
Solid storage and handling guidelines

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Guideline

Contents

About this guide	4
Why should I use this guide?	4
How can I manage my risk?	4
Source	5
Pathway.....	5
Receptor.....	6
Controls	7
Handling materials	7
Engage good handling practices and equipment	7
Engage good cleanup practices and equipment	8
Storage controls.....	9
Contain materials.....	9
Place bulk material under cover or tarpaulins	9
Establish site drainage systems to divert surface water flows away from stored material.....	10
Dust minimisation measures.....	10
Select suitable storage locations.....	11
Use impervious surfaces	11
Additional information.....	12

Solid storage and handling guidelines

About this guide

This guideline provides information on storage and handling of solid materials, including powders, granules and pellets. Examples of practical controls to prevent spills and loss of materials to the environment are also provided.

This information is general in nature and intended to be applied to solid materials (which may include solid waste). There may be other specific waste management requirements that are not addressed in this guide. You should familiarise yourself with all requirements relevant to your situation, and seek advice as required. This guide should be read in conjunction with other relevant guidance, such as:

- [Liquid storage and handling guidelines](#) (EPA publication 1698)
- Waste management requirements: www.epa.vic.gov.au/your-environment/waste
- Dangerous Goods and Occupational Health and Safety Requirements: www.worksafe.vic.gov.au

Why should I use this guide?

You have a responsibility to minimise risks of harm to human health and the environment through applying appropriate storage and handling practices for all materials involved in your processes.

Materials stored and handled incorrectly can be released into the environment. This can contaminate land, pollute waterways and groundwater, and create dust emissions which can harm people, plants, animals and ecosystems.

Prevention of solid material spills can save valuable material, produce less waste and save money.

How can I manage my risk?

It is important to understand how your activities impact human health and the environment. Using a structured method to assess and control risk (Figure 1) will help prevent harm to human health and the environment, comply with legal obligations and meet community expectations. Refer to [Assessing and controlling risk: a guide for business](#) (EPA publication 1695) for more information on steps to control hazards and risks.



Figure 1: Steps in controlling hazards and risks

Solid storage and handling guidelines

When identifying hazards and assessing risks, it can be helpful to think about the *source*, *pathway* and *receptor* (Figure 2). Each of these elements is explained in further detail in the following pages.

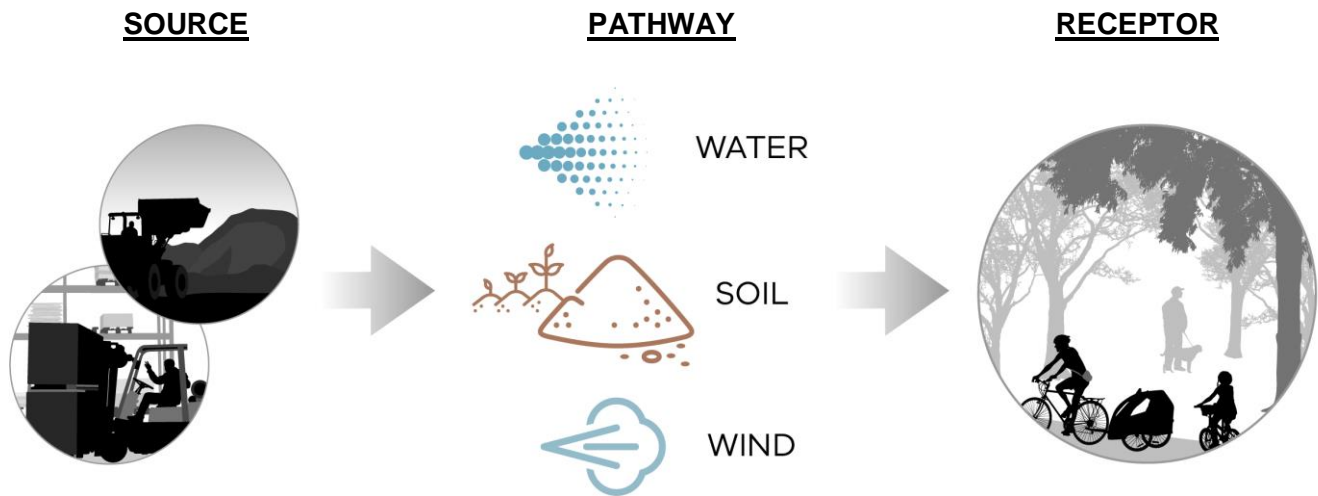


Figure 2: Source - Pathway - Receptor

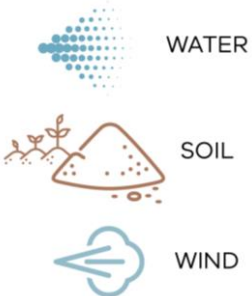
Source



Storage and handling activities can be a source of solid materials entering the environment if not managed properly. This may include:

- storage areas of materials
- when material is received from a supplier
- during transfer to onsite storage locations
- during processing or service activities
- during transfer of products for transport
- use of inappropriate packaging, containment or equipment.

Pathway



When materials enter waterways, soil, groundwater and/or air, they can be transported to areas where they can cause harm. Various pathways are described and modelled in Figure 3.

Water pathway: rainfall runoff washes material across the ground surface or into the **drain** and the nearby waterway.

Soil and groundwater pathway: rainfall can dissolve some solid materials, leaching contaminants into the soil and groundwater. This may impact residents and other users of extracted groundwater who use it for drinking water, irrigation water or other public uses.

Wind pathway: material is blown along the ground as debris or through the **air** as **dust**, causing inhalation or amenity impacts. Material may also be deposited through dust into the waterway, or onto residential areas where it can contaminate soil and groundwater.

Solid storage and handling guidelines

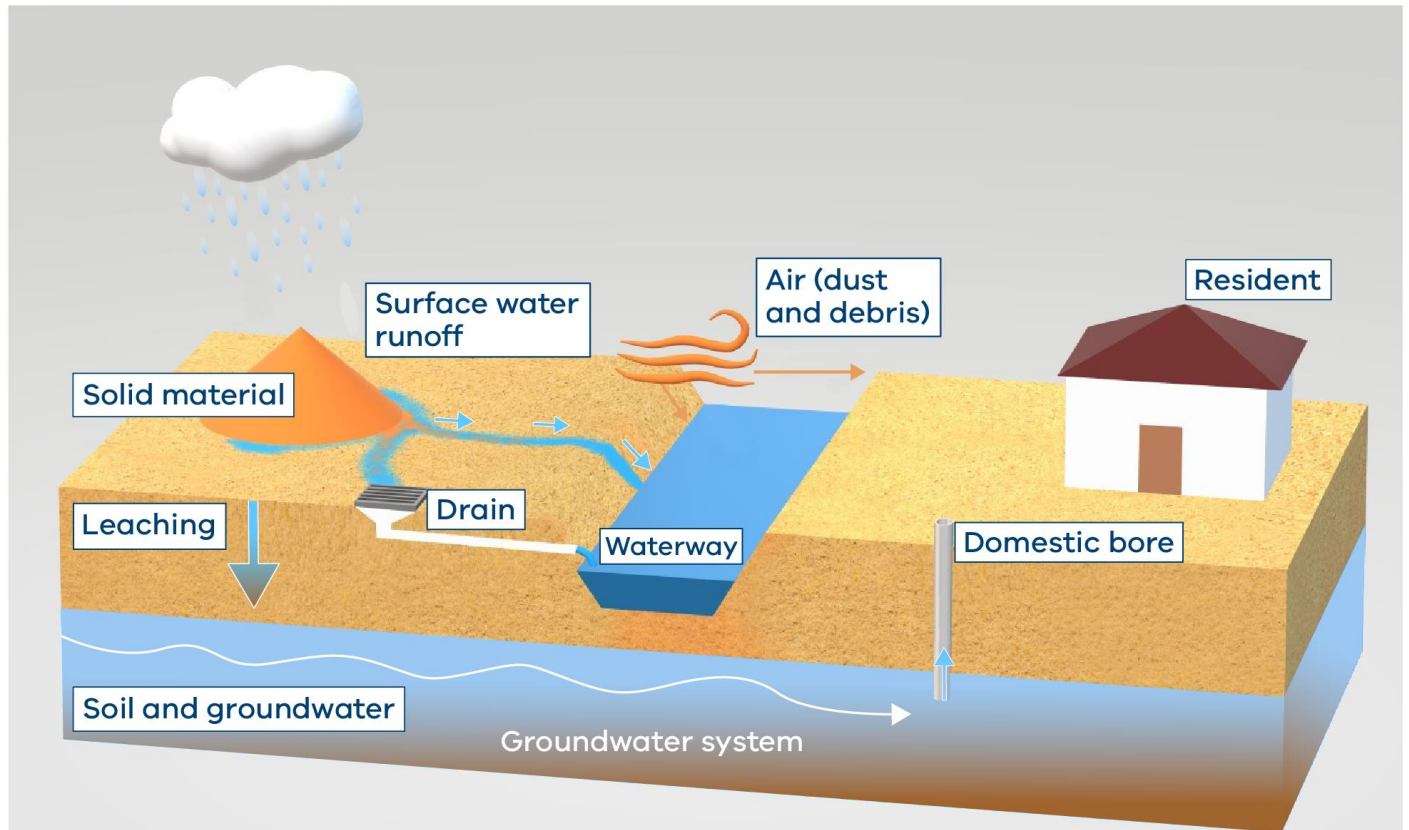


Figure 3: Model of potential pathways for solid material storage and handling

Receptor



A receptor may include living organisms, ecosystems or humans that can be impacted by environmental pollution.

Key environmental receptors include:

- creeks and rivers
- wetlands, dams and lakes
- forests and woodlands
- plants and animals.

For impact to take place, a receptor is exposed to the hazard via an exposure pathway.

Uncontrolled releases of solid materials can leave a site via various pathways and can cause harm to human health and/or the environment.

Solid storage and handling guidelines

Controls

Examples of controls that can help prevent materials entering waterways and the broader environment during solid storage and handling activities are presented below. You should also identify other suitable controls that are relevant to the risks you are trying to control.

Handling materials

The following are examples of controls that can be used when **handling** materials to help maintain a clean and organised work site.

Engage good handling practices and equipment

- In material transfer areas consider using:
 - **wide mouth hoppers** for receiving powdered or pelletised materials
 - fixed or temporary **bunds** (or secondary containment areas) around the area, or grading the area towards a blind sump that can be vacuumed out. See [Liquid storage and handling guidelines](#) (EPA publication 1698) for further information.
- Bale, bundle, bag or otherwise **contain materials** that can be easily blown or washed away.
- Establish **procedures** for staff and contractors to handle materials with care, **train** them properly on these procedures and implement them.
- **Talk to your suppliers** and transporters about what you need them to do to minimise spills.
- For non-powdered materials, use **fences and drain guards** to contain materials as a last line of defence.



Figure 4: Solid material leaking from a Bulka bag
Source: *Tangaroa Blue Foundation*

Solid storage and handling guidelines

Adopt good cleanup practices and use appropriate equipment

It is important to ensure that materials are stored and managed in such a way that reduces the likelihood of a spill occurring. Sometimes however spills do occur, if that happens clean them up as soon as possible to prevent the material washing or blowing away.

For example:

- Ensure your operation is **set up** to allow for easy cleanup (it is hard to clean up a spill on bare soil for instance).
- Ensure **equipment is readily available** around your work site to allow for cleanup (vacuums, brooms, brush and pan, labelled bins) and consider permanent, accessible spill kits.
- Establish **procedures** for spill cleanup, **train** your staff and implement the procedures. You may want to consider having your staff involved in developing the procedures.
- **Inspect** the premises routinely, identify spills, or areas where a spill could occur, communicate work instructions to staff on cleanup actions and have them respond with the actions undertaken.



Figure 5: Spilt material that has been flushed into a drain by rainfall runoff
Source: *Tangaroa Blue Foundation*

Solid storage and handling guidelines

Storage controls

The following are examples of controls that can minimise risk from storing solid materials.

Contain materials

- Ensure the primary containment of solids is suitable. For example, ensure storage vessels such as drums, intermediate bulk containers (IBCs) and bulka bags do not leak or contain holes.
- Maintain storage vessels in secondary containment areas, so that any leaks are contained (for example bunds).

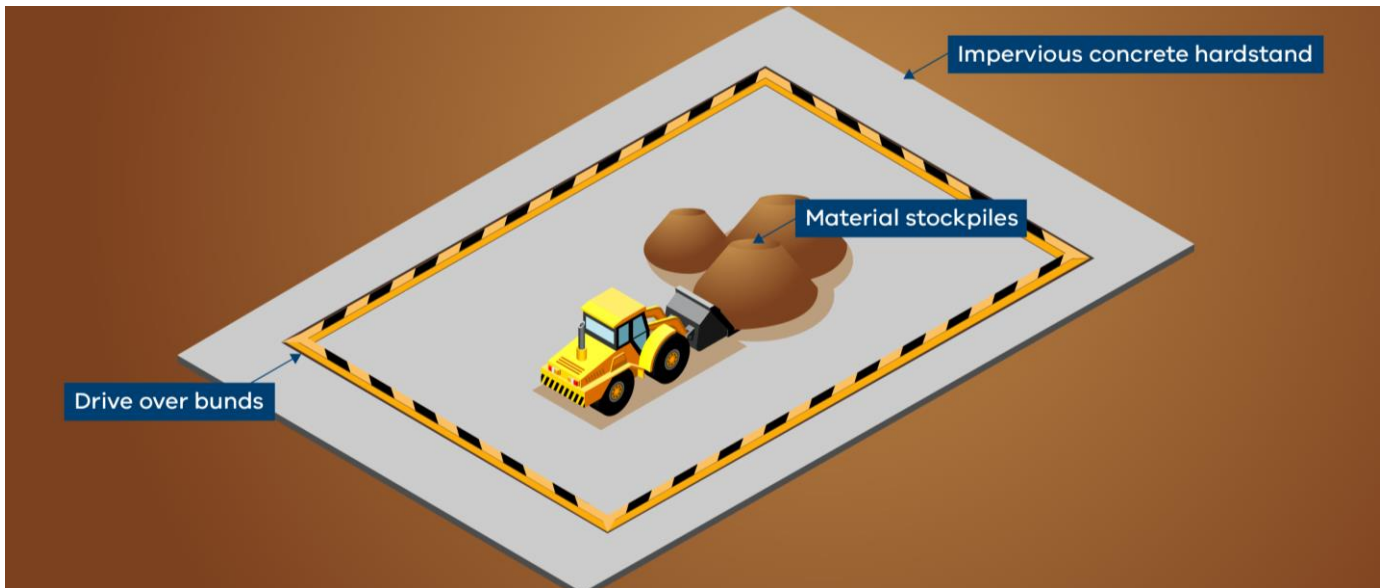


Figure 6: Stockpiles stored on a concrete hardstand, with a drive over bund

- Install and maintain controls to prevent materials moving into drains such as mesh drain guards, filters or other interceptor mechanisms (noting the control should be suitable to the material type and size).

Place bulk material under cover or tarpaulins

- Consider storing material under cover or tarpaulins to prevent rain making contact with stockpiles. Please note, this should only be considered if there are no other dust, gas, fire or other safety risks with this approach.
- If using tarpaulins, consider if it is appropriate to secure them by pegging all sides down to the ground, to prevent them lifting in the wind.



Figure 7: Stockpiles being covered under tarpaulins
Source: *Fulton Hogan*

Solid storage and handling guidelines

Establish site drainage systems to divert surface water flows away from stored material

- Rainfall creates surface water flows on a site, and can enter a site from nearby areas. Establish appropriate drainage to capture these flows and divert them away from stockpiled material towards either sediment basins for turbid (cloudy) water, or to stormwater drains for clean water.

Dust minimisation measures

- **Wind fences** are **mesh structures** that can be installed around a site to help minimise the impact of wind. They should be considered when stockpiling materials that are prone to producing windborne dust or debris.
- Protection should consider prevailing wind directions, and sensitive areas of the environment or receptors that may be impacted (including where people work or reside).
- Porous materials such as meshes are best as they restrict wind rather than block it completely. Blocking wind can create turbulence and stir up more dust.
- For outdoor bulk storage of soils or materials containing soils, **dust suppression** with water or polymer-based products can be considered, but they should be non-toxic to people or the environment.



Figure 8: Screening fences providing wind suppression for a site
Source *Fulton Hogan*

Solid storage and handling guidelines

Select suitable storage locations

- Materials that might react dangerously with each other should be stored in separate areas.
- Check material safety data sheet (MSDS) information to ensure that materials are compatible.
- Storage areas should be well sign posted or labelled.
- Store flammable and combustible materials in cool, dry, well-ventilated areas and away from potential ignition sources. See [Management and storage of combustible recyclable and waste materials – guideline](#) (EPA publication 1667) for further information.
- Store materials away from drains, exposed soils and sensitive areas such as occupied buildings, waterways and vegetation.
- Secondary containment such as bunded areas should be located away from drains.

Use impervious surfaces

Solid materials can dissolve in liquids (such as rainwater) and then leach into most soils, or through cracks in concrete and bitumen surfaces.

- Solid materials should be stored on, and handled (including loading and unloading) over ground surfaces that do not allow fluids to soak through them (low leachability).
- Prevent ground surface infiltration of liquid solutions by painting or lining ground surfaces with fluid resistant layers.
- Secondary containment areas such as bunds should hold fluids, and any liners or fluid-resistant layers should be free from defect.
- Solid materials that are in powdered or dissolvable form (like cement for example) should not be stored on bare soil as rainfall can readily leach these substances into soil and groundwater.



Figure 9: Cracks in surface allows runoff to leach solid materials into underlying soils
Source: *iStock*

Solid storage and handling guidelines

Additional information

The information in this publication is for general guidance only and should not be relied on as a complete statement of your obligations or the law. This publication does not constitute legal or other professional advice. You should obtain professional advice for your specific circumstances. Because it is intended only as a general guide, it may contain generalisations. Environment Protection Authority Victoria (EPA) has made every reasonable effort to provide current and accurate information, but it does not make any guarantees regarding the accuracy, currency or completeness of that information. Other laws and regulations which are not administered by EPA also apply to the storage and handling of solid materials, and it is your responsibility to ensure your operations comply with all applicable laws.