work on live plumbing systems.



On completion of the water systems installation, all joints should be subject to a visual inspection as part of commissioning and for at least two weeks thereafter. If visual inspections are not possible, leak detection at strategic points is recommended. All pipework should be subject to a pressure testing regime in accordance with manufacturer's guidelines. This generally involves an initial air test followed by sectional hydraulic testing at a minimum of 1.5 times the working pressure for a minimum duration of one hour for metal pipes and two hours for plastic pipes. Full pressure testing should then be undertaken for a recommended period of eight hours. All sections of the pipework should be certified to have met the test standard.

There should be a full audit trail of all components used, the testing regime, commissioning procedures and approval certificates.

SECURITY

Arson continues to be a major cause of fires on construction sites and the fire safety plan should consider suitable security measures to prevent this. The principal considerations include:



- Ensuring the site is secured against unauthorised entry by use of perimeter hoardings and securing doors and windows.
- Keeping the site entrance should be locked and secured outside normal working hours.
- Periodically inspecting the integrity of perimeter security.
- Repositioning security lighting as required following alterations to the site.
- Liaising closely with on-site security guards and reviewing security logs.
- Reviewing CCTV recordings following incidents.

Security of construction plant is a major concern, and it is recommended that such items are security marked and logged on an approved asset register, such as the CESAR scheme:

[CLICK HERE](#)



Mechanical plant may also be secured by the installation of alarms and immobilisers



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STRATEGIC RISKS



BUSINESS CONTINUITY AND SUPPLY CHAIN



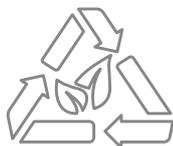
CYBER RISKS



ONLINE RISK MANAGEMENT SYSTEMS



LIABILITY CLAIMS DEFENSIBILITY



HEALTH, SAFETY AND ENVIRONMENT



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PROPERTY RISKS

If you would like to discuss any of these risk management services please contact us on 0151 236 5656 or by [email](#).



ACKNOWLEDGEMENTS, REFERENCES AND RECOMMENDED FURTHER READING

- Fire Prevention on Construction Sites: Joint Code of Practice - FPA
- Guidance Note on Managing Escape of Water Risk on Construction Sites - CIREG
- Fire Safety in Construction - HSE Books

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