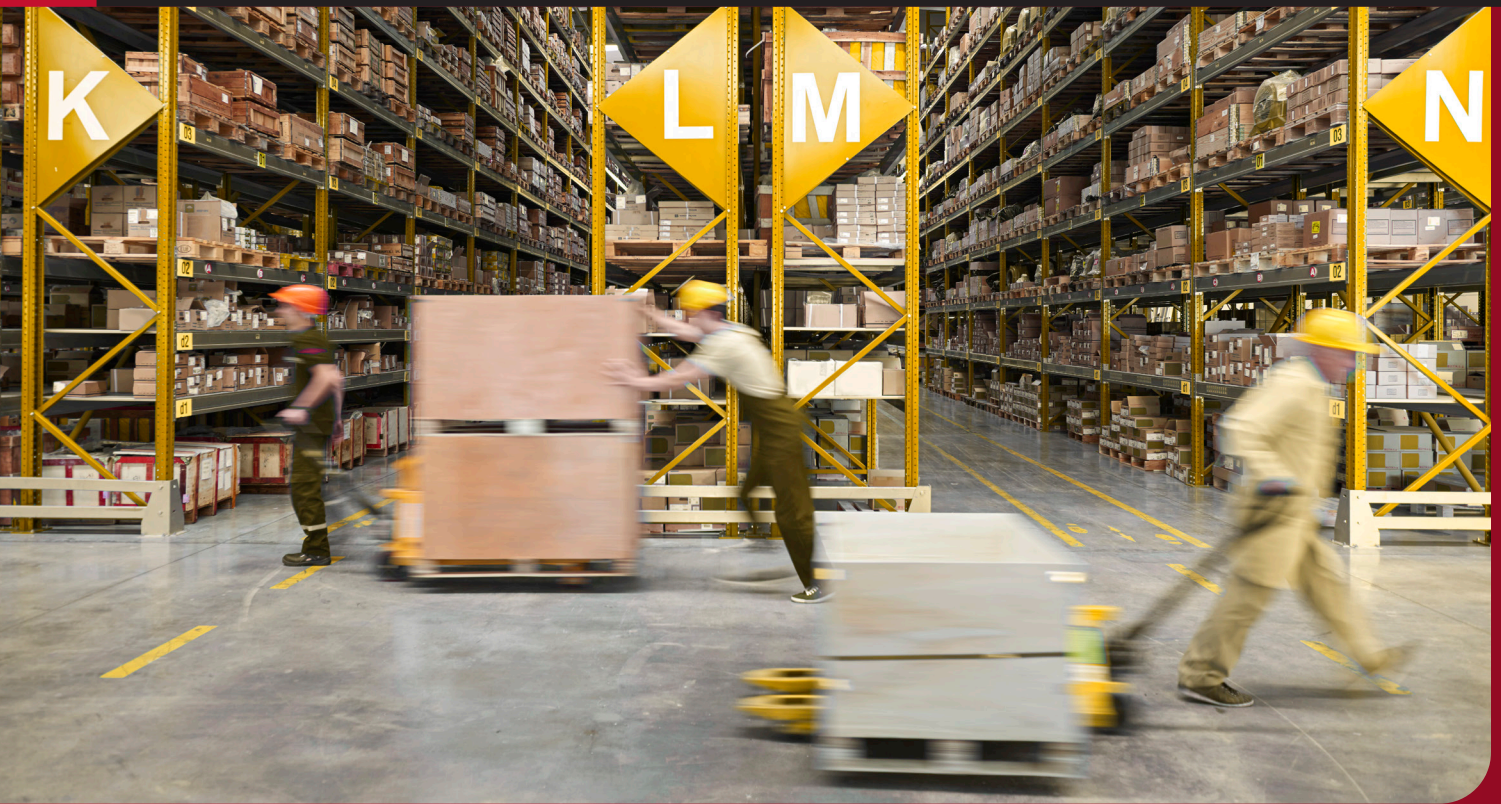


BASIC FIRE PREVENTION IN WAREHOUSES



This document is a simple guide for warehouse managers to identify the most common warehouse risks and offers practical risk control suggestions.

FIRE PREVENTION IN WAREHOUSES

DELIVERED FROM INDUSTRY EXPERIENCE

REDUCING THE RISK OF FIRE

1 HUMAN CONTROLS

Are human actions like smoking controlled?



2 SECURITY

Is the warehouse safe from intruders?



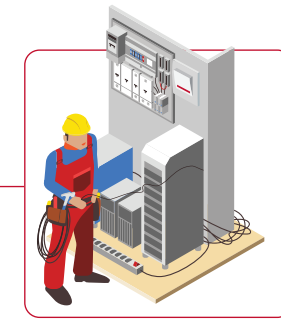
3 HOUSEKEEPING

Is the warehouse clean and tidy?



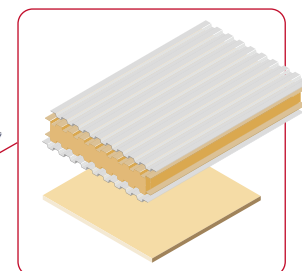
4 ELECTRICALS

Is electrical equipment and wiring well maintained?



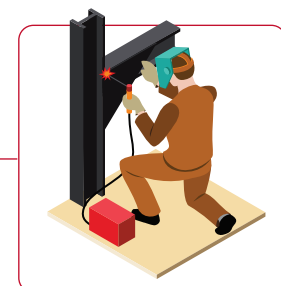
5 COMPOSITE PANELS

Are composite panels identifiable and sealed?



6 HOT WORK

Is hot work conducted safely under supervision?



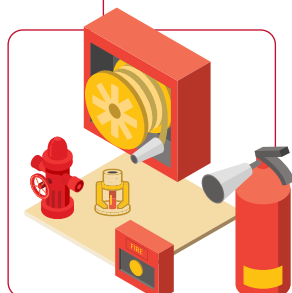
9 REGULAR CHECKS

Are you performing regular fire safety check?



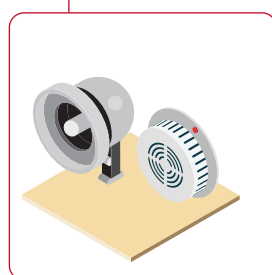
8 FIRE SUPPRESSION

Is the warehouse equipped to suppress a fire immediately?



7 FIRE DETECTION

Is the warehouse equipped to detect a fire early?



DETECTING AND SUPPRESSING FIRES

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RECOMMENDATIONS FOR REDUCING FIRE RISKS

DOORS / WINDOWS

Risk: Doors and windows are obvious openings which can be exploited for arson or theft so it is important that all doors and windows are adequately protected.

Action: Secure doors, windows, skylights and other openings.

Specific Recommendation:

1. All windows should be locked and alarmed (either via vibration detector or motion detector)
2. All doors should be alarmed with contact switches and remain closed and locked when not in use

HOUSEKEEPING

Risk: Good Housekeeping is important as it: **(a)** demonstrates that management is in control of the facility, and **(b)** ensures that there is no waste paper lying around which could be fuel for a fire.

Action: Facility should be kept clean and tidy at all times.

Specific Recommendation:

1. Warehouse and office facilities should be kept clean on a daily basis
2. Signs should be displayed around the facility highlighting that waste paper should be placed in internal trash bins and floor area kept clean at all times
3. All waste paper / cardboard should be properly placed in garbage bins
4. There should be sufficient garbage bins to contain all waste
5. Fire doors should have free access – nothing should impede an escape route
6. Keep all flammable liquids in a metal cabinet
7. Keep idle pallets away from any possible sources of ignition



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SMOKING REGULATIONS

Risk: Fire. Although this may seem an obvious risk we have seen smoking regulations which mean employees are allowed to smoke just outside the warehouse doors (in one incident right next to a battery charging area where hydrogen gas was being produced).

Action: No smoking allowed in premises.

Specific Recommendation:

1. Smoking should only occur in restricted smoking areas and these areas should be well signposted
2. Smoking areas should all be outside the facility – and minimum of 10 metres from site to avoid wind blowing cigarette ash and butts
3. Doors between the designated smoking area and the warehouse should remain closed at all times
4. Special attention should be given to avoid truck drivers smoking next to dock doors

HOT WORK

Risk: Factories and warehouses are working environments where repairs are inevitable. When repairing metal via "welding" there is an obvious fire risk due to the intense heat. Any activities that involve the use of portable gas, electric or arc welding equipment and any activities that generate heat, sparks or flames require careful supervision to prevent fires.

Action: Any "hot work" must be strictly managed to prevent the possibility of fire.

Specific Recommendation:

1. Each location must have a "written" hot work procedure in place. Advice may be obtained from the local fire department
2. If possible all hot work should be conducted outside the facility (i.e. in the open air)
3. Regardless of where the hot work is taking place there should be at least one person (in addition to the worker) on "fire watch" with appropriate fire extinguishing equipment and training
4. The fire watch should continue for 1 hour after the hot work has completed

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ELECTRICAL WIRING

Risk: Loose or poorly maintained electrical wiring is a common source of combustion and as such should be well maintained and insulated.

Action: Ensure all electrical wiring is in good condition.

Specific Recommendation:

1. Wiring should be in good condition
2. Wiring should not be hanging but placed in cable trays (conduits)
3. Cables attaching to mobile air fans (used to cool warehouse staff) often cause shorts as the cables are stretched. Cables should be secured so as not to stretch or have the chance of being tripped over causing wire damage

ELECTRIC FORKLIFT TRUCKS

Risk: Electric forklift trucks are used in almost all warehouse and manufacturing facilities globally as they are an efficient and necessary element of logistics.

However, hydrogen gas is produced by the battery during charging. There is therefore a risk of fire and / or explosion if flammable mixtures of hydrogen accumulate. Hydrogen does not have an odour, making it particularly dangerous.

In essence forklift truck batteries produce a hydrogen cloud directly over the batteries and this can be ignited by a spark from the wiring, a falling metal object, a short circuit or inappropriate smoking regulations.

An explosion of hydrogen in a warehouse environment will **(a)** pose a threat to human life, and **(b)** result in a major fire in the warehouse.

Action: Battery charging area should be segregated from combustibles and well ventilated

Specific Recommendation:

1. The forklift truck charging area **MUST** be properly ventilated so as to extract the hydrogen gas from the warehouse and disperse to the outside air. The more batteries being charged, the more powerful the ventilation should be. (The local fire department will be able to advise on appropriate extraction volumes)
2. Designate the charging area "No Smoking" and "No Naked Lights"
3. Make sure the battery is topped up to the correct level
4. Ensure all connections are secure before switching on
5. Electrical equipment / sources of ignition must be kept well away from the charging area and below the level of the battery
6. As warehouse facilities vary dramatically there are different approaches to this safety measure. Large warehouses will have an outside building where all batteries are charged. Others will have a specific section of the warehouse dedicated to charging. However regardless of where the batteries are charged there must be proper ventilation
7. No combustible material within 5 metres of battery charging area

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FORKLIFT TRUCKS (PROPANE POWERED)

Risk: Less common but never the less plentiful, is the use of propane powered forklift trucks. The risk here is one of explosion. Where there are pressurized gases in a working environment, then there is always the possibility of something going wrong.

Action: Storage area should be segregated and outside the facility.

Specific Recommendation

1. Propane canisters should be stored outside the facility at all times
2. Canisters should be placed in a cage and be as far from the building as possible, so as to reduce the risk of fire or injury should an explosion occur

SMOKE / HEAT DETECTION

Risk: Smoke / heat detection can provide an essential alert in the early stage of a fire when it can still be controlled or extinguished, avoiding what otherwise could develop into an uncontrollable fire.

Action: Install and maintain smoke / heat detection sensors.

Specific Recommendation

1. Warehouse should have smoke or heat detectors throughout
2. Detectors should be connected to person or persons who can immediately react and call the fire department or tackle the fire using fire suppression equipment



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SPRINKLERS

Risk: Where a location has sprinklers in place, the set-up of the warehouse must allow the sprinklers to function properly, otherwise fire may develop quickly and become uncontrollable.

Action: Sprinkler system should always be switched to automatic mode and all valves physically locked in the open position allowing water flow.

Specific recommendation:

1. Where generator is diesel, the diesel tank should always be $\frac{3}{4}$ full as a minimum
2. Sprinkler pumps should be regularly tested as per manufacturer's instructions
3. Water tanks should be full at all times

STORAGE DISTANCE FROM THE ROOF

Risk: Where a building is sprinkler protected then it is important that the 'sprinkler head' has enough room to effectively dissipate the water. In a warehouse environment sprinkler heads are often obstructed by material being stored to high. If stored material is too close to the sprinkler head then the water will be ineffective in extinguishing the fire.

Action: Allow sufficient room between uppermost stored material and the "sprinkler head"

Specific Recommendation:

1. There should be at least 1 metre of clearance at each head as obstructions will diminish the operation of the head



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RACKING

Risk: Racking in a warehouse is an efficient and effective method of storing products. However should the racking be 'compromised' then it can collapse and depending on the design of the warehouse, create a domino effect with other racking. Collapsed racking will not only damage the product, but may seriously interrupt the business.

With such tight time pressures on the logistics chain, forklift truck drivers often try to "literally" cut corners, which can result in them colliding with racking.

Action: Racking supportive columns must be protected from vehicle impact.

Specific Recommendations:

1. The main cause of racking collapse is when they are struck by a forklift truck whilst 'cutting' a corner. To prevent this exposure the corners of each rack should be protected by a strong metal or concrete bollard. This will prevent the forklift truck from being able to hit the racking

HAZARDOUS GOODS

Risk: Hazardous goods can corrode metal, cause fires and injury. In a warehousing and manufacturing environment hazardous goods can include cleaning liquids, paints and acid.

Action: Control storage location.

Specific Recommendation:

1. When possible, all hazardous goods should be stored outside the premises in a shed or other suitable place depending on the environment. The storage area should be removed from and not attached to the main warehousing or manufacturing building. If they are stored inside the warehouse, then they should be enclosed in a metal, fire proof cabinet
2. Ensure appropriate fire-fighting extinguishers are sufficiently close to the hazardous goods to extinguish fire quickly



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FIRE HOSES / FIRE EXTINGUISHERS

Risk: Fire hoses and fire extinguishers are effective methods of putting out a fire before it gets out of control.

Action: Ensure fire suppression equipment is on hand

Specific Recommendation:

1. In consultation with the fire department, there should be sufficient hoses / extinguishers to allow quick access to attack the fire
2. Signs showing the location of the fire hoses should be bright, clear and unblocked (during a fire people panic, clarity of signs is therefore very important)
3. Each team of employees should have fire prevention training from the fire department. If used incorrectly fire extinguishers can spread the fire so proper use of fire-fighting equipment by employees is therefore essential

COMPOSITE PANELS / SANDWICH PANELS (PANELS WITH COMBUSTIBLE INSULATION SUCH AS EPS / PIR / PUR)

Risk: If ignited, composite panels can create an intense fire, as EPS / PIR / PUR are oil derivatives.

Action: Reduce / eliminate composite panels, otherwise ensure the panel condition is regularly maintained.

Specific Recommendation:

1. Are all combustible panels identified and clearly labelled?
2. Are all the panel facings and joints well maintained to prevent exposing the combustible cores to ignition sources?
3. Are all the added non-combustible linings well maintained?
4. Are all exposed edges (top and bottom) of external panels sealed off with steel capping
5. Are all openings in the panels sealed with suitable fire-resistant material?
6. Are periodic electrical examinations of equipment and electrical cabling housed in the combustible panels being carried out?

HIGH INTENSITY DISCHARGE (HID) LIGHTING

Risk: These bulbs can explode, raining down hot embers on stock below and create a fire. HID lights can operate at high temperatures (1300 degrees C) and pressures (6 bar).

Action: Eliminate the use of HIDs wherever possible, otherwise ensure bulbs have a containment barrier

Specific Recommendation:

1. Ensure all bulbs have a containment barrier to contain hot glass in event of an explosion
2. Lamps should be changed when they reach 70% of lifespan

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Notes

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