# Managing Fire Risks and Hazards in Buildings

The risk of fire exists at every stage of a building's lifecycle, such as during construction, occupancy and renovation. Such incidents can cause severe property damage, or worse, result in the loss of lives among workers and building occupants. The tragic fire in Hong Kong's Wang Fuk Court housing complex serves as a reminder of the catastrophic consequences when fire safety measures are inadequate.

A fire could occur when three elements are present (Figure 1):
- Ignition source (e.g. faulty or improper use of electrical appliances, lighted cigarettes)
- Fuel (e.g. flammable materials)
- Oxygen

Figure 1: Fire Triangle
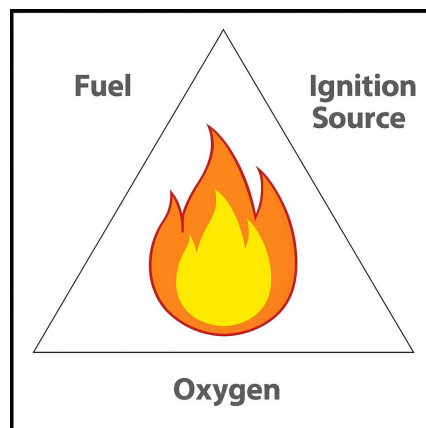
Removing any one of these elements significantly reduces the risk of fire. As oxygen is present in the environment, efforts should focus on managing ignition and fuel sources.

The WSH Council calls on all companies to prioritise fire safety and put in place measures to prevent fire outbreaks, ensuring a safe working environment.

What companies should do

Companies should assess fire risks and implement the following measures or checks:

Fire Risk Assessment

Conduct a fire risk assessment at your workplace using these three steps:
- **Step 1** – **Fire hazard identification**: Identify potential ignition and fuel sources.
- **Step 2** – **Fire risk evaluation**: Assess the risk levels of identified hazards, taking into account existing control measures (if any).
- **Step 3** – **Fire risk control**: Implement appropriate measures to reduce risks to an acceptable level based on the risk evaluation determined in Step 2.

Control Ignition Sources

Ignition sources are energy sources capable of igniting flammable materials, substances or gases. Examples of controls can include:

- **Smoking restrictions:** Prohibit smoking at critical work areas (e.g. where flammable materials are handled or stored) and designate smoking areas away from flammable materials with proper disposal containers.

- **Electrical safety:** Inspect and replace damaged electrical wiring, sockets and equipment regularly. Use and charge certified appliances/batteries only and avoid overloading circuits.

- **Permit-to-work:** Implement a permit-to-work system for hot works such as welding and cutting.

- **Prevent static buildup:** Use anti-static additives and ensure proper bonding and grounding of containers and equipment during the transfer of flammable liquids to prevent sparks from static electricity.

Manage Fuel Sources

Fuel is any flammable or combustible material that can sustain a fire. Flammable materials present a fire hazard as they are readily ignitable and can easily cause a fire to spread at a very fast pace. Examples of fuel source controls can include:

- **Good storage practices:** Proper storage of flammable materials prevents ignition and ensures that if a fire occurs, it can be controlled to minimise its spread.
  - Minimise the amount of flammable materials stored on-site.
  - Keep flammable materials away from ignition sources and incompatible substances.
  - Store flammable materials in open areas under securely fastened fire-retardant protective sheets or covers, wherever possible.

- **Housekeeping:** Maintain clean, organised and clutter-free work areas. Good practices include removing combustible waste, keeping escape routes clear and storing flammable materials properly to reduce ignition risks and enable quick emergency response.

- **Use fire-retardant materials:** Replace flammable materials with fire-retardant or non-combustible alternatives. For example, use fire-retardant scaffold overlays and screening nets, and selecting mineral wool in place of polystyrene boards for insulation purposes. Ensure all materials f for construction comply with [Clause 3.15 of the Code of Practice for Fire Precautions in Buildings](#).

Emergency Drills

Conduct emergency evacuation drills at least twice a year, or in accordance with the Singapore Civil Defence Force's requirements. Drills must incorporate different possible scenarios and test alternative evacuation routes in any case exits become congested or inaccessible.

Emergency Response Plan (ERP)

Develop and implement a comprehensive ERP that outlines fire safety measures, floor layouts plans and evacuation procedures. The ERP can include:

- **Company Emergency Response Team (CERT):** Define the duties of all members (e.g. site main controller, site incident controller, response team members and fire wardens).

- **Emergency evacuation plan:** Specify escape routes, emergency exits, evacuation procedures and designated assembly points.

- **Fire protection systems:** Indicate the availability and accessibility of firefighting equipment (e.g. extinguishers, hose reels), fire detection systems, manual fire alarm systems and fire suppression systems (e.g. sprinkle).

- **Emergency Contact Information:** Display emergency contact details prominently on-site.

- **Communication:** Establish effective means to alert occupants and coordinate with emergency services during an incident.

For more information, refer to the Fire Safety Act and its subsidiary legislation, Ministry of Manpower Circular on [Circular On Safe Storage Of Combustible Materials In Construction](#), the WSH Council's [Code of Practice on WSH Risk Management](#) and [WSH Guidelines on Flammable Materials](#), the Singapore Civil Defence Force's [Code of Practice for Fire Precautions in Buildings 2023](#) and [Evacuation Planning Guidelines](#).

Under the WSH Act, first-time corporate offenders may be sentenced to the maximum fine of $500,000 whilst individuals can either be sentenced to the maximum fine of $200,000 and/or an imprisonment not exceeding 2 years. Read more on the [WSH Act penalties](#).