Communities and Local Government

CFRA
CHIEF FIRE & RESCUE ADVISER

Fire and Rescue Service Operational Guidance

GRAs
generic risk assessments

GRA 3.3
Fighting fires in domestic chimneys

Generic Risk Assessment 3.3

Fighting fires in domestic chimneys

August 2011

London: TSO

TSO
information & publishing solutions

Published by TSO (The Stationery Office) and available from:

Online
www.tsoshop.co.uk

Mail, Telephone, Fax & E-mail
TSO
PO Box 29, Norwich, NR3 1GN
Telephone orders/General enquiries: 0870 600 5522
Fax orders: 0870 600 5533
E-mail: customer.services@tso.co.uk
Textphone: 0870 240 3701

TSO@Blackwell and other Accredited Agents

Published with the permission of the Department for Communities and Local Government on behalf of Her Majesty's Stationery office.

ISBN 9780117540415

Printed in the United Kingdom by The Stationery Office

J002471460 C2 07/11 14222 19585

Contents

SECTION 1

Generic risk assessment 3.3 Fighting fires in domestic chimneys

Scope

This generic risk assessment examines the hazards, risks and control measures relating to Fire and Rescue Service personnel, the personnel of other agencies and members of the public when fighting fires in domestic chimneys. Domestic chimneys will include similar structures in other buildings such as public houses. It also covers false chimneys. Industrial chimneys pose specific risks and fall outside the scope of this generic risk assessment; therefore liaison with site owners may be necessary to identify individual characteristics. This generic risk assessment also does not cover fires in ducting and extraction units.

Depending on the nature and scale of the operational incident a variety of significant hazards may be present. Fire and Rescue Services may therefore need to consider the contents of other generic risk assessments in this series. These may include:

- Introduction
- 1.1 Emergency response
- 3.1 Fighting fires – In buildings
- 5.1 Generic hazards – Electricity
- 5.9 Generic hazards – Asbestos
- 5.10 Generic hazards – Working at height

Fire and Rescue Services must conduct their own risk assessments and produce their own safe systems of work (which include standard operating procedures, training programmes, provision of equipment, levels of response, etc.) within the context of integrated risk management plans, local conditions, knowledge and existing organisational arrangements.

This generic risk assessment is intended to assist Fire and Rescue Services in their own assessment of risks at the planning and preparedness stage and is not designed to be used at incidents. Services should ensure this assessment is undertaken by a competent person(s).

Significant hazards and risks

The number of calls to domestic chimney fires may vary considerably between Fire and Rescue Services. Whereas all such incidents share common features, they may differ due to the type of premises, construction method used, ease of access and other site specific risks. The following significant hazards may be present (this list is not exhaustive and other hazards may be present):

- falling masonry and exploding chimney pots
- fire and smoke spread
- working on a roof space/falls from height
- working within a roof space/falls from height
- blow back
- hazardous substances and materials
- access and egress
- ground conditions
- overhanging branches and overhead cables
- nesting insects/birds and vermin
- domestic back boiler explosion; and
- false chimneys.

Falling masonry and exploding chimney pots

It can be the case that, particularly with older property, the linings of the chimney can spall away from the flue and fall into the hearth. There is a risk that chimney brickwork will become dislodged leaving the chimney in an unstable condition. Additionally, chimney pots may fall to the ground.

Chimney pots have been known to break up, with explosive effect, on the application of water and have caused serious injury to personnel on the roof and the ground.

Fire and smoke spread

Fire can spread externally from a chimney fire due to flying sparks and embers and this will be affected by the construction of the roof and building. This can be a serious problem if adjacent buildings or surrounding areas are readily combustible. Thatched roofs pose a particular risk of rapid fire spread.

Fire may also travel from the chimney to any structure that is adjacent to it. This internal spread can occur undetected through concealed voids within the building, e.g. under the hearth.

There is also the potential for smouldering fires to be started in roof or floor joists adjacent to the chimney that may not be immediately apparent or detected at the time of the incident and give rise to a second fire after crews have left the scene.

The potential for a high volume of stored material in roof spaces may contribute to the fire loading.

Visibility may be affected due to any smoke generated.

Toxic fumes may be generated from the fireplace e.g. from burning plastics. A damaged or porous chimney breast may allow the leakage of potentially toxic gases to the interior of the property.

Working on a roof/falls from height

There will be occasions when Fire and Rescue Service personnel need to work from the roof to extinguish a chimney fire or make the situation safe.

The hazards associated with working on a roof may include:

- poor weather conditions
- poor lighting
- poor or limited access/egress
- restricted working space
- fragile roofs
- the angle of the roof
- the condition of the roof and roof tiles
- the presence of moss and other slip hazards
- lack of suitable anchor points for work at height equipment
- the presence of roof furniture e.g. aerials, satellite dishes, photovoltaic and solar panels or wind turbines; and
- non maintained external chimney access ladders.

Some domestic properties, especially in town houses of the Victorian and Edwardian periods and also tenement properties, may have raking ladders secured by bolts at the apex of the roof and to the chimney head. They allow climbing access from roof level to the top of a chimney stack. The ladders can become rusty, loose and move with the slightest weight applied. Converted warehouses and other buildings may also have external access ladders.

Working within a roof space/falls from height

There will be occasions when Fire and Rescue Service personnel need to work from within the roof space (the loft) to extinguish a chimney fire or make the situation safe.

The hazards associated within a roof space may include:

- fragile ceiling materials posing a risk of falling through (note – the fragile surface may be boarded but may not be sufficiently robust to support Fire and Rescue Service personnel or their equipment)
- roof collapse
- trip hazards – pipe work, household items stored in the roof space, exposed ceiling joists
- live electrical apparatus
- exposed electrical conductors due to poorly insulated/installed cabling
- nesting insects such as bees and wasps
- open and exposed water storage tanks
- fibrous/man made insulation such as asbestos and fibreglass
- poor or limited access/egress
- restricted working space
- poor/low light levels.

Blow back

When water is applied to a chimney fire, steam is rapidly generated. The rapidly expanding steam rises with significant velocity and leaves the chimney normally at the highest point. The velocity at which the steam will leave the chimney depends on the size of the fire and the amount of water used. There is a risk that personnel who are working close to the chimney pot or other outlet (e.g. open vent) may receive scald injuries.

Hazardous substances and materials

Fire and Rescue Service personnel may be exposed to hazardous materials during fire fighting, damping down and cutting away. These activities may disturb materials such as asbestos and man made mineral fibres (e.g. loft insulation) which pose a respiratory or skin contact risk.

Toxic fumes may be produced by the heating or burning of materials, particularly man-made materials.

Access and egress

Access to and egress from the chimney may be impeded by a range of factors and contribute to making fire fighting operations more difficult.

Ground conditions

Ground conditions such as sloping ground may make fire fighting operations more difficult, especially when pitching ladders or positioning aerial appliances.

Overhanging branches and overhead cables

The presence of overhanging branches and overhead cables (electricity, television cables etc.) may make fire fighting operations more difficult.

Flashing or arcing may be a risk and present a particular risk to aerial appliances.

Low voltage insulated cables can sometimes terminate (around some part of the roof (usually under the eaves) and may be mistaken for telephone lines.

It may be difficult and time consuming to get external electrical supply cables isolated as this may need to be carried out remotely from the property by the electricity supply company.

Nesting insects/birds and vermin

The risk of stings and bites from nesting insects (wasp/bee nests are frequently found in roof spaces) may be present and there is the potential to encounter nesting birds such as pigeons and vermin such as mice/squirrels within the roof space or on the roof. These have the potential to carry infections which are transmittable to humans.

Domestic back boiler explosion

There have been a few occasions when a domestic back boiler has exploded. Examples of this occurrence have included cases attributed to inclement weather/frozen pipe work and also due to building work where a boiler has been left in situ, deemed to be redundant and has exploded due to insufficient ventilation. This can cause structural damage and pose a risk of flying debris. This may be an additional consideration when dealing with a chimney incident.

False chimneys

False chimneys have been used in construction in circumstances where the appearance of a chimney is wanted but there is no fireplace or chimney breast installed within the premise.

A metal or plastic frame is used, which is clad with a brick facing to look like a chimney. This is placed on the structural members of the roof and the normal roof covering placed around it. The roof members are designed to be strong enough to support the dead weight of the chimney and imposed forces, such as the wind.

If roof structures are affected by fire, the weakened joists may not support the weight of the false chimney. Normally risks posed by weakened roof structures may result in:

- roof coverings slipping off the pitch
- sections falling into the roof space; or

- tall gable ends or chimneys becoming unstable.

These false chimneys may however overcome the structural support of the roof joists, and fall straight through the roof space into the floor below.

Additionally, a chimney which may have been identified as an anchor point for safe working at height may not actually be able to support any additional weight, and fail if shock loaded in the event of a fall.

Key control measures

Planning

Planning is key to enhancing the safety of firefighters and others likely to be affected by Fire and Rescue Service' operations. Each Fire and Rescue Service's integrated risk management plan will set standards and identify the resources required to ensure safe systems of work are maintained.

Each Fire and Rescue Service should assess the hazards and risks in their area relating to this generic risk assessment. The assessment should include other Fire and Rescue Service's areas where 'cross border' arrangements make this appropriate.

Site-specific plans should be considered for locations where the hazards and risks are considered significant. Plans should take into account and specify any variation from the normal operational capability of personnel, appliances and equipment. In particular, recognition should be given to the physical effort and psychological pressures that an operational incident may apply to Fire and Rescue Service personnel.

Site specific plans should include:

- levels of response
- relevant standard operating procedures.

Planning is underpinned by information gathering, much of which will be gained through inspections or visits by Fire and Rescue Service personnel – for example, those covered by section 7(2)d and 9(3)d of the *Fire and Rescue Services Act 2004.*

Information needs will vary in proportion to the size and nature of the incident. The capacity of Fire and Rescue Service personnel to assimilate information will vary in relation to the complexity of the incident. Therefore, arrangements may need to be flexible and be based on more than one system.

Information should also be gathered and used to review safe systems of work from sources both within and outside the Fire and Rescue Service, including:

- incident de-briefs
- health and safety events; and
- local authorities and partner agencies.

Fire and Rescue Services should ensure systems are in place to record and regularly review risk information and to ensure that new risks are identified and recorded as soon as practicable.

Fire and Rescue Services must ensure that the information gathered is treated as confidential, unless disclosure is made in the course of duty or is required for legal reasons.

Fire and Rescue Services should consider the benefits of using consistent systems and formats to record information from all sources. In order to support decision making, consideration should be given to the efficiency and effectiveness of information retrieval systems.

Information on domestic chimneys may be gathered through home fire safety checks. These home visits may give the opportunity for the Fire and Rescue Service to provide safety advice to occupiers on chimney maintenance and safety. Information on false chimneys may also be gathered.

Competence and training

When formulating a competence and training strategy a Fire and Rescue Service should:

- Ensure those tasked with carrying out this assessment and developing procedures are competent
- Ensure their personnel are adequately trained to deal with hazards and risks associated with domestic chimney fires. Attendance at domestic chimney fires in some Fire and Rescue Services may be rare and this lack of experience should be considered and addressed
- Ensure that the level and nature of training undertaken be shaped by an informed training needs analysis that takes account of Fire and Rescue Service guidance on the competency framework, national occupational standards and any individual training needs
- Ensure that training and development programmes:
  - follow the principles set out in national guidance documents
  - should generally be structured so that they move from simple to more complex tasks and from lower to higher levels of risk
  - will typically cover standard operational procedures as well as ensuring knowledge and understanding of equipment and the associated skills that will be required to use it
  - should consider the need for appropriate levels of assessment and provide for continuous professional development to ensure maintenance of skills and to update personnel whenever there are changes to procedure, equipment, etc; and

- should also involve personnel involved in other processes that support the emergency response such as planners devising procedures and people procuring equipment.

Specific training requirements for domestic chimneys fires will include hazard awareness, the standard operating procedure and the equipment to be used.

Training outcomes should be evaluated to ensure that the training provided is effective, current and it meets defined operational needs as determined by the Fire and Rescue Service's integrated risk management plan.

Command and control

The Incident Commander should follow the principles of the current national incident command system.

Prior to committing personnel into any hazard area, the Incident Commander must take account of the actual information available regarding the incident at the time. This will assist them to make effective operational decisions in what are recognised as sometimes dangerous, fast moving and emotionally charged environments.

A thorough safety brief prior to deployment of personnel within the hazard zone should be carried out.

Communication of new or changed risks should continue throughout the incident.

Safety Officer(s)

The early appointment of one or more competent Safety Officer will help ensure that risks are either eliminated or reduced to an acceptable level.

The Incident Commander should confirm that the Safety Officer understands:

- their role and area of responsibility
- allocated tasks
- current information about on site hazards and risks; and
- lines of communication.

Those undertaking the Safety Officer role should:

- undertake their role as briefed
- take any urgent corrective action required to ensure safety of personnel
- update the Incident Command structure regarding any change in circumstances; and
- not be engaged in any other aspect of operations, unless this is required to deal with a risk critical situation.

Safety Officers should be competent to perform their role. The role of a Safety Officer can be carried out by any of the fire service roles, but the complexity of the task, size of the incident and scope of responsibility should be considered by the Incident Commander when determining the competency level required.

Safety Officers should wear nationally recognised identification to indicate they are undertaking the 'Safety Officer' role.

Fire and Rescue Services should ensure that training and other measures (such as aide-memoires) are in place and available to support those staff liable to undertake this role.

With regard to domestic chimney fires, a safety officer(s) may need to be appointed to:

- **check for falling debris or monitor overhead hazards and control access and egress to and from the area(s) considered to be at risk from these hazards.**

Personal protective equipment

Fire and Rescue Services must ensure that any personal protective equipment provided is fit for purpose and meets all required safety standards. When choosing suitable protective garments, the standard of clothing worn beneath the specialist personal protective equipment should also be taken into account. Consideration should also be given to the selection of suitable sizes and gender specific requirements of personal protective equipment.

Personal protective equipment should also take account of the need for rescuers to be clearly visible against the operational background including night working and for the Incident Commander and other managerial and functional roles (defined in the national incident command system) to be distinguishable.

All personnel must use appropriate levels of service provided personal protective equipment and respiratory protective equipment as determined by the safe system of work.

Post incident

The following measures should be considered to help eliminate or remove risks after an incident, as appropriate to the nature and scale of the incident:

- Any safety events that may include personal injuries, exposure to hazardous substances, avoidable equipment damage or near misses should be recorded, investigated and reported in line with legislative requirements such as *Reporting of Injuries Diseases and Dangerous Occurrence Regulations 1995*, etc.
- Arrangements should be in place to either remove all contamination from personal protective equipment or to ensure it's safe and appropriate disposal and to check that the equipment maintains the agreed levels of integrity and protection for the wearer throughout its lifecycle

- When necessary, occupational health support and surveillance follow up including counselling and support services
- Conduct a debrief to identify and record any 'lessons learned' from the incident. Debriefs will range in complexity and formality, proportionate to the scale of the incident and in line with individual Fire and Rescue Service's procedures
- Consider any changes required to safe systems of work, appliances or equipment in the light of any lessons learned from debriefs or from safety events
- Consider the need to review existing information or the need to add a new premises or location into future preplanning, e.g. by undertaking home fire safety checks
- Where appropriate, inform partner agencies of any concerns about the welfare of the occupants
- When necessary, consideration should be given to arranging for staff to make a contemporaneous written record of their actions. This information may be used to assist in any internal or external investigations or enquiries that follow any incident, e.g. coroners court, public enquiry, etc.

Standard operating procedures

Fire and Rescue Services should prepare, communicate and implement a standard operating procedure for domestic chimney fires utilising this generic risk assessment and other relevant guidance documents. This will identify the necessary control measures to be adopted by Fire and Rescue Service personnel.

When communicating the standard operating procedure, Fire and Rescue Services should ensure personnel receive, read and understand the information.

Fire and Rescue Services should ensure that they have effective procedures relating to:

- work at height
- confined space working
- manual handling
- asbestos
- domestic back boilers (crews should check with occupants on the presence of a back boiler and check that the heating system water is circulating if a back boiler is present).

Equipment

Fire and Rescue Services should consider the provision, use and maintenance of suitable equipment for providing access to fragile and slippery roofs, or enforce policies that prohibit roof access. Suitable equipment will range from aerial access appliances to roof ladders and work positioning/fall arrest systems. Any work at height equipment must comply with the Work at Height Regulations.

The provision of a thermal imaging camera will reduce the risk to firefighters and increase the likelihood of identifying the concealed spread of fire.

The use of a mirror should be considered for inspecting the grate/flue area protecting firefighters from falling debris or hot gases.

False chimneys

When dealing with property fires in modern buildings (particularly when the roof is involved), the Incident Commander should check that there is a fireplace in a building whenever a chimney is seen from the outside or whenever suspicions are raised about the type of chimney in place. False chimneys can be found on the ridge, mid-pitch or at the gable ends.

If considering using a chimney as an anchor point whilst working at height, a check should be made that there is a fireplace in the premises and it is connected to the chimney.

Technical references	
1	Health and Safety Executive Information sheet, working safely near overhead power lines. Agriculture Information sheet no 8 (revised)
2	Manual of Firemanship, Book 11, Chapter 5
3	Manual of Firemanship, Book 2, Chapter 4, Small gear

SECTION 2

Summary of Generic Risk Assessment 3.3

Fighting fires in domestic chimneys

Task – Pre incident

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
1	Planning	Planning activity	Subject to local risk assessment	Subject to local risk assessment	**Prevention** • public awareness campaigns targeted at areas of greatest risk • provision of targeted home fire safety checks and advice. **Organisational risk control** • produce a standard operating procedure for domestic chimney fires • identify and address training needs and competency requirements for domestic chimney fires and for risk assessing and developing procedures • Incident Commanders to be competent at gathering relevant information, processing information and making decisions about risk. This applies to Fire and Rescue Service personnel in the risk area • procure suitable equipment • procure suitable personal protective equipment • manual handling training.

Task – Initial stages of the incident

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
2	Access and egress	Ground conditions e.g. sloping ground Overhead branches Overhead cables Roof conditions Hazardous material Fire spread Being struck by or striking against objects	Death from fall or electrocution Serious injury Smoke inhalation	Fire and Rescue Service staff Public	**Incident risk control** • implement incident command system • implement standard operating procedure • tackle the fire from the hearth where possible • use of aerial appliances • use of specialist crews • work at height procedures and equipment • cordon off area around the building • limit people below to a minimum • lighting • use of thermal image camera • safety officer(s) to monitor overhead hazards and control access to areas with the potential for falling debris.

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
3	When fighting the fire from the grate	Burns and scalds from burning soot, steam and falling debris Heat exhaustion Fire spread	Inhalation of combustible gases causing respiratory condition. Burns Impact injures Dehydration	Fire and Rescue Service staff	• apply standard operating procedure and incident command system • consider possibility of blowback due to pressures from blocked chimney • personal protective equipment • breathing apparatus • isolate fuel sources (gas, oil, coal, wood) • access to water for hydration • suitable first aid provision • use of thermal image camera.
4	When fighting the fire from a higher level	Fire spread Smoke Blow back Exploding chimney pots Falling debris Concealed voids	Death Serious injury Burns Smoke inhalation Struck by objects	Fire and Rescue Service staff Public	**Incident risk control** • work from ground level where possible • apply standard operating procedure and incident command system • consider possibility of blowback due to pressures from blocked chimney • use of thermal image camera • personal protective equipment • breathing apparatus • cordon off area around building • isolate fuel sources (gas, oil, coal, wood).

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
5	When working in the roof space	Fragile surfaces Roof collapse Hazardous materials e.g. asbestos Confined space Access and egress Exposed electrical conductors Exposed ceiling joists Insects, vermin etc. Bulky/heavy work equipment Blow back Open water storage tanks Fire spread	Death Serious injury Fall from height Respiratory disease (e.g. zoonoses) and contamination of personal protective equipment Infection Electric shock Leptospirosis Drowning	Fire and Rescue Service staff	**Incident risk control** • apply standard operating procedure and incident command system • implement decontamination procedures where necessary • use thermal image camera • provide lighting • breathing apparatus • personal protective equipment • manual handling procedures • isolate electrical supply • use of safety officer at roof space hatch • confined space training • hygiene • decontamination.

Task – As the incident develops

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
6	When working on the roof	Access and egress Work at height Fragile roofs Slips and trips Falling objects Conditions on the roof Inclement weather Chimney collapse Overhanging branches Overhead cables Blow back Bulky/heavy work equipment non maintained external chimney access ladders	Death Serious injury Fall from height Falling objects	Fire and Rescue Service staff Public (falling objects)	**Incident risk control** • work from ground level where possible • implement standard operating procedure and incident command system • consider use of aerial appliances where possible • breathing apparatus • personal protective equipment • use of work at height equipment such as work restraint and fall arrest • cordon off area at risk from falling objects • use safety officer to control area at risk from falling objects and identify any risk of contact with overhead electrical cabling • provide lighting • use specialists crews where necessary • lighting • manual handling procedures • do not use non maintained external chimney access ladders.

Ref. No.	Activity	Hazard	Risk	Persons at risk	Control measures
7	Fire fighting – property fires	False chimneys	Death or serious injury arising from Collapse of false chimney into roof space/building below. Failure of anchor point if false chimney has been used	Fire and Rescue Service Staff	Incident commander checks on type of chimney Implement incident command system Do not use as an anchor point.
8	Fire fighting	Domestic back boiler explosion	Death Serious injury	Fire and Rescue Service Staff	Implement incident command system and standard operating procedure Fire fighting/personal protective equipment Check for presence of back boiler and that water is circulating.
9	Post incident	Subject to local risk assessment	Subject to local risk assessment	Subject to local risk assessment	**Risk review and prevention** • review any safety event information • review debrief information • health surveillance if necessary • use information to develop/refine standard operating procedure • use information to review and update competency strategy • review nature and frequency of domestic chimney incidents and review and update prevention strategy.