WSHCOUNCIL
Tripartite Alliance for Workplace Safety and Health

SAFE HANDLING OF FLAMMABLE MATERIALS

There were two separate incidents involving flammable materials in the first two weeks of March 2023.

On 7 March, an explosion in a room caused a section of the building wall to collapse. Preliminary investigations revealed the explosion was caused by the accumulation of flammable vapours from a waste oil tank placed in a lift motor room.

Figure 1: Lift motor room where waste oil was stored.

On 13 March, a large fire occurred at an industrial chemical blending and storage warehouse. Preliminary investigations revealed the fire started from an adhesive dispensing unit containing flammable solvents. The fire eventually engulfed the warehouse and its connecting production areas.

Figure 2: Packing area where the liquid adhesive was being dispensed into 20-litre tins.

While no one was badly injured, both incidents highlight the need for workplaces to better manage flammable materials as workplace fires can lead to mass casualties and cause extensive damage to assets.

As we are still in the midst of the Heightened Safety Period, the WSH Council calls on all companies storing or handling flammable materials, including flammable waste, to undertake an urgent assessment of their safety measures. Examples of flammable materials include petroleum products, volatile organic solvents, and all substances listed in the Fourth Schedule of the Fire Safety (Petroleum and Flammable Materials) Regulations.

Workplaces storing or handling flammable materials should ensure the effective implementation of the following measures:

Risk assessment

- Use Safety Data Sheet (SDS) information as input to risk assessments.
- Look out for advice and precautions on storage, handling, and disposal in the SDS.

Training and awareness

- Place the control of flammable materials under a competent person and allow only authorised workers who have been trained on the hazards and precautions to take, to handle flammable materials.
- Provide readily accessible copies of Safety Data Sheets to persons using or handling flammable materials.

Storage

- Ensure that storage areas are well-ventilated to prevent flammable vapour accumulation. Flammable storage must be segregated from heat and ignition sources

(e.g. open flames, hot work, sparks, hot surfaces). Examples include fire-rated or flammable storage cabinets, and dedicated storage areas with fire protection provisions.
- Optimise the quantity of flammable materials stored on site to as low as reasonably practicable, considering the required quantities for use during production.
- Use spill control pallets or build dikes/curbs with adequate drainage to contain potential spills.
- Affix GHS labels for flammable raw material and product storage containers.
- Provide flammable material storage areas with adequate firefighting equipment.

Handling

- Ensure risk control measures are implemented to address hazards associated with flammable materials, including:
    - Implementing effective control of ignition sources;
    - Bonding and grounding of metal containers to prevent ignition by electrostatic discharge during flammable liquid transfers;
    - Transferring flammable materials under local exhaust ventilation to prevent accumulation of flammable vapours;
    - Keeping containers of flammable material closed when not in use to minimise fugitive emissions of flammable vapours; and
    - Installing gas detectors or using portable gas detectors to continuously monitor the work environment where practicable.
- Ensure workers put on personal protective equipment (e.g. fire-retardant clothing, face shield, respirator, gloves and safety boots) when working with flammable materials.
- Plan and implement an effective emergency response plan.

Disposal

- Label flammable waste containers according to the SS 603: 2021 Code of Practice for Hazardous Waste Management.
- Dispose flammable materials separately from general waste.
- Check for chemical compatibility before disposing waste into collection tanks. Never mix waste with another type of waste unless the constituents in both waste sources are known. If necessary, conduct laboratory tests to ascertain hazardous substances before combining waste from different sources.
- Treat mixtures of flammable liquids with other less flammable liquids, as flammable. For example, if waste kerosene is mixed with more flammable naphtha, the mixture should be stored and disposed as a flammable liquid.
- Monitor flammable material waste for prompt collections by Toxic Industrial Waste Collectors to minimise on-site waste inventory.

For more information, refer to the WSH (Risk Management) Regulations, Fire Safety (Petroleum and Flammable Materials) Regulations, Environmental Public Health (Toxic Industrial Waste) Regulations, SS 532: 2016 Code of Practice for the Storage of Flammable Liquids, SS 603: 2021 Code of Practice for Hazardous Waste Management, and the WSH Council's Code of Practice on WSH Risk Management, WSH Guidelines on Management of Hazardous Chemicals Programme, and WSH Guidelines on Flammable Materials.