Safe asbestos removal guidelines

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The following Guidelines have been developed by Benchmark Consulting as commissioned by PMI and IFRC. This document aims to provide clear practical guidance for PMI staff in the safe removal of asbestos containing roof sheeting that was inadvertently used by a number of communities on temporary shelters as part of the Red Cross Red Crescents, West Java Earthquake Response.

This document has been released publicly to assist other organisations facing a need to deal with asbestos safely in the absence of clear government regulations and or enforcement. Where such guidance does exist it is strongly recommended that organisations conform to national standards.

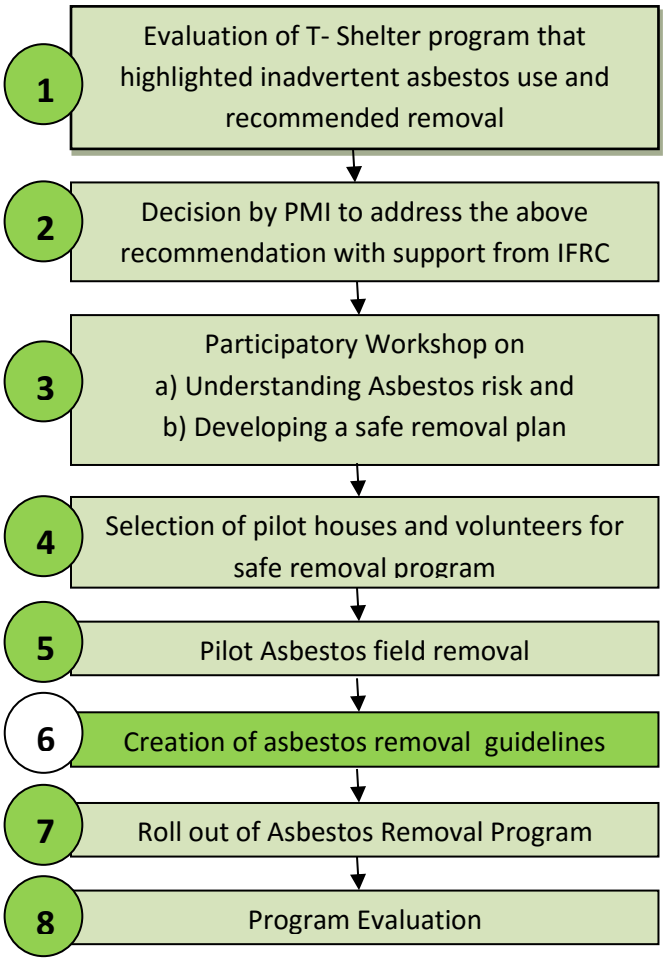
It is hoped that these guidelines will be seen as a work in progress, aiming to assist field workers to make practical decisions on how to deal with Asbestos in the field, as such for any input, comments or questions please email info@humanitarianbenchmark.org

Asbestos Removal Guidelines

Introduction

The following document outlines procedures for the safe removal and disposal of asbestos containing cement sheet roofing material.. The guidelines are based on the outcomes of a two day participatory workshop and field pilot removal project as conducted by Red Cross Indonesia Volunteers with the support of IFRC and Benchmark Consulting

There have been a number of stages involved in the creation of these guidelines:



Stages 1 to 4 have been documented in an earlier report to PMI and IFRC by Benchmark Consulting. The presentations used in the workshop are available in both Indonesian and English by contacting Benchmark Consulting or PMI/IFRC Indonesia.

Asbestos Removal Guidelines

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Removal and Disposal Vs Encapsulation

Once encapsulated in cement, asbestos fibres are harmless unless disturbed. Any form of disturbance, particularly breaking or cutting sheets may release fibres, and therefore should be avoided. In permanent structures where the roofing will not be disturbed, best practice is not to remove the sheeting but rather to paint the roofing with a an absorbent paint or glue and leave it undisturbed.

The recommendation and decision for removal of roofing material was based on the following factors:

1) The shelters on which the roofing was used, were designed as temporary structures only, made from untreated bamboo, they will collapse within a few years at most, leaving the affected community dealing with a hazardous material with no guidance or assistance.

2) As the largest global health based agency, the Red Cross movement has a clear policy of not using hazardous materials such as asbestos in its programs, Removal sends a clear message regarding the movement's stance on the dangers and their commitment to these policies.

3) West Java is a highly earthquake prone area, with regularly minor tremors and a high probability of larger quakes. Standard encapsulation through paining will not ensure blockage of fibre release

Components of the removal program

The Participatory Asbestos workshop identified 4 main components to the asbestos removal program

1. **Organisational Preparation**
2. **Public Outreach**
3. **Actual Asbestos Removal**
4. **Transportation and disposal**

Asbestos Removal Guidelines

1. Organisational Preparations

If asbestos has been identified and it has been decided that the best solution will be to remove it, before the actual removal activity, the team should already have implemented:

1.1. Training on asbestos hazard

1.2. PLANNING

- Survey the location (identify which houses require asbestos removal)
- Identify available PPE (Personal Protective Equipment)
  - Ensure that PPE is affordable for the community
- Budgeting
- Volunteer mobilisation plan
- Assessment and survey of disposal site
  - Determine access to the disposal site
  - Determine if transportation is required.
- Identification of disposal tools

1.3. COORDINATION

- Consult with local government (sub-district, village and RT/RW)
- Gain approval for the asbestos removal plan at relevant level of local government
- Gain permission for disposal to landfill at relevant level of local government
  - Landfill criteria
    - ✓ Village land (belongs to the village)
    - ✓ Agreed to by the community (during community consultation)
    - ✓ Will not be dug up again
    - ✓ Not in a landslide-prone area.
    - ✓ Not having any land title issues (i.e. not disputed land)
  - Together with the local government, conduct a public outreach program forthe local community
- Security
  - There's no need for the police. Local young people or local security guards can be organised to prevent the curious community getting too close to the house while the asbestos removal is in process
  -
  -
    - ✓ Monitoring and evaluation
      - ∇ Project report
      - ∇ Financial report

    Using the same format as the previous project reports

Hold a coordination meeting within PMI in each district

- Recommend assignment to conduct public outreach on the danger of asbestos
- Information dissemination on asbestos
  - Consultation
  - Banner
  - Brochure
  - Mass media
  - Printed media
- Stationery
- Volunteer mobilisation
  - Motorbikes for volunteers
  - Communication
  - Insurance for volunteers

- WORK PLAN
  - Project preparation
    - Inform PMI Headquarters of public outreach activities
    - Needs assessment
    - Create a letter providing information about the project and cc all related departments
  - Project plan
    - Venue
    - Type of activity and target group
    - Timeframe for the implementation
    - Budget
  - Requirements
    - Logistics
      - ✓ Stationery
      - ✓ PPE
      - ✓ Transportation
      - ✓ Visibility / media
      - ✓ Documentation
    - Budget
      - ✓ Operational cost for each branch
        - ∇ Transportation
        - ∇ Perdiem
        - ∇ Health insurance
        - ∇ Communication
        - ∇ Report
        - ∇ Preparation
      - ✓ Operational costs for the activity

Logistics preparation and equipment list

The following equipment has been chosen forits cost effectiveness and appropriatenessfor the task.

1.4. Composition of the Team

- Team wearing safety clothing consists of 8 people:
  - 2 people for removal (one to remove the nails, one to water the nail hole)
  - 2 people under the roof to catch the removed asbestos
  - 2 people for wet packaging
  - 2 people for dry packaging
- 2 people to support logistics from outside police line (not wearing safety clothing)
- Note: people behind the police line and in front of the police line should not exchange places because those who are not wearing safety clothes are not allowed to go behind the police line.
- Note: the disposal team are the 8 people who are wearing safety clothing.

1.5. Work Schedule (1 week)

- 1st,2nd,3rd day : assessment and preparation (determine the location of the houses with asbestos to be removed, determine the location of the disposal site, administration, and permission letter, meet the community, buy equipment and PPE.)
- 4th day: equipment preparation and digging of disposal site
- 5th day: identification of asbestos risk, thoroughly water the area, set out the police line, clean the furniture inside the house, move the furniture outside the house, prepare the water pump, undertake the asbestos removal, wrap the asbestos, ensure the area inside the police line is free of asbestos, wrap asbestos a second time, transport, burial.
- 6th day: reroofing
- 7th day: evaluation and notification to local authority where the disposal site is

    - ∇ Consumption
    - ∇ Stationary
    - ∇ Operational cost for the community
    - ∇ Timeframe for the implementation
  - Project implementation
    - ✓ Consultation
    - ✓ Removal

    Note: Assessment, public outreach, implementation: 2 months
  - Reporting

2. Public Outreach

Public Outreach and Education (Community and Local Authorities)

- PREPARATION
  - Share knowledge gained during asbestos awareness training with staff and volunteers in the chapter
  - Planning
    - Budgeting
    - Target groups:
      - ✓ Government officials
      - ✓ Community
      - ✓ Community leaders
      - ✓ Shop owners
    - Work plan
      - ✓ Time
      - ✓ Place
      - ✓ Facilitator
      - ✓ Materials for public outreach
      - ✓ Supporting documents and logistics
      - ✓ Letters, invitations, etc
- IMPLEMENTATION
  - Public outreach to government officials / community leaders / shop owners
    - Goal
      - ✓ To explain of what asbestos is
      - ✓ To provide information about the project implementation (planning, target, beneficiaries)
      - ✓ To encourage the community and local authorities to participate and to support the implementation of the project
    - Target
      - ✓ Relevant government offices; Health office, Regional Management Agency (BPBD), Environmental Management Agency (BPLH)
      - ✓ NGOs
      - ✓ Local government officials
      - ✓ Village and sub-district government officials
      - ✓ PMI
    - Type of activity
      - ✓ Workshop
      - ✓ Coordination meeting
    - Logistics
      - ✓ Projector, flip chart, poster, brochures, newspaper clipping (print or from the internet), banner, guidelines, camera, stationary, computerandprinter
    - Venue
      - ✓ PMI Chapter office or any appropriate meeting place not far from the beneficiaries and/ or the government offices

- Steps
  - ✓ Introduction
  - ✓ Presentation about the project facilitated by the those carrying out the asbestos removal and disposal
  - ✓ Group discussions, to discuss several questions or case studies that have been prepared earlier
  - ✓ Question & answer session
    - ∇ Brochures, guidelines, etc

- Public outreach to the community
  - Goal
    - ✓ To provide information about asbestos
  - Target
    - ✓ Head of RW and RT, community leaders, or religious leaders
    - ✓ Beneficiaries
  - Type of activity
    - ✓ Consultation
    - ✓ Simulation / exercise on asbestos handling
    - ✓ Art show (i.e. wayang) with the theme on the dangers of asbestos
  - Target
    - ✓ Beneficiaries (30 people max), local community
  - Venue options
    - ✓ Any neutral place
    - ✓ Village hall
    - ✓ School
    - ✓ Local young people's organisation (karangtaruna)
    - ✓ Women's group (Dasawisma)
  - Time
    - ✓ Agree on timeframe for public outreach session with the community
  - Logistics
    - ✓ Poster, brochures, films, stationary, projector
    - ✓ Stationary, camera, handy cam, projector and screen, laptop, transportation, pamphlets, banner, stickers, T-shirts
  - Budget
    - ✓ Operational cost
  - Steps
    - ✓ Introduction: speech from PMI
    - ✓ Film screening
    - ✓ Community opinion
      - ∇ The facilitator prepares questions for the interview with the community
    - ✓ Evaluation
      - ∇ Determine whether the community has understood all the material
      - Using pictures, the facilitator asks the community to explain what they have learnt so far in their own words.
  - Souvenir
    - ✓ Give some gifts; anti-asbestos T-Shirt and anti-asbestos calendar
  - Public campaign

- ✓ Cell phones (texts)
- ✓ Radio (serious discussion)
  - ∇ PMI as the moderator
  - ∇ PMI work together with ORARI (Organisation of Amateur Radio in Indonesia)
- ✓ Partnership with RRI (Radio Republic of Indonesia) three times per week
  - ∇ 1 hour with INA BAN (Indonesia Ban Asbestos Network)
- ✓ Facebook – Group PMI – Anti asbestos
- ✓ Printed media (press release)

3. Asbestos Removal

1.6. PRE-REMOVAL

First, an assessment should be conducted. If asbestos is found during the assessment; a decision should be made to remove the asbestos. The motto before, during, and after the removal is: "Safety first. It's our life."

1.7. PREPARATION

- Tools
  - Personal Protective Equipment (PPE)
    Personal protective equipment should be used as a "second line of defence". The most important thing is to keep the asbestos roof wet all the time.

    - Clothing
      - ✓ Choose the best quality protective clothing that you can find in the local area. Choosing locally available products will encourage locals to follow your example.
      - ✓ A rain coat that you use once only and destroy afterwards.
      - ✓ A white lab coat like those used in bird flu treatment can also be used. These can be found at health or livestock offices. But it is, once again, better to find a locally available material that local people would be able to find instead of using a high tech alternative that they may not be able to source. Therefore, in this case, it would be better to wear a raincoat and waterproof trousers which have elastic cuffs around the arm and leg to prevent your body being exposed to the dust

    - Mask
      - ✓ Choose the best quality mask that is locally available. This is to allow local people to follow your example. If possible, use a full face mask if it is locally available. There are three types; the 3M, the one with filters, the one with two way filters. It is sufficient to use the 3M mask.
    - Filters
      - ✓ The filter from the mask should be changed and the mask cleaned after use. If it is very dusty the filter may need to be changed during the removal. The maximum use for a filter is 8 hours.
    - Safety helmet (i.e. construction helmet)
      - ✓ This is only to be used for those people under the roof to catch the removed asbestos then put it in a place for wet packaging.
    - Protective rubber gloves (long arm)
      - ✓ Plastic long arm type (i.e. for washing the dishes)
      - ✓ To be worn under the cuff of the waterproof jacket

[insert picture]

    - Shoes
      - ✓ Light shoes are preferable for those working on top of the roof.
      - ✓ Shiny shoes are good so the dust won't attach tothem.
      - ✓ High rubber boots. The cuff of the trousers should be pulled over the boots.

- Duct tape
  - ✓ Use the duct tape to seal the connection between gloves and sleeves and shoes and trousers, to prevent underclothes being exposed to dust. .
- Goggles
  - ✓ If you are using the ordinary mask without the built in goggles.
  - ✓ To be used only for those who are under the roof.

- General
  - Water pump
    - ✓ Strong enough to pump water to a height of 25 meters
  - Hose
    - ✓ With adjustable sprayer
  - Generator set
    - ✓ In case there is not enough electricity in the field
  - Fold out ladder
  - Electric tools
  - Tool kit
  - Dust cloth
    - ✓ If it's not possible to wet all the furniture, wet the cloth and use it to wipe down all the furniture inside the house under the asbestos roofing
  - Plastic
    - ✓ To wrap the asbestos sheeting
    - ✓ Do not use such good quality sheeting that the community will take it and re-use it, but not such bad quality sheeting that the tarpaulin will be torn by the corners of the asbestos sheeting.
    - ✓ Choose an appropriate size to wrap the asbestos sheeting (90x180cm)
  - Duct tape
  - Bucket
  - Board
    - ✓ To use to step on the rooftop to avoid direct contact with the asbestos roofing
  - Fuel (Solar) for the gen set

- Drainage system
  - Make a simple drainage system
  - Make one corner of the drainage system deep enough to hold the water
  - If it's not possible to dig a trench then put a gutter on the roof

1.8. REMOVAL PROCESS

Identification

- 1 person from the team in full PPE identifieseverything in the house and yard that isat risk of asbestos contamination (i.e. asbestos rubble, furniture exposed to asbestos, yard with asbestos dust). Put up a sign to identify this contaminated areas if possible.
  - ✓ Create the danger zone by putting up the police line
  - ✓ Determine area for dry and wet packaging& furniture storage. Set aside and clean an area that the team can use to have a rest if necessary.

- While 1 person is doing the identification the other 7 peopleprepare equipment and the water system.
  - ✓ Water installation
  - ✓ Prepare equipment

- Wetting process
  - 2 people
    - Wet down all areas outside the house, inside police line.
  - 2 people
    - Clean the furniture with a wet cloth inside the house.
  - 2 people
    - Move the furniture out of the house, or keep it inside the house in a safe place covered with plastic(Note: If furniture is being moved outside the house it is assumed that area for furniture storage is ready and set-up.)
  - 2 people
    - After furniture has been cleaned, move the furniture outside the house or wrap in plasticand leave it in the danger zone area.
- Team 1 removes the asbestos sheeting using crowbar and pliers.
  - 2 people on the rooftop
    - Place a board on the roof so that shoes do not directly contact the asbestos.
    - Put the board on top of the asbestos roofing in the area where it has timber underneath to avoid it from breaking.
    - While 1 person removes a nail, the other person keeps wetting the nail hole to avoid the release of dust.

[insert picture]

  - 2 people under rooftop
    - Pass the asbestos sheeting down
    - Take it to the wet packaging team
  - 2 people for wet packaging team.
    - Ensure that the asbestos sheeting is wet, wet down again if necessary.
    - Wrap the asbestos sheeting in tarpaulin
    - Duct tape the tarpaulin

[insert picture]

    - Note: there should be no more than 4 asbestos sheets in each package
  - 2 people for dry packaging team
    - Wrap the wet package in dry plastic
  - 2 logistics people
    - Ensure that the team has got the water system running and it I working all the time.
    - Ensure that duct tape and plastic is always available and ready to be supplied to the astronaut team inside
- Sterilisation
  - 2 people under rooftop to clean up inside the house once again and make sure that there is no leftover asbestos dust caused by the asbestos removal

- 2 people to water the roofing and the walls
- 2 people to rake and collect any loose soil around the house, within the police line, to a depth of 3cm. Wrap the soil and prepare for disposal.

- Last Step
  - All of those who worecoveralls, to clean themselves before the disposal process in order to avoid asbestos release to public spaces.
  - Wash all used equipment

4. Transportation and Disposal

1.9. Disposal site preparation

- Dig a 2 meter-deep hole.
- (Note: In Indonesia, it is common practice to dig a hole two meters deep to bury the dead in cemeteries. Two meters is a sufficient depth to bury asbestos. It is best to use a standard depth that the community is already used to. It is possible that if we set a new standard for asbestos (i.e. deeper than two meters) the local community will not adhere to this and may in fact set their own standard which is less than two meters. A hole of less than 2 meters is a danger as the asbestos may be dug up again)

1.10. TRANSFER TO DISPOSAL SITE

- Using transportation
  - Identify vehicle type
    - Depends on the disposal site
  - Tool check
    - Bucket, hose, hoe, spade, crowbar, rubber gloves, tarps, ropes
  - Security for asbestos transportation (i.e. someone from the village office). This is to ensure that the curious members of the community do not attempt to approach the disposal site, and expose themselves to asbestos dust.
- Without transportation
  - The team in full PPE (8 people) will bring the asbestos sheeting to the disposal site

1.11. DISPOSAL PROCESS

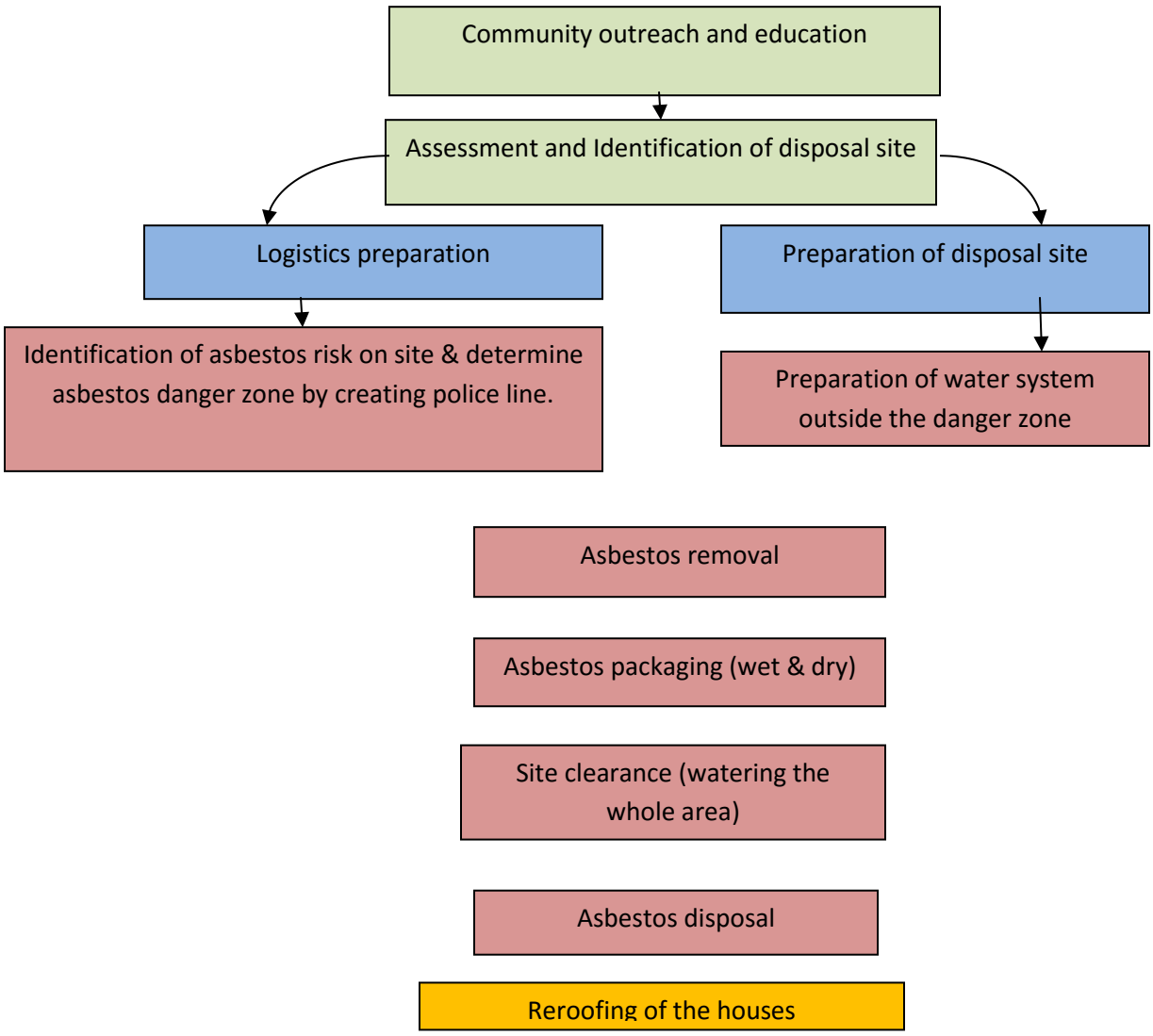
- Put the tightly wrapped asbestos material into the hole
- Pile the asbestos to a maximum of 0.5 meters high.
- Fill in the hole with 1.5 meters of soil.
  - After the first 30 cm filling in the hole with soil, stamp the soil so the asbestos underneath is crushed. This is to avoid the local people re-using the asbestos.
- Stand over the hole and wet all the clothes that have been worn during asbestos removal and transportation
- Take the wet clothing off, the hand scoops, the mask filter, and tear them apart to avoid someone re-using it, then dispose of the clothing in the hole
- Clean the tools.
- Put up a sign “danger - asbestos”
- Wet the soil until it becomes really wet.
- Fill the rest of the hole until it is the same level as the surrounding soil.
- Plant some trees if the disposal land is in an open space

  Note: keep every team member wet at all times.
- Inform the owner of the land/community/local authority
  - Send a letter to the local authorities and community leader in the village and the local authorities at a district level. Also advise relevant stakeholders and government offices.

- Documenting the process
  - At a minimum take photographs of the site
  - Identify the disposal site on the village map
    - So, even if people working for the local authorities change, there is still a record that there is an asbestos disposal site in the village.
    - So no one will use the asbestos disposal site for future development.
- Invite related government offices to supervise the burial of asbestos.
  - Do not use disposable clothing and masks again. Wrap contaminated clothing and masks with plastic ready for disposal.

Evaluation

It is recommended that a real time evaluation is undertaken to check conformity to the guidleines



Appendix 1: PPE Personal Protection Equipment

Item	Description	Photo
Masks	The highest quality dust masks available. Important that they seal well to the face. People with beards and moustaches should not engage in removal. Preferably rubber masks with disposable dust filters.	
Gloves	Smooth thick disposable rubber gloves, like those used for dishwashing, should be thick enough to not tear, not slippery but cheap enough to be disposed of. Rubber or latex NOT cotton	
Boots	Cheap Rubber or plastic gum boots. That can be disposed of after use. It is important that boots have sufficient grip and are not too large for the user as users will be climbing on structures	
Goggles	Those working on the ground or within the structure should use plastic safety goggles at all times. These may not always be required for those on top of the roof	
Suits	Disposable single piece hazardous material suits are ideal, but when unavailable, cheap plastic motorbike raincoat and waterproof trousers are fine, should be tape sealed to boots and gloves. Hair should be contained within a sealed hood	

Appendix 2: Supplies and Equipment checklist

Equipment	Reusable items	Consumables	Detail
Water system	• Water pump • 25m pipe • 100m water hose • T-joint • L-joint • 2 water sprayers/misters • Roll of electrical cable for pump.	• glue	• The water pump must be strong enough to pump water to a height of 5m above ground level
Removal tools	• 4 water buckets, • 4 cloths, • 2 small crowbars, • hoe, • 2 pairs of big scissors, • 2 cutters, • gutter(optional), • 4m Aluminium ladder	• Tape or string to mark out "police" line • 2 2mx25m rolls of thick plastic to double wrap asbestos • 15 rolls of duct tape for wrapping asbestos,	• Hoe to dig the trench (for drainage). • Use a gutter if it is not possible to dig a trench.
Transportation tools	• Small pick-up truck for medium distances • Enclosed truck for longer distances • Open wooden cart where disposal site is close	•	• Tray of vehicle should be completely washed down after use
Disposal site equipment	• 2 rakes, • 2 shovels, • 2 hoes, • 2 big crowbars.	• 2 markers, • 2 cardboard boxes, • 2 pieces of plastic to wrap signs in	•
Reroofing equipment	• saw, • hammer, • machete, • measuring tape	• Nails, • bamboo, • Rope	•
Safety box	• Complete First aid kit	• Bandages • Antiseptic wash • Eye wash	• Should include: Eye cleaning equipment, • Bandages for cuts and abrasions • Antiseptic for washing out wounds