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Fire Precautions During Construction of Large Buildings

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1 Role of this Document

The role of this document is to provide information to help the broad range of people and organisations with responsibilities for fire safety on a construction site to reduce the risk from fire.

The information applies to the design and planning stages as well as the actual construction phase, and many hazards can be addressed by good design and planning before they become an issue.

Construction projects can include demolition, alterations, renovations, repair and maintenance as well as new buildings.

Much of the content of this guide can be incorporated in:

- design documentation (including design reports);
- building permits;
- the Workplace Health and Safety (WHS) Plan for the site, which may refer to a separate Fire Safety Plan;
- safe work methods; and
- hot work permit systems.

It is critical that all parties involved in a project work together to ensure that the fire risk is minimised and that everyone on a construction site is aware of their responsibilities.

This guide does not apply to the completed structure. Minimum community building standards for fire safety in completed buildings are mandated by State and Territory Acts and Regulations that normally require compliance with the National Construction Code (NCC), among other things. WHS legislation may require additional fire precautions to be implemented, such as evacuation plans and emergency procedures.

Any recommendations in this guide do not negate the need to comply with all relevant legislation and contractual requirements.

2 Relevant Legislation

Regulation of matters relating to fire safety and occupational health and safety (OHS) and workplace health and safety (WHS) is the responsibility of the States and Territories of Australia. Substantial efforts have been made to obtain a nationally consistent approach through the National Construction Code (NCC)[1] and the Model Workplace Health and Safety Acts[2]. At the time of writing, all States and Territories adopt similar approaches but there are still variations in the detailed legislation and administration.

Building Acts and Regulations in the States and Territories require building surveyors/certifiers to ensure compliance with the National Construction Code (NCC). The NCC Volume 1 (EP1.5)[3] requires suitable means to be installed in a building to allow initial firefighting and for the fire brigade to undertake firefighting measures. The related deemed-to-satisfy provisions included in Clause E1.9[4] are limited to providing fire extinguishers in buildings up to an effective height of 12 metres. For buildings above that height, hydrants, hose reels and booster connections are also required. Where an alternative solution that meets performance requirement EP1.5 is proposed, most State regulations require the matter to be referred to the relevant fire authority.

Under WHS legislation, a person conducting a business or undertaking (PCBU), have a general duty to ensure the health and safety of employees at work and members of the public on or adjacent to the site. Note: A 'person' may be an organisation or an individual.

While fires on construction projects are not common, they do pose a significant risk to both human safety and construction programs, so the risk needs to be managed.

WHS legislation places additional responsibilities on principal contractors undertaking construction work. These include preparing a written WHS management plan, requirements for signage and obligations to ensure compliance with other regulations at the workplace.

It also requires persons who conduct a business that commissions construction work to consult with the designer, and requires designers of structures to provide a written report regarding health and safety. In relation to fire safety, the designer could be a fire safety engineer or, if deemed-to-satisfy approaches are adopted, the architect or a regulatory consultant.

Persons conducting a business are required to control risks associated with construction work and impose duties around safe work method statements and liaison with other persons as necessary.

Under the WHS legislation, there is an obligation on all the parties involved to address issues such as fire prevention, emergency procedures and evacuation, and other mitigation methods in addition to firefighting as defined in the NCC Building Code of Australia.

There is additional complexity when buildings are partially occupied while building works are being undertaken. In such cases, building owners and the employers of the people occupying the building also have duties to fulfil under WHS regulations.

This document provides practical fire safety guidance for buildings during construction and has been created as a tool to help people meet their obligations. Because of the nature of WHS legislation, this document does not negate the need to undertake risk assessments where appropriate and develop mitigation measures to address site-specific issues.

3 Definitions

Large projects (buildings):
Construction relating to Class 2 to 9 buildings as defined in the BCA, where the value of the building or proposed building exceeds $5 million. Note: *A contractor may have a relatively small contract value but if the works are being undertaken in a large, existing building the work should be classified as a large project.*

Fire resisting coverings:
Coverings applied to elements of construction to increase the fire resistance of the element of construction. Examples include covering systems protecting timber or structural steel (eg. fire-rated plasterboard). The protection required depends on the application.

Fire preventative coverings:
Coverings, screens or treatments to combustible materials/elements of construction that reduce the risk of ignition.

Examples include:

- fire retardant treatments
- fire resisting coverings
- non-combustible sheeting.

The performance required depends on the application.

Exposed combustible materials:
Combustible materials that are exposed or with coverings that do not provide adequate protection from expected fire sources such that the combustible core can be readily ignited.

4

Fire Safety Plan

A site may have a Fire Safety Plan incorporated in its WHS Plan or a separate Fire Safety Plan referenced by the WHS Plan.

Generally, the principal contractor undertaking construction is responsible for developing the WHS plan, including a Fire Safety Plan, which may be based on detailed risk assessments.

The plan should include:

- the organisation structure and responsibilities for fire safety;
- arrangements for recording fire safety training/induction given to site personnel and visitors, including required actions in case of fire;
- risk assessments and designer reports requiring specific fire safety measures;
- inclusion of fire safety requirements in Safe Work Methods (SWMs);
- emergency procedures;
- fire prevention measures, including:
  - security requirements
  - control of ignition sources
- hot works permits/regulations;
- electrical supplies and equipment;
- compliance with 'no smoking' legislation;
- cutting;
- plant equipment and vehicles;
- prohibition of open fires;
  - control/reduction of combustible materials;
- flammable liquids and gases;
- stored and waste materials disposal;
- combustible façade and building materials;
- fire brigade access, facilities and coordination;
- evacuation plan and procedures for alerting the fire brigade;
- fire protection provisions:
  - fire extinguishers
  - hydrants, hose reels and water supplies
  - automatic fire sprinklers
  - automatic fire detection and alarm systems
  - temporary emergency lighting
  - compartmentation
  - lining materials
  - structural adequacy and mitigation measures prior to application of fire protection
- separation from adjacent buildings and other hazards:
  - temporary buildings and accommodation
  - on-site storage facilities
  - adjacent permanent structures
- special provisions if work is being carried out in occupied buildings; and
- bushfire safety requirements if appropriate.

5 Fire Prevention

5.1 Fire Safety Awareness, Training and Compliance Monitoring

All people working on or visiting the site should be made aware of the importance of fire prevention and the content of the Fire Safety Plan, including what to do in the event of fire, emergency procedures, location of assembly points and good housekeeping practices.

Training in relation to the use of portable firefighting equipment, safety precautions for those undertaking hazardous operations, and the site-specific emergency procedures must be provided appropriate to the role of the individual.

Records should be kept of fire safety training and inductions given to site personnel and visitors.

5.2 Security

Security is required on a construction site for many purposes. Arson is the single largest cause of fires on building sites and it plays a key role in fire prevention.

The Fire Safety Plan should identify the required security measures, which may include:

- erecting secure fencing around the perimeter of the site;
- securing access points such as entries to the construction zone during refurbishment of an occupied building;
- employing 24-hour security guards on larger sites supported by CCTV;
- storing combustible materials, such as flammable liquids and gases, and potential ignition sources in secure areas to limit access to materials that could be used to start a fire;
- illuminating the site so that unauthorised people on the site can be easily identified; and
- installing intruder alarms in temporary buildings and storage areas as appropriate.

It can be beneficial for security staff to be trained in the use of portable extinguishers, particularly if they are on site outside normal working hours.

5.3 Control of Ignition Sources

5.3.1 Hot Works

Hot works include any activities that could initiate fires or explosions such as:

- cutting and grinding;
- welding, brazing and soldering;
- thermal spraying;
- use of oxyacetylene torch or blow torch; and
- installation of heat-applied materials.

Cutting/welding too close to combustibles is the second most common cause of fires after arson.

As far as reasonably practicable, activities involving hot works should be avoided. A permit system should be implemented where they cannot be avoided. The system should incorporate, as a minimum, the following features:

- Requirements for written permission (a permit) to be obtained prior to commencement of hot works.
- Hot works permits must be specific to a location, activity and work period and must not provide blanket coverage for more than one location activity or work period.

- An inspection of the hot works area before work begins to ensure that:
  - combustibles have been moved or are adequately protected;
  - appropriate fire extinguishers are on hand, fully charged and operable;
  - evacuation paths are available.
- A suitably trained and equipped person is assigned to fire watch during the hot works and for an appropriate period after works has been completed.
- Inspection of hot works areas at the end of the day and by security staff if on site and it is reasonably practicable and safe to access the area.
- There are means for communicating an alarm.

The requirement for a hot works permit and other precautions should be incorporated in Safe Work Methods (SWMs) for each type of hot works, based on the outcomes of a risk assessment or industry standard.

5.3.2 Electrical Supplies and Equipment

The use of electrical equipment and supply systems can be an ignition source during construction and care is required in order to minimise this risk. Consideration should be given to the following:

All electrical systems and equipment, including temporary installations, must be installed and maintained in accordance with relevant regulations.

All portable electrical devices and extension leads must be regularly inspected and tagged in accordance with State regulations.

Remove any faulty or damaged equipment from use immediately and label it accordingly.

Securely fasten any equipment that operates at surface temperatures exceeding 75°C to prevent hot parts of the equipment coming into contact with combustible materials.

Equip fragile components, such as temporary lights, with guards to prevent accidental damage where they are exposed to the risk of an impact.

Low voltage equipment should be used where practicable.

Remove temporary wiring immediately after completing the job it was installed for.

5.3.3 Smoking Materials

Smoking materials are a significant ignition source of fires on construction sites. Smoking restrictions should be applied throughout a construction site because hazardous materials, such as flammable gases, may be used in open as well as enclosed areas.

If designated smoking areas are to be provided on or adjacent to a construction site, a specific risk assessment should be undertaken. Smoking areas should be constructed of non-combustible materials and be separated from buildings by at least six metres (or more if determined necessary by a risk assessment). Provide safe receptacles for smoking materials.

Smoking restriction zones must be clearly identified, signposted and strictly enforced.

The risk of smoking materials being discarded around the perimeter of the site should be considered and, if the risk is significant, precautions should be implemented. These may include providing hoardings constructed from fire preventative coverings.

5.3.4 Open Fires/Waste Fires

Open fires, including the burning of waste materials, should be prohibited on the construction site. Combustible waste materials should be regularly removed from the site.

5.3.5 Plant Equipment and Vehicles

Locate plant equipment and vehicles so that their exhausts discharge, as far as practicable, away from combustible materials.

Prevent combustible materials coming in contact with hot surfaces or being close to hot surfaces such as flues/exhaust pipes.

Fuel storage and service areas should not be located within structures under construction, alteration or demolition.

Safe Work Methods (SWMs) should be prepared for refuelling activities.

Avoid the use of temporary heating equipment as far as reasonably practicable. Where it is to be used, undertake risk assessments.

The temporary heating equipment should, as a minimum, comply with relevant regulations and be installed, used and maintained in accordance with the manufacturer's instructions. The outcomes of the risk assessment may require additional precautions such as:

- specification of separation distances from combustible materials;
- requirement for personnel to be in attendance when the heater is running;
- restraining the heating device to minimise the risk of the appliance being knocked over or being incorrectly located; and
- regular inspections.

5.4 Control of Combustible Materials

5.4.1 Stored and Waste Materials

Remove combustible waste materials, dust and debris from the building and its immediate vicinity at the end of each shift or as soon as practicable.

Store combustible materials before its disposal as far from buildings as reasonably practicable.

Store materials susceptible to spontaneous ignition, such as oily rags, in clearly labelled non-combustible containers and remove them from site as soon as practicable.

Unless specific items of vegetation are planned to be retained, all dry vegetation should be removed from larger sites for a distance of 20 metres from buildings and structures under construction and work areas.

5.4.2 Storage of Combustible Building Materials

As far as possible, program the delivery of combustible materials to minimise the time they are stored on site.

Where significant volumes of combustible building materials are to be stored on site, they should be stored in a secure area at least 10 metres away from any buildings or partially constructed buildings and any location where hot works are undertaken.

Where there are no reasonably practicable alternatives and combustible building materials have to be stored within or close to the building under construction, the area used for storage should:

- have controlled access;
- not be in an area where hot works are being carried out;
- be in either an area covered by the site fire detection system or included on the route of regular fire checks;
- have firefighting equipment close by; and
- be protected from ignition sources where reasonably practicable by fire preventative covers (e.g. fire retardant, fire resistant, or non-combustible sheeting).

5.4.3 Exposed Combustible Materials During Construction

During the construction process, combustible materials may be temporarily exposed in locations such as the façade or as parts of wall or ceiling linings. Typical examples include:

- shade cloths, tarps and other covering around scaffolding, separating work areas and around the site perimeter;
- combustible façade materials; and
- timber framing.

Once the building is completed, these materials may not present a hazard because:

- they may have been removed from the site;
- fire preventative coverings or treatments may have been applied; or
- fire protective measures may have been installed, such as automatic sprinkler systems or compartmentation.

During the construction phase, if a risk assessment determines that the volume of exposed combustible materials is significant, additional precautions may be required.

In determining the need or extent for mitigation methods, the risk assessment should consider the proximity of the incomplete building to surrounding buildings, as well as fire safety within the site.

The following are examples of typical additional mitigation measures that could be considered.

Shade cloths and tarps and other temporary coverings should be fabricated from non-combustible materials, or fire retardant materials, where reasonably practicable, so as to minimise the risk of fire spread. The NCC Volume 1[5] requirements for lining materials may form appropriate controls.

For buildings of four or more storeys, where the exposed façade is combustible or the construction is predominantly of combustible construction, one or more of the following additional controls may be specified:

- Exposed combustible materials should be progressively clad with fire preventative coverings so that the number of storeys with significant exposed combustible materials is limited to two below the current construction level.
- If an automatic fire sprinkler system is to be provided, the sprinkler system should be progressively commissioned so that the number of unprotected storeys with significant exposed combustible materials is limited to two below the current construction level.
- Early installation of permanent or temporary fire compartments can limit fire spread in the event of an uncontrolled fire. Protection of door openings, windows, shafts and service penetrations need to be addressed.
- A temporary alarm system may need to be provided and evacuation procedures modified to address the expected rate of fire spread.
- Separation distances or fire barriers are needed between adjacent buildings and the building under construction appropriate to the fire hazard.

Risers should be installed progressively as construction is undertaken. Hydrants and hose reels required by the National Construction Code for the completed building must be progressively commissioned, as soon as reasonably practicable, on all levels of a building under construction.

The NCC deemed-to-satisfy provisions[6] require the following:

"After the building has exceeded an effective height of 12 metres.

(i) The required fire hydrants and fire hose reels must be operational in at least every storey that is covered by the roof or floor structure above except the two uppermost storeys and

(ii) any required booster connections must be installed."

5.4.4 Flammable Liquids and Gases

The storage and use of flammable liquids and gases require specific safety measures that address the risks of use in confined spaces and potential explosions, in addition to normal fire risks. Refer to the relevant State or Territory WHS legislation and guidelines that address the use of these substances and necessary precautions. This category includes common fuels (e.g. petrol and LPG) and acetylene used for cutting purposes. Typical requirements are provided in the Model Health and Safety Regulations[7]. Some (but not all) of the main mitigation methods applicable to fire safety are:

- instruct and train workers in the storage and handling of dangerous goods;
- keep storage of flammable liquids and gases to a minimum;
- store flammable liquids and gases in clearly labelled containers/cylinders compliant with Australian Standards in secure areas (preferably an open compound as far as practicable from the building under construction and work areas);
- provide clear signage identifying the materials being stored and prohibiting smoking, naked flame, hot works and the use of mobile phones;
- keep flammable liquid containers and tanks closed when not in use;
- segregate storage of flammable liquids and gases from materials that could intensify the fire or present a toxic hazard such as oxygen acetylene and chlorine;
- properly remove flammable materials before work is carried out on an empty container or vessel; and
- consider proximity to flammable liquids and gases in hot work risk assessments.

5.5.4 Waste/Garbage Chutes

If waste chutes are to be provided, where practicable they should be constructed of non-combustible materials and be located outside the building envelope.

The accumulation of combustible materials close to the chute should be minimised as far as practicable.

Deemed-to-Satisfy Provisions are specified in the relevant sections of the NCC. In many instances a Deemed-to-Satisfy Provision may reference another document, rule, specification, standard or provision. The NCC includes a number of specifications which may, in turn, reference other documents, standards or similar documents. Part A1.2 to A1.7 of the NCC and referenced Specifications describe the hierarchy for the various types of documents and how they should be interpreted.

6 Fire Brigade Intervention and Emergency Procedures

6.1 Liaison with Fire Authorities

Regular liaison with the fire brigade is important so that it has knowledge of a site before a fire emergency, which will allow a more effective response. An initial site plan should be prepared and a process for updated drawings to be available in a fire emergency should be agreed.

The site plan should include:

- fire brigade access points to the site;
- any special provisions for firefighting activities;
- emergency escape routes and stairs;
- positions of hydrants and hose reels that are operative;
- location of booster connections;
- any other operative fire safety systems that have been provided;
- locations of assembly points and registers of persons currently on the site; and
- details of temporary accommodation and storage areas including location for storage of hazardous items such as flammable liquids, gas cylinders, etc.

The fire brigade should also be made aware of any alternative solutions that could affect firefighting operations.

6.2 Water Supplies

The construction program should be planned, as far as reasonably practicable, to maintain adequate firefighting water supplies at all times throughout the site.

Australian Standards such as AS 2118[8], AS 2419[9] and AS 2441[10] may provide useful benchmarks for water supplies.

Regularly update the fire brigade on the hydrants and hose reels that are operational and of any potential or actual interruptions to the water supplies.

If the firefighting water supplies are interrupted:

- prohibit hot works;
- notify site workers; and
- undertake risk assessments to determine any additional actions that should be undertaken while firefighting water may be limited.

6.3 Fire Brigade Access

Maintain clear and unobstructed fire brigade access to the site and buildings at all times and notify the fire brigade immediately of any changes or restrictions to the access points.

If practicable, significant changes to the access to the site should be discussed with the fire brigade before being implemented.

6.4 Emergency Procedures

Written emergency procedures must be displayed in prominent locations and given to all employees and visitors on site. Typically, they should include:

- emergency contact details for key personnel who have specific roles or responsibilities under the emergency plan; for example fire wardens, floor wardens and first aid officers;
- contact details for local emergency services; for example police, fire brigade and poison information centre;

- description of the mechanisms for alerting people at the workplace to an emergency or possible emergency, for example siren or bell alarm;
- evacuation procedures including arrangements for assisting any hearing, vision or mobility-impaired people;
- map of the workplace illustrating the location of fire protection equipment, emergency exits and assembly points;
- triggers and processes for advising neighbouring businesses about emergencies;
- post-incident follow-up process, for example notifying the regulator, organising trauma counselling or medical treatment; and
- procedures for testing the emergency plan including the frequency of testing.

Additional guidance can be obtained from Safe Work Australia, State Safety Authorities and AS 3745-2010[11] *Planning for emergencies in facilities*.

Instruct nominated personnel, such as the security guards, 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.

Assembly points should be clearly identified.

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.

7 Fire Protection

7.1 General

When the following fire protection services are required to be provided in the completed building, the project should be planned to achieve their installation and operation as soon as reasonably practicable:

- Fire stairs, including fire-resistant walls.
- Fire compartment boundaries, including fire doors, penetration seals and general protection of other openings. These should be completed progressively throughout a construction project to minimise fire spread in the event there is a fire during construction. Where the provision of fire compartments is critical to fire safety during construction, temporary coverings of openings should be provided while ensuring exit paths are not compromised.
- Fire protective materials to structural steel and fire preventative coverings over combustible construction if required.
- Automatic fire sprinkler systems and other automatic suppression systems. Where automatic fire sprinkler systems are required to be installed in a new building, there are significant advantages in progressively bringing the sprinkler system into service on each floor level. This approach is particularly effective in buildings where the design strategy relies on a sprinkler system to supplement fire separations (e.g. waiving requirements for spandrels or reducing FRLs) or controlling fire spread when combustible materials are exposed during construction.
- Automatic detection and alarm systems.

7.2 Temporary Alarm Systems

Where it is impractical to commission the permanent automatic detection and alarm systems during construction, an alternate means of warning of fire and other emergencies must be established to allow staff to raise an alarm across the site if a fire is detected and to alert the fire brigade. Manual devices may be utilised provided that:

- they are distinctive and clearly audible above background noises in all areas;
- all staff and inducted visitors are trained/instructed so that they can recognise the fire/emergency alarm and understand what action to take; and
- the devices are distributed throughout the site and staff are trained in their use.

Telephone systems can be used to alert the fire services if the emergency procedures adequately specify responsibilities for alerting the fire brigade and emergency numbers are prominently displayed together with the site address. Emergency phones should be located at strategic points and clearly identified.

7.3 Means of Egress

Construction programs should be planned to ensure that adequate paths of travel to exits and fire exits are provided at all times, taking into account the number of people, activities being undertaken and occupant capabilities.

Regular checks should be undertaken to ensure they are maintained clear of obstructions and provided with clear signage. Typically, these should be undertaken daily or weekly, depending on the risks associated with the site. The frequency should be increased if significant hazards such as blocked exits are observed.

7.4 Fire Extinguishers

In accordance with the BCA deemed-to-satisfy provisions[12] at least one fire extinguisher to suit Class A, B and C fire risks and electrical fires must be provided at all times on each storey adjacent to each required exit, or temporary exit or stairway. Refer to AS 2444[13] for further details relating to the fire risk classification and selection of extinguishers.

In addition, extinguishers should be provided for fire watch activities while hot works are being undertaken and at any other locations determined as a result of risk assessments or required as part of a standard safe work method.

The fire extinguishers should be maintained and regularly inspected, and staff should be trained in the use of manual firefighting equipment.

7.5 Hydrants and Hose Reels

All hydrants and hose reels required by the NCC for the completed building must be fully operational and any required booster connections must be installed for the building under construction as soon as reasonably practicable.

The NCC deemed-to-satisfy provisions[14] require the following:

"After the building has exceeded an effective height of 12 metres.

(iii) The required fire hydrants and fire hose reels must be operational in at least every storey that is covered by the roof or floor structure above except the two uppermost storeys and

(iv) any required booster connections must be installed."

8

Temporary Buildings and Accommodation

Locate temporary offices and sheds and other storage facilities having combustible construction or contents as far as practicable from the building under construction or other occupied buildings.

Use risk assessment to determine fire precautions within temporary buildings and accommodation including temporary fixed fire protection systems, portable firefighting equipment and alarm systems.

Internal linings should comply with the deemed-to-satisfy provisions of the BCA based on the most appropriate BCA building classification unless a risk assessment has been undertaken.

9

Alternative Solutions

The Building Code of Australia offers two pathways to compliance:

- satisfy the deemed-to-satisfy provisions; or
- demonstrate that an alternative solution meets the performance requirements.

Where the alternative solution approach is adopted, a fire safety engineer (the designer) will prepare a fire engineering report assessing the design against relevant performance requirements of the NCC. Under some circumstances, the alternative solution may need to be assessed for its impact on fire safety during construction against performance requirement E1.5 and, if appropriate, additional precautions may be nominated in the fire safety engineering report. Items that may need consideration include:

- fire properties of materials used during construction;
- structural protection during construction;
- materials and methods to reduce the need for hot work on site;
- design details that prevent or restrict the passage of fire and smoke through the building;
- design of evacuation routes;
- fire brigade access to the site; and
- fire protection firefighting and alarm systems.

10

Construction Zones within Occupied Buildings

Renovation and maintenance activities are often undertaken while buildings are occupied, presenting a number of challenges to WHS responsibilities. The employer(s) of people working in the building and the building owner, in addition to the principal contractor, need to be actively involved in managing fire safety while the construction work is undertaken.

Common issues to be addressed include:

- isolation of existing fire protection systems in occupied areas in addition to the construction zone;
- verification of alarm system performance after adjustments/reprogramming;
- fire and smoke separation of the construction zone from the occupied areas;
- security to prevent unauthorised access to work areas;
- blocking of evacuation paths from occupied parts of the building;
- disturbance of service penetrations through existing fire separations; and
- modification of the performance of smoke management systems and firefighting equipment.

The planning phase is critical to ensure that acceptable safety levels are maintained during the construction works. The principal contractor should take the lead in preparing a site Fire Safety Plan but senior representatives of the employers of people working in the premises and the building owner should be involved in developing a plan that addresses all stages of the construction project.

A joint fire safety committee should be established with the responsibility for the establishment, validation and implementation of the emergency plan and procedures for the facility, including construction zones, for the duration of the construction project.

A combined emergency control committee should be established with the responsibilities of individuals clearly defined. It should ensure that issues such as those listed above are adequately addressed in addition to those of a typical construction site or workplace.

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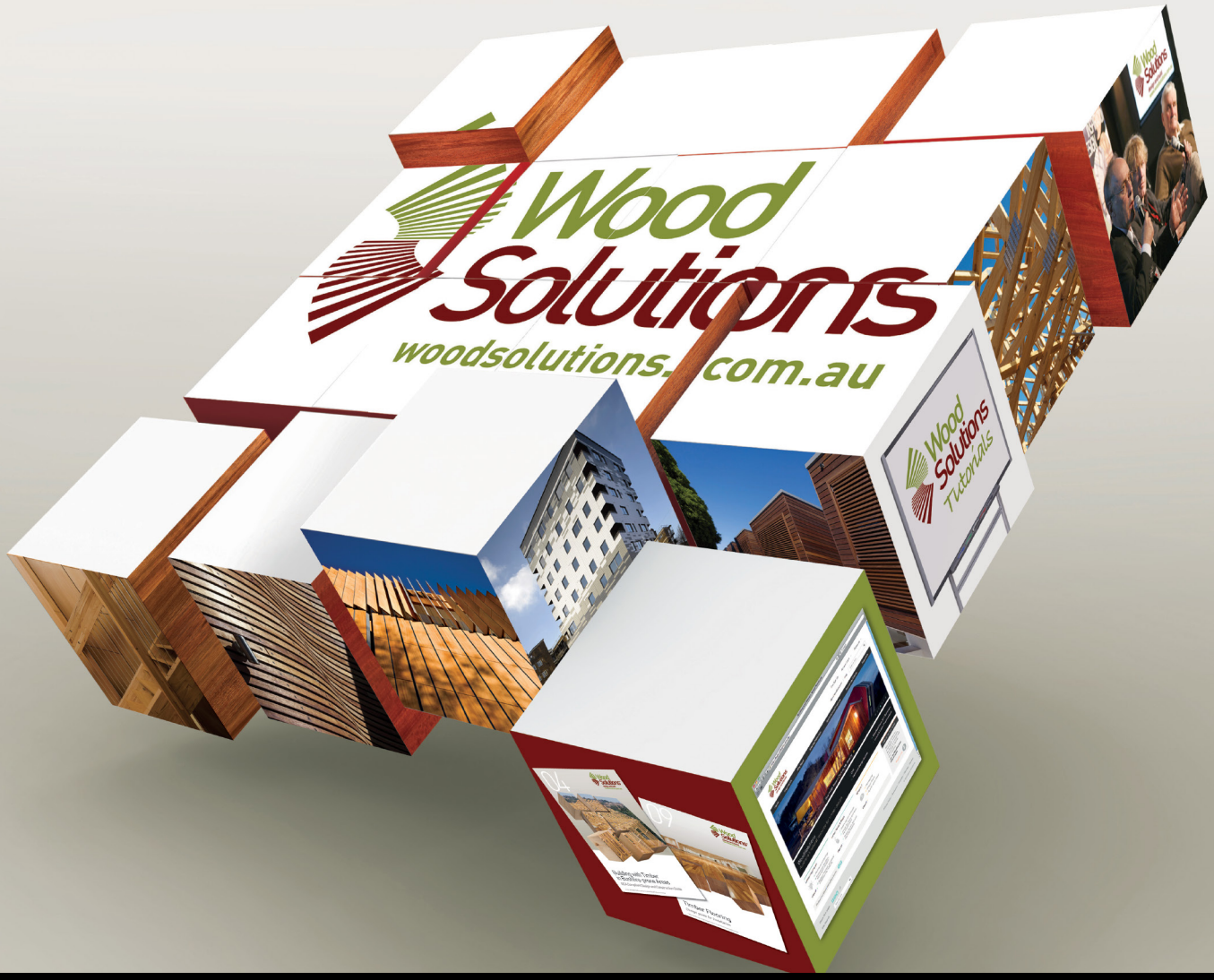
Bushfire Safety

Where a construction site is in an area where there is a risk of bushfire, additional controls will need to be put in place including:

- restrict hot work activities on days of high bushfire risk;
- where reasonably practicable, plan construction phases so that the external façade of the building is in place before the bushfire season begins;
- where reasonably practicable, protect openings in the building under construction if the contents are susceptible to ignition by embers;
- clear excess vegetation around the building as permitted by the relevant council or shire;
- minimise storage of combustible materials on the site; and
- if combustibles need to be stored on site, provide non-combustible or fire retardant treated covers.

12 References

1. National Construction Code Series 2013 Volume One, Building Code of Australia Class 2 to Class 9 Buildings: Australia Building Codes Board, Canberra ACT.
2. Model Work Health and Safety Bill: Safe Work Australia; Commonwealth of Australia.
3. Performance requirement EP1.5 Fire precautions during construction, National Construction Code Series 2013 Volume One, Building Code of Australia Class 2 to Class 9 Buildings: Australia Building Codes Board, Canberra ACT.
4. Clause E1.9 Fire precautions during construction, National Construction Code Series 2013 Volume One, Building Code of Australia Class 2 to Class 9 Buildings: Australia Building Codes Board, Canberra ACT.
5. Specification C1.10 Volume one, Building Code of Australia Class 2 to Class 9 Buildings: Australia Building Codes Board, Canberra ACT.
6. Clause E1.9(b) Fire precautions during construction, National Construction Code Series 2012 Volume One.
7. Model Work Health and Safety Regulations Safe Work Australia 2011.
8. *AS 2118 – AS 2118 Automatic fire sprinkler systems;* Standards Australia. Note the following editions are referenced in the 2013 edition of the BCA. More modern editions of the following standards may be adopted as alternative solutions therefore the appropriate edition should be confirmed by the building surveyor/certifier. Part 1 1999 General requirements 1999, Part 4 Residential 1995, or Part 6 Combined sprinkler and hydrant 1995.
9. *AS 2419 Fire Hydrant Installations Part 1 System Design Installation and Commissioning*; Standards Australia 2005.
10. *AS 2441 Installation of Fire Hose Reels*; Standards Australia 2005.
11. *AS 3745-2010 Planning for Emergencies in Facilities*. Standards Australia 2010.
12. Clause E1.9(a) Fire Precautions During Construction, National Construction Code Series 2012 Volume One
13. *AS 2444 Portable fire extinguishers and fire blankets – Selection and location*; Standards Australia 2001.
14. Clause E1.9(b) Fire Precautions During Construction, National Construction Code Series 2012 Volume One.



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