

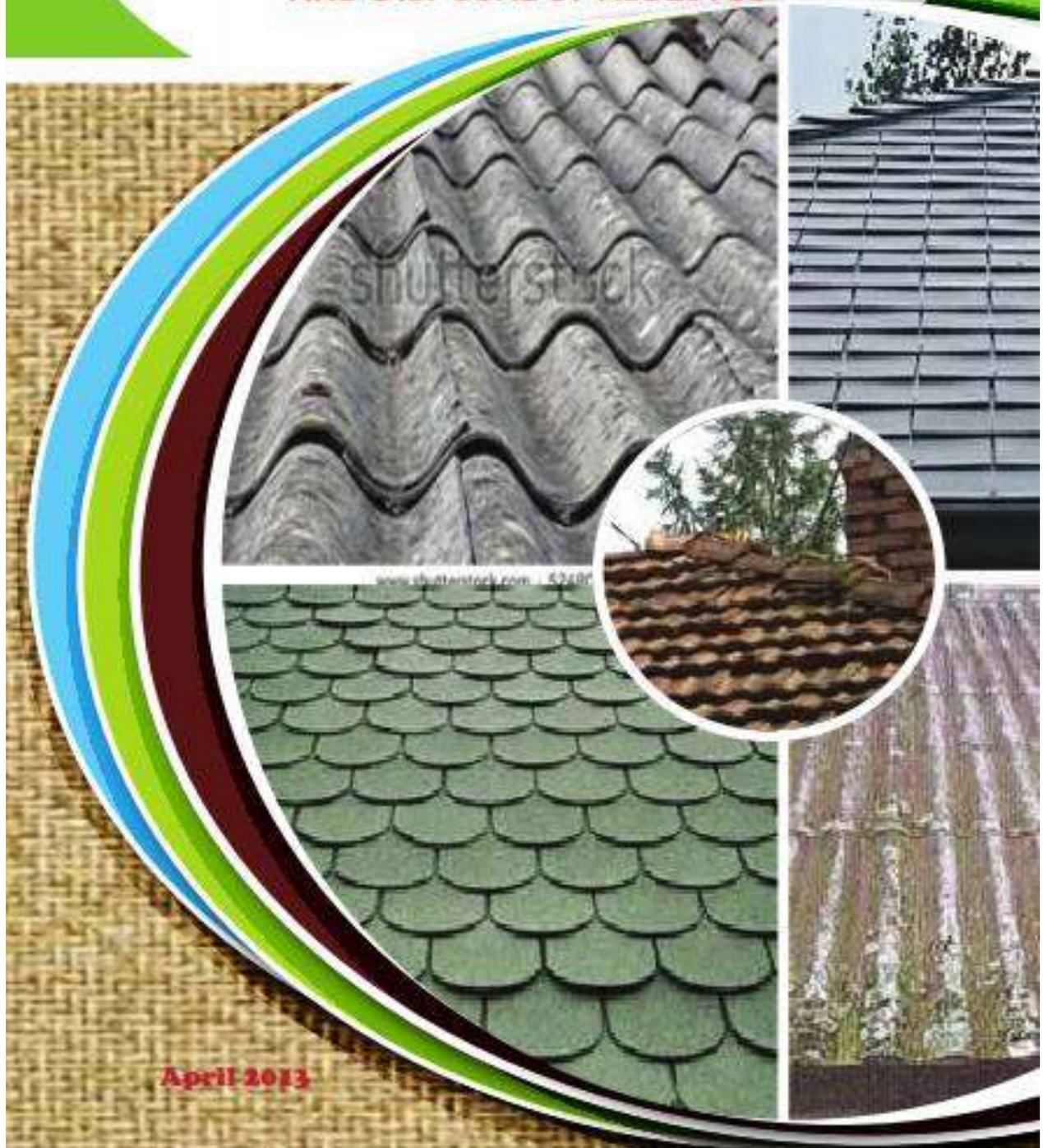


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NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY

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## NATIONAL GUIDELINES ON SAFE MANAGEMENT AND DISPOSAL OF ASBESTOS



April 2013



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National Guidelines On Safe Management And Disposal Of Asbestos

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***Towards achievement of Vision 2030*** 



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*Acronyms*

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CCN	City Council of Nairobi
CDE	County Director of Environment
DOSHS	Directorate of Occupational Safety and Health Services
EIA	Environmental Impact Assessment
EMC	Environmental Management and Coordination
EMCA	Environmental Management and Coordination Act, 1999
MoPHS	Ministry of Public Health and Sanitation
NEMA	National Environment Management Authority
OSHA	Occupational Safety and Health Act, 2007
PPE	Personal Protective Equipment
SWSI	Surface Water Supply Index

### *INTERPRETATION OF TERMS*

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In these guidelines;

**“Asbestos waste”** means waste containing asbestos and may include waste from renovation, demolition and repair of asbestos roofing sheets, asbestos ceiling boards and asbestos clutch plates, brake pads and linings and insulation materials.

**“Authority”** means the National Environment Management Authority established under section 7 of Environmental Management and Coordination Act (EMCA), 1999.

**“County Director of Environment”** means an officer of the National Environment Management Authority in charge of a County.

**“Disposal site”** means any area licensed by the Authority for disposal of Asbestos waste.

**“Employee”** means a person who works under contract or employment and related expressions shall be construed accordingly.

**“Contractor”** means any person or firm engaged in handling, removal and disposal of asbestos.

**“Safe management”** means the handling of asbestos materials in a manner that minimizes risk of exposure.

**“Asbestos material”** means any material that contains asbestos.

**“Waste generator”** means any person carrying out activities that generate asbestos waste.

**“Encapsulation”** means a process in which a material containing asbestos is treated with a product that covers the material and prevents the fibres from being released.

**“Friable materials”** means materials that, when dry, can be easily crumbled or powdered by hand when disturbed

**“Asbestos-containing materials”** means any manufactured articles or other materials that contain 1 % or more asbestos by weight at the time of manufacture.

## FOREWORD

The Government of Kenya is committed to ensuring a clean and healthy environment for its citizenry. The constitution of Kenya espouses the tenets, duties and responsibilities of the state and its institutions to eradicate all forms of environmental degradation to promote sustainable development. As Kenya develops towards achieving Vision 2030 its imperative that all forms of development and waste associated with it is managed in a responsible manner.

The development of Guidelines on Safe Management and Disposal of Asbestos has been necessitated by the need to safeguard human health and environment from adverse impacts related to asbestos materials. According to the Legal Notice No. 121 of the Environmental Management and Coordination (Waste Management) Regulations, 2006, wastes containing asbestos in the form of dust or fibres are classified as hazardous wastes. In addition, the Legal Notice requires that hazardous waste be disposed off in a specific manner as approved by the National Environment Management Authority (NEMA). Due to the risks associated with Asbestos fibre or dust, there the need to give clear guidelines on the safe handling management and disposal of Asbestos material.

In the 1960s and 1970s, Asbestos was a material of choice in the construction industry. A number of facilities including food manufacturing industries as well as residential homes used asbestos roofing material due to its durability and fire resistance characteristics. These roofing materials have deteriorated over time requiring their replacement with more environmentally safe materials necessitating their removal and disposal. Due to the lack of appropriate and licensed disposal facilities and the increased demand for the safe disposal, NEMA as the principal environmental regulator found it prudent to inform the public and manage Asbestos material by formulating operational guidelines. This process has been through a multi-sectoral as well as interdisciplinary approach.

I recognize the effort that NEMA has put in formulating necessary regulations and guidelines to serve the interest of the citizens of Kenya to ensure better management of the environment.

**Hon. Amb. Chirau Ali Mwakwere, EGH, FCILT, MP**  
**Minister for Environment and Mineral Resources**

## **PREFACE**

This guideline is one of the tools for environmental management in Kenya under the Environmental Management and Coordination Act (EMCA), 1999 and the Environmental Management and Coordination (Waste Management) Regulations, 2006.

The guideline is aimed at a broad readership, which will include government agencies (who are responsible for decision making, formulating policies, and enforcing health and safety aspects on asbestos management in the country), manufacturers and assemblers of asbestos materials, garage operators, contractors and all institutions that have asbestos material in their premises and other interested stakeholders.

This guideline provides direction for safe management of Asbestos waste and shall be the main regulatory reference material for Asbestos waste in Kenya. The document has been designed to apply common approaches on safe handling, packaging, transportation and final disposal of asbestos waste. The guideline will be reviewed from time to time as deemed necessary.

**Mr. Ali D. Mohamed, CBS**  
**Permanent Secretary**  
**Ministry of Environment and Mineral Resources**

## **ACKNOWLEDGEMENT**

The Asbestos Guidelines have been produced through consultative and collective efforts of NEMA and the relevant lead agencies namely; Ministry of Public Health and Sanitation, Directorate of Occupational Safety and Health Services and City Council of Nairobi.

NEMA profoundly acknowledges the noble role played by NEMA Board of Management by providing the necessary resources and conducive environment which cannot be gainsaid to have tremendously contributed to the finalization of this document.

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## CHAPTER 1



### INTRODUCTION

#### *1.1 Background Information on Asbestos*

Asbestos is a group of six fibrous minerals that occur naturally in metamorphic deposits located around the world. Of the hydrous magnesium silicate variety, the six types include tremolite, actinolite, anthophyllite, chrysotile, amosite and crocidolite. The major producers of asbestos include Canada, Kazharkstan, Ukraine, Russia, India, South Africa and Zimbabwe. Asbestos used to be mined in Kenya in the past but was stopped.

Asbestos is a chemically inert mineral that is fire resistant and does not conduct heat or electricity thus making it a commonly used insulator. It has high tensile strength, insoluble and odourless. Due to these properties, asbestos has been used in a wide range of manufactured goods, including roofing materials, ceiling and floor tiles, paper and cement products, textiles, coatings and friction products such as automobile clutch, brake, transmission parts and sewer pipes. When used due to its resistance to fire or heat, it is woven into fabrics or mats while when used for building material such as roofing sheets, it is often mixed with cement.

Asbestos is a hazardous material with extremely fine fibres and can remain suspended in air for hours. If handled without caution, it may cause serious chronic health problems such as asbestosis, lung cancer and mesothelioma. The diseases cause long term serious social, economic and emotional problems.

When left intact and undisturbed, asbestos materials do not pose a health risk. It becomes a problem when, due to damage, disturbance, or deterioration over time, the material releases fibres into the air. Exposure to air containing the fibres increases the risk of inhaling the fibres and developing the associated diseases.

There is increased removal and disposal of asbestos roofing materials due to global awareness of its negative health effects, deterioration of asbestos sheets over time and increased drive

towards roof water harvesting. The removal and disposal of asbestos has not been done in accordance with any guideline. In order to increase awareness and to reduce or eliminate the risk of exposure to asbestos fibres and the risk of disease, a consistent approach to management of asbestos especially handling, demolitions, renovations and repairs is therefore required.

The Authority in consultation with relevant lead agencies namely the Ministry of Public Health and Sanitation (MoPHS), Directorate of Occupational Safety and Health Services (DOSHS) and City Council of Nairobi (CCN) developed these guidelines.

## **1.2 Objectives**

The main objective of these guidelines is to protect the environment and minimise risk to workers and public from asbestos fibers.

Specific objectives of the guidelines are;

1. To ensure environmentally sound disposal of asbestos
2. To provide assistance compliance with Environmental Management and Coordination (EMC) Waste Management Regulations, 2006
3. To ensure safe removal, handling, packaging and transportation of asbestos.
4. To create and raise awareness on hazards of asbestos.

## **1.3 Scope**

These guidelines will apply to all persons or firms operating in facilities and premises in which asbestos materials may be handled during installation, demolition, renovation, repair or removal for disposal.

## **1.4 Regulatory and Institutional Framework**

### **1.4.1 Regulatory Framework**

#### ***Environmental Management and Coordination Act, 1999 section 91 (1-7)***

The EMCA, 1999 requires the Authority to categorize hazardous wastes on the recommendation of Standards Enforcement and Review Committee (SERC) and to issue guidelines and regulations for the management of each category of hazardous wastes. The categorization has been done under the EMC (Waste Management) Regulations, 2006, while these guidelines provide for safe management of asbestos and its wastes.

#### ***Environmental Management and Coordination (Waste Management) Regulations, 2006.***

Asbestos has been classified as hazardous waste under the Waste Management Regulations, 2006

- 1) Every person who generates toxic or hazardous waste shall treat or cause to be treated such hazardous waste using the classes of incinerators prescribed in the Third Schedule to these Regulations or any other appropriate technology approved by the Authority.
- 2) Any leachate or other by-products of such treated waste shall be disposed of or treated in accordance with the conditions laid down in the license or in

accordance with guidelines issued by the Authority in consultation with the relevant lead agency.

- 3) In issuing a licence for the disposal of waste, the Authority shall clearly indicate the disposal operation permitted and identified for the particular waste

### *Public Health Act Cap 242 Sections 11-13 –*

An act of parliament to make provision for securing and maintaining health. Section 13 states that it shall be the duty of every health authority to take all lawful, necessary and under its circumstances reasonably practicable measures for preventing the occurrence or dealing with any outbreak, or prevalence of any infections, communicable or preventable diseases or conditions to safeguard and promote the public health and to exercise the powers and perform the duties in respect of the public health conferred or imposed on it by this act or by any other law.

The Public Health Act Cap 247, Section 3 gives provisions for use of poisonous substances. It refers to regulations for protection of persons against risk of poisoning, imposing restrictions or conditions on the importation, sale, disposal, storage, transportation or use of poisonous substances. This Act also requires persons concerned with importation, sale, disposal storage, transportation or use of poisonous substances to be registered and licensed and provides measures for detecting and investigating cases in which poisoning has occurred.

The Public Health Act Sec 126 A, empowers municipal councils, urban and area councils to make by laws for all or any of the following matters with regards to buildings for -

- controlling the construction of buildings and the materials to be used in the construction of buildings;
- Preventing the occupation of a new or altered building until a certificate of the fitness thereof for occupation or habitation has been issued by such local authority.
- To compel owners to repair order to demolish unsafe, dangerous or dilapidated buildings.

The Act further gives the municipal Urban or area councils power to require removal or alteration of work in certain cases the local authority may by notice to the owner either require him to pull down or remove the work, or if he so elects to comply with any other requirements.

### *The Occupational Safety and Health Act, No. 15 of 2007*

The purpose of the **Occupational Safety and Health Act (OSHA)** is to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces and to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

Though not explicitly provided, the act and the rules made there under have various sections on hazardous materials that apply to Asbestos.

The OSHA stipulates that an employer shall not require or permit his employee to engage in the manual handling or transportation of a load which by reason of its nature is likely to cause the employee to suffer bodily injury.

It also states that any person supplying, distributing, conveying or holding in chemicals or other toxic substances shall ensure that they are packaged, conveyed, handled and distributed in a safe manner so as not to cause any ill effect to any person or the immediate environment.

#### *The Factories and Other Places of Work (Hazardous Substances) Rules, 2007*

Asbestos has been listed as a hazardous substance and its threshold limit values given, therefore these rules apply to all workplaces where asbestos is present.

#### *The Factories (Building, Operations and Work of Engineering Construction) Rules, Legal Notice No. 40 of 1984*

The Factories (Building, Operations and Work of Engineering Construction) Rules, Legal Notice No 40 of 1984, rules 20 and 21 prohibit any inhalation of dust and fumes. In any building operation or work of engineering construction where dust or fumes likely to be injurious to the health of persons employed are given off, all reasonably practicable measures shall be taken to prevent the inhalation of dust or fumes by the person employed by ensuring adequate ventilation or providing suitable respirators at the place where the operation or work is carried on.

#### *The Local Government Act, Chapter 265*

**Section 160 (a)** of The Local Government Act, Chapter 265 empowers every municipal council, town council and every urban council to establish and maintain sanitary services for the removal and destruction of, or otherwise dealing with, all kinds of refuse and effluent and, where any such service is established, to compel the use of such service by persons to whom the service is available.

**Section 201(1) – (4)** expands the jurisdiction of local authority to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of the health, safety and well-being of the inhabitants of its area or any part thereof and for the good rule and government of such area or any part thereof and for the prevention and suppression of nuisances. The by-laws so made may control, regulate, prevent, prohibit or compel certain activities to be undertaken and prescribe offences in case of contraventions.

### **1.4.2 Institutional Framework**

#### *National Environment Management Authority*

The Authority is established to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. Its mandate includes implementation of Legal Notice no. 121 on Environmental Management and Coordination (Waste Management) Regulations, 2006 which stipulates the disposal of Hazardous waste such as asbestos.

#### *Local Authorities*

The ministry of local government is charged with the responsibility of providing guidance, supervisory and monitoring services of local authorities in matters of infrastructure development and service delivery including solid waste.

#### *Directorate of Occupational Safety and Health Services*

The department is mandated to implement all rules pertaining to the protection and prevention of workers from occupational hazards and ensure safe working environment. The Directorate implements the OSHA, 2007 and various rules made there under.

*Ministry of Public Health and Sanitation*

The mandate of MoPHS is to support the attainment of the health goals of the people of Kenya by implementing priority interventions in public health, guided by the strategic framework provided from the medium-term Plan 2008-2012 and the wider health sector.

The ministry is involved in prevention of communicable and non-communicable diseases, health promotions, and curative services at all levels.

The department of environmental health and sanitation aims to reduce disease burden arising from environmental pollution, by preventing disease transmission from general environmental health pollutants.

## CHAPTER 2

### EXPOSURE AND EFFECTS OF ASBESTOS



#### 2.1 Types Of Asbestos

Asbestos is a group of six fibrous minerals that occur naturally in metamorphic deposits located around the world. Of the hydrous magnesium silicate variety, the six types include tremolite, actinolite, anthophyllite, chrysotile,amosite and crocidolite (see Annex 1).

#### 2.2 Uses of Asbestos

Asbestos fibres are incredibly strong and have properties that make them resistant to heat. Many products are in use today that contain asbestos. Most of these materials are used in buildings as roofing, sound proofing, ceilings and tiles; as insulation materials in boilers, steam pipes, water heaters, brake linings, clutch plate, bonnet lining; and in protective gears as fire resistant blankets, jackets and gloves.



### 2.3 People at risk

Historically, asbestos exposure has been of greatest concern to those involved in mining and milling of the raw material, people in the construction trades, and workers engaged manufacturing or using products containing asbestos.

Secondary exposure occurs when people who do not work directly with asbestos are inadvertently exposed to fibres as a result of sharing workspaces where others handle asbestos.

In addition to people who work with asbestos either directly or indirectly, workers' families and other household contacts are also at risk from asbestos workers who go home covered in asbestos dust; family and household members are then exposed via inhalation of the dust from workers' skin, hair, and clothing, and during laundering of contaminated work clothes.

Asbestos is released into the air and soil around facilities such as refineries, power plants, factories, shipyards, steel mills, vermiculite mines, and building demolitions. People living around these sites are also exposed to asbestos

Other groups at risk of developing an asbestos-related disease are the people who are involved in rescue, recovery, and cleanup of disaster sites where construction materials used contain asbestos.



### 2.4 Sources of Exposure

Currently, the people most heavily exposed to asbestos are those in construction trades, and most occupational exposures occur during repair, renovation, removal or maintenance of asbestos that was installed years ago.

#### 2.4.1 Installation and Repair

As brake pads and linings with asbestos material wear down, asbestos is exposed and fibres are released into the air. The dust can also gather on other brake parts. Mechanics often blow dust away with an air hose or by mouth, oblivious of the inherent dangers. It is impossible to tell whether or not a car has asbestos-containing brake pads merely by looking at it, mechanics should always exercise caution when working on a car's brake system by wearing a respirator or other protective mask.



Technicians involved in either installation or repair works of materials containing asbestos such as buildings and boilers should always observe the precautions.

### **2.4.2 Manufacturing**

The ore contains only about 10% asbestos, which must be carefully separated from the rock to avoid fracturing the very thin fibres. The most common method of separation is called dry milling. In this method, the primary separation is done in a series of crushing and vacuum aspirating operations in which the asbestos fibres are literally sucked out of the ore.

Manufacturing processes involve mixing asbestos materials with cement, ceramics e.t.c. during which dust is likely to be generated. Machining and cutting activities during manufacturing will generate substantial dust that will cause exposure of asbestos dust to the workers and people nearby. In Kenyan situation, however, only machining and cutting processes take place.

### **2.4.3 Removal and Disposal Operations**

During the removal operations there are bound to be breakages that will generate dust therefore inhalation will occur.

### **2.4.4 Environment**

Due to the fibrous nature of the asbestos, airborne dust is likely to be present in the environment close to the premises where asbestos is handled. All people within that vicinity are likely to be exposed to the dust in the air.

### **2.4.5 Mining**

The asbestos ore deposits are loosened from the surrounding rock by careful drilling and blasting with explosives. The resulting rocky debris is loaded into large rubber-tired haul trucks and brought out of the mine. Some operations use an excavation technique called block caving, in which a section of the ore deposit is under-cut until it crumbles under its own weight and slides down a chute into the waiting haul trucks. During the process, asbestos dust will be generated, hence exposing the workers and people nearby. However, mining is not a major source of exposure in Kenya since it was stopped.

## ***2.5 Effects of Asbestos Exposure***

### **2.5.1 Health Effects**

Fibres embedded in lung tissue over time may cause serious lung diseases including asbestosis, lung cancer or mesothelioma. Smoking increases the risk of developing illness from asbestos exposure. Disease symptoms may take several years to develop following exposure.

The major health effects associated with asbestos exposure includes:

- **Asbestosis** -- Asbestosis is a serious, progressive, long-term non-cancer disease of the lungs. Symptoms of asbestosis include shortness of breath and a dry, crackling sound in the lungs while inhaling. There is no effective treatment for asbestosis.

- **Lung Cancer** -- People who work in the mining, milling, manufacturing of asbestos, and those who use asbestos and its products are more likely to develop lung cancer than the general population. The most common symptoms of lung cancer are coughing and a change in breathing. Other symptoms include shortness of breath, persistent chest pains, hoarseness, and anaemia.
- **Mesothelioma** --this is a rare form of cancer that is found in the lung, chest, abdomen, and heart and almost all cases are linked to exposure to asbestos. This disease may not show up until many years after asbestos exposure.

### **2.5.2 Socio-Economic Effects**

Asbestos is considered as one of the biggest occupational health risk faced by workers, and the related diseases are reaching epidemic proportions in many parts of the world. Studies carried out in Canada, Australia and the UK indicate that death continues to be one of the worst consequences of asbestos exposure which is the most common cause of asbestos related diseases in the workplace. Death due to asbestos may be as high as 100,000, assuming that the world labor force is about 2.7 billion (Takala, 2002). Experts suggest that the number of deaths from asbestos related diseases will rise in future.

The social and emotional impacts of people affected by asbestos disease and associated issues were demonstrated by Walker and LaMontagne in 2004. Workers' and community members' knowledge and awareness about asbestos grew as a result of increased deaths, fear of living with risk of the past exposure and experience with medical professionals. Living with asbestos related disease has been identified as capable of affecting identity by the conversion from being a healthy and independent person to being physically limited and reliant on family and others, this leads to feelings of anger, frustration, fear and uncertainty (Walker and LaMontagne (2004).

The economic impacts in terms of medical costs, legal costs and scientific investigations are enormous. In short, asbestos disease is a serious public health worldwide whose impacts are only starting to emerge after 100 years of misuse and therefore deserve commensurate public health response. The primary strategy to address this problem is prevention, with worldwide elimination of asbestos use and replacement of asbestos by safe substitutes (Tushar K.J. et al., 2003).

## CHAPTER 3

### PRE –REMOVAL AND PRE- DISPOSAL ACTIVITIES

This chapter covers the activities to be undertaken before the removal and disposal of the asbestos.

#### 3.1 Precautionary Measures

In view of the adverse health effects posed by exposure to asbestos fibres, the Guidelines highlights the precautions necessary to reduce or mitigate risks of exposure. It is therefore necessary that the facility owners undertake the following;

- 1) Keep an updated inventory of all asbestos containing materials in the work place;
- 2) Notify the Authority by filling in the notification form (ANNEX 2);
- 3) Ensure that all asbestos containing materials are clearly marked and visible;
- 4) Develop safe work procedures including the correct use of personal protective equipment (PPE) for workers who may work near asbestos containing materials(ANNEX 3);
- 5) Instruct all workers who would be exposed in all aspects of the asbestos management;
- 6) Prepare written work procedures specific to each job site and make them available to all workers;
- 7) Ensure that work is carried out under the supervision of experienced and qualified personnel;
- 8) Keep accurate and complete records regarding asbestos management;
- 9) Conduct a risk assessment of the potential for exposure to any of the asbestos containing materials;

#### 3.2 Risk Assessment Requirements

A risk assessment must be conducted prior to the disturbance, repair or removal of asbestos containing materials to determine which action is to be taken. The purpose is to identify the location and gauge the condition of the material prior to the work, as well as any other potential hazards that might affect the workers.

Risk assessment report should include but not limited :

- a) Type of asbestos present and the percentage
- b) Friability of the material
- c) Condition of the material (good, poor etc)
- d) Potential for occupant exposure
- e) Other potential hazards present (biological, chemical, electrical, confined spaces, heat, cold etc)
- f) Risk rating or classification and rationale
- g) Personal protective equipment to be used

- h) How the work area will be isolated from any occupants
- i) Person completing the risk assessment, signature, date and phone number.

The Risk Assessment should only be conducted by a qualified person such as officers serving as Safety, Health and Environment Managers, Property Managers or a consultant.

In any building which is being altered or renovated, materials that have the potential for releasing asbestos fibres can either be removed, enclosed or encapsulated which includes coating or painting.

### **3.3 Environmental Impact Assessment (EIA)**

- a) The asbestos waste generator should ensure that a disposal site is identified and an EIA is done for removal, handling and disposal of asbestos before commencing the work process
- b) The findings of the risk assessment must be included in the EIA report submitted to the authority.
- c) The EIA shall specify safe conditions for removal, handling and disposal of asbestos
- d) A hydrogeological report must be done to inform on the best siting of the disposal site and be included in the EIA report
- e) The EIA should be carried out by experts who are registered by NEMA.
- f) The EIA report should be submitted to NEMA for processing.
- g) The removal, handling and disposal of asbestos shall not commence until an EIA licence is issued.

### **3.4 Notification**

- When asbestos waste is to be generated or removed from a site, parties that may be affected shall be notified the time and nature of work to be done.
- The parties to be affected must be given at least seven (7) days notice of the intention to remove and dispose asbestos by the waste generator
- The staff, neighbors and any other person who might be at risk within the premises shall also be notified to prevent their exposure. (annex 2)

## CHAPTER 4

### HANDLING

This chapter outlines the steps necessary for the employer to ensure, as far as is practicable, the prevention of contamination by asbestos from any workplace; to ensure that asbestos-containing materials are stored, labelled and disposed of appropriately.

#### 4.1 Removal

The waste generator shall ensure that the following precautions are observed when removing asbestos materials from buildings or other structures:

- Secure the site to prevent unauthorized persons and to restrict movement
- Wet the asbestos sheets before removal. If asbestos sheets should begin to crack or crumble, immediately wet the cracked or broken areas with the pintsize spray bottle or garden pump sprayer. **NB. Breakage releases asbestos fibres.**
- Remove pieces of asbestos sheets by pulling any fasteners (nails, screws, rivets) or cutting fastener heads so as to minimize breakage. If necessary, carefully lift asbestos sheets with pry tools to expose the fasteners' heads.
- Do not slide asbestos sheet over each other.
- Carefully lower removed asbestos sheets to the ground. **Do not throw or drop it.**
- Care should be taken not to stand or sit on the asbestos sheets to avoid breakage.
- The workers removing the asbestos must have the appropriate Personal protective equipment which must be removed as they enter the shower room immediately after removal of the asbestos.

#### 4.2 Temporary Storage,

If the asbestos must be stored before disposal they must be stored in such a way that its containers are secure from accidental or deliberate damage, access by staff and the general public.

- Temporary storage refers to the time between removal and final disposal of asbestos waste. The duration for temporary storage of asbestos waste should not exceed thirty (30) days from the time of removal.
- The temporary site should be within the premises where the asbestos are being removed.
- The removed bulky asbestos, such as roofing sheets, beams, joists, and studs, should be stacked and wrapped, into stacks which can be easily loaded into the transportation vessel, in a plastic sheet of a minimum of 500 gauge double wrapped and secured with tape and labeled
- Any debris (broken pieces) should be collected in a sealed polythene woven bag or any other air tight container. The bags should then be wrapped, into stacks which can be easily loaded into the transportation vessel, in a polythene sheet awaiting final disposal.

- The bags should be considered full when half full and should be tightly sealed or when filled up to a level where the open neck can be twisted tightly, folded over into a "gooseneck," and the ends sealed to the side of the bag with heavy plastic tape such as duct tape.
- Care should be taken to ensure that sharp pieces do not puncher the bags/ wrappers
- Removed asbestos sheets should not be allowed to lie about the site where they may be further broken or crashed by machinery or site traffic.
- The storage area must have restricted entrance and locked or secured on a 24 hour basis.
- Warning label ("**Asbestos hazard area, keep out**") and danger sign should be affixed to each wrapped stack or storage area using English, Swahili and Local language.

### **4.3 Handling of Asbestos materials in garages**

This section applies to activities involving relining of brake and clutch assemblies, motor vehicle repair and maintenance and commercial garages and service stations.

1. Wherever possible, brake and clutch parts that do not contain asbestos fibre should be used.
2. Where products containing asbestos are being handled, the number of people in the area should be kept to the lowest possible figure.
3. Workshops should be isolated from other occupied parts of the building or areas that the public have access to.
4. Under no circumstances should compressed air or drybrushing be used for cleaning purposes.

#### **4.3.1 Servicing of brakes and clutches in garages or workshops**

Airborne asbestos fibre is most likely to be produced when parts are worked on by cutting or machining. The dust that accumulates during usage also contains asbestos and handling or cleaning such parts will produce airborne asbestos fibre.

1. If the brake or clutch parts are to be sent out for specialist servicing, they should be sealed in a bag to prevent the release of asbestos fibres.
2. When products are machined, the employer should ensure that the release of dust into the work environment is reduced to the lowest practicable level.
3. An effective dust-extraction system with appropriate treatment to prevent air pollution must be fitted to all equipment that is used to cut, grind or otherwise machine the asbestos materials.
4. Mechanics should always exercise caution when working on a car's brake system by wearing a respirator or other protective mask.
5. Provide air tight containers for storage of the removed parts awaiting disposal.
6. All the waste containing asbestos generated should be disposed of as stipulated in these guidelines.

## CHAPTER 5

### TRANSPORTATION AND DISPOSAL

This chapter deals with preparation for transportation, transportation and the actual disposal of Asbestos waste.

#### 5.1 Preparation for Transportation

Material containing asbestos or contaminated with asbestos must be viewed as hazardous and packaged to keep fibres from getting into the air. Containers used for packaging may be hard or flexible and must seal airtight. The following are some of the precautions that should be observed in the packaging.

- a) The waste transporting vessel must be lined with a 500 gauge double wrapped plastic sheet with every seam sealed with a tape and covered.
- b) The transportation vessel should be labeled "**Danger - Contains Asbestos Fibres. Cancers and Lung Disease Hazard**" and contain the following information: (i) the identity of the hazardous waste. (ii) the name, physical address and telephone contact of the generator of waste
- c) The bags and stacks should be gently loaded into transportation vessel.
- d) The goosenecks should not be used as handles for carrying the bags, because that might unseal the ends or tear the bags. Tossing the bags into a waste transporting vessel must be avoided because of the risk of rupture.
- e) The asbestos waste should be transported to a prepared disposal site that is authorized by NEMA.

#### 5.2 Transportation

- a) The vehicle transporting the asbestos waste should be licensed as per the EMC (Waste Management) Regulations 2006 and must be accompanied by a tracking document (Annex 4)
- b) The waste shall be transported to the disposal site in an enclosed vehicle or container, capable of being washed without lodgment of debris and fibres, and secure from escape of fibres to the atmosphere.
- c) The contractor should ensure that all persons involved in handling and disposal of asbestos are trained in emergency operating procedures. These procedures shall include how the waste is to be handled, services to be contacted during such an exposure, and additional personal protective equipments. (Annex 5)

#### 5.3 Disposal Site

Disposal of asbestos must be at a site;

- Designated by the local authorities and licenced by NEMA;
- Privately owned disposal facility licenced by NEMA;
- Designated by the waste generator (on-site disposal).

Where a designated site by the local authorities or privately owned facility does not exist the waste generator shall identify an appropriate site, undertake an EIA and be duly licensed.

The Disposal site should be as per specifications in the EIA report. However the following minimum conditions must be observed:

- i. The optimal distance of the disposal pit shall be as far as practicable from the nearest human settlement and as it shall be determined by the Ministry of Public Health and Sanitation.
- ii. A lined pit that does not reach the water table or according to other standards that may be approved by NEMA.
- iii. Disposed material to be one metre below ground level.
- iv. Disposal site should be fenced off appropriately and the gate locked.

#### 5.4 Disposal Operation

The waste generator shall ensure that the following precautions are observed when disposing asbestos wastes:

- i. The waste generator shall notify the Authority on commencement of disposal activities. (Annex 3)
- ii. Asbestos materials **must not** be reused or offered for sale.
- iii. All asbestos sheets and the debris should be wrapped before it is hauled to the disposal site or transfer station in a covered vehicle.
- iv. Asbestos waste must be disposed of at approved disposal sites only.
- v. The depth of the disposal pit shall be as deep as practically possible to accommodate more asbestos waste but at least one (1) metre above water table.
- vi. The asbestos should be lowered gently into the disposal site and should not be dropped from any height to avoid breakage.
- vii. When all available asbestos has been lowered into the pit, cover with polythene paper followed by 6 inch layer of soil. Continue doing this until the pit is full or the waste is finished.
- viii. The pit shall be considered full when the asbestos waste is **one meter** below the ground level or the asbestos waste is exhausted.
- ix. After the pit is full, cover with 500 gauges double wrapped polythene sheet and fill the pit with layer of soil up to the ground level.
- x. Disposal site should be completely fenced off with at least chain link and a lockable gate which shall be locked at all times. The fence should be at least one (1) metre from the edge of the pit.
- xi. Warning notices stating “**Asbestos hazard area, keep out**” shall be placed at the disposal site. These signs, with lettering of minimum 150mm in height, are to be placed so that they are clearly visible.

#### 5.5 Post - Disposal

1. All transportation vessels, re-useable containers or any other similar article which have been in contact with asbestos waste shall be cleaned at the disposal site.
2. The disposal site should be maintained including the warning signs, the fence, the gate among others to prevent vandalism and interference.

3. Human activities which might interfere with the buried asbestos waste such as construction and pitting should not be allowed at the disposal site.
4. The waste generator shall notify the Authority in writing on completion of disposal of asbestos waste.



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## ANNEX 1

### Types of Asbestos

Asbestos is a group of six fibrous minerals that occur naturally in metamorphic deposits located around the world. Of the hydrous magnesium silicate variety, the six types include tremolite asbestos, actinolite asbestos, anthophyllite asbestos, chrysotile asbestos, amosite asbestos and crocidolite asbestos. Asbestos is a chemically inert mineral that is fire resistant and does not conduct heat or electricity (making it a commonly used insulator), is insoluble and is without odor. Asbestos' combination of properties made it a valuable resource, regularly used in buildings, automobiles, shipyards and a variety of household products.

#### *Tremolite Asbestos*



Plate 1: Tremolite

Tremolite asbestos was not often used industrially or commercially; though it could be found (uncommonly) in products such as certain talcum powders in limited amounts.

#### *Actinolite Asbestos*



Plate 2: Actinolite

Actinolite asbestos was not often used industrially or commercially. Airborne actinolite fibres are easily inhaled and severely damaging to the lungs.

#### *Anthophyllite Asbestos*



Plate 3: Anthophyllite

Like tremolite and actinolite, anthophyllite was not often used industrially or commercially; though it could occasionally be found in certain vermiculites.

#### *Chrysotile Asbestos*



Plate 4: Chrysotile

Also called white asbestos, chrysotile asbestos is unique in that it has a serpentine fiber-formation (curled fibres) compared to the amphibole fiber-formation (straight, needle-like fibres) of the other five asbestos types. Chrysotile asbestos is less friable (less-likely to be inhaled) than other types of asbestos. Chrysotile asbestos is less likely to be

inhaled and therefore viewed by many to be the safest of the asbestos types.

### *Amosite Asbestos*



Plate 5: Amosite

Also called Grunerite or brown asbestos, amosite asbestos is an amphibole originating in Africa. Amosite was used industrially for various purposes such as cement sheet and pipe insulation.



Plate 6: Crocidolite

Also called blue asbestos, crocidolite asbestos is an amphibole mineral that can be found in Africa and Australia. On the opposite end of the spectrum than chrysotile asbestos, crocidolite is viewed to be the most dangerous type of asbestos.

### *Crocidolite Asbestos*

## ANNEX 2

### ASBESTOS MATERIALS NOTIFICATION FORM

#### ASBESTOS MATERIALS NOTIFICATION FORM

*(To be filled in triplicate)*

##### 1. GENERAL INFORMATION

a) Name of the Person/Organization

\_\_\_\_\_

b) Contact Person

\_\_\_\_\_

c) Postal Address

\_\_\_\_\_

d) Physical Address

\_\_\_\_\_

e) Telephone contact (Landline and Mobile)

\_\_\_\_\_

f) Email address

\_\_\_\_\_

g) ID Number

\_\_\_\_\_

h) PIN NO.

\_\_\_\_\_

##### 2: PARTICULARS OF ASBESTOS MATERIAL/WASTE

a) Present use of asbestos (roofing, boilers, brake pads etc)

\_\_\_\_\_

b) Quantity of asbestos in possession (Kg./number)

\_\_\_\_\_

c) Status of the asbestos (friable, intact, broken, removed and how it is stored)

\_\_\_\_\_

d) Quantity intended for disposal (Kg./ number)

\_\_\_\_\_

d) Site Location (*Latitude and Longitude should be given to five decimal places*)

GPS Coordinates – Geographic WGS84, Latitude \_\_\_\_\_ Longitude

\_\_\_\_\_

LR No. \_\_\_\_\_

e) Village/Town

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f) Sub Location

---

g) Location

---

h) Division

---

i) District/County

---

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Official Stamp:

## ANNEX 3

### PERSONAL PROTECTIVE EQUIPMENTS

Personal Protective Equipment (PPE) refers to clothing and respiratory apparatus designed to shield or protect individuals from chemical, physical or biological hazards. PPE assists in providing preventive measures when used correctly. All PPE must be suitable for the person using it and provide effective protection for its intended purpose

The following are some of the protective equipment that can be used:

- Respirators - half-face, dual-cartridge respirators, each equipped with a pair of High Efficiency Particulate Air filters (HEPA).
- Coveralls – should be with built-in booties and disposed off properly in sealed asbestos disposal bags after use.
- Rubber boots - These are highly recommended so that coverall booties do not wear through. Rubber boots can be washed off later or disposed of as contaminate debris.
- Eye protection - Each person removing asbestos materials should wear non-fogging goggles or safety glasses.



should be worn with each re-entry.

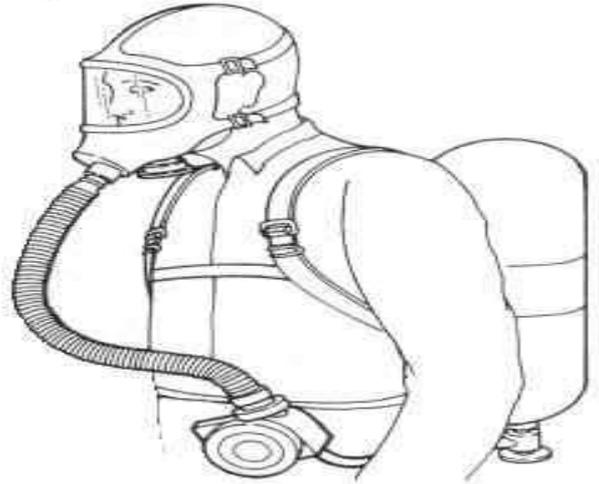


**A dust-mask respirator**

**A half-face cartridge respirator**



**A self-contained breathing apparatus (SCBA)**



Coveralls



ANNEX 4

TRACKING DOCUMENT

**FORM III**  
 (To be completed in Five Copies)  
**TRACKING DOCUMENT**  
 (Regulation 8)

<b>A</b> Transporter	<b>Serial No.</b> Registered Name of Transporter..... Usual Municipality/District of operation..... License number ..... Issuing Authority .....
<b>CONSIGNMENT NOTE FOR THE CARRIAGE AND DISPOSAL OF SOLID WASTE</b>	
<b>B</b> Description of the waste	Area collected/facility/ person ..... Type of Waste..... Description and physical nature of waste..... Quantity/size of waste ..... Number of containers.....
<b>C</b> Disposer's Certificate	I certify that I have received the waste as described in A and B above.. The waste was delivered in vehicle _____ (Registration No.) at _____ (time) on _____ (date) and the carrier gave his/her name as _____ on behalf of _____. The waste shall be disposed off as per disposal licence issued by the Authority. Signed: _____ Name: _____ Position: _____ Date: _____ On behalf of: _____

## ANNEX 5

### EMERGENCY OPERATING PROCEDURES FOR ASBESTOS -INCIDENTS

- The contactor must have written emergency procedures with details on the collection and handling of contaminated materials in such a situation.
- Contractors must give clear instructions, provisions and the means to adequately decontaminate or clean up themselves and the injured workers(s) before leaving the work site.
- Injured workers who have not been decontaminated must be covered in such away as to minimize contamination of clean areas.
- The cover should not hinder access to the worker(s) by first aid or ambulance personnel
- An employee familiar with the handling and disposal of asbestos contaminated clothing should accompany the injured worker(s) to the hospital. In case the worker is still contaminated upon arrival at the hospital, the employee must inform the hospital staff of this and instruct them on appropriate disposal of contaminated clothing.

#### Emergency Operating Procedures during Transportation

- Notify the police, fire brigade and NEMA immediately.
- Erect warning signs to road users
- Keep the public away from the area
- Secure the area

