

## Fork-Lift Trucks

### Understanding the Risk

The use of fork-lift trucks introduces a number of substantial, inherent hazards. These hazards emanate from both fork-lift trucks themselves and from the environment in which they are deployed.

Whilst fork-lift trucks undoubtedly introduce a number of health and safety specific issues to the workplace, the prevalent hazard dealt with by this guide, is that of fire. Fires involving fork-lift trucks typically occur as a result of electrical short circuit, poor maintenance, poor charging/fuelling arrangements, etc. Fires involving fork-lift trucks can have an immediate impact, even where the use of the equipment is incidental to core activities.

A number of serious fires, originating with fork-lift truck operations, have caused significant damage to premises and in extreme cases, a complete loss of assets at the facility.

### Controlling the Hazard

Hazards associated with use of fork-lift trucks need to be adequately risk assessed and controlled to eliminate, reduce or control them and create a safe working environment. This is important not only to protect the financial status of your organisation but also to fulfil your legislative obligations.

Fork-lift trucks commonly used can be powered by diesel, liquefied petroleum gas (LPG), or by battery. Each presents specific hazards. Consequently, fire risk assessment should be conducted based on the type of equipment and the environment in which it is used.

This document deals solely with hazards arising from fork-lift trucks. However, advice detailed below is equally pertinent to other forms of mechanical handling equipment, such as side loaders, scissor lifts, etc.

The under noted issues should be considered fully to create an integrated risk management programme:

### General Management

- Undertake a fire risk assessment to identify hazards and develop appropriate self-inspection checklists.
- Maintain good housekeeping regimes to eliminate unnecessary combustible storage, especially in close proximity to fork-lift truck charging or refuelling areas.



- Obtain the user manuals and other appropriate publications from the manufacturer or supplier of the equipment. Provide and maintain up-to-date records of induction and refresher training to employees in the correct use of the fork-lift truck.
- Develop written emergency plans and have regular drills incorporating action to be taken in the event of a fork-lift truck incident.
- Fork-lift trucks should be inspected frequently and subjected to planned preventive maintenance in accordance with recommendations of the manufacturer or provider of the equipment.
- Only personnel who have been trained in their use, should be permitted to operate fork-lift trucks.
- Drivers should ideally be trained by an accredited body and be selected based on aptitude and medical fitness. Refresher training should be undertaken at regular intervals. Familiarisation sessions should be held on new vehicles.
- Before start-up, a responsible person should be tasked with carrying out a condition inspection on the fork-lift truck. Such inspection to check for oil, fuel, and hydraulic fluid leaks and the integrity of fuel lines. Battery connections and protective covers should be confirmed to be in place. Defects should be rectified before the equipment is used. Alternatively, the fork-lift truck should be removed from service.
- Adequate gangways and aisles should be maintained to facilitate safe fork-lift truck operations.
- It is essential that a comprehensive assessment of the potential risk of impact damage is undertaken. Particular attention should be given to avoiding impact damage to passive fire protection measures such as fire doors and compartment walls and to structural elements of the building generally.

- Due to the well documented risks associated with composite panels (combustible core can lead to rapid fire propagation), impact damage to these elements of the building should be avoided.
- For sprinkler protected locations, a comprehensive assessment specific to the risk of impact damage to sprinkler heads, range pipes and installation control valves is necessary. Similar comment applies in respect of other fire protection measures, for example, fire hose reels.
- Where potential for impact is identified, appropriate mechanical protection should be provided. Such impact protection to be engineered to be sufficiently robust to withstand multiple impacts.
- Fork-lift trucks should carry a suitable contract maintained portable fire extinguisher. Fork-lift truck operators should be trained in safe use of portable fire extinguishing equipment.
- In the event of fire impacting an LPG fuelled fork-lift truck, no attempt should be made to extinguish the fire in advance of isolating the LPG supply at source.
- Full recognition should be given to the inherent fire hazards associated with materials conveyed and special care taken as appropriate.
- When idle, fork-lift trucks should be kept in a dedicated store, ideally a detached building, which is separated from operational or storage areas.
- Fork-lift truck storage areas should be kept secure when not in use. Idle trucks should be immobilised to prevent unauthorized use. Under no circumstances should fork-lift truck keys be left in the ignition when the equipment is idle.

### Battery Powered Fork-Lift Trucks

- Battery charging should be carried out in a detached, non-combustible building, dedicated to and specially designed for the purpose. Alternatively, a specially designed charging area may be used. The charging area should be separated from other areas of the workplace by fire rated compartmentation, offering at least 60 minutes fire resistance.
- Where advice given above is impractical, charging should be confined to a dedicated area of the workplace, which should be kept entirely free of combustible material. Clear space separation of a minimum 2.0m should be maintained between charging equipment/fork-lift trucks and any adjacent combustibles or composite panels having a combustible core.
- Where 2.0m spatial separation is not possible, a partition having a minimum of 30 minutes fire resistance should be used to demarcate the charging area from combustible storage.
- This latter point is appropriate to a single panel charging station only and where charging does not involve battery removal. It is not appropriate to and should not be used where goods stored are highly combustible or highly valuable.



- Charging equipment should be installed on a concrete floor, or securely mounted on a non-combustible wall structure. Under no circumstances should battery chargers be affixed to or placed against composite panel walls having a combustible core.
- Safety cut-out protection should be provided to all battery charging equipment, specifically over-charge and over-current devices.
- Connecting leads between the battery charger and fork-lift truck under charge should be kept as short as possible. Leads and connectors should be kept in good condition and inspected frequently for damage. When not charging, leads should be stored in a manner which precludes mechanical damage.
- Housekeeping is extremely important in areas where battery charging takes place. They should be kept clean, tidy and free of combustibles.
- Hydrogen is produced during charging and introduces an explosion hazard into the workplace. Adequate natural or mechanical ventilation should be provided, where charging is carried out in an enclosed area.
- Where both natural and mechanical ventilation are concerned, ventilation rates should be sufficient to maintain hydrogen content in the atmosphere at or below 25% of the gas's Lower Explosive Limit (LEL).
- Where risk assessment deems it prudent, hydrogen gas monitoring equipment should be installed in battery charging areas. Monitoring equipment should be interlocked with and automatically isolate charging apparatus in the event of gas accumulation above safe limits.
- Personnel authorised to change or charge batteries should be adequately trained. Refresher training should be programmed at regular intervals.
- Tools used in the installation or maintenance of batteries should be electrically insulated and acid resistant.
- Use of open flames or smoking should be specifically prohibited in battery charging areas. Suitable signage to this effect should be prominently displayed.

- All electrical installations should be installed, inspected and tested in accordance with the latest enforceable version of BS7671 - "Requirements for Electrical Installations. IET Wiring Regulations", by a National Inspection Council for Electrical Installation Contracting (NICEIC) approved company. Additional advice is available in the RiskFix document entitled Electrical Fires – Fixed Electrical Installations.
- Battery charging areas should be included in the fire and explosion assessment conducted in accordance with the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).

### Diesel Powered Fork-Lift Trucks

- Appropriate storage arrangements for diesel fuel are an important safety feature. It should be contained in drums or tanks located in the open, well clear of buildings and bunded to contain leaks or spillages. A suitably rated Loss Prevention Certification Board (LPCB) approved portable fire extinguisher should be provided in the vicinity of diesel storage.
- Refuelling activities should be conducted externally, in the open air, at a designated location.
- Only approved dispensing equipment should be used. Where emergency refuelling is necessary, approved safety containers should be used. Overfilling and spillage should be avoided.
- Fork-lift trucks should be switched off during refuelling.
- Use of open flames or smoking should be specifically prohibited in refuelling areas. Suitable signage to this effect should be prominently displayed.
- Personnel should be cognizant of risks associated with the exhaust system, engine bay and any other potentially hot surfaces. Such areas should be maintained free of waste material.
- Where risk assessment deems it prudent, exhaust outlets should be fitted with a spark arrestor.

### LPG Powered Fork-Lift Trucks

- The valve on the LPG cylinder should be closed when the fork-lift truck is idle.
- Care should be taken where the storage and use of LPG cylinders is concerned, to ensure that fire safety is not compromised. Additional guidance on LPG storage is available in the RiskFix document entitled Fire Safety – Flammable Gases.

- In the event that the LPG supply is in the form of a bulk tank for the refilling of cylinders, special advice should be obtained concerning tank installation and location. Generally, the bulk tank should be located externally, as far from buildings as practicable.
- Personnel involved in cylinder refilling operations should be appropriately trained and fully aware of the fire hazards involved and precautions necessary.
- LPG powered appliances should not be used in areas where they are exposed to high temperatures, for example, near ovens, furnaces, etc.
- Use of open flames or smoking should be specifically prohibited in refuelling areas. Suitable signage to this effect should be prominently displayed.
- Personnel should be cognizant of risks associated with the exhaust system, engine bay and any other potentially hot surfaces. Such areas should be maintained free of waste material.
- Where risk assessment deems it prudent, exhaust outlets should be fitted with a spark arrestor.

### Fork-Lift Trucks in Hazardous Atmospheres

- The Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) apply in premises where potentially explosive atmospheres may occur. Equipment for use in potentially explosive atmospheres, including fork-lift trucks, must comply with the health and safety requirements of the European Union's ATEX (Atmosphere Explosive) Directive.
- Only explosion proof fork-lift trucks are appropriate for use in areas where potentially explosive atmospheres may occur.
- Explosion proof fork-lift trucks should be regularly inspected, serviced and maintained by trained engineers in accordance with manufacturers recommendations. After servicing or repair, fork-lift trucks should be confirmed, by a competent person, as meeting original certification criteria, prior to being returned to operation.

For further information please contact your local AIG risk engineer.

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