

GENERAL STRATEGY FOR RISK REDUCTION

LINKED TO ASBESTOS CEMENT

1. Situation Analysis

1.1. Impact of the Cyclone IDAI

Tropical Cyclone IDAI made landfall near Beira city, Sofala province, on the night of 14th to 15th of March. Strong winds (180 – 220 km) resulted in heavy damage to buildings in the area, in particular destruction of roofs. Available damage assessment indicates that around 70% of buildings¹ were damaged in the city of Beira, including public buildings, schools, hospitals, industries and warehouses, as well as private properties. In the provinces of Sofala and Manica, the total number of houses totally or partially destroyed raises to 240,000².

Concerns were raised early in the response about the possible presence of Asbestos-Containing Materials among damaged roofing and debris (fibre cement) by Humanitarian Actor, Government and Local Authorities.



Figure 1 – Damaged fibre cement roofing in Publics and Commercial buildings in Beira city

Fibre cement material was produced in a local factory (“Lusalite”) located in Dondo city (30 km from the Beira City). Information from current owner of the factory indicate that the products are asbestos-free only since 2008³, so it can be assumed that most fibre cement products used until that date will probably contain asbestos.

Information from National Statistics Institute (see table 1 below) indicate that high percentages of “Lusalite” roofing for housing can be found in Beira (19,6 %) and Dondo

¹ Source: Beira Municipal recovery and Resilience plan

² Source: PDNA

³ It is confirmed on the Mozalite website (source: <https://mozalite.net/a-mozalite/>)

(18,1%), while percentages are much lower in Districts of Nhamatanda and in Manica province. The percentage of fibre cement roofing in public buildings (schools, hospital, etc.) and commercial/industrial building may be significantly higher.

Table 1 - Number and percentage of houses with "Lusalite" roofing in affected areas (Source: INE)

Location	Percentage of houses with lusalite roofing	Number of houses with lusalite roofing
BEIRA (2013)	19,6%	18 609
BUZI (2013)	1,6%	522
DONDO (2013)	18,1%	5 574
NHAMATANDA (2013)	1,4%	590
TOTAL SOFALA PROVINCE	8,1%	27 463
SUSSUNDENGA (2011)	2,4%	595
MANICA PROVINCE	4,9%	13 950

1.2. Field assessment

Field assessments were conducted in the cities of Beira and Dondo, as well in Buzi. The visit confirmed the large number of public, commercial/industrial buildings, as well as houses had damaged fibre cement roofing.

Apart from this suspected asbestos cement material, no other types of asbestos containing material were observed.



Figure 2 – Asbestos cement debris among rubbles in Buzi rural hospital (left) and in Beira city (right)

It was also possible to observe, as clearance activities started right after the cyclone, piles of asbestos-cement roofing debris along the roads and in the affected communities. On visits to the main Beira dumpsite (Munhava) and the emergency disposal site "Ceramica", fibre cement debris could also be observed mixed within the normal waste stream.

Evidence of crushing of damaged roofing sheet and re-use for filling of potholes and landfilling in affected neighbourhoods could also be observed.

Samples of debris were taken for further analysis⁴ in different locations in Beira city, including piles of rubble, disposal sites, and new fibre cement material. The results of laboratory analysis (see Annex 4) confirmed the presence of asbestos in fibre cement material found within the rubbles from the cyclone, as well as the absence of asbestos in the new fibre cement material sampled.



Figure 3 – Filling of potholes with asbestos cement rubbles and disposal at Beira dumpsite

1.3.Regulation related to Asbestos in Mozambique

Existing regulation in relation to asbestos material in Mozambique includes:

- Decree n. 55/2010 – Ban of importation, use and commercialization of material containing asbestos:
 - Since 2010, new fibre cement products shall use asbestos-free processes (use of vegetable fibres, man-made mineral fibres, etc.)
- Decree n. 83/2014 – Regulation on Hazardous Waste:
 - Identifies products with asbestos as hazardous waste (Annex 9)
 - Hazardous waste management is under responsibility of the producer / owner (art. 4)
 - Ministry in charge of environment has authority to emit rules for hazardous waste (art. 5)
 - All public and private entities involved in hazardous waste management activities have to prepare a written hazardous waste management plan before beginning activities (art. 11)
 - Private or public hazardous waste collection requires proper license (art. 14)
 - During the act of hazardous waste collection, a register of quantities collected, type and destination needs to be produced (art. 14)
 - Parcel of hazardous waste have to be labelled properly (Annex 4)

Apparently, there is no specific asbestos management, removal and disposal regulation currently in Mozambique.

⁴ Samples were submitted to local company based in Maputo (SGS Moçambique Lda), for subsequent analysis at a laboratory in Europe with ISO-7025 accreditation

2. Suggestion of interventions

2.1.Purpose

This strategy is intended to reduce risks related to asbestos cement material present in the debris and damaged roofing from Cyclone IDAI. It is not meant to cover high risk asbestos containing material such as sprayed asbestos coating, asbestos insulation boards, thermal insulation of pipes, boiler rooms, etc.

Asbestos cement is considered a low risk type of asbestos containing material⁵ since the fibres are bounded within the matrix of the cement sheet (non-friable asbestos containing material). Only when physically disturbed or damaged are the asbestos fibres released.

Internationally, it is recommended not to remove asbestos unnecessarily, as removing it can be more dangerous than leaving it in place and managing it⁶.

The strategy covers the following axes of intervention:

- Awareness;
- Training;
- Safe collection and removal;
- Safe Disposal;
- Long-term recommendations.

2.2.Awareness

Awareness needs to be raised at two different levels, with messages and adapted to the target groups:

- Decision makers;
- Population and communities in general.

The general purpose of the awareness exercise is to create a common understanding of the risks and how to manage them, and at the same time to avoid creating panic with the question of asbestos and asbestos cement in particular.

2.2.1. Awareness for decision-makers

The asbestos awareness training for decision-makers shall include:

- Properties, risks and health effects from exposure to asbestos fibres;
- General knowledge of the types and uses of asbestos and asbestos containing material and their associated risks;

⁵ *Source* : <https://www.dgs.pt/paginas-de-sistema/saude-de-a-a-z/amianto.aspx>. "As a general rule, the presence of asbestos in construction material represent a low risk for health, as long as the material is in good conservation state, is not friable and not subject to direct aggressions. Any activity involving perturbing the integrity of the material (cutting, drilling, breaking) increases significantly the risk of realizing fibers in the air."

⁶ *Source* : www.use.gov.uk/asbestos/duty.htm

- Specific situation in Mozambique and areas affected by the cyclone.

Key target groups for awareness sessions on asbestos are⁷: National, provincial and local government institutions (Municipalities, Districts, MITADER, DPTADER, MOPHRH, INGC, etc.), Humanitarian partners (UN and NGO's of key clusters) and the Private sector (construction and waste management contractors).



Figure 4 – Awareness session with Humanitarian partners

2.2.2. Awareness for communities

At community level, some awareness is also needed to ensure that the population is aware of the risks linked to asbestos cement, and avoid risk practices such as:

- Cutting;
- Crushing;
- Brushing;
- Using as rubble to fill potholes.

The general message to be transmitted to the population is to avoid any practices potentially disturbing the asbestos cement material and making the fibres airborne. At the same time, it shall be clear that asbestos cement material in construction does not need to be removed if not damaged.



Figure 5 –Examples of IEC material for asbestos (left, example of China) and culturally adapted IEC material on Protection against sexual exploitation and abuse (PSEA, right)

⁷ During the months of May and June 2019 UNDP and Shelter Cluster's Asbestos expert implemented awareness sessions covering the following target groups: Provincial Direction of Environment (DPTADER), Beira Municipality, Education clusters in Beira and Maputo, Shelter Cluster, Members of Early Recovery working group, In total approximately 100 people received awareness session on asbestos. The content of the awareness presentation is available in [Annex 1](#).

Visual Information, Education and Communication (IEC) material could be developed to illustrate these key messages taking into consideration the need to be culturally sensitive for the message to go through (see Figure 5). Trained community mobilizers can support the divulgation of these messages, with direct involvement of institutions in charge (DPTADER, Local Authorities).

2.3. Training

All workers and supervisors directly involved in removal and handling of asbestos cement material shall have received a proper training provided by a trainer suitably qualified and experienced, and shall be delivered a written training certificate, including photo ID.



Figure 6 –Example of safe asbestos handling classroom training and certificate (training provided to Beira Municipality Solid Waste Management workers)⁸

The training shall include but not necessarily be limited to the following:

- Asbestos Awareness Training (same as detailed in section 2.2.1);
- Classroom training on collection, removal and disposal of asbestos cement:
 - Production and use of risk assessments and plans of work;
 - Health and Safety;
 - Assessment of non-asbestos hazards on sites e.g. the safe working at height requirements;
 - Prevention of exposure to asbestos fibres;
 - Selection and correct use of Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE), including short practical;

⁸ During the months of May and June 2019 UNDP and Shelter Cluster’s Asbestos specialist implemented classroom training on safe removal of asbestos cement covering approximately 40 participants, including workers from Beira Municipality (Urban Services and Construction directorates) and technical staff from DPTADER.

The activity only covered classroom training and shall be completed by a proper on-site practical training. The on-site training was not implemented because of unavailability at the time of the training of all required equipment (in particular adequate Respiratory Protection Equipment). Training material used to support the training is available in Annex 2.

- Dealing with accidents and emergencies;
 - Collection and removal of asbestos cement sheets and asbestos waste handling;
 - Personal Decontamination;
 - Final Disposal.
- On-site practical training on collection, removal and disposal of asbestos cement:
- Establishing an asbestos works area;
 - Correct use of the PPE and RPE provided;
 - Correct use of the equipment to keep the asbestos cement damp;
 - The collection of the asbestos cement without further disturbance or damage;
 - Wrapping or bagging the asbestos cement with suitable polyethene bags or sheeting;
 - Placing the asbestos cement in the container for final movement to the disposal location;
 - Inspection and audit of the site;
 - Arrangement at the site for final disposal.

The practical training shall focus on workers potentially directly involved in handling of asbestos cement (municipal workers of solid waste and construction, workers of civil construction contractors, community builders, etc.), as well as technical personnel in charge of supervision and auditing.

The availability of specialized companies with required qualification and experience to provide training in the region shall be explored, in particular in South Africa. Considering the extend of the needs, Training of Trainers shall also be considered as a way to increase local capacity to handle asbestos cement in the future.

2.4.Safe removal and handling

2.4.1. Site assessment and prioritization

In order to prioritize safe removal of asbestos cement interventions, site assessments need to be implemented. Site assessments shall include, but not be limited to:

- Product type;
- Extent of damage;
- Location;
- Amount estimate;
- Use, occupancy and activities at the location;
- Likelihood of disturbance.

2.4.2. Implementation of safe removal activities

Minimum requirements for safe removal and handling of asbestos cement have been compiled in a guidance note available in [Annex 3](#). It includes the need of having a specific plan of work and risk analysis before starting removal activities, training of workers, use of adequate Personal Protection Equipment (PPE) and Respiratory Protection Equipment (RPE) as well as work procedures to minimize the risk of exposure, and finally arrangement in place for final disposal.

These minimum requirements shall be followed by all entities involved in works involving asbestos cement removal and handling (debris collection, building rehabilitation), and could also be integrated in tender documents for rehabilitation work of buildings with asbestos cement material.

A quick assessment of local market in Beira has shown that that all PPEs and RPEs, as well as other key consumable needed for safe handling of asbestos cement can be made available in Beira by local suppliers. Second-hand information also gave evidence that know-how shall be available in local construction companies, as safe asbestos removal activities were already implemented by local construction companies in the harbour during rehabilitation works in the past (before the cyclone).



Figure 7 – Safe removal of asbestos cement roofing sheet and debris

2.5.Final disposal

Arrangement for final disposal site shall be agreed on with Local Authorities and Ministry in charge of Environment. Some key requirements for final disposal of asbestos are:

- Asbestos containing material has to be buried and covered, in order to avoid future access to the material. There is no need of specific protection regarding ground water as asbestos does not causes risks of groundwater pollution;
- The choice of the location for final disposal is very important, it shall be an area with little access to the population and with no plan for excavation/urban expansion in the future;
- The disposal location shall be properly demarcated and the exact location of the area registered (GPS coordinates) and the record kept;
- Security and access control measures need to be put in place and maintained during the time of operation.

2.6. Long term considerations

On a longer-term perspective, the following recommendations can be done in order to improve management of asbestos containing material:

- Complete existing national regulation on asbestos, specifying minimum requirements for handling, removal and disposal of asbestos containing material (mirroring existing regulation in Europe);
- Implement an exhaustive survey on the existing presence of asbestos containing in the country, in particular in public buildings, in order to and prioritize future interventions;
- Create capacity in country for analysis of samples of suspected Asbestos Containing Material (possibility to create a laboratory in partnership with national Universities);
- Implement dedicated Municipal phone service (“Linha verde”) for Collection and disposal service of asbestos cement debris.

3. Activity Plan

Activity	Key Government counterpart	Intervention time
1. Awareness		
1.1 Awareness to decision-makers	DPTADER	0 - 3 months
1.2 Awareness to population in general	DPTADER / Local Authorities	0 - 6 months
2. Collection of information and priority setting		
2.1 Needs analysis in affected areas (presence of asbestos cement in rubble and damaged buildings)	DPTADER / Other provincial Directorates / Local Authorities	0-3 months
2.2 Detailed in situ evaluation in priority locations	DPTADER / Other provincial Directorates / Local Authorities	0-6 months
3. Training on safe removal of asbestos cement		
3.1 Training for workers of public sector involved in work with asbestos cement	DPTADER	0-6 months
3.2 Training of workers from private sector	Sector privado	0-6 months
4. Safe Removal		
4.1 Acquisition of equipment for collection and transportation	Local Authorities	0-3 months
4.2 Acquisition of consumables for safe removal operation (PPE, RPE, etc.) ⁹	Local Authorities	Continuous activity
4.3 Integration of safe handling and removal requirements in building rehabilitation tenders and contracts	Provincial Directorates / Local Authorities	0-3 months
4.4 Safe removal and transportation of asbestos cement	Provincial Directorates / Local Authorities	Continuous activity
4.5 Supervision and auditing of safe removal and transportation activities	DPTADER / Other provincial Directorates / Local Authorities	Continuous activity
5. Final Disposal		
5.1 Identification of suitable locations for final disposal	DPTADER / Local Authorities	0-3 months
5.2 Preparation of cells for final disposal	Local Authorities	0-3 months
5.3 Operation and control of final disposal operation	Local Authorities	Continuous activity
5.4 Auditing of final disposal operation	DPTADER	Continuous activity

⁹ Considering local cost from suppliers in Beira, the estimate total cost for safe asbestos handling and removal equipment and consumables is 25.000 USD for 30 people involved in the activity during 2 months.

Annexes

Annex 1 - Awareness presentation (Portuguese / English)

Annex 2 - Training support material (Portuguese)

**Annex 3 - Guidance note on safe removal of asbestos cement
(Portuguese /English)**

Annex 4 – Result of laboratory analysis of fibre cement material in Beira