




---

---

---

---

---

---

---




---

---

---

---

---

---

---




---

---

---

---

---

---

---

- "Fire Risk" refers to the potential likelihood of a fire happening multiplied by the **severity** of the potential fire outcomes - this includes loss of life, fire spread and property damage.
- The potential outcome from a fire hazard depends on the potential for development of a fire originating from the hazard and then the potential consequences in terms of life and/or property loss.
- Determining the potential for harm requires the assessor to make a judgement on the possible outcome of the hazard.

---

---

---

---

---

---

---

- The potential for ignition is the first consideration, but thought must also be given to the number of times the situation could occur and the factors that could cause it to occur, e.g. the competence of people involved, environmental conditions and the condition of equipment.
- The potential for development will be affected by a number of factors not least the length of time the fire could burn before it is detected and how long before the fire threatens the means of escape.
- Factors such as building construction (combustible materials and/or lack of compartmentation) and contents (combustible and/or flammable materials which will provide fuel) will also impact on this.

---

---

---

---

---

---

---

- Fire risk assessment is an organised look at what, in your work activities and workplace, could cause harm to people from fire.
- It will help determine the chances of a fire occurring and the dangers from fire that the workplace poses for the people who use it.
- Its purpose is to determine whether existing fire precautions are adequate and reasonable relative to the overall risks presented or if it requires reduction via control measures.

---

---

---

---

---

---

---

Major events...

1981	New York, USA	146 killed in a fire in a garment factory
1986	Piper Alpha, UK, North Sea	167 killed by a fire on an oil platform
1993	Nakhon Pathom, Thailand	188 killed in a fire in a toy factory
2003	Station Nightclub, Rhode Island, USA	100 killed in nightclub fire
2010	Karachi, Pakistan	289 killed in a fire in a garment factory
2012	Ahmadia District, Dhaka, Bangladesh	117 killed and more than 200 injured in a garment factory fire
2013	Minshui, China	156 killed and more than 40 injured in a food processing fire
2014	Shengquang, China	48 killed and 15 injured in a cereal packaging factory
2015	Watermark City, Philippines	74 killed in a slipper factory fire
2019	Prithvi Road, Marol, India	43 killed in a garment factory fire
2020	Market port, Lebanon	At least 297 deaths, 7,500 injured, fire caused ammunition stored in magazine
2021	Rugganj, Dhaka, Bangladesh	At least 52 killed in a fire in a food and beverage factory

The sequence of events leading to a major fire.....

- The storage and use of combustible materials in the workplace;
- The presence of a source of ignition;
- Failure to quickly detect the presence of fire or smoke;
- Failure to control the fire and extinguish it

- The inability of an employer or controller of the premises concerned to manage the risk of fire can lead to numerous human fatalities.
- The most common reason for a fire becoming a major human disaster is the inability of persons trapped within a building to escape in time.
- The problem is often compounded by the potential "domino effect" of the fire setting off an explosion or the building collapsing, which further reduces the chances of effective evacuation.
- Many more people are killed in fires by the inhalation of smoke and toxic gases than by the heat of the fire itself.
- Toxic gases may cause loss of consciousness within minutes, so it is imperative that people be able to evacuate the building and reach a place of safety or protected zone as quickly as possible.

---

---

---

---

---

---

---

---

### reasons for failure to make a timely escape

The reasons for failure to make a timely escape from the building may include the following unsafe conditions or practices:

- Poor building design
- Obstruction of fire escape routes
- The lack of an early warning system in the event of a fire
- A lack of emergency procedures

---

---

---

---

---

---

---

---

### Poor building design

- The lack of provision of suitable escape routes in the design of a building can result in dead ends.
- If a fire occurs between these areas and the only exit, the persons involved will have no means of escape.
- Often fire escape routes are constructed only on the ground floor of a multi-storey building.
- If a fire develops on a lower floor and staircases are not sufficiently protected, workers on higher floors may be trapped by rising smoke.

---

---

---

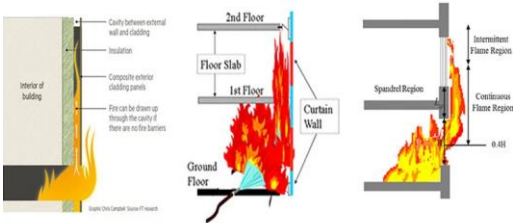
---

---

---

---

---




---

---

---

---

---

---

---

---

## Obstruction of fire escape routes

- Warehouses and storage facilities often suffer from poor housekeeping or inadequate storage space, resulting in the obstruction of fire escape routes and exit doors.
- The locking of exit doors as a security measure may make it impossible to open up exit routes and cause people to become trapped in a dead end within the burning building.
- Fire escape routes that are too narrow for the number of people in the building may prevent them from escaping from the building in a timely manner.

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

### The lack of an early warning system in the event of a fire

- Early warning systems such as smoke detectors, heat detectors or flame detectors provide an effective way of detecting fires rapidly and applying timely control measures.
- Detectors should be connected to an evacuation alarm system with a signal loud enough to be heard by all workers in the event of an emergency.
- The lack or malfunctioning of systems and equipment for detecting the presence of fire and sounding the alarm can lead to a significant delay in the evacuation of a building.
- The system should also be appropriate for people with hearing impairments or other disabilities, for example by including flashing lights.

---

---

---

---

---

---

---

---

### A lack of emergency procedures

- A lack of emergency procedures, a lack of training in the procedures that exist and a lack of routine practices of such procedures are all factors that can lead to a delay in the evacuation of a building.




---

---

---

---

---

---

---

---

### Importance And Benefits Of Fire Risk Assessment

Fire risk assessments are essential for several reasons,

- legal responsibilities,
- personal safety, and
- potential cost savings.

---

---

---

---

---

---

---

---

• **Legal Compliance:** In many jurisdictions, it's a legal requirement for businesses to conduct regular fire risk assessments. Failure to do so can result in hefty fines, penalties, and, in severe cases, imprisonment.

• **Safety:** The primary purpose of a fire risk assessment is to identify any potential fire hazards and ensure that appropriate measures are in place to mitigate these risks. This helps ensure the safety of everyone on the premises, including employees, visitors, customers, and residents.

• **Prevention:** Fire risk assessments help prevent fires by identifying potential risks and hazards early. This allows businesses to take corrective action before a fire occurs, such as removing flammable materials or fixing faulty equipment.

---

---

---

---

---

---

---

---

• **Emergency Preparedness:** Fire risk assessments also involve evaluating the effectiveness of current fire safety measures, such as fire alarms, fire extinguishers, and escape routes. This helps ensure that people can evacuate safely and quickly during a fire.

• **Financial Savings:** Fires can be devastating financially, causing extensive damage to property and goods, potentially shutting down operations, and leading to higher insurance premiums. Regular fire risk assessments can help prevent such losses. They may also result in lower insurance premiums, as many insurers offer discounts to businesses that demonstrate a proactive approach to fire safety.

---

---

---

---

---

---

---

---

• **Reputation Management:** Demonstrating a commitment to safety can enhance a business's reputation with employees, customers, and the wider community. In contrast, a fire, particularly one that could have been prevented through proper risk assessment, can severely damage a business's reputation.

• **Business Continuity:** Businesses can ensure continuity by identifying potential fire risks and implementing prevention and mitigation strategies. Fire can cause significant downtime, but the risks are minimized by being proactive and having a robust fire safety procedure, ensuring business operations can continue with minimal disruption.

---

---

---

---

---

---

---

---

## The fire risk assessment must meet the following criteria:

A fire risk assessment must fulfil a number of criteria as follows:

- Be a suitable and sufficient assessment of the fire risk;
- Include significant findings and measures to reduce and manage the risk from fire;
- Identify any group of persons especially at risk;
- Be a written record (when there are five or more employees);
- Be reviewed regularly to meet changes in the premises, technical and organisational measures, work processes and routines etc.

---

---

---

---

---

---

---

---

## Steps involved in the fire risk assessment process

- **Step 1:** Identify Fire Hazards on Your Premises or Workplace
- **Step 2:** Identify People at Risk
- **Step 3:** Evaluate, Improve and Decide on the Adequacy of Current Fire Safety Measures
- **Step 4:** Document Your Findings, Create an Emergency Plan, and Educate All Involved
- **Step 5:** Regularly Review Your Fire Risk Assessments

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---



**STEP 1**

**IDENTIFY FIRE HAZARDS ON  
YOUR PREMISES OR  
WORKPLACE**

- The first step in the fire risk assessment process involves identifying fire hazards within your establishment or workspace.

---

---

---

---

---

---

---

• **Sources of Ignition:** These are things that could potentially start a fire. Examples include open flames, heating equipment, or even specific industrial processes that generate heat or sparks. It's important to list all potential ignition sources to fully understand where a fire could start.

---

---

• **Fuel Sources:** These items can feed a fire, allowing it to spread or become more intense. This might include waste materials, display items, textiles, or other inventory items. Identifying these sources can help you understand what might fuel a fire if one were to start.

---

---

• **Oxygen Sources:** Fire needs oxygen to burn, so identifying potential sources of oxygen is essential. This could include air conditioning systems or supplies of oxygen used for commercial or medical purposes. Be aware of areas where oxygen levels might be higher than usual in your establishment.

---

---

---

---

• **Structural Factors:** Certain structural features of your building can contribute to the spread of fire. For example, flues and ducts, gaps in firewalls that lack fire stops, large expanses of flammable material, vacant attic spaces, or unusually long escape routes can all amplify the risk and impact of a fire. It's vital to recognize these factors and consider them during your assessment.

---

---

---

---

---

---

---

- Have you found anything that could start a fire?
- Have you found anything that could burn?
- How could a fire start?
- Think about heaters, lighting, electrical equipment and hot works
- Have you considered smoking and the use of matches?
- Hot processes, welding and grinding should also be taken into account

---

---

---

---

---

---

---

## STEP 2

### IDENTIFY THE PEOPLE WHO'RE AT RISK

- The second step in the fire risk assessment process is to identify the individuals who may be particularly vulnerable in the event of a fire.

---

---

---

---

---

---

---

- **People Sleeping on the Premises** might include residents in a multi-use building or employees working overnight shifts. These individuals could be unaware of a fire until it's too late due to being asleep.
- **Large Groups of People:** In spaces where many people gather, such as event venues or large offices, the sheer number of individuals can complicate evacuation efforts.
- **Unfamiliar Individuals:** Visitors or new employees unfamiliar with the building's layout may struggle to find emergency exits during a fire.
- **Individuals Exposed to Specific Fire Risks:** People working in or near areas with identified fire hazards face a higher risk.
- **People with Impairments or Disabilities:** Those with hearing, sight, or mobility impairments may need additional assistance during an evacuation.

---

---

---

---

---

---

---

- **Workers near Fire Hazards:** Employees who work near identified fire dangers are naturally at a higher risk.
- **Lone Workers or Those in Isolated Areas:** These individuals may not be promptly alerted to a fire, delaying their evacuation. Isolated areas could include storage spaces, rooftops, or remote parts of a large site.
- **Parents with Infants or Elderly People:** These groups may need additional time or assistance to evacuate.
- **People with Slower Response Times:** This could include people with certain medical conditions, cognitive impairments, or even those under the influence of medication or alcohol.
- **External Contractors, Temporary Workers, or Agency Staff:** These individuals might not be familiar with the fire safety procedures of the premises.

---

---

---

---

---

---

---

- Everyone is potentially at risk from fire
- Think about night staff or people not familiar with the premises, such as visitors or customers
- Children, the elderly or disabled people are especially vulnerable
- Who could be at risk?
- Who could be especially at risk?

---

---

---

---

---

---

---

STEP 3

EVALUATE, IMPROVE, AND  
DECIDE ON THE ADEQUACY OF  
CURRENT FIRE SAFETY  
MEASURES

- This stage involves assessing fire risks and the adequacy of current measures and considering improvements if necessary.

---

---

---

---

---

---

---

(1) Assess the risk of fire

• Based on your observations and analysis during the risk assessment, classify the building's fire risk (likelihood of ignition) into the following categories:

Low	Medium	High
-----	--------	------

---

---

---

---

---

---

---

• **Low:** Little risk of fire due to few combustible materials, absence of highly flammable substances, and minimal heat sources.

• **Medium:** Fire could occur but is unlikely to spread rapidly due to the presence of combustible materials and heat sources.

• **High:** High fire risk due to large combustible materials, highly flammable substances, or conditions that could allow the fire to spread rapidly.

---

---

---

---

---

---

---

(2) Identify the potential consequences of a fire

• Considering the building's structure, its occupants, and existing safety measures and procedures, determine the potential harm in case of a fire.

• Categories are:

Slight harm	Moderate harm	Extreme harm
-------------	---------------	--------------

---

---

---

---

---

---

---

- **Slight Harm:** No severe injuries or fatalities are expected in the event of a fire.
- **Moderate Harm:** Injuries might occur to one or more occupants, but mass fatalities are unlikely.
- **Extreme Harm:** There is a significant risk of severe injury or death to multiple occupants.

\*Remember to consider sleeping occupants when assessing the level of harm.

---

---

---

---

---

---

---

**(3) Determine the risk rating**

Using the results from steps (1) and (2) above, use the table below to determine the risk rating.

Potential consequences if a fire was to occur> Risk of a fire occurring	Slight harm	Moderate harm	Extreme harm
Low	Trivial risk	Tolerable risk	Moderate risk
Medium	Tolerable risk	Moderate risk	Substantial risk
High	Moderate risk	Substantial risk	Intolerable risk

Accordingly, it is considered that the risk to life from fire at this building is:

Trivial	Tolerable	Moderate	Substantial	Intolerable
---------	-----------	----------	-------------	-------------

---

---

---

---

---

---

---

**(4) Determine the Action level and timeframe**

Risk Level	Required Action & Timescale
Trivial	No need for immediate action or detailed record-keeping, but regular monitoring is recommended.
Tolerable	Significant new controls aren't required. Regular monitoring is needed, and affordable improvements may be considered.
Moderate	Efforts should be focused on minimizing the risk. Risk reduction measures should be implemented within a specific timeline and monitored regularly.
Substantial	Significant resources may be needed to reduce risk. Unoccupied buildings should remain so until the risk is reduced. If the building is occupied, immediate action is required.
Intolerable	The area (or building) shouldn't be occupied until the risk is reduced. Immediate action is necessary.

---

---

---

---

---

---

---

If the existing fire safety measures are insufficient, consider how you could reduce or remove fire hazards. This could involve:

- Replacing highly flammable materials with less flammable alternatives.
- Separating flammable materials from ignition sources.
- Implementing a strict no-smoking policy.
- Reducing the time and distance of escape routes.
- Providing additional escape routes.
- Upgrading your fire alarm system.
- Improving fire safety signage.
- Considering active firefighting systems, such as sprinklers.
- Appointing fire wardens.
- Implementing fire safety training programs.

---

---

---

---

---

---

---

---

- Have you assessed the risks in the workplace?
- Do you have enough escape routes?
- Have you planned escape routes?
- Have you made sure people will be able to safely find their way out, even at night?
- Is a fire alarm system needed?
- Are signs, such as fire exit signs, needed?
- Is emergency lighting required?
- Are fire extinguishers needed and, if so, where should they be located?
- Have you kept sources of ignition away from fuel sources?
- Have you made sure that everyone is safe in case of fire?
- Do you have a fire safety plan?
- Who will call the fire and rescue service?
- Could you put out a small fire and stop it spreading?

---

---

---

---

---

---

---

---

## STEP 4

**DOCUMENT YOUR FINDINGS,  
CREATE AN EMERGENCY PLAN,  
AND EDUCATE ALL INVOLVED**

- In this phase, it's essential to record your findings, develop an emergency response plan, and provide necessary information and training to everyone who could be affected.
- All hazards and at-risk individuals identified in steps 1 and 2 should be documented. The measures taken in step 3 to mitigate these risks should also be recorded. This documentation should be completed using the appropriate fire safety risk assessment form specific to your business type.

---

---

---

---

---

---

---

---

The types of premises for which dedicated forms are available include:

- Large Places of Assembly
- Offices
- Residential Care Premises
- Educational or Academic Premises
- Small and Medium Place of Assembly
- Sleeping Accommodation

If your premises do not fall into one of these categories, you can seek advice from your local safety authorities or relevant safety departments.

Following this, an emergency plan specific to your premises should be developed. This plan should outline the actions to be taken if there's a fire within your property or in a nearby facility. Information on creating emergency plans can usually be sourced from your local fire service or online safety resources.

- Finally, everyone involved should be informed about the identified fire risks, including employees and others who might be at risk.

- They should also be instructed on fire safety measures to manage these risks.

- Specific individuals, such as fire marshals or safety officers, may require additional training to handle emergency situations effectively.

- This step is crucial in ensuring everyone's safety and equipping them with the necessary knowledge to respond appropriately in a fire emergency.

- Have you planned what everyone will do if there is a fire?
- Do all your staff know the plan?
- Have staff had up-to-date training and completed a fire drill?
- Have you included temporary staff?
- Are you maintaining everything that is provided or required to keep people safe from fire?
- Formulate your action plan to reduce the fire hazards. The plan is an inventory of actions, normally prioritised and time constrained to devise, maintain or improve controls. Remember, where appropriate, this can be eliminating or controlling hazards (e.g. better separation of combustible materials from ignition sources)

## STEP 5

### REGULARLY REVIEW YOUR FIRE RISK ASSESSMENTS

- It's essential to conduct regular reviews of your fire risk assessments to ensure they remain up-to-date and accurately reflect the current risks in your premises. Risks can change for several reasons, and an outdated assessment can leave you ill-prepared to handle potential fire hazards.
- If there has been a significant change in the level of risk at your premises, or if there's been a close call, you should revisit and revise your fire risk assessment promptly.

---

---

---

---

---

---

---

---

### Factors that might prompt a review include:

- **Alterations in the nature, type, and layout of the premises:** Any physical modifications to the structure of the building or its usage can alter the fire risk and should be accounted for.
- **Changes in the number and type of individuals on the premises:** A growth in staff size or a shift in demographics (e.g., more individuals with mobility issues) could affect how fires are handled.
- **Updates to equipment and plant layout:** Introducing new machinery or reconfiguring current equipment could create new fire hazards or change the dynamics of existing ones.

---

---

---

---

---

---

---

---

- **Modifications in the on-site materials:** A change in the volume or type of materials stored, especially if they are flammable or combustible, can dramatically alter the fire risk profile.
- **Introduction of new procedures and processes:** The fire risks might also change if your operations change.
- **Changes in shift patterns:** For instance, adding a night shift could change the dynamics of potential fire risks, including the number of people on-site and their ability to respond to a fire.

---

---

---

---

---

---

---

---



- Keep your assessment under regular review.
- Remember to update it as risks or hazards change.
- If you make any significant changes, you should review your risk assessment.
- Have you made any changes to the building since the last assessment?
- Have you had a fire or a near miss?
- Have stock levels changed significantly?
- Have you started to store chemicals or dangerous substances?

---

---

---

---

---

---

---

---

### Common pitfalls in the fire risk assessment process

- Carrying out a risk assessment in retrospect in an attempt to justify a decision that has already been made;
- Using a generic assessment when a site-specific assessment is needed;
- Carrying out risk assessment using inappropriate practices;
- Not involving a team of people in the process. A team approach to risk assessment should be adopted whenever possible. Pooling the knowledge, skills, expertise and experience of a range of people with different perspectives should ensure comprehensive coverage of all fire hazards;
- Failure to identify all hazards;
- Failure to consider all possible outcomes;
- Failure to consider the hierarchy of controls;

---

---

---

---

---

---

---

---

- Failure to implement control measures;
- Not doing anything with the results of the risk assessment e.g. failure to implement control measures;
- Failing to pass on the results of the risk assessment to those covered by it.

---

---

---

---

---

---

---

---

## Fire risk reduction and control

- For an employer or person in control of a building, the first requirement in the process of effective risk reduction is the appointment of a manager to be responsible for fire risk management issues; this person is designated as the "Fire Manager".
- The appointed Fire Manager should produce a "Fire Plan", after liaising closely with worker representatives during implementation of the employer's policies and procedures for fire risk reduction.
- The employer should consider appointing a Fire Warden for each area of the building.

### Fire Wardens should be responsible for:

- Assisting the Fire Manager in the development and implementation of the Fire Plan;
- Carrying out daily or weekly checks of the workplace fire safety arrangements, to include:
  - monitoring the fire escape routes to ensure that they are unlocked and free of obstructions,
  - monitoring the storage of combustible materials, where this is allowed by national laws and regulation
  - monitoring the control and minimization of sources of ignition,
  - checking the availability of and access to firefighting equipment;

- ensuring that all persons within their area are able to evacuate should an emergency arise;
- special arrangements may be required for workers with disabilities or children in childcare facilities, where these are provided by the employer;
- ensuring that all persons have evacuated from their work area in an emergency;
- ensuring that only trained workers use the firefighting equipment



The fire-risk-reduction policy and plan should take into account the following critical elements:

- Controlling combustible materials
- Reducing the potential for ignition
- Rapid identification and notification of the presence of fire or smoke
- Effective emergency provision and procedures
- Control of the fire

---

---

---

---

---

---

---

### Controlling combustible materials



- All workers should receive information, instruction and training in working safely when handling/storing/using combustible materials, and should be urged to follow them.
- Employers, managers and supervisors must ensure that these safe systems of work are followed.
- Combustible materials need to be restricted to appropriate areas within the building and suitably stored.
- The amounts of stored materials should be kept to a minimum.
- Flammable or highly flammable liquids and gas bottles should be securely stored in external storage buildings unless in use, in which case the amount inside the building should be the minimum required, and should be kept in labelled, fire-resistant containers.

---

---

---

---

---

---

---

- Combustible materials such as paper, fabrics, wood, plastics, packaging materials, chemicals and so on should not be stored beneath staircases or in stairwells, or in close proximity to sources of ignition, such as:

- heating equipment;
- electrical cabinets or equipment;
- places where hot work, such as welding and grinding, is performed;
- cookers or smoking areas

---

---

---

---

---

---

---

- All flammable materials and liquids should be adequately labelled as such and stored in suitable fire-resistant containers.
- With regard to the storage of chemicals, the warning signs stipulated by the Globally Harmonized System of Classification and Labelling of Chemicals should be used, particularly those warning of the following risks.
- The implementation of good housekeeping practices and regular workplace inspections will ensure the effective control of combustible materials in the workplace.




---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

- It is important to provide an adequate number of waste receptacles for each workstation, to avoid the accumulation of waste and scraps on the workplace floor and to facilitate housekeeping.
- Receptacles for contaminated fabrics and rags should have a tight-fitting cover to reduce the risk of vapours being released into the workplace.

---

---

---

---

---

---

---

---

- The outside of the building should be kept clear of any material that might become combustible in hotter weather (e.g. dry vegetation).
- Where places are allocated for workers to smoke, these must be kept free of combustible materials.



---

---

---

---

---

---

---



---

---

---

---

---

---

---

### Reducing the potential for ignition

- The presence of sources of heat or ignition needs to be taken into account in relation to the location of combustible or flammable materials.



---

---

---

---

---

---

---

**The following control measures should be included in the Fire Plan:**

- No smoking in the workplace, except where controlled smoking areas are provided;
- Controlled access to minimize the potential for arson;
- Good housekeeping in areas where hot work (welding/grinding) is carried out and, once such work is completed, regular checks of the work area to ensure material has not ignited;
- Safe procedures for the burning of waste materials, where this is allowed by national laws and regulation;
- Continuous supervision of heat sources during kitchen work;
- Effective electrical maintenance and inspection

---

---

---

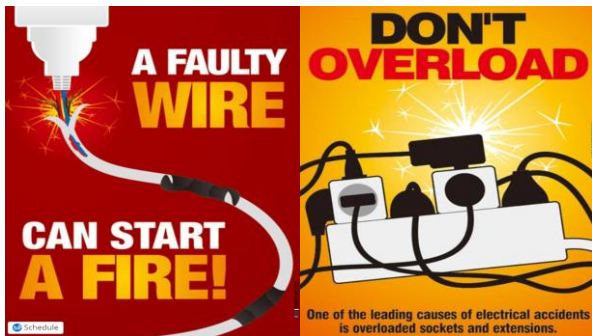
---

---

---

---

---




---

---

---

---

---

---

---

---

Poor electrical maintenance can lead to sparking, overheating or arcing, thus causing ignition.

**The following special precautions should therefore be observed:**

- Electrical equipment should be earthed to minimize the potential for static electricity creating sparks or arcing.
- Each electrical circuit should have an adequate fuse or circuit breaker located in a fire resistant cabinet.
- Hard-wired circuits should be used, not extension cables, to minimize the potential for damage to the wiring insulation and to prevent the practice of "ganging" multiple plugs and overloading circuits.
- Isolators should be arranged and properly identified so that all electrical equipment can be swiftly isolated in an emergency.

---

---

---

---

---

---

---

---

Rapid identification and notification of the presence of fire or smoke

- The provision of detectors connected to an automatic alarm and warning systems is important for rapid identification and early warning of the presence of fire or smoke.
- Fires can be detected using a variety of electrically powered equipment that may identify the presence of smoke, heat (or rapid heat rise) or flickering light.
- These devices need to be routinely inspected and tested in accordance with national legislation and manufacturers' instructions. Their location and distribution are critical.
- Their presence is vital, especially in areas of a building where combustible materials or flammable liquids are stored

---

---

---

---

---

---

---



---

---

---

---

---

---

---

Effective emergency provision and procedures

- Ensuring that everyone can evacuate the building in a timely fashion is a vital risk control measure.
- A workplace should normally have at least two exit routes to permit the prompt evacuation of workers and other building occupants during an emergency.
- More than two exits may be required if the number of workers, size of building or arrangement of the workplace does not allow workers to evacuate swiftly.

---

---

---

---

---

---

---



- Exit routes should be located as far away from one other as possible, but within the maximum distances prescribed by national fire safety codes in case one is blocked by fire or smoke.
- Additional emergency escape routes may be needed, depending on distances, numbers of people and internal floor distribution.
- Closed rooms (such as offices) may have one exit, so long as the door opens onto an exit route.
- If the number of occupants or local arrangements allow for all occupants to safely evacuate in an emergency, then one exit route may be acceptable.
- All fire escape routes must be visibly marked, wide enough for the maximum number of occupants to pass through in minimal time, and free of obstruction.

- Most codes stipulate that the determination of exit requirements for a building should be based on the type of use or occupancy of the building, the occupant load, the floor area, the distance to an exit and the capacity of the exits themselves.
- Higher floors in buildings should be constructed with at least two separate escape routes, preferably at different ends of the building.
- These escape routes should be protected to delay the ingress of fire/smoke for a sufficient time to allow safe evacuation.
- Fire escape routes should be well lit with emergency lighting. All escape routes must lead to a safe place outside the building.
- All fire escape routes should be checked on a daily basis to ensure that the routes are unobstructed and that the escape doors can be opened easily.






---

---

---

---

---

---

---

- If the employer feels the need to lock the final exit doors for security reasons, they must open outwards and be fitted with push-bar releases or locked with mechanisms that can be easily opened from the inside without the need for a key.
- All workers should be instructed and trained in the fire escape procedure, which should be the primary OSH element in a worker's induction training.
- All workers should take part in a fire escape practice at least annually, whenever layouts change, or in accordance with local codes.
- This exercise should be observed by the Fire Manager and any improvements or corrective actions subsequently implemented.

---

---

---

---

---

---

---

## Control of the fire

- Firefighting equipment for use by occupants and fire service personnel must be selected and positioned to be as accessible as possible.




---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

The Fire Manager must ensure that the following factors are considered in the firefighting plan.

- Fire extinguishers must be matched to the potential type of fire (fires are classed according to type, from combustible solid materials through flammable liquids and gases/aerosols to metal and electrical fires). The markings and colours of extinguishers may vary with local codes.
- Fire extinguishers must be located throughout the floor area, within a specified distance of any point and, where necessary adjacent, to a particular hazard area.
- The firefighting equipment for use by the fire services (such as hose reels and hydrant connections) must be positioned at the exits from the building, so that they can be accessed from a safe position.




---

---

---

---

---

---

---

---

- Fire detection and safety equipment vary widely by workplace, but these are some of the everyday maintenance tasks:
  - Have your **fire extinguishers** tested every few years and know when they need replacing—their lifespan depends on what type they are
  - Test fire and smoke **alarm systems** periodically to ensure they're working correctly and that employees recognize them
  - Verify that **emergency lights** and illuminated **exit signs** are functioning
  - If any of your emergency systems depend on **batteries**, make sure they're periodically tested and maintained
- Regardless of what kind of equipment your company has, keep records of your inspection and maintenance procedures, as fire marshals will require them during an inspection.
- Internal accountability is key to ensuring you're doing your best to keep people safe at work.

---

---

---

---

---

---

---

---




---

---

---

---

---

---

---

---

- The firefighting equipment must be properly mounted, in an unobstructed and marked position.
- A sufficient number of workers must be selected and trained in the use of the extinguishers.
- The Fire Manager must be notified of any use of the extinguishers for any purpose.
- The fire extinguishers must be inspected at least weekly, to ensure that they are correctly positioned and fully charged for use.
- All relevant workers must be instructed and trained in the proper use of the firefighting equipment (including which equipment is for use only by adequately trained and equipped firefighters), and in how to fight a fire in a safe manner.

---

---

---

---

---

---

---

---

- Prompt reporting to supervisors and to the firefighting department is critical for the control of a fire and for the rescue of trapped workers.
- The telephone numbers of emergency contacts should be clearly indicated in workplaces, and means of making such contact should be available.
- The spread of a fire should be limited by installing fire-rated compartment walls between the different areas of a building, with fire doors at openings and in corridors.
- Fire doors slow the rate of spread of a fire, allowing workers more time to evacuate the building.
- The specification of fire doors may be dictated by local codes, but will generally be in line with internationally recognized standards.

---

---

---

---

---

---

---

---

## Management of fire risk

- The numbers of workers and visitors within a building must be known to the Fire Manager or their appointed deputy.
- Workers, contractors and visitors must be instructed in the evacuation procedure: when the alarm is given, evacuate without delay, avoiding the use of lifts/elevators.
- The only exception is if a person is assigned to a specific task by the fire/emergency plan.
- Doors on escape routes should be self-closing so as not to hinder evacuation.

---

---

---

---

---

---

---

- Fire wardens should be trained to check that their areas are cleared of people before exiting themselves, then should report to the Fire Manager or his/her deputy.
- Having evacuated the building, people must remain in a designated safe area until the Fire Manager has accounted for them.
- Under no circumstances must they be allowed to re-enter the building until instructed by the Fire Manager.
- Any vehicles carrying flammable liquids or gas bottles should, if possible without increasing the risk to those involved, be moved to a safe distance from the building.
- Approach routes must be clear at all times to allow the emergency services easy access to the site.

---

---

---

---

---

---

---

## Information, training and education

- Workers should be given formal training in the emergency procedures and fire management processes as part of their induction.
- Workers should be given refresher training on a regular basis.
- On arrival in the building, all visitors should be given instructions and information concerning the fire alarm warning system, evacuation routes and fire assembly points.
- This information may be provided on cards.

---

---

---

---

---

---

---

## Five Steps to Workplace Fire Safety

- Workplace fires can stem from various sources, spread quickly, and, if not dealt with properly, may lead to massive damage, including injuries or loss of life.
- While any company hopes fire prevention measures will keep disasters at bay, you must prepare for the worst.
- Ensure your team's safety by providing regular and thorough training in a fire prevention plan, evacuation routes, and equipment handling.
- Seconds matter when dealing with a fire; chaos or confusion will only increase the danger.
- Ideally, responsibilities and reactions will become instinctual through repeated practice.

---

---

---

---

---

---

---

## 1. Teach prevention by recognizing fire hazards

- Prevention is the first step in fire safety. Train employees to identify and respond to fire risks in the workplace.
- Some hazards are inherent to the line of work—especially with more dangerous jobs—such as sparks produced by welding rigs.
- Other risks are entirely avoidable, like frayed power cables.
- You can and should fix these problems immediately.
- Either way, threat and risk assessment is key to preventing the unthinkable.

---

---

---

---

---

---

---

- Potential fire hazards vary widely by industry, but here are some of the most common types:
- **Electrical equipment:** There are many causes of electrical fires, and almost all are easily preventable. Frayed or faulty wiring, overloaded outlets or power strips, and space heaters are all common culprits. Regular inspections of devices and wiring can catch problems before they become threats.
- **Flammable liquids or gases:** Flammable materials are present in work environments ranging from construction sites to hospitals to kitchens. Thus, employees should know how to handle and store them properly.
- **Kitchen equipment:** Data from the U.S. Fire Administration indicates that 30% of workplace fires start in an office kitchen. Regularly check appliances for faults or defects, and do not leave them unattended for long periods.

---

---

---

---

---

---

---

• **Combustible materials:** Combustibles present a risk for sparking and prolonging a fire. Certainly, chemicals and metals in industrial settings present hazards. However, even excess dust or loose papers can start an office fire.

• **Smoking:** An improperly discarded cigarette butt can smolder for several hours before starting a flame. Allowing employees to smoke in unattended areas or use plastic containers or plants as ashtrays increases the risk of fire from cigarette butts. Of course, smoking areas must also be well away from flammables or combustibles. Instruct employees to discard cigarettes into a metal container filled with water.

---

---

---

---

---

---

---

---

## 2. Train employees on fire response

• Indecision can be deadly when a fire breaks out. Every second someone wonders what to do, the fire can grow and spread, exacerbating an already dangerous situation.

• The first decision anyone must make is whether to fight or flee. If a small fire starts in a toaster oven and a portable fire extinguisher is nearby, it's probably safe to unplug the toaster, put the fire out, and then assess the situation. Conversely, if an electrical fire starts at an outlet and spreads into the walls, everyone should evacuate immediately and wait for the fire department to arrive.

• Help your employees make the right call by teaching them how to understand what type of fire they're dealing with. Focus your training programs on the following information:

---

---

---

---

---

---

---

---

• Types of **flammable and combustible materials** present in the workplace

• Which **classes of fires** are most likely to occur

• When and how to use **fire extinguishing systems** and equipment

• How to **report a fire** using your company's emergency communications system

• **When to evacuate** rather than attempt to fight the fire

• **First aid training** so employees can act in case of injuries while they wait for first responders

• **Communication protocols**, including procedures for responding to company-wide alerts and reporting their whereabouts after an evacuation

---

---

---

---

---

---

---

---

### 3. Develop comprehensive evacuation plans

- If your employees have to evacuate due to a fire, they must understand exactly where to go and what to do.
- A robust fire evacuation plan includes far more than emergency exits and a few maps on the wall. It's a set of fire emergency action plans, responsibilities, and contingencies to ensure your entire team can reach safety.

---

---

---

---

---

---

---

- **Primary and secondary evacuation routes:** In a perfect world, everyone could find their nearest emergency exit and reach it. A building that's on fire is hardly an ideal world, though. Evacuation plans must include backup routes if employees encounter smoke or fire on their primary route.
- **Items to take during evacuation:** It can be tempting to grab valuable items. However, this detour wastes precious time and slows down the process. Employees should grab their cell phones if it's readily available to check in or communicate with emergency services, but leave everything else behind.

---

---

---

---

---

---

---

- **Responsibilities during evacuation:** Depending on the size of your company, designate a few key personnel to coordinate the evacuation. Assign route guides to direct their coworkers and facilitate a calm and orderly process. Floor monitors should be the last to leave a given area, ensuring it's empty before departing. A chief "fire warden" is responsible for the response, performing final checks on the facility and collecting headcounts from floor monitors.

---

---

---

---

---

---

---

- **Designated assembly points:** Once everyone has left the building, they must proceed to a designated spot and stay there until instructed to leave. If they depart early, it can throw off headcounts and create false alarms for missing personnel. Depending on the work environment and level of fire risk, consider setting a backup assembly point if the primary one is unsafe or inaccessible.




---

---

---

---

---

---

---

---

- **Two-way communication:** An employee safety monitoring platform is a critical communication tool during a fire. It allows company safety leaders to push mass notifications and updates to employees. And with two-way communication capabilities, it expedites the check-in process, letting employees easily report their location and condition.




---

---

---

---

---

---

---

---

#### 4. Perform regular fire drills

- Practice makes perfect. Simulating a fire comprehensively is impossible—you don't want to set your sprinkler system off unless necessary. However, conducting fire drills is a good way to ensure your organization understands your fire evacuation plan.




---

---

---

---

---

---

---

---



• **Clear communication:** Before the drill, ensure everyone understands the company's evacuation plan and their role in it. Additionally, planning the drill and minimizing conflicts with regular business is essential.

• **Set goals:** Collect metrics to help identify and fix shortcomings in your evacuation process. How long does the evacuation take? How long does it take to collect headcounts and report the completion of the drill? What inefficiencies can you address?

• **Rehearse various scenarios:** Telling everyone to use their primary exit route is a start, but it's not ideal preparation for an actual fire evacuation. To better simulate reality, introduce complicating factors. For example, say that specific hallways are inaccessible or that exiting to one side of the building is unsafe. And what happens if your fire warden happens to be out sick? Is someone trained and ready to step into that role?

---

---

---

---

---

---

---

• **Collect and apply feedback:** Observe how employees perform in the drill and ask them for feedback. Are there parts of the evacuation plan they don't understand? Do they need more training on how and when to help their coworkers? How can education programs better facilitate fire safety?

---

---

---

---

---

---

---

5. Test and maintain fire safety equipment

- Lastly, it's important to make sure you can depend on your emergency equipment if you need it.
- A fire extinguisher is useless if it's too old, and you don't want to discover that when you're backed into a corner.

---

---

---

---

---

---

---



- In the event of a fire, every second counts. Rick Rescorla, Morgan Stanley's Security Chief at the World Trade Center, experienced this first-hand when he safely led 2,700 employees out of the South Tower on September 11, 2001. After surviving the 1993 terrorist attack on the Twin Towers, Rescorla was one of the few who saw the towers' vulnerability, and he was certain they would eventually be attacked again.
- Rescorla required that Morgan Stanley employees practice swift and orderly emergency evacuation drills every three months. He planned these drills as a response to a terrorist attack, where fire is only one of many deadly hazards. It's a compelling example of how evacuation drills can effectively save lives.

---

---

---

---

---

---

---

---

## What Is a Fire Drill?

- A fire drill is an evacuation simulation that helps prepare participants for a real fire emergency response. Running drills lets people know what to expect and how to respond safely.
- During a fire drill, everyone will evacuate the building upon hearing an alarm or announcement and follow the fire evacuation plan that has already been communicated. Fire drills are different from other emergency drills, such as shelter-in-place drills, in that building evacuation is the primary goal, since a fire poses a risk to anyone in the building.




---

---

---

---

---

---

---

---

## How Important Are Fire Drills at Work?

- The National Fire Protection Association (NFPA) reports that local fire departments responded to 1.5 million fires in 2022 (that's one fire every 21 seconds).
- These fires caused roughly 3,790 civilian deaths, 13,250 civilian injuries, and \$18 billion in property damage.
- Armed with stats like this, your company would be wise to plan regular fire drills.
- In fact, many landlords and office management companies require organizations to have emergency plans and conduct fire drills in their leases.

---

---

---

---

---

---

---

---

Emergency drills are not only to prepare for fires. They train employees on a number of life-saving skills, including:

- How to leave the office quickly in case of any emergency or life safety situation
- How to engage Environmental Health and Safety (EHS) when there's a potential hazard
- How to locate escape routes and where to go after vacating the premises
- What to expect once emergency responders arrive

- "When you're planning drills, it is important not to have them at a predictable frequency because the nature of fire itself is unpredictable. Employees need to be ready for this irregularity."  
— Brian O'Connor, Technical Services Engineer at NFPA

## Repetition is key

- Ask any school-age child about fire drills, and they will probably mention doing a mock emergency evacuation within the last few months.
- Schools repeat fire evacuation drills often, so the routine becomes a habit and kids know what to do without really thinking about it.
- Fire drills are a great example of why emergency preparedness professionals typically "hope for the best; prepare for the worst."
- There may be a low chance of a real fire in your facility, but it's still important to have critical information like fire exits, extinguishers, and emergency supplies memorized, so if complications arise, your team knows how to respond.

- In a fire emergency, evacuation routes could be blocked or doors could be jammed, and you will need alternative routes.
- Hearing-impaired employees will need to be notified through a reliable channel other than a fire alarm or audio announcement.
- A fire alarm could be out of order.
- Regular fire drills will reveal these issues.

---

---

---

---

---

---

---

## Develop a Detailed Fire Evacuation Plan

- Before sending building occupants scurrying for the exits at the sound of a fire alarm system, make a detailed fire drill plan.
- As part of this work, you'll want to consider various scenarios:
  - Where might a fire start?
  - Are there areas of the building more likely to start fires, like kitchen appliances or chemicals in the warehouse?
  - Do wildfires threaten your business?
  - What is the fire code or maximum number of occupants for your building (and is your office violating it)?
  - Is your HVAC maintenance up to date?

---

---

---

---

---

---

---

### high-level steps to create a [fire evacuation plan](#):

- Establish roles and responsibilities for the fire evacuation team, including that of fire warden
- Develop comprehensive fire drill procedures
- Create a communication plan (using a multichannel, two-way mass communication system such as Alert Média makes this easy)
- Plan and map evacuation routes, emergency exits, and evacuation procedures
- Know your tools, such as smoke detectors, fire alarms, and fire extinguishers
- Rehearse evacuation fire drills at least twice per year
- Follow up and report using a modern employee notification system so you can determine the safety of all employees

---

---

---

---

---

---

---

## Fire Drill Procedures




---

---

---

---

---

---

---

---

### Step #1: Coordinate the plan

- Now it's time to get down to the drill. Once you have your fire evacuation plan in place, you know the routes. But it's not as easy as heading to the nearest pull station and pulling the alarm. Everyone needs to be on board when you conduct a fire drill at work.
- First, you must ensure the entire fire team (from the warden on down) is trained in the evacuation procedures and ready to make the drill a success.
- Second, you need executive buy-in since the drill will take people away from the factory line, their desks, and the warehouse.

---

---

---

---

---

---

---

---

- Third, and perhaps most importantly, all employees need to understand the importance of the fire drill and [fire safety](#) protocols; otherwise, they won't take it seriously.

---

---

---

---

---

---

---

---

## Step #2: Communicate with the team

- The key to a successful fire drill at work is communication.
- Announce the drill in every place employees will see it, including platforms such as an employee portal, intranet, website, Slack channel, newsletter, and text message.
- [Employee communication software](#) that covers the most common communication channels will make this a lot easier.
- Mark the time of the drill on the company Outlook or Google calendar.
- Include information about the fire team and their roles, orderly evacuation routes, and expectations for the fire drill procedure and participants' behavior.

*"With fire prevention education, some organizations communicate a little too frequently. When it's talked about too often, it becomes noise and employees are going to tune it out. But on the other end of the spectrum, when it's not talked about enough, you can't accomplish your safety and prevention goals. So, finding a middle ground for that is key." — Brian O'Connor, Technical Services Engineer at NFPA*

## Step #3: Set goals for success

- Your fire safety team will want to set goals and standards for the drill. If you include these in your first drill, you can work to improve them in subsequent drills.
- For instance, if your first drill takes 15 minutes to get all occupants safely outside because you discover people are visiting the restroom or wrapping up calls, you have work to do.

- Some metrics to measure:
  - Time from drill activation to complete evacuation
  - Time to report completion of the drill
  - Successful shutdown of equipment (where appropriate)

---

---

---

---

---

---

---

**Step #4: Practice the fire drill plan**

- Conduct rehearsals of increasing complexity. For example, your fire safety leaders could first rehearse “on paper” with a tabletop exercise where they describe the evacuation process to the fire warden. The team should describe their actions during a fire drill and analyze any perceived weaknesses or confusion. After the fire safety leaders understand their roles, they should physically walk through the fire drill.
- Next, conduct a full rehearsal with as many of your employees as possible. Large companies may favor doing this by building or by section to prevent business disruptions.

---

---

---

---

---

---

---

**Introduce challenge scenarios**

- Once your employees have mastered a basic fire drill, your fire safety leaders should design more intricate scenarios.
- Change up variables within the drill to train employees on how to react when complications arise.
- For example, by adding obstacles such as closed stairwells, obstructions, and blocked exits, you can simulate a more realistic environment and improve fire safety training overall.

---

---

---

---

---

---

---



---

---

---

---

---

---

---

- Fire drills are not successful unless every employee is accounted for outside of the building. This crucial step of the drill occurs at the assembly point. The designated area should be a familiar and agreed-upon location that is strategically placed at a safe distance outside the building. For large companies, multiple assembly areas allow for maximum efficiency with a separate fire team leader at every point.
- Companies with a mass emergency notification system such as Alert Media's can use the survey feature and event pages to track the status of employees who have yet to reach their assembly area. For those who may have lost their cell phones while evacuating, fire team leaders should also use old-school roll call to ensure every employee is accounted for.

---

---

---

---

---

---

---

- In the event of an actual fire, if someone is missing, fire team leaders should follow the predetermined reporting protocol and immediately alert the fire department and the entire fire team.

---

---

---

---

---

---

---



Step #5: Reflect and improve the plan

- When you conduct a fire drill at work, choose a few people who are not on the fire evacuation team to act as neutral observers. Task them with looking for the following:

---

---

---

---

---

---

---

- Large groups moving slowly or talking with each other
- People on cell phones or using other mobile devices
- Unhelpful behavior such as grabbing coats, purses, and bags
- Difficulties for people with disabilities or mobility impairments such as hard-to-open doors or slippery stairwells
- Employees who choose a different route rather than the nearest exit to their workstation

---

---

---

---

---

---

---

Fire management systems

- Risk-reduction plans should be drawn up following consultation with the workers and consideration of all the factors and information contained in the guidance.
- Employers should consider the use of checklists as a means of conducting simple risk assessments or as a tool for the conduct of routine inspections of the workplace.

---

---

---

---

---

---

---



- 
- 
- 
- 
- 
- 

---

---

---

---

---

---

- 42

### What is a Fire Insurance Policy in India?

- It is a type of fire insurance that acts as a contract between an insurance firm and a policyholder in which the insurance provider takes the responsibility of indemnifying the policyholders for any kind of damages and losses resulting from a fire outbreak.
- This policy helps the insured to recover the fire damage by providing the necessary financial support.

---

---

---

---

---

---

---

### Features of Fire Insurance

- The nature of fire insurance is based on the principle of indemnity. It means, the insurance provider is legally bound to restore the business or a property to the same position as it was before.
- When selecting the right policy, make sure to look for the following characteristics of fire insurance:

---

---

---

---

---

---

---

• **Comprehensive List of Inclusions:** Insurance providers understand that fire can be caused by a variety of reasons. So, to provide you with comprehensive coverage, they offer an extensive list of inclusions.

• **Built-in Covers:** Fire insurance policies from reliable providers come with built-in covers to help you mitigate the perils of fire accidents in the best possible way. These add-ons provide for the fees for repairers, architects, or engineers, the cost of debris removal, the cost of stock removal, and more.

• **Hassle-free Claims Settlement:** Fire insurance policies come with a simple and straightforward claim procedure to help you rebuild your business and overcome the losses as soon as possible.

• **Suitable for All Businesses:** Whether you are a small shop owner or running a large business facility such as a factory or shopping mall, fire insurance policies are designed to suit every need.

---

---

---

---

---

---

---

## Benefits of Fire Insurance

- Offers Financial Support
- Offers Coverage for Property Damage
- Provides Economic Stability

---

---

---

---

---

---

---

## Offers Financial Support

- A fire outbreak can lead to significant damages worth lakhs and even crores. Without fire insurance, dealing with such losses can impose a hefty financial burden on the business owners.
- On the other hand, if you have a fire insurance plan, you will not have to make last moment financial arrangements by taking high-interest loans leading to debts.
- One of the main objectives of fire insurance is to offer the necessary financial support to the business to recover the losses resulting from a fire incident.

---

---

---

---

---

---

---

## Offers Coverage for Property Damage:

- Another benefit of fire insurance is that it offers coverage for movable as well as non-movable property along with securing other assets.
- These include buildings, furniture, inventory, raw materials, finished/unfinished goods, packaging materials, and more.

---

---

---

---

---

---

---

## Provides Economic Stability

- Some incidents are just unavoidable no matter how stringent safety regulations you follow, and unforeseen fire outbreaks are no exception. Fire accidents can sometimes lead to total loss of goods.
- With the right fire insurance policy, you can prevent your business from getting halted due to such mishaps. By making a fire insurance claim after a fire accident, you can get reimbursed and get your business back on track at the earliest.

---

---

---

---

---

---

---

## FIRE INSURANCE

- Insurance sector is divided in two parts as under:
- In this module we will explain various insurance policies related to non-life /general insurance.
- Non-life /general insurance means the insurance of various tangible or non-tangible assets other than human life.
- Even loss of human life or damage to human body due to accidents are covered by general Insurance.
- Thus, human life relates to life insurance and the belongings i.e. properties of human beings fall under this category.

---

---

---

---

---

---

---

- Though there are various general insurance policies but we will discuss only the following important policies:

1. Fire Insurance
2. Marine Insurance (Transit)
3. Vehicle Insurance
4. Personal Accident Insurance
5. Health Insurance
6. Rural Insurance Policies

---

---

---

---

---

---

---

- The above said policies are being sold only by general insurance companies and cannot be sold by life insurance companies.
- This restriction is imposed only in India but not in other parts of the world.
- In India also, prior to nationalization, general insurance business was conducted by life insurance companies also but after nationalization in 1972, consequent upon passing of the General Insurance Business Nationalisation Act (GIBNA) General Insurance Corporation of India was formed and was conferred the exclusive power to regulate and conduct the business of General Insurance in India.
- Since 1973 the GIC and its four subsidiary companies namely New India Assurance Co. Ltd., National Insurance Co. Ltd., Oriental Insurance Co. Ltd., and United India Insurance Co. Ltd. had been the sole players in the field until the passing of the IRDA Act 1999 which allowed the entry of private players.

---

---

---

---

---

---

---

---

- Over the past few years a few private players have entered the arena.
- The new players have entered the General Insurance field but are playing cautiously.
- These are still early days but the field is wide open, the future is bright and the customer is the one who will be benefited the most by the growing competition.
- We hope to see international level of service and products in the country soon and a multiple choice to select from

---

---

---

---

---

---

---

---

## HISTORY OF FIRE INSURANCE

- The development of fire Insurance can be traced back to 1601 A.D. when the Poor Relief Act was passed in England.
- Vide this act, letters called "briefs" were read from the church asking for collections from the public to help those who suffered losses from fire.
- There was a great fire in London—a historical disaster in which within span of three days from 2nd to 5th Sept.'1666, 80% of the city was destroyed which sowed the seeds of fire Insurance as we know it now.

---

---

---

---

---

---

---

---

- First, only buildings were insured and the first fire office was established by a builder Nicholas Barbon in 1680.
- In 1708, Charles Povey founded the Traders Exchange for insuring movable goods, merchandise and stocks against loss or damage and this was the first to insure both the building and its contents.

---

---

---

---

---

---

---

## MEANING OF FIRE INSURANCE

- The term fire in a fire insurance is interpreted in the literal and popular sense.
- There is fire when something burns.
- In other words fire means visible flames or actual ignition. Simmering/ smoldering is not considered fire in Fire Insurance.
- Fire produces heat and light but either of them alone is not fire.
- Lightening is not a fire but if it ignites something, the damage may be due to fire.

---

---

---

---

---

---

---

- Under section 2(6A) Insurance Act 1938, the fire insurance business is defined as follows:
- "Fire insurance business means the business of effecting, otherwise than independently to some other class of business, contracts of insurance against loss by or incidental to fire or other occurrence customarily included among the risks insured against in fire insurance policies"

---

---

---

---

---

---

---

The following are the items which can be burnt/ damaged through fire:

- Buildings
- Electrical installation in buildings
- Contents of buildings such as machinery, plant and equipments, accessories, etc.
- Goods (raw materials, in-process, semi-finished, finished, packing materials, etc.) in factories, godowns etc..
- Goods in the open
- Furniture, fixture and fittings
- Pipelines (including contents) located inside or outside the compound, etc.

---

---

---

---

---

---

---

- The owner of abovementioned properties can insure against fire damage through fire insurance policy which provide financial protection for property against loss or damage by fire.

---

---

---

---

---

---

---

### Who Should Buy Fire Insurance Policies

- Fire insurance can be purchased by anyone who is exposed to the risk of fire outbreaks. Some of the suitable candidates for fire insurance are:
- Business Owners
- Any institution/organisation/firm exposed to the risk of loss due to fire accidents.
- Manufacturing firms
- Warehouse owners
- Hospitals
- Hotels and Lodging Centres
- Transporter
- Shop Owners

---

---

---

---

---

---

---



- Residential Property Owners
- Educational institutions
- Banks and other financial institutions

---

---

---

---

---

---

---

## FEATURES OF FIRE INSURANCE

---

---

---

---

---

---

---

### Offer & Acceptance :

- It is a prerequisite to any contract. Similarly, the property will be insured under fire insurance policy after the offer is accepted by the insurance company.
- Example: A proposal submitted to the insurance company along with premium on 1/1/2011 but the insurance company accepted the proposal on 15/1/2011.
- The risk is covered from 15/1/2011 and any loss prior to this date will not be covered under fire insurance.

---

---

---

---

---

---

---

**Payment of Premium:**

- An owner must ensure that the premium is paid well in advance so that the risk can be covered.
- If the payment is made through cheque and it is dishonored then the coverage of risk will not exist.
- It is as per section 64VB of Insurance Act 1938.

---

---

---

---

---

---

---

**Contract of Indemnity:**

- Fire insurance is a contract of indemnity and the insurance company is liable only to the extent of actual loss suffered.
- If there is no loss, there is no liability even if there is fire.
- Example: If the property is insured for Rs 20 lakhs under fire insurance and it is damaged by fire to the extent of Rs. 10 lakhs, then the insurance company will not pay more than Rs. 10 lakhs.

---

---

---

---

---

---

---

**Utmost Good Faith:**

- The property owner must disclose all the relevant information to the insurance company while insuring their property.
- The fire policy shall be voidable in the event of misrepresentation, mis-description or non-disclosure of any material information.
- Example: The use of building must be disclosed i.e whether the building is used for residential use or manufacturing use, as in both the cases the premium rate will vary.

---

---

---

---

---

---

---

**Insurable Interest:**

- The fire insurance will be valid only if the person who is insuring the property is owner or having insurable interest in that property.
- Such interest must exist at the time when loss occurs.
- It is well known insurable interest exists not only with the ownership but also as a tenant or bailee or financier.
- Banks can also have the insurable interest.
- Example: Mr. A is the owner of the building. He insured that building and later on sold the building to Mr. B and the fire took place in the building.
- Mr. B will not get the compensation from the insurance company because he has not taken the insurance policy being a owner of the property.
- After selling to Mr. B, Mr. A has no insurable interest in the property

---

---

---

---

---

---

---

---

**Contribution:**

- If a person insured his property with two insurance companies, then in case of fire loss both the insurance companies will pay the loss to the owner proportionately.
- Example: A property worth Rs. 50 lakhs was insured with two Insurance companies A and B. In case of loss, both insurance companies will contribute equally.

---

---

---

---

---

---

---

---

**Period of fire Insurance:**

- The period of insurance is to be defined in the policy.
- Generally the period of fire insurance will not exceed by one year.
- The period can be less than one year but not more than one year except for the residential houses which can be insured for the period exceeding one year also.

---

---

---

---

---

---

---

---

**Deliberate Act:**

- If a property is damaged or loss occurs due to fire because of deliberate act of the owner, then that damage or loss will not be covered under the policy.

---

---

---

---

---

---

---

**Claims:**

- To get the compensation under fire insurance the owner must inform the insurance company immediately so that the insurance company can take necessary steps to determine the loss.

---

---

---

---

---

---

---

**Types of Fire Insurance**

- There are different kinds of fire insurance policies you can buy depending on your risk exposure and other requirements.
- The following are the main types of fire insurance to choose from:
  - **Valued Policy**
  - **Average Policy**

---

---

---

---

---

---

---

## Valued Policy

- Valued policy is a type of insurance in which the value of the insured item is decided in advance and gets indemnified accordingly if it suffers damage as per the terms and conditions.
- In this type of fire insurance, the value of the sum insured for a valued item will not be changed regardless of its market value at present. This type of policy is mainly used for items such as jewellery, paintings, crafts, and articles whose price is subject to change.
- Let's understand a valued policy with an example: Suppose you insure a gold necklace worth ₹50,000 using valued fire insurance. Now, in the event of damage or loss to this necklace, your insurance provider will offer coverage of only ₹50,000, regardless of the current price of your necklace.

---

---

---

---

---

---

---

---

## Average Policy

- There is an average clause in fire insurance policies.
- When it is applied, the normal policy becomes an Average Policy.
- This type of fire insurance policy is used to penalise the insured for having a policy with a lesser sum insured as compared to the actual value of the property.
- If the insured property suffers damage more than the insured sum, the Average clause is applied, and the resulting loss due to under-insurance is transferred to the policyholder.

---

---

---

---

---

---

---

---

- For example, suppose you have a property worth ₹8,00,000, but you only insure it for ₹5,00,000. Now, if you suffer damage or loss worth ₹6,00,000 due to a fire accident, the insurance company will apply an Average clause to decide the reimbursement amount.
- The insurance recovery is calculated as :  

$$= \left[ \frac{\text{Insured Value}}{\text{Actual Value}} \right] \times \text{Loss}$$

$$= \left[ \frac{5,00,000}{8,00,000} \right] \times 6,00,000$$

$$= ₹3,75,000$$
- Thus, your insurance company will only pay ₹3,75,000 and not ₹6,00,000. You have to pay the rest of the amount out of your pocket as a penalty for under insurance.

---

---

---

---

---

---

---

---

## Comprehensive Policy



- A comprehensive policy, as the name suggests, is a fire insurance policy that offers comprehensive coverage for a variety of perils alongside fire accidents. [Fire and Burglary Insurance](#) is a good example of a comprehensive fire insurance policy.

---

---

---

---

---

---

---

## Fire & Burglary Insurance

- Fire and Burglary insurance packages are designed to provide coverage for private or individual entities, companies, and businesses to cover any kind of loss resulting from fire and allied perils outside your control.
- Two plans under our roster to insure your business:
- Policy provides coverage for your property up to a sum insured of ₹5 Crores at one location.
- Policy provides coverage for your property for a sum insured exceeding ₹5 Crores up to a maximum limit of ₹50 Crores at one location.

---

---

---

---

---

---

---

## Floating Policy

- A floating policy allows you to insure multiple properties or items scattered at different places. For example, suppose you have 4 shops at different locations.
- So, rather than purchasing an individual fire insurance policy for each, you can purchase a floating policy for all the properties you want to insure.
- In case any insured property undergoes a loss or damage as per the terms, the insurance provider will reimburse you according to a decided sum insured.

---

---

---

---

---

---

---

### Replacement Policy

- As the name suggests, a replacement policy involves replacing the damaged assets caused by a covered risk.
- In this type of policy, the insurance provider pays the replacement value of the insured item, which is calculated after taking into consideration its current market value minus the depreciation rate.

---

---

---

---

---

---

---

### Specific Policy

- Specific policy offers coverage up to a pre-specified amount, which is usually lower than the actual value of the insured property.
- For instance, if you have fire insurance worth ₹50,000 and your property suffers a loss of ₹80,000, then the insurance company will only offer ₹50,000 as compensation.
- But the good thing is, you will not be penalised, similar to the case of an Average policy, because the value of the property is not considered with this policy.

---

---

---

---

---

---

---

### PROCEDURE TO INSURE THE PROPERTY UNDER FIRE INSURANCE:

- For insuring any property under the fire insurance policy, the following is the procedure:
  1. Filling of proposal form
  2. Inspection of the property
  3. Payment of premium
  4. Issue of Cover note/ Policy document in lieu of acceptance of the proposal.

---

---

---

---

---

---

---

**I) Filling of Proposal Form** The fire proposal includes the following information :

- Description of the property.  
This would include:
  - I. Construction of external walls and roof, number of storeys.
  - II. Occupation of each portion of the building.
  - III. Presence of hazardous goods.
  - IV. Process of manufacture.
  - V. The sums proposed for insurance.
  - VI. The period of insurance.
  - VII. History of previous losses.
  - VIII. Insurance history - whether previously other insurers had declined the risk, etc

---

---

---

---

---

---

---

---

**II) Inspection of the property**

- In case of property of any business organization, whether manufacturing or other type of organization, a risk inspection report is submitted by the insurer's engineers.
- The engineers submit in their report the nature of risk involved in the factory/ manufacturing unit.

---

---

---

---

---

---

---

---

**III) Payment of Premium:**

- Based on the proposal form and the inspection report of the engineers, the insurance company will submit the premium rates to the property owner and if these rates are acceptable to him then he should pay the amount to the insurance company.
- It is also a legal requirement under section 64VB of Insurance Act 1938 that the premium is paid in advance in full to the insurance company.

---

---

---

---

---

---

---

---



#### IV) Issue of Cover note/ Policy document:

- On receipt of a completed proposal form and / or inspection report, the cover note is issued, pending preparation of the policy document.
- The cover note is an unstamped document issued to provide evidence of cover till the time the policy is issued.
- The cover note provides insurance against specified perils on the usual terms and conditions of the company's policy

- The printed policy form provides for a schedule in which the individual details of the contract are typed.
- The items are similar to those in the Cover Note but with more detailed information.
- After issuing the policy document, it is likely that there may be some changes in the nature of property or sum insured may increase or decrease.
- In this case, these changes can be incorporated by way of endorsements which are issued to record changes such as alteration in risk, increase or decrease of sum insured, etc.

#### 1.5 PROCEDURE TO SETTLE THE FIRE INSURANCE CLAIM

- If there are any damage or loss arising due to fire then the policy holder should immediately inform the insurance company in writing and with estimated amount of loss.
- Survey Report:
  - If the amount of loss is small (i.e. up to Rs. 20,000/-), the insurance company may depute an officer to survey the loss and decide on the settlement of the loss on the basis of the claim form and the officer's report. However, in large losses, an independent surveyor duly licensed by the Government is appointed to give a report on the loss.

- The survey report would generally deal with the following matters:
  - i. Cause of loss.
  - ii. Extent of loss.
  - iii. Under-Insurance, if any.
  - iv. Details and value of salvage, and how it has been disposed of or proposed to be disposed of.
  - v. Details of expenses (e.g. fire brigade expenses).
  - vi. Compliance with policy conditions and warranties.
  - vii. Details of other insurance policies on the same property, and the apportionment of the loss and expenses among co-insurers.

---

---

---

---

---

---

---

#### Claim form: The policy holder will submit the claim form with the following information

- i. Name and address of the Insured.
- ii. Date of loss, time and place from where the fire started.
- iii. Cause of fire.
- iv. Details of the property damaged such as description, etc.
- v. Value at the time of fire, value of salvage and the amount of loss.
- vi. Details of other policies on the same property giving the name of the insurer, policy number and sum insured.
- vii. Fire Brigade report details.
- viii. F.I.R. at the nearest police station regarding third party liability, if any.

---

---

---

---

---

---

---

#### Settlement of claim:

- On the basis of the claim form and the survey report, decision is taken about the settlement or otherwise of the loss

---

---

---

---

---

---

---

## 1.6 PRACTICE OF FIRE INSURANCE IN INDIA

• In India, under fire insurance policy, in addition to fire, other perils are also included and the policy is known as "Standard Fire and Allied Perils Policy".

• The perils specified in the fire policy are:

• A. Fire: It has been explained as above.

B. Lightning: Any lightning due to cloud burst may damage the property and the same will be covered under the fire policy.

C. Explosion / Implosion: Sudden change in the temperature in any plant & machinery or exposure to atmospheric pressure may result into loss and the same will be covered under fire policy.

D. Aircraft Damage: Any damage to the property due to any droppings by aircraft or by itself will also be covered under the fire policy.

E. Riot, Strike and Malicious Damage (RSMD): Any damage to the property due to public or strike by employees or malicious damage (intentional damage) by any person will be covered under this policy.

F. Storm, Cyclone, Typhoon, Tempest, Hurricane, Tornado, Flood and Inundation (STFI): The property damage due to any of these storms and flood will also be covered under this policy. The meaning of these perils lies in different intensity of the storms. Flood not only means the leakage of water through river but also accumulation of water due to heavy rains in the premises.

G. Impact Damage: Damage to the property due to impact by any Rail / Road vehicle or animal by direct contact, but not belonging to or owned by the Insured or any occupier of the premises or their employees while acting in the course of their employment

H. Subsidence and Landslide including Rock Slide Destruction or damage caused by Subsidence of part of the site on which the property stands or Land slide / Rock slide.

**I. Bursting and/or overflowing of Water Tanks, Apparatus and Pipes:**

- If due to bursting or overflowing of water from the water tanks installed in the premises of the policyholder any damage or loss to the property of the policyholder is caused, it will be covered under this policy.

---

---

---

---

---

---

---

**J. Missile Testing Operations:**

- Any loss or damage due to missile testing by the Govt. or otherwise will be covered under this policy.

---

---

---

---

---

---

---

**K. Leakage from Automatic Sprinkler Installations :**

- In most of the organizations as a fire protection measure, automatic sprinkler system is installed. If due to non-usage of the sprinkler system or otherwise it starts leaking and damages the property, then it will be covered under the fire insurance policy

---

---

---

---

---

---

---

L. Bush Fire:

- It means fire spread from the bushes (small fire) but will not include forest fire.

---

---

---

---

---

---

---

THE FIRE INSURANCE DOES NOT COVER THE FOLLOWING RISKS KNOWN AS GENERAL EXCLUSIONS

- In every claim minimum deduction say Rs 5000/- or Rs 10000/- will be made while settling the claim under this policy. It is to avoid small losses.
- (ii) Loss, destruction or damage caused by war, and kindred perils.
- (iii) Loss, destruction or damage directly or indirectly caused to the insured property by nuclear peril.
- (iv) Loss, destruction or damage caused to the insured property by pollution or contamination.

---

---

---

---

---

---

---

- v) Loss, destruction or damage to any electrical and / or electronic machine, apparatus, fixture or fitting (excluding fans and electrical wiring in dwellings) arising from or occasioned by over-running, excessive pressure, short circuiting, arcing, self-heating or leakage of electricity, from whatever cause (lightning included).
- (vi) Loss of earnings, loss by delay, loss of market or other consequential or indirect loss or damage of any kind or disruption whatsoever.
- (vii) Earthquake: It is not covered under the fire policy but by paying additional premium, the earthquake can be covered

---

---

---

---

---

---

---

## 1.8 SPECIAL POLICIES

---

---

---

---

---

---

---

### Floater Policy

- This policy is issued only for the stocks, not for plant & machineries.
- Sometime the stock is kept at various locations and it is very difficult to provide the value of stock at each location.
- Therefore to cover the risks of stocks at various locations under one sum insured an additional premium can be paid.
- Example: A person is having two godowns at Delhi and the value of stock is Rs 50 lakhs and he is not having the value at each location then he can insure the stock under floating policy by paying an additional premium.

---

---

---

---

---

---

---

### Declaration Policies

- This type of policy is useful where there is frequent fluctuations in stocks / stock values and to avoid the under insurance (insurance of lower value) of the stock, Declaration Policy(ies) can be granted subject to the following conditions:

---

---

---

---

---

---

---

- (a) The minimum sum insured shall be Rs. 1 crore.
- (b) Monthly declarations based on the average of the highest value at risk on each day or highest value on any day of the month shall be submitted by the Insured latest by the last day of the succeeding month. If declarations are not received within the specified period, the full sum insured under the policy shall be deemed to have been declared.
- (c) Reduction in sum insured shall not be allowed under any circumstances.

---

---

---

---

---

---

---

- (d) Refund of premium on adjustment based on the declarations / cancellations shall not exceed 50% of the total premium.
- (e) The basis of value for declaration shall be the Market Value unless otherwise agreed to between insurer and insured.
- (f) It is not permissible to issue declaration policy in respect of
  - i) Insurance required for a short period
  - ii) Stocks under going process
  - iii) Stocks at Railway sidings

---

---

---

---

---

---

---

### C) Floater Declaration Policy

- It is combination of the above mentioned policies i.e. stock lying at different locations and the value of stock fluctuating

---

---

---

---

---

---

---

## 1.9 ADDITIONAL TERMS & CONDITIONS

### a) Reinstatement Value

This is the fire policy with the reinstatement value clause attached to it. The clause provides that in the event of loss, the amount payable is the cost of reinstating property of the same kind or type, by new property (i.e.) "New for Old".

- This basis of settlement differs from the basis under the fire policy where the losses are settled on the basis of market value i.e. making deductions for depreciation, etc.
- Under reinstatement value policy, it is possible to cover the depreciated value of the building or machinery.
- The cost of replacement of the damaged property is ascertained by new property of the same kind.
- If due to technical improvements the new machinery is better than the damaged machinery e.g. output is increased with less consumption of power, the insured is obliged to bear a part of the cost of the new machinery to ensure that he does not derive any undue benefits.
- Thus, the principle of indemnity is still observed.

- The reinstatement value clause incorporates the following special provisions:

- Reinstatement must be carried out by the insured and completed within 12 months after the destruction or damage, or within such extended time as may be allowed by insurers, failing which the loss will be settled on the normal indemnity basis i.e. according to the Fire Policy.
- Until reinstatement is carried out, the liability under the policy remains on the normal indemnity basis. i.e. market value basis.
- Pro-rata Average is applied by comparing the sum insured with the cost of reinstatement of the entire property insured as on date of reinstatement.
- The reinstatement basis of settlement will not apply (i) If the insured fails to intimate to the insurer within 6 months or any extended time his intention to replace the damaged property. (ii) If the insured is unable or unwilling to replace the damaged property. In such cases the loss will be settled on the normal basis of indemnity.
- The work of reinstatement may be carried out upon another site and in any manner required by the insured provided the liability under the policy is not thereby increased.



- These insurances are granted to insureds whose bonafides are satisfactory and, are generally issued only in respect of building, plant and machinery in a comparatively new condition.
- These insurances are not granted on stocks.

---

---

---

---

---

---

---

## b) Local Authorities

- Clause Reinstatement Value Policy may be extended to cover such additional cost of reinstatement of the destroyed or damaged property as may be incurred solely by reason of the necessity to comply with the Building or other Regulations under any Act of Parliament or bye-laws of any Municipal or Local Authority.

---

---

---

---

---

---

---

## c) Agreed Bank Clause

- All policies in which a Bank has a partial interest are to be made out in the name of the Bank and Owner or Mortgagor and the Agreed Bank Clause incorporated in the policy.
- The salient features of the clause are : (a) The claim is payable to the bank whose receipt shall be a complete discharge and binding on all parties insured. (b) Any notice under the policy is sufficient if given by or to the bank. (c) Any settlement, compromise etc. in relation to dispute if made with the bank shall be valid and binding on all parties insured. (d) Any alteration or increase in risk does not invalidate the insurance, provided the bank notifies the same as soon as it comes to its knowledge and pays additional premium.

---

---

---

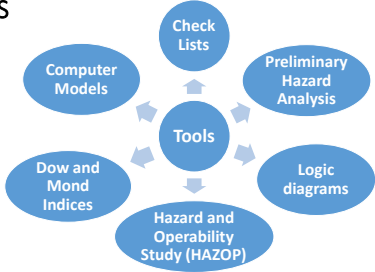
---

---

---

---

HAZARD IDENTIFICATION AND ANALYSIS TOOLS



---

---

---

---

---

---

---

CheckList

- Checklists are easy-to-use hazard identification tools particularly if resources like time and expertise are unavailable or if the occupancy is assessed as not requiring involved exercise.
- while checklists are useful tools, the scope of a hazard identification exercise should be clear to determine whether a checklist is indeed appropriate.

---

---

---

---

---

---

---

CheckList

Location:		Date:	
Description of occupancy and type of construction:			
Team members: 1.		2.	
Part 1: Fire safety features			
Sl.No.		Yes	No
1.	Is the premises connected to other premises?		
2.	Are exit routes marked and kept free?		
3.	Are aisles marked and kept free?		
4.	Are extinguishers provided as per IS:2190?		
5.	Are extinguishers maintained as required and records kept?		
6.	Are automatic detector and/or alarm systems installed on site?		
7.	Are detectors/alarms linked to a central panel monitored 24-7?		
8.	Are internal hose reels provided and maintained?		
9.	Is the facility provided with hydrant protection?		
10.	Are personnel trained in fire fighting?		
11.	Are mock drills conducted on site?		
12.	Are external fire escape stairs provided in multi-storied buildings?		
13.	Are personnel aware of emergency procedures?		
14.	Is a permit-to-work system followed for hot work?		
15.	Are fire safety audits/inspections conducted regularly?		
16.	Are MSDS available on site?		
17.	Are hazardous materials marked and stored properly?		
18.	Are fire incidents investigated and records maintained?		
19.	Does the site have access for emergency vehicles?		
20.	Are statutory licences available and up-to-date?		

---

---

---

---

---

---

---

Preliminary Hazard Analysis

- intended to help in conducting preliminary analyses of hazards in an activity or process.
- Both the inputs required and the results arrived at are not detailed

Activity	Hazards	Potential effects	Corrective and preventive measures

---

---

---

---

---

---

---

Logic Diagrams

- Logic diagrams such as...
  - *fault trees*,
  - *event trees*
  - *cause-consequence diagrams*, etc.
- are designed to use logic to reason out sequence of events leading to undesired events.

---

---

---

---

---

---

---

(FTA) and (ETA)

- It is easy to get confused between these two techniques. Indeed, the two are in fact complimentary (and are often used together) but focus on opposite sides of an undesired event.
- when complimentary FTAs and ETAs are used, it's called the bow-tie technique.

---

---

---

---

---

---

---

## Fault Tree Analysis (FTA)

- The fault tree is a logic diagram based on the principle of multi-causality, which traces all branches of events which could contribute to an accident or failure.
- It uses sets of symbols, labels and identifiers.
- A fault tree diagram is drawn from the top down.

---

---

---

---

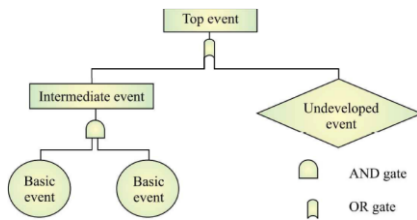
---

---

---

---

## Fault tree analysis (FTA)




---

---

---

---

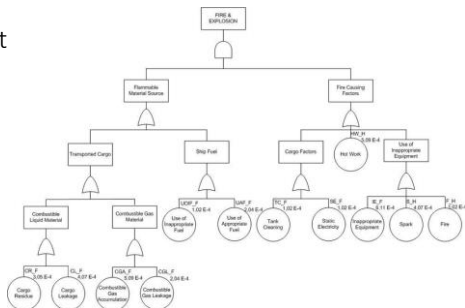
---

---

---

---

## Fault




---

---

---

---

---

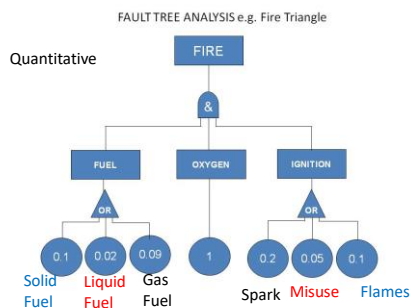
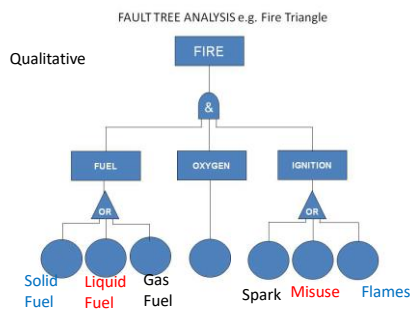
---

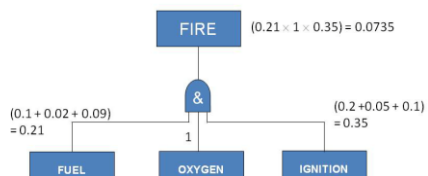
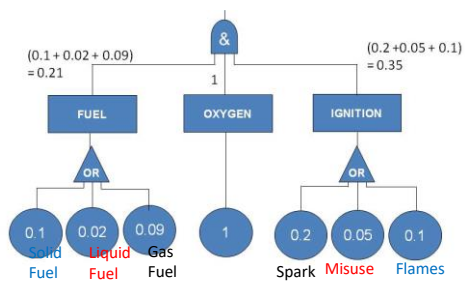
---

---

## Fault Tree Analysis (FTA)

- The starting point is the undesired event of interest (called the 'top event' because it gets placed at the top of the diagram).
- You then have to logically work out (and draw) the immediate contributory fault conditions leading to that event.
- These may each in turn be caused by other faults and so on.





## Event tree analysis (ETA)

- This is a complimentary technique to FTA but defines the consequential events which flow from the primary 'initiating' event.
- Event trees are used to investigate the consequences of loss-making events in order to find ways of mitigating, rather than preventing, losses.

Event tree analysis (ETA)

- 1. Identify the primary event of concern.
- 2. Identify the controls that are assigned to deal with the primary event such as automatic safety systems, alarms on operator actions.
- 3. Construct the event tree beginning with the initiating event and proceeding through failures of the safety functions.
- 4. Establish the resulting accident sequences.
- 5. Identify the critical failures that need to be addressed.

---

---

---

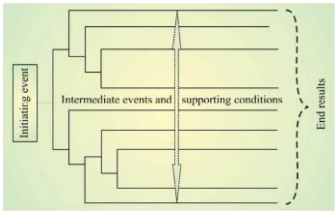
---

---

---

---

Event tree analysis (ETA)



---

---

---

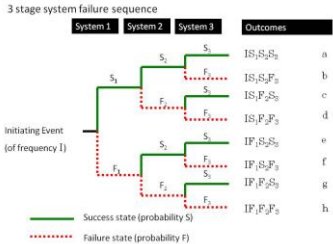
---

---

---

---

Event tree analysis (ETA)



---

---

---

---

---

---

---

Event tr



Conveyor



---

---

---

---

---

---

---