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PacWastePlus
PACIFIC WASTE MANAGEMENT

This initiative is supported by **PacWastePlus**-a 72 month project funded by the European Union (**EU**) and implemented by the Secretariat of the Pacific Regional Environment Programme (**SPREP**) **to sustainably and cost effectively improve regional management of waste and pollution.**

RECOMMENDED PROCEDURES:
DISPOSAL AND LANDFILLING OF ASBESTOS CONTAINING WASTES

July 2022

This **Recommended Procedures for the Disposal and Landfilling of Asbestos Containing Wastes** is designed to provide accessible, practical advice to a broad range of parties who have a responsibility or duty of care in regards of exposure to asbestos or Asbestos Containing Materials (ACM).

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Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures.

PacWastePlus Programme

The Pacific – European Union (EU) Waste Management Programme, PacWastePlus, is a 72-month programme funded by the EU and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP) to improve regional management of waste and pollution sustainably and cost-effectively.

About PacWastePlus

The impact of waste and pollution is taking its toll on the health of communities, degrading natural ecosystems, threatening food security, impeding resilience to climate change, and adversely impacting social and economic development of countries in the region. The PacWastePlus programme will generate improved economic, social, health, and environmental benefits by enhancing existing activities and building capacity and sustainability into waste management practices for all participating countries.

Countries participating in the PacWastePlus programme are: *Cook Islands, Democratic Republic of Timor-Leste, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu*.

KEY OBJECTIVES

Outcomes & Key Result Areas

The overall objective of PacWastePlus is "to generate improved economic, social, health and environmental benefits arising from stronger regional economic integration and the sustainable management of natural resources and the environment".

The specific objective is "to ensure the safe and sustainable management of waste with due regard for the conservation of biodiversity, health and wellbeing of Pacific Island communities and climate change mitigation and adaptation requirements".

Key Result Areas

- Improved data collection, information sharing, and education awareness
- Policy & Regulation - Policies and regulatory frameworks developed and implemented.
- Best Practices - Enhanced private sector engagement and infrastructure development implemented
- Human Capacity - Enhanced human capacity

Learn more about the PacWastePlus programme by visiting

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PacWastePlus
PACIFIC WASTE MANAGEMENT

https://pacwasteplus.org/

About Regional Asbestos Project

The management and disposal of asbestos and asbestos containing materials (ACM) is an ongoing concern in the Pacific region. In seeking to improve the ways that asbestos and asbestos containing materials are managed, our project's focus is to prevent exposure to asbestos fibres in order the eliminate asbestos-related diseases.

Asbestos is a known health hazard and may be present in buildings and pipes throughout the pacific. A 2016 study estimated some 188,000m^2 of non-residential asbestos was present in Pacific islands, of which some 146,000 m^2 (78%) was confirmed as a high or moderate risk to human health (SPREP 2016).

When products containing asbestos are damaged or become degraded over time, asbestos fibres are exposed and may become airborne. Health risks are exacerbated in natural disasters, with destructive cyclones damaging products such as asbestos roofing and cladding, an issue of increasing concern as the impacts of climate change are experienced across the region.

The World Health Organisation (WHO) states that when a country stops using asbestos, their asbestos-related disease burden decreases over time. In contrast, countries continue to use asbestos are likely to have a substantial burden of asbestos-related disease in the future due to their past and ongoing asbestos use. Reducing exposure without addressing ongoing import and use are insufficient to eliminate asbestos-related diseases (Kameda et al, 2014).

PacWastePlus Regional Asbestos Project

The PacWastePlus Regional Asbestos Project will support countries in executing solutions, both legislative and policy driven, to preventing exposure to asbestos fibre, and thereby reduce asbestos-related diseases.

The activities to be delivered by the PacWastePlus Regional Asbestos Project are:

- Promote the understanding of asbestos exposure risks
- Implement legislative/regulatory bans on the manufacture, use, reuse, import, transport, storage, or sale of all forms of asbestos and ACMs
- Create and support the adoption of an ACM Code of Practice
- Provide support tools/documents to properly manage and control ACM.

The project will achieve these outcomes through direct work with countries, and development of tools and guidance as described in the following schematic.

The technical resources will be supported through the production and dissemination of a variety of community and government resources, and provision of training to government workers involved in the management of asbestos.

Learn more about our regional asbestos project: https://pacwasteplus.org/regional-project/804/

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Concerns and Risk Pathways of Asbestos

Asbestos is a naturally occurring fibrous mineral that is used in many applications for its fire resistance, noise insulation and electrical insulation properties. Common uses prior to the mid-1970's included building products such as pipe insulation, acoustical sound proofing, house insulation, fireproofing, house siding, floor coverings, roofing materials and heating and cooling systems.

There are two general forms of asbestos: friable and non-friable. Friable asbestos can be crumbled, pulverized or reduced to a powder by hand pressure when dry and is the most dangerous form. Non-friable asbestos cannot easily be pulverized or reduced to a powder. Nonfriable asbestos that is damaged to the extent that it can be crumbled or reduced to a powder by hand pressure must be handled and packaged like friable asbestos wastes. Resilient floor tile, roof felts, asphalt tiles, asphalts, mastics, and transite roofing shingles, siding and piping are considered non-friable forms of asbestos, unless they are or will be damaged during demolition or renovation activities.

The primary concern associated with handling asbestos wastes is exposure to airborne asbestos fibres. These fibres, if inhaled, can increase the risk of lung damage or cancer. Ordinarily, even a very small quantity of inhaled asbestos fibres may cause long-term respiratory side effects. The most important thing in handling, transporting, or disposing of asbestos is to do so in a way that prevents airborne release of fibres or dust.

Authorisation/Licensing of a Landfill Facility to Accept Asbestos Containing Waste

The disposal of asbestos containing waste is the final step at which exposure to asbestos risk may occur. The disposal of this waste should be in accordance with all local regulations and at a landfill authorised to accept asbestos waste. Asbestos containing waste should never be disposed of in the general waste system or by burning.

Controlling Access to a Landfill Containing Asbestos Containing Wastes

Controlling public access is required to prevent exposure of the public to potential health and safety hazards at the disposal site (see box **Public Risks Associated with Buried Asbestos**). Therefore, fencing and warning signs are recommended to control public access when natural barriers do not exist. Access to a landfill should be limited and fencing should be installed around the perimeter of the disposal site in a manner adequate to deter access by the public. Chain-link fencing, 6-ft high and topped with a barbed wire guard, is recommended. More specific fencing requirements may be specified through local regulations. Warning signs should be displayed at all entrances and at intervals of 100 meters or less along the property line of the landfill or perimeter of the sections where asbestos waste is deposited.

The sign should read as follows:

ASBESTOS WASTE DISPOSAL SITE

BREATHING ASBESTOS DUST MAY CAUSE LUNG DISEASE AND CANCER

Public Risks Associated with Buried Asbestos

The public perception of risks related to waste disposal facilities appears to reflect general societal anxieties and fears, which may not have a reasonable basis. A risk assessment study was conducted to evaluate the landfill disposal of asbestos-containing waste. From the analysis, none of the possible exposure pathways associated with landfill disposal of asbestos-containing waste was found to be potentially significant.

Promentilla, Michael Angelo and Peralta, Genandrialine, *An evaluation of landfill disposal of asbestos-containing waste and geothermal residues within a risk-assessment framework, Journal of Material Cycles and Waste Management*, 2003 January, Pg. 0013-0021. Doi: 10.1007/s101630300003.

Preparation of Landfill Cell to Accept Asbestos Containing Waste

Disposal involves the isolation of asbestos waste material to prevent fibre release to air or water. Landfilling is an environmentally sound isolation method because asbestos fibres are virtually immobile in soil. Other disposal techniques such as incineration or chemical treatment may not be feasible (see: **Treatment Options for Detoxification of Asbestos Containing Wastes**) due to the unique properties of asbestos.

Recognizing the health dangers associated with asbestos exposure, the following procedures are recommended to augment solid waste landfill requirements:

- Designate a separate area for asbestos waste disposal. All asbestos waste disposal areas at a landfill should be within their own dedicated special waste location, which is situated a sufficient distance away from the edge of the landfill and an adequate distance from other landfill activities to minimise the risk of exposure. These areas should be appropriately marked.
- Prepare a separate trench to receive asbestos wastes. The size of the trench will depend upon the quantity and frequency of asbestos waste delivered to the disposal site. The trenching technique allows application of soil cover without disturbing the asbestos waste containers. The trench should be ramped to allow the transport vehicle to back into it, and the trench should be as narrow as possible to reduce the amount of cover required. If possible, the trench should be aligned perpendicular to prevailing winds.
- Provide a record for future landowners that asbestos waste has been buried at this location and that it would be hazardous to attempt to excavate that area. Future regulations may require property deeds to identify the location of any asbestos wastes and warn against excavation.

Treatment Options for Detoxification of Asbestos Containing Wastes

Many scientific papers and patents proposed physical, chemical, and biological treatments aimed to the detoxification of asbestos containing wastes (or the reduction of their health effects) and looking for the adoption of technologies, which allow the reuse of the end-products. For a good summary of the recent innovative treatments of asbestos containing waste can be found in this publication listed below.

Spasiano D, Pirozzi F. *Treatments of asbestos containing wastes*. J Environ Manage. 2017 Dec 15;204(Pt 1):82-91. doi: 10.1016/j.jenvman.2017.08.038. Epub 2017 Aug 30. PMID: 28863339.

Acceptance of Asbestos Containing Waste at Landfill

A landfill approved for receipt of asbestos waste (See **Checklist for Acceptance of Asbestos Containing Wastes for Disposal**) should require notification by the waste hauler that the load contains asbestos.

Checklist for Acceptance of Asbestos Containing Wastes for Disposal

- All friable asbestos was adequately wetted/dampened using a low pressure, fine water spray to prevent blowing of asbestos fibres prior to the plastic being applied – precaution should the container become damaged during transport.
- Material is properly packaged – fully contained/sealed in a plastic drum or bagged/wrapped in one six-ply or two three-ply contractor grade plastic bags/sheeting totaling no less than 6-mil in thickness. All seams are completely sealed with duct tape. Items that have sharp edges may need additional layers to avoid puncturing or tearing.
- All friable asbestos packages/containers are properly identified with the asbestos containing materials warning:
  - The warning must be affixed with a label or written on the container with a permanent marker.
  - If the warning is written on the container, the type size of the lettering is specific
    - to the size of the package, but the lettering must be readily legible under normal day
    - light conditions
    - The warning must also be prominently displayed on the package
    - If labels are used, they must be firmly affixed to the package

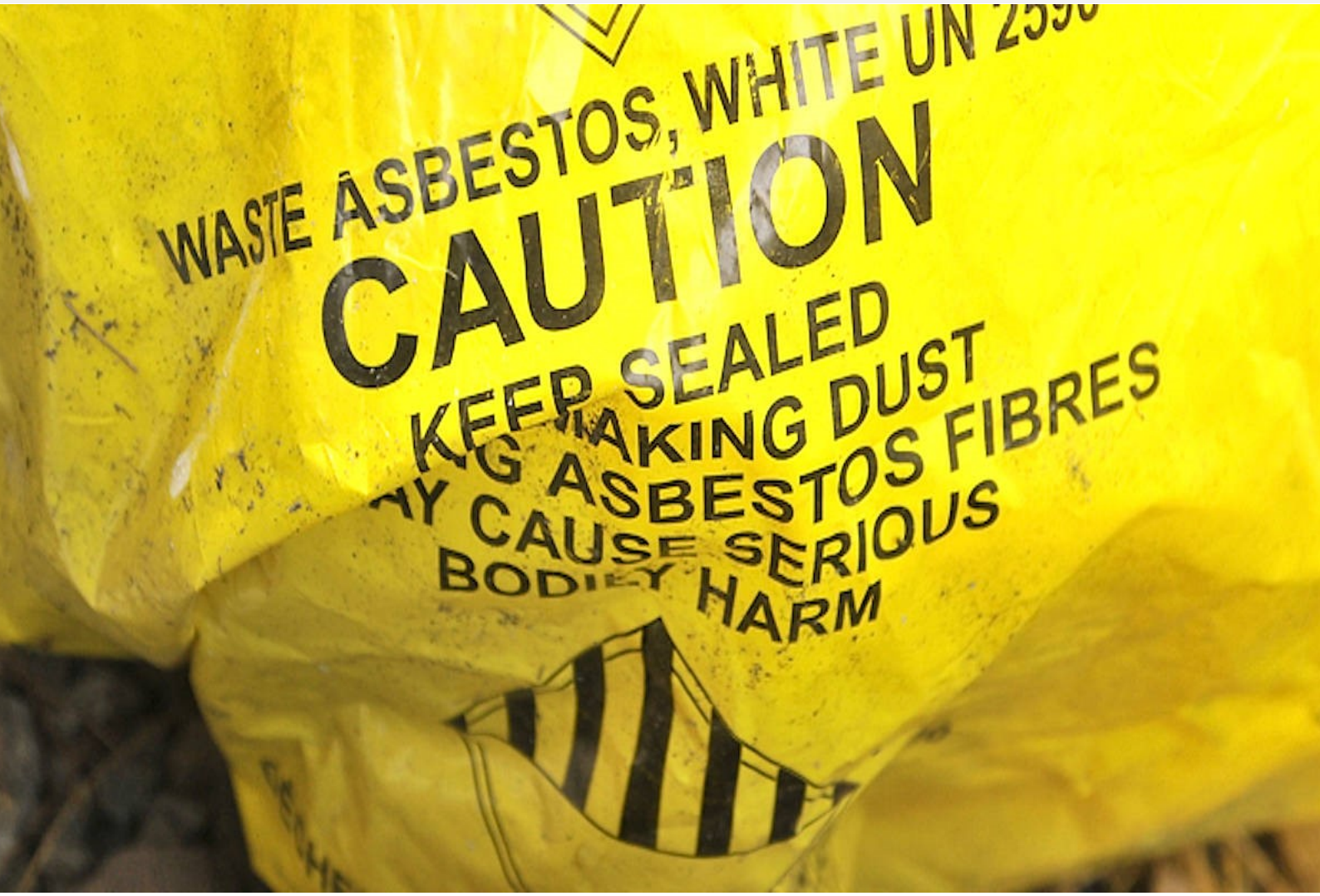
The landfill operator should inspect the loads to verify that asbestos waste is properly contained in leak-tight containers and labelled appropriately. (See **Requirements of International Conventions for Transport and Disposal of Asbestos Containing Wastes**).

In situations when the wastes are not properly containerised, the landfill operator should thoroughly soak the asbestos with a water spray prior to unloading, rinse out the truck, and immediately cover the wastes with non-asbestos material.

Requirements of International Conventions for Transport and Disposal of Asbestos Containing Wastes

Remote and geographically dispersed countries with relatively small populations have limited options for waste disposal, in particular hazardous or asbestos-contaminated waste. Therefore, the effect of international conventions governing transporting asbestos waste for disposal should be strongly considered.

The Basel and Waigani Conventions exist to control the transboundary movements of hazardous wastes by reducing and eliminating these movements and minimising the production of hazardous and toxic wastes in the Pacific region. The Conventions also ensure disposal of wastes in the Convention area is completed in an environmentally sound manner.



Active Disposal of Asbestos Containing Waste at Landfill

An acceptable disposal facility for asbestos wastes must have no visible emissions to the air during disposal or minimising emissions by covering the waste within 24 hours.

Workers involved in the process, from inspection through to disposal, must wear the appropriate PPE for working with asbestos containing materials, including waste materials (See **Personal Protective Equipment for workers managing asbestos containing waste**). In addition, training in asbestos awareness is recommended.

Once accepted for disposal the following procedures are recommended

- Place the asbestos waste containers into the trench carefully to avoid breaking them. Be particularly careful with plastic bags because when they break under pressure asbestos particles can be emitted.
- Completely cover the containerised waste within 24 hours with a minimum of 6 inches of non-asbestos material. **Note: if improperly containerised waste is received at the disposal site, it should be covered immediately after unloading.** Only after the wastes are completely covered, can the wastes be compacted, or other heavy equipment run over it. During compacting, avoid exposing wastes to the air or tracking asbestos material away from the trench.
- The final capping of general and restricted solid waste landfills should comprise, from bottom to top:
    - a seal-bearing surface consisting of a properly designed and engineered layer of material at least 300 millimetres thick to support the sealing layer; the material should meet recognised specifications for engineered materials.
    - a sealing layer, comprising a compacted clay layer at least 600 millimetres thick, with an in situ saturated hydraulic conductivity of less than 1×10^{-9} metres/second
    - a revegetation layer at least 1000 millimetres thick and comprising clean soils and vegetation with root systems that will not penetrate lower layers; the upper 200 millimetres should be a topsoil layer, which can include compost to help with vegetation establishment and growth. The revegetation layer should promote water removal by evapotranspiration and runoff; protect the sealing layer from desiccation and/or damage; and sustain microbial populations that oxidise a proportion of any methane passing up through the cap.

Personal Protective Equipment for Workers Managing Asbestos Containing Waste

When working with asbestos-containing materials (ACM), controls must be implemented to reduce exposure. Workers who handle, transport, and dispose of ACM must wear appropriate PPE to further reduce asbestos risks.

For a good summary of appropriate administrative controls and personal protective equipment for Pacific Island workers involved in handling, transporting, and disposing of asbestos containing materials can be found in the publication listed below. Personal protective equipment: guidance for waste management workers in Pacific Island countries. https://pacwasteplus.org/resources/personal-protective-equipment-guidance-for-waste-management-workers-in-pacific-island-countries/

Documentation and Record Keeping

A landfill owner should maintain documentation of the specific location and quantity of the buried asbestos wastes. In addition, the estimated depth of the waste below the surface should be recorded whenever a landfill section is closed.

Such information should be recorded in the land deed or other record along with a notice warning against excavation of the area.

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