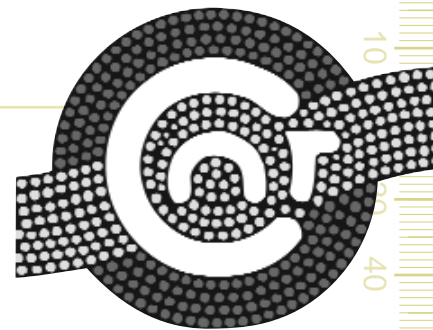


Managing liquid fuel risk



Diesel, petrol and oil contain a range of organic chemicals that can have toxic effects at low levels of exposure. People are exposed to the toxic effects of hydrocarbons through 'exposure pathways' – ingestion, skin and eye contact, and inhalation (see figure 1).

The best ways to reduce exposure is to prevent spills and minimise potential exposure pathways. If spills do occur, they must be quickly contained and cleaned up. Management of risks posed by hydrocarbon spills involves:

- managing the source – preventing, controlling and cleaning up spills
- minimising potential exposure pathways.

This BUSH TECH provides information about how to:

- prevent spills
- contain spills
- clean up spills
- minimise exposure pathways around drums, tanks, power house generators and pump generators.

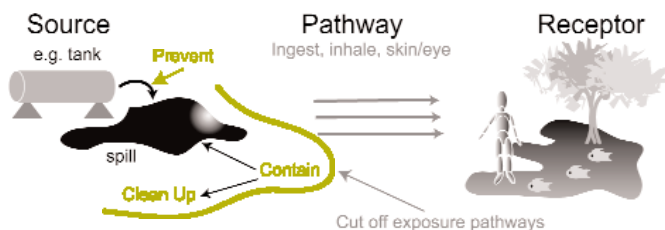


Figure 1

The 'Source' is the potential pollution. The 'Pathway' is the means of exposure to the pollution source. The 'Receptor' is the person, animal or plant that could be affected by the source.

Preventing spills

Preventing spills means taking action to stop spills occurring.

Regularly inspect drums, tanks, generators and pumps for rust (corrosion) and leaks. For tanks, ensure that valves, taps and hoses are also checked. Perhaps nominate a person for each piece of equipment.

If storage vessels are rusty or are leaking, move fuel to a vessel

in better condition. For tanks, contact the supplier for repair or replacement. CAT can assist.

Consider solar power as an alternative to diesel. Contact CAT for details.

CHECKLISTS FOR PREVENTING SPILLS

Drums

- Drums are not intended for long-term storage. It is preferable to store fuel in a tank.
- Store drums under a roof to stop corrosion. The roof should be high enough to allow vehicle access to deliver drums.
- Seal drum lids securely.
- Store in a well ventilated area, removed from acids, strong alkalis, heat and ignition sources.
- Remove drums from the delivery truck with care.
- Locate drums close to the generator/pump that will use the fuel.

Tanks

- Tank construction and siting should comply with relevant standards, and a structural engineer should advise on installation foundations and support.
- The best environmental protection comes from double-skinned, above-ground steel tanks with corrosion protection.
- All pipes should be above ground so that they can be inspected for leaks.
- Talk with the fuel delivery truck driver about the importance of avoiding spills when re-filling tanks.

Generators and pump engines

- Have a strategy to minimise the possibility of spillage or fire when transferring fuel from the storage vessel. For example, using a hand pump and a funnel. A funnel could be made from a plastic bottle. This must occur within a bund.

Containing spills

Spills are contained by putting a bund around the stored fuel or equipment (see figure 2). A bund is a raised surface, wall or trench that contains substances within a specified area. A bund should:

- be highly impermeable
- be capable of storing 110% of the volume of the fuel storage vessel's maximum capacity
- be capable of containing every part of a tank's storage arrangement, including hoses, taps etc
- have one rounded wall to allow vehicle access, so any spillage during delivery/re-filling is contained (see figure 2)
- have a bottom with a very slight gradient towards one corner to assist in drainage, but not steep enough to compromise capacity i.e. the bottom is almost level
- have a roof, particularly in areas of high rainfall or where drums are stored.

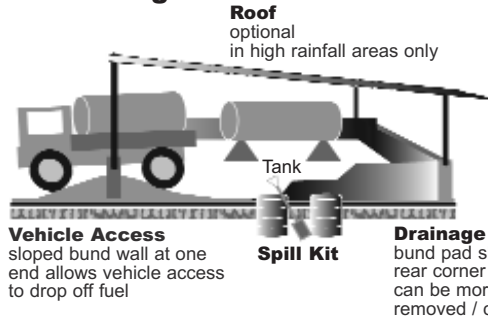
Ideally a bund will be made from concrete. Alternatives are:

- 0.5 mm HDPE plastic – temporary use only
- Spill containment pallet – plastic bund with a metal grate cover, for one or two drums
- A drip tray – goes under a small piece of equipment to capture leaks/spills.

Managing liquid fuel risk



Tank Storage



Drum Storage

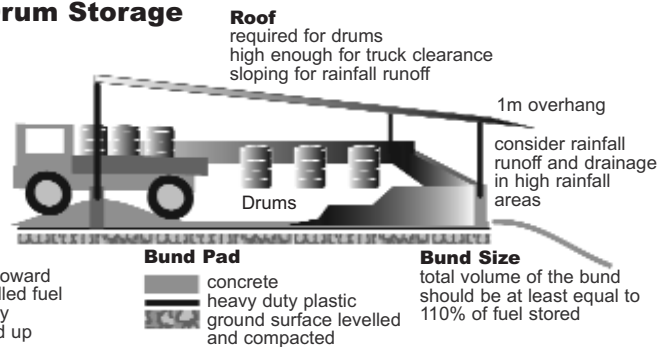


Figure 2

Cleaning up spills

If a spill is due to failure of a bulk storage (e.g. >10,000 litre tank) or fuel transport vessel (tank refuelling truck), contact emergency services. If this is not possible, follow the procedure below.

There are two principles in managing a spill.

1. Move contaminated material away from where people could be exposed to it, such as:

- groundwater bores
- where children play
- where food is grown
- where people live
- creeks and rivers.

2. Treat contaminated material.

Also:

- clean up spills immediately
- wear protective equipment
- have a 'spill kit' close to potential sources containing
 - an empty drum with lid for contaminated absorbent material
 - a drum with lid containing clean absorbent material
 - a shovel
 - protective equipment.

HOW TO CLEAN UP A SPILL

Spills where people are likely to be exposed to them

A. If spill is inside a bund:

1. Recover fuel for re-use if it is not contaminated.
2. Mix/rub absorbent material into the spill (see use of Absorbent material).

If spill is on the ground, use a shovel to dig up the contaminated soil.

B. Shovel contaminated soil/absorbent material into an empty drum and take to the Treatment Area. (see use of a Treatment Area)

C. Treatment: Using a shovel, spread contaminated material across the Treatment Area, and dig it into the ground.

Minimising exposure pathways

In addition to preventing spills, it is important to minimise exposure if a spill was to occur (exposure pathways). The three exposure pathways are contact with skin or eyes, ingestion and inhalation.

- Contact with skin and eyes and inhalation can occur when handling fuel; for example, transferring it from a drum to a generator or in cleaning up a spill.
- Ingestion can occur through contamination of groundwater and surface water, ingesting contaminated soil (for example where children play) or not washing hands before eating.

To minimise exposure pathways

Store and use hydrocarbons where, if there is a leak, it will not flow into:

- groundwater bores
- where children play
- where food is grown
- where people live
- creeks and rivers.

Consider factors including ground surface contours (topography), permeability of the ground, rainfall, depth to groundwater.

- Wear PVA/viton gloves and splash-proof goggles when working with diesel hydrocarbons.
- Wash hands thoroughly with soap and water after working with hydrocarbons
- Wear the following if managing a large spill: PVA/viton gloves, splash-proof goggles, a Type A (organic vapour) respirator, coveralls, rubber boots.
- Store hydrocarbons in tightly sealed containers.

Use of Absorbent material

Absorbent material is used to soak up a spill on a low permeability surface such as concrete. Options are:

- powdered plant matter (commercially available)
- sawdust
- sand and soil.

Use of a Treatment Area

Designate a Treatment Area for diesel and petrol contaminated material. The Treatment Area must be close enough to where spills may occur so as not to deter use, but far away from where people could be exposed to it. Next to a community landfill, if the landfill meets the location criteria may be practical. Do not mix contaminated material into a general waste landfill. A fence and sign (warning that contaminated material is present) will deter people from entering the area.

To speed up degradation of contaminated material, regularly:

- *add water:* Sprinkle water across the Treatment Area so the soil is damp but not saturated
- add animal droppings and green waste, chopped up and evenly spread. These add carbon and bacteria
- turn soil with a shovel. This increases flow of oxygen to the microbes and mixes the other ingredients through the soil.

More information

BUSH TECH #22 **Used oil**

TECHNOLOGY POSTER **How to look after your bore**

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