



# WaterAid UK

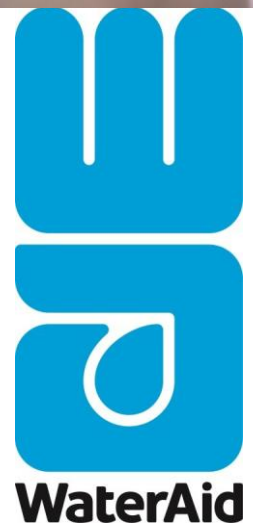
## Construction Health & Safety Policy



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Programme Support Unit

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## Organisational Policy on Health and Safety within WaterAid-funded Construction Projects

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This document outlines WaterAid’s organisational policy on Health and Safety within WaterAid funded construction projects. It is aimed at WaterAid Country Directors and is intended to act as a definitive guide to assembling and updating a country programme policy on Health and Safety within WaterAid funded construction projects.

This policy was last updated in June 2017 to ensure that it remains current and relevant to the on-site construction activities carried out by partners and country staff when they are involved in direct or co-implementation. Updates made in 2019 include:

- Guidance on the handling of faecal sludge
- Guidance on handling medical waste and sanitation at healthcare facilities
- A general up-front section on site security including information on personal protective equipment
- An improved Excavations section
- Condensing the hand dug wells section as this is now a proportionally smaller part of WaterAid’s construction work. This has been balanced with more information on drilling and above ground construction projects (which would cover most institutional sanitation construction).
- The section on drilling operations has been moved to the section on safety precautions which must be observed by WaterAid staff and partners as drilling is increasingly acknowledged to carry significant risks if not carried out in a safe manner.
- Updating out of date references and terminology
- Addition of a requirement to give information about immediate actions undertaken on the ‘Information required for the immediate notification of accidents and other serious incidents’ form (Appendix A)

The central purpose of this document is to state WaterAid’s policy on Health and Safety within WaterAid-funded construction projects. It is also intended to support Country Directors to draft applicable, easy to update and easy to audit Health and Safety policies that are tailored to the risks and legislative requirements of the country context.

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## 1. INTRODUCTION

WaterAid supports local partner organisations to carry out programmes relating to water supply, sanitation and hygiene promotion in urban and rural areas. These programmes often include a construction component. This policy applies to the field environment and the construction activities of partners. Where WaterAid are involved in direct or co-implementation with partners the policy also applies to WaterAid staff. All WaterAid country programmes are required to have an up to date Health and Safety policy for construction projects. It is vital that all partners involved in construction activities adhere to the provisions of this country programme policy. This organisational policy outlines:

- Safety precautions which **MUST** be observed by everyone involved in work if it is to be funded by WaterAid
- Safety precautions which **MUST** be observed by WaterAid's staff and which are **RECOMMENDED** to local partners and anyone else involved in work funded by WaterAid
- Other suggested safety precautions for consideration

All Country Programme policies and procedures should ensure legal compliance in each country where WaterAid operates, ensure the health, safety and welfare of all employees and promote exemplary Health and Safety amongst partner organisations and contractors. Where there are discrepancies between a national Health and Safety policy and this one, the more stringent of the two should be followed.

This document outlines WaterAid's organisational policy on Health and Safety within WaterAid funded construction activities and is intended for use as a guide to Country Directors when assembling and updating a policy tailored to the national context and national standards / legislation. A policy template is provided at the end of this document.

### 1.1.1. The possibility of accidents

Just because the technologies which are recommended by WaterAid are simple, it should not be thought that there is little possibility of accidents occurring. Accidents may occur in any of the following ways:

The commonest ways:

- By persons falling or tripping - from scaffolds, into openings such as trenches or wells, or on the level
- By objects falling onto persons
- By persons stepping on, or striking against, objects
- During loading, unloading, lifting, carrying and transporting loads
- When using or handling hand tools

Other ways:

- Through the collapse of earth
- Through the collapse of scaffolds
- In connection with vehicles

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- In connection with working machines
- Through the use of lifting appliances
- Through the use of welding and cutting equipment
- Through the use of compressed-air equipment
- Through lack of oxygen, or presence of poisonous or explosive gases, in excavations and confined spaces

Whilst those working on a construction site may appear to be most at risk the risks posed to those living or working nearby by also be considered to ensure that construction carried out by WaterAid and partners does not have a negative impact on the community it is trying to work alongside.

## 1.2. The causes of accidents

There are many causes of accidents, but they are likely to be among the following groups:

- Inadequate efforts made to cordon off and secure construction sites
- Defective equipment
- Defective methods of working
- Defective organisation
- Dangerous acts by workers

Staff turnover in WaterAid country offices and partner organisations necessitates regular checks by Regional Teams to ensure all Country Directors and senior management teams are aware of the provisions of the country programme Health and Safety policy. Organisation for the prevention of accidents should start at the planning stage of a project and should extend to all its activities. It should include:

- definition of practical Health and Safety policy procedures
- the appointment of competent supervisors who will carry out a risk assessment before work starts
- awareness raising and training of staff in relation to construction Health and Safety policy procedures including reporting of accidents

Help or advice on policy matters can be obtained from the WaterAid UK Programme Support Unit in London.

## 2. WATERAID'S HEALTH AND SAFETY POLICY

### 2.1. Policy statement

WaterAid's Board of Trustees regards Health and Safety as an integral part of the operations which WaterAid supports and expects all reasonably practicable measures to be taken to ensure the health, safety and welfare at work of all its employees, those of its local partners and others who may be affected by the activities which it supports.

The principal aim is to prevent accidents which result in:

1. the injury or ill-health of any person
2. damage to, or destruction of, property
3. operations having to cease
4. any other incident which may have a detrimental effect on the efficiency or reputation of WaterAid

### 2.2. Limitations of responsibility

WaterAid recognises that country programmes are implemented through independent local partners and that there are practical limitations to the degree of responsibility which WaterAid can take for the actions of its partners.

Therefore WaterAid divides safety matters and safety precautions into the following three categories:

- Safety precautions which **MUST** be observed by everyone involved in work if it is to be funded by WaterAid.  
(See Appendix B)
- Safety precautions which **MUST** be observed by WaterAid's staff and which are **RECOMMENDED** to local partners and anyone else involved in work funded by WaterAid.  
(See Appendix C)
- Other suggested safety precautions for consideration.  
(See Appendix D)

These categories are described in more detail in Section 2.7 and in Appendices B, C and D.

### 2.3. Country Health and Safety policies

WaterAid requires each Country Director

- To produce a Health and Safety policy document which is relevant to the particular activities which WaterAid supports in his, or her, country and which will ensure that matters of Health and Safety are given proper consideration in the day to day running of the country's programmes.



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- To comply with any national legislation on Health and Safety and ensure that this is referenced in the country programme Health and Safety policy document.
- To ensure WaterAid's local partners in the country to give similar consideration to Health and Safety issues.

A country's Health and Safety policy document should state:

1. The name of the author, approver and the date the policy was last approved.
2. A policy statement on Health and Safety within construction sites in your country programme.
3. National legislation relevant to Health and Safety within constructions sites or excavations.
4. The persons responsible for implementing and monitoring construction site Health and Safety policy.
5. What provisions will be made for providing training in Health and Safety for WaterAid's staff and for that of its partners.
6. Which of the mandatory Health and Safety procedures (described in Appendices B {mandatory for all} and C {mandatory for WaterAid's staff only}) will be observed in the country)
7. For each type of construction project regularly occurring, which approved construction method will be used and details of how this method will actually be executed.
8. Which, if any, of the recommended Health and Safety procedures (described in Appendices C and D) will be observed in the country.
9. How the WaterAid Country Office will monitor the implementation of its policy by its own staff.
10. How the WaterAid Country Office will monitor the observance by its partners of the mandatory Health and Safety procedures (described in Appendix B).

The Country Health and Safety Policy document must be submitted to the relevant Head of Region for approval, both when initially drafted and when any changes are proposed.

(Suggestions regarding how to write a country policy, and what it should contain, are set out in Appendix E to this document, "Guidance for Country Directors when drafting a country policy.")

## **2.4. Organisational responsibilities**

WaterAid's Board of Trustees recognises the need to adopt a consistent and comprehensive policy, within practicable limits, which clearly allocates responsibility for Health and Safety at every level. The following sub-sections identify the responsibilities assigned to individuals within WaterAid's own structure, but the development and implementation of effective Health and Safety policies in a particular country must rest with WaterAid's Representative in that country.

### **2.4.1. Director of International Programmes**

The Director of International Programmes is responsible to the Chief Executive for the promotion and development in all country programmes of a comprehensive Health and Safety policy document relating to WaterAid funded construction activities. Once such a policy has been produced and approved, they are responsible for ensuring that it is implemented effectively.

They must also ensure that proper arrangements exist for reporting fatal accidents, and other events which may seriously affect Health and Safety, which are related to the programmes which WaterAid supports in the countries where it is represented. (see Section 2.6)

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### 2.4.2. Heads of Region

The Heads of Region are responsible to the Director of International Programmes for the promotion and development in each country under their supervision of a comprehensive Health and Safety policy document relating to WaterAid funded construction activities and, once such a policy has been produced and approved, for ensuring that it is implemented effectively.

They must also ensure that proper arrangements exist for reporting fatal accidents, and other events which may seriously affect Health and Safety, which are related to the programmes which WaterAid supports in the countries where it is represented. (see Section 2.6)

In addition, they are responsible for:

- The review and approval (in consultation with the Programme Support Unit) of all Health and Safety policies drafted by Country Directors.
- Ensuring that country programmes update policies on a regular basis
- Checking that country programmes are implementing Health and Safety policies for construction projects
- Checking that country programmes communicate the provisions of the country programme policy to all relevant partners
- The establishment and monitoring of arrangements for communicating information on Health and Safety matters to and from countries in which WaterAid is represented.

### 2.4.3. Country Directors

The Country Director is responsible for:

- The elaboration of a Health and Safety policy for the country programme which complies with this policy on Health and Safety within WaterAid funded construction projects as well as any legal and policy requirements stipulated by that country.
- Communicating the contents of that policy to all WaterAid's staff in the country.
- Monitoring the compliance of WaterAid's staff with the provisions of the country policy on Health and Safety within WaterAid funded construction projects.
- Making available the country policy on Health and Safety within WaterAid funded construction projects to WaterAid's local partners and explaining to them the issues involved.
- Notifying WaterAid's local partners regarding which elements of the country policy on Health and Safety within WaterAid funded construction projects they **must** observe when carrying out their work, and monitoring their compliance.
- Making the reports described in Section 2.6 of this document.

Safety in design, construction and operation must never be overlooked but the strict standards of developed countries may not be realistic in many areas and it will be necessary to adapt responsibly to local practice. Insistence on certain safety measures may reduce the speed of construction and may cause impatience and intolerance on the part of the people carrying out the work; the provision of additional material and equipment required for reasons of safety may add to the cost of the project; so will the training of sufficient supervisors to ensure that nothing is constructed without adequate supervision.

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Country Directors will need to exercise judgement in weighing up the various factors and in deciding which methods of construction and which safety measures are most suitable for their projects. Compromises will have to be made but it should be accepted that the provision of appropriate safety measures will require the expenditure of time and money.

#### **2.4.4. Health and Safety advice**

WaterAid's Programme Support Unit is responsible for providing advice to the Director of International Programmes, Heads of Region and Internal Auditor on all aspects of Health and Safety within WaterAid funded construction projects. The Programme Support Unit can be called on by the Director of International Programmes to comment on all country policies on Health and Safety within WaterAid funded construction projects.

#### **2.4.5. Internal Auditor**

As a part of WaterAid's internal audit process, the Internal Auditor is responsible for commenting on whether or not:

- a country's policy on Health and Safety within WaterAid funded construction projects meets the requirements of WaterAid's overall policy on Health and Safety within WaterAid funded construction projects, and
- a country's policy on Health and Safety within WaterAid funded construction projects is being satisfactorily implemented in that country.

### **2.5. Health and Safety Training**

WaterAid considers Health and Safety issues to be important and is prepared to invest in staff training in this area where such a need is identified through the normal staff appraisal process.

WaterAid considers increasing awareness of Health and Safety issues to be an appropriate and desirable component of the institutional strengthening of its local partners. Likewise WaterAid considers basic training in site safety and the use of tools and equipment to be an appropriate and desirable part of community training during project work.

Refresher training sessions should be carried out which are appropriate to staff roles and responsibilities.

Relevant training courses are outlined in the table below. WaterAid Country Directors should seek out appropriate and reputable organisations in-country capable of providing to staff this kind of training but, in the absence of such organisations, should source appropriate support from outside if necessary.

Country Directors should give consideration to training some WaterAid programme staff as trainers for partners.

<b>Training Course</b>	<b>To whom</b>
Safety in the field and on construction site visits	All those visiting sites.
First Aid Training	Technical staff, field staff, drivers for both WaterAid and Local Partners

Table 1 Relevant types of training

## 2.6. Reporting accidents

Any fatal or serious accident which is connected with WaterAid's work and any incident involving WaterAid's employees or associates which might lead to adverse press publicity, must be reported immediately via the Director of International Programmes to the Chief Executive.

The information required initially, as shown in Appendix A, should preferably be sent in writing by email, but may also be sent by telephone. This must be followed within a reasonable period by a more detailed investigation report containing all the facts, conclusions and, where appropriate, specific recommendations to prevent a recurrence. Where appropriate, sketches, drawings, witnesses' statements and photographs should accompany the full report. In the case of work-related accidents and dangerous occurrences, the standard accident report form must also be completed.

## 2.7. Safety categories and implementation

WaterAid divides safety precautions into the following three categories:

### 1. Safety precautions which **MUST** be observed by everyone involved in work if it is to be funded by WaterAid.

(These precautions are described in Appendix B to this policy document under the following headings):

- General safe working practices
- Excavations and trenches
- Hand dug wells
- Drilling operations
- Above ground construction
- Working with faecal sludge

### 2. Safety precautions which **MUST** be observed by WaterAid's staff and which are **RECOMMENDED** to local partners and anyone else involved in work funded by WaterAid.

(These precautions are described in Appendix C to this policy document, under the following headings):

- Fire risks
- Use of motor vehicles
- Use of petrol or diesel engines
- Use of air-driven tools
- The provision of first aid kits and first aid training
- Breaking stones to produce aggregate

### 3. Other suggested safety precautions for consideration.

(These guidelines are described in Appendix D to this policy document, under the following headings):

- Tidiness on project sites
- Use of hand tools
- Lifting heavy loads by hand
- Working over water
- Use of hand-operated winches
- Use of ropes and chains
- Handling of medical waste and sanitation at health care facilities

## **2.8. Monitoring implementation**

It is the responsibility of the WaterAid Country Director to monitor the implementation of the policy on Health and Safety within WaterAid funded projects, once that policy has been agreed with the relevant responsible persons (see Section 2.3).

Country policies should outline how monitoring will be carried out. It is recognised that WaterAid programmes operate on the basis of providing support to partners rather than having a tight monitoring role and the length of visits of WaterAid Programme Managers and Officers does not provide the necessary full Health and Safety supervision for a construction site.

**It is the local partner organisation's responsibility to ensure continuous supervision of its construction sites.**

Programme Managers, Coordinators or Officers should verify that the Policy's requirements for work of this nature are being met by local partners during routine field visits.

WaterAid Programme Managers should discuss Health and Safety aspects with implementing partners, and check that awareness of H&S issues and practical supervision of construction is present during routine field visits.

WaterAid Programme Managers/Officers should discuss the Health and Safety aspects of different designs, such as sanitation options, with partners. Where risks have been identified by one project partner, WaterAid should facilitate in the communication of these risks and methods of reducing them, to their other project partners.

Health and Safety issues will be included in partner monitoring reports and compliance should be communicated to the Head of Region.

## **2.9. Review**

Country Health and Safety policies should be reviewed by the Country Director at least annually to ensure that they remain up to date with current activities and national legislation. Policies must also be reviewed by the Country Director after any serious accident to see if changes are needed to prevent a recurrence of the incident. Evidence of reviews must be logged in the Country Programme's quarterly reports to the Head of Region.

Heads of Region will review compliance with Country policies on Health and Safety within WaterAid funded construction projects during their management visits to the programme. Evidence of reviews must be included in the Head of Region's visit report.

The Internal Auditor will review and comment on the Country Health and Safety policy, its implementation and its adherence to WaterAid's overall policy on Health and Safety within WaterAid funded construction projects (this document) during internal audit visits.

# Appendix A. Information required for the immediate notification of accidents and other serious incidents

Date and local time of incident: .....

Name and address of injured personnel: .....

Age: ..... Marital status: .....

Is the injured person an employee of WaterAid? YES / NO

If NO, give status (For example: visitor, member of the public, sub-contractor, etc):

.....

Employer's name and address:

.....

.....

Exact location of incident:

.....

Nature of injury (if fatal, please state):

.....

Damage to plant, property, etc, whether or not accompanied by injury:

.....

.....

Brief details of incident (please give dimensions, distances, speed, etc, where possible; for instance. injured man fell 10 metres, etc):

.....

.....

Immediate action taken:

.....

.....

Person reporting incident:

Name: ..... Position: .....

Location: .....  
(Include photographs of the scene, wherever possible, to help explain what happened.)

## **Appendix B. Safety precautions which must be observed by everyone involved in work if it is to be funded by WaterAid**

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- B.1 General safe working practices
  - B.1.1 Site Security
  - B.1.2 Avoiding use of poor equipment
  - B.1.3 Use of Personal Protective Equipment
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- B.3 Hand Dug Wells
  - B.3.1 General safety points
  - B.3.2 Dangers during and after construction
    - B.3.2.1 Avoiding falling objects
    - B.3.2.2 Preventing the sides of a well excavation collapsing during excavation from ground level to water table.
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    - B.3.2.4 Avoiding asphyxiation
    - B.3.2.5 Preventing people and objects falling into the well
- B.4 Drilling Operations
- B.5 Above ground construction
- B.6 Working with Faecal Sludge

### **B.1. General safe working practices**

There are some precautions that apply to all construction projects which will minimise risks considerably. These are detailed below.

#### **B.1.1. Site Security**

All sites where construction is taking place should be clearly cordoned off using tape or another material to delineate a boundary. Community members should be briefed that it is hazardous to

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cross the boundary as materials or excavations may cause injury or death. Children or unauthorised persons should not be allowed to cross the boundary. No one should be permitted to work alone on any construction site.

### **B.1.2. Avoiding use of poor equipment**

Unless there is systematic inspection and maintenance, equipment can deteriorate and become dangerous to use without anyone noticing.

Equipment should be:

- Examined before despatch to the project site.
- Inspected regularly.
- Serviced in accordance with the manufacturer's instructions.
- Maintained in good condition during its working life.

Specific points to look for are:

- The moving parts of any equipment should be well lubricated.
- The tool used for excavating inside the shaft should suit the dimensions of the space available; a trenching tool may be preferable to a spade.
- For hoists:
  - Head frames should be robust; they should be designed to suit the dimensions of the work.
  - The hoist rope should not foul any part of the head frame.
  - The hoist rope should be checked regularly to ensure that it is not becoming frayed or damaged; if it is, it should be replaced.
  - Crane hooks should be attached securely to the hoist rope; with a steel wire rope, use bulldog clips.
  - Crane hooks should be fitted with keepers, to ensure that their load does not slip off.
  - If chain slings are used they, too, should have keepers.
  - Skips or kibbles should not be so large that they are difficult to empty by hand.
  - Winding gear and windlasses should have ratchets and pawls, or other suitable safety devices; otherwise, if the load falls at an uncontrolled speed injuries can be caused (at ground level by the spinning handles of the windlass and, down the well, by the load falling onto the workers).

### **B.1.3. Use of Personal Protective Equipment**

Personal protective equipment (PPE) should be used as a last resort and the following are recommended. The types of equipment needed will depend on the particular work being carried out and this should be assessed in a work plan before work starts.

- A helmet to protect against falling objects or when working at height: a helmet
- Boots (preferably with a steel toe cap) to protect against falling objects
- Ear defenders or ear plugs to protect against hearing loss if mechanical tools are in use for a long period of time or if compressed air tools are used within a confined space

- Gloves with long arms to protect hands and arms from cement burns, bacteria, or minor injury
- A mask to protect against dusts (particularly if working with dry cement or if an excavation requires the cutting of stone or rock)
- Overalls to protect against biological or chemical contamination or if working with paint or contaminated dust

## **B.2. Excavations and trenches**

There are many kinds of excavation which may be required as part of a WASH programme including pits for latrines, trenches for foundations of sanitary blocks or laying of pipes, sub surface or sand dams and hand dug wells.

All excavations should be clearly cordoned off and community members should be warned against crossing the boundary and approaching them. All excavations whether complete or not should be securely fenced off and covered with a firm, weight bearing material (not branches) when construction is not taking place to prevent people from falling into them. This also applies if leaving an excavation site overnight.

If the trench sides are strutted, do not stand on the struts. If timber is used for supports, make sure it is free from defects. When trenches are excavated by hand do not allow the workers to get too close to each other; people unused to using a pick can easily hit someone else, or even themselves. Mark out a length, say two or three metres, for each worker to dig.

It is easy to under-estimate the dangers of excavation work and risks include objects falling on people working in an excavation, the sides of the excavation collapsing and burying people working in it or people, especially children, falling into excavations.

Deeper excavations carry more risks than shallow ones and where excavations are deeper than 1.2m extra analysis should be carried out concerning the soil types and the nearby presence of water channels which may weaken the walls of an excavation.

If a trench needs to be excavated to a depth greater than 1.2 metres in any material other than solid rock, the following precautions should be taken:

- The sides of the excavation must either be battered (sloped back) to a safe angle of repose or
- The sides of the trench must be supported by a suitable system of timber walings and struts.
- The ground alongside trenches must be kept clear of loose objects
- Heaps of excavated material must be kept well away from the sides of the trench as the weight of spoil heaps can cause the sides to collapse.
- Excavations for pit latrines should be circular where possible as this reduces the likelihood of collapse.
- The advice of a competent engineer or soil mechanic must be sought.

### B.3. Hand Dug Wells

Wells dug by hand are often deep; the deeper they are, the more potentially dangerous they can be and the greater the possibility of accidents. They can be dangerous both during and after construction. Whilst many of the risks associated with the construction of hand dug wells are the same as those for any excavation there are some things which are worth noting specifically, giving hand dug wells their own section in this document. However these guidelines are applicable for any deep excavation.

Accidents can occur either from lack of awareness of the possible dangers or, particularly in areas where there is a local tradition of digging wells, by familiarity breeding carelessness. The commonest causes of accidents are:

- objects falling down the well onto people.
- the sides of the well collapsing during construction.
- the use of poor equipment.
- asphyxiation, either because all breathable air has been used up, or because poisonous gases have been released from the ground in which excavation is taking place or from engines being used during construction.

Separate notes are given below on each of these possible causes.

The construction of hand dug wells should be planned carefully in advance and a method statement should be produced which sets out the construction techniques to be used and the safety procedures to be followed. All of this should be explained to the people involved in carrying out the work, before any work starts.

Factors to be taken into account when planning the work should include the following:

1. The type of ground.
2. The probable depth of the water table.
3. How long the work will take.
4. Seasonal factors.
5. The type of labour to be employed (for example, bearing in mind the desirability of community involvement, whether local labour will be suitable or whether outside specialists will be required because of construction techniques or safety factors).
6. The need to provide training to supervisors and workers.

The following notes describe various dangers, and safety precautions, which should be considered both during construction and after the well has been completed. **WaterAid recommends the Practical Action publication Hand Dug Wells and Their Construction (S.B. Watt and W.E. Wood, 1979, reprinted 2007) for further reference on well construction methods.**

### **B.3.1. General safety points**

1. There should be a competent person in charge of the construction of a hand dug well. A “competent person” is deemed to be someone who has received safety training appropriate to the tasks undertaken. This person must be present when work is being carried out and should inspect the well daily for the presence of defects and hazards.
2. There should be a signalling system for the raising and lowering of material and workers which is known to all persons concerned with operating it. When work is proceeding in a well shaft an alert person should always be present at the top of the shaft, to watch for dangerous occurrences and to guide the operator of the winch.
3. At any stage of work in a hand dug well it must be possible to haul an injured person inside the shaft to ground level quickly; anyone working in the excavation should wear a safety harness to which can be attached a rope leading to ground level. (If an excavator can be persuaded to work with the rope attached, so much the better). The safest way to get in or out of a well is to use a bosun’s chair. Anyone ascending or descending inside the shaft by means of ladder, rope or step-irons, during construction or afterwards, should be attached to a safety rope held securely by someone at ground level who is taking in the slack. The rope should pass through, or over, a device which would grip it should the person in the well fall (a simple example of such a device could be a short length of galvanised iron pipe, fixed horizontally to the head frame, over which the rope laps once or twice before being held at ground level).
4. Explosives must only be used by competent, fully trained persons who are aware of the dangers associated with their use. The use of explosives must be authorised by the Country Director. In any country there are likely to be regulations about the use and storage of explosives, which must be observed. Normally, explosives will be stored underground, in a locked chamber; detonators must be stored separately from explosives.
5. No one must be allowed to urinate or defecate inside the well shaft; either a latrine bucket must be lowered or workers must emerge from the shaft for these purposes.
6. When completed, the lining of the upper well shaft should be water-tight, to prevent polluted ground water from entering the well and contaminating it.

### **B.3.2. Dangers during and after construction**

The possible dangers and precautions needed to be taken during and after the construction of hand dug wells are discussed under the following headings:

1. Avoiding falling objects
2. Preventing the sides of a well excavation collapsing during excavation from ground level to water table.
3. Preventing the sides of a well excavation collapsing during excavation below the water table
4. Avoiding asphyxiation
5. Preventing people and objects falling into the well

### **B.3.2.1. Avoiding falling objects**

Falling objects can injure people, or kill them.

- A fence should be erected around the site and onlookers should be kept away from the excavation.
- A protective kerb should be provided round the edge of the excavation, to prevent objects being kicked in. This can be made of earth or concrete (not loose blocks, which can themselves be kicked in) or timber boards placed on edge.
- Anyone working in the excavation, or descending into it, should wear a safety helmet; its chin strap should always be fastened.
- Tools should be lowered into the well, not carried, in case they drop onto someone below.

### **B.3.2.2. Preventing the sides of a well excavation collapsing during excavation from ground level to water table.**

Extra loading must not be placed on, or near, the edges of the excavation. Therefore:

- Heaps of excavated material must be kept well away from the excavation.
- Heavy materials, such as pre-cast concrete rings or piles of bricks or blocks, should be kept well away from the excavation.
- If a head frame is being used to raise or lower material from or into the well, the loading caused by its feet should be spread by the use of timber bearers; the dimensions of the frame should be such that the bearers are not too near the excavation.

The edges of the excavation may be strengthened by lining the top few feet with blockwork or concrete cast in situ. Such a lining can be extended above ground to form a protective kerb. However, if the well is to be excavated by sinking its permanent lining (methods B and C below) the internal diameter of the strengthening ring must be greater than the external diameter of the permanent lining. Alternatively, if care is taken to ensure that the topmost lining ring is always above ground level, the permanent lining can itself form a protective kerb.

Too much surface water can weaken, or damage, the edges of the excavation; if heavy rainfall is likely, provision should be made to divert storm flows away from the excavation.

Excavators require room in which to work; conditions which are too cramped can contribute to accidents. **Hand Dug Wells and Their Construction (S.B. Watt and W.E. Wood, 1979, reprinted 2007)** recommends 1.3 metres as the normal internal diameter of a finished well that has been dug by hand.

Excavations for wells will generally have vertical sides. Most soils, but not all, will collapse if such an excavation is attempted. It follows that the sides of the excavation must be supported during the excavation. **One of the following safe methods of excavation must be used:**

#### **(A) Chicago tunnelling method:**

Excavating within temporary steel or timber planking which is supported against the sides of the excavation.

Struts would impede the excavators, so the support is likely to be provided by steel waling rings, against which the planking is secured by means of folding timber wedges. The waling rings will need to be in two halves, bolted together, to allow additional rings to be positioned below existing ones.

Care must be taken to ensure that the planking is never unsupported (this might occur if waling rings do not accompany the planking as excavation proceeds) and that it is not allowed to span distances greater than those intended.

Points for and against:

<b>For</b>	<b>Against</b>
Inexpensive	Offers opportunities for error
Makes excavators feel secure	May be ineffective in loose soils or where ground pressure against the planking prevents it from being lowered or raised

Table 2 Points for and against the Chicago tunnelling method of hand dug well construction

**(B) Caisson method:**

By excavating within pre-cast concrete rings or blocks, which sink as the excavation proceeds. If using blocks they should be curved in plan and seated on a separate cutting ring and the length of each should be such that a definite number (probably about ten) will form a circle. They should have holes in them so that successive layers can be fastened together by reinforcing bars which pass vertically through these holes and are concreted into them.



It may be necessary to tie the rings together to prevent them becoming separated as the excavation proceeds.

Points for and against:

Pre-cast concrete rings	Pre-cast concrete blocks
<p>For:</p> <ul style="list-style-type: none"> <li>• Safe.</li> <li>• Speedy, because the rings are pre-cast and can be stored ready for use.</li> </ul> <p>Against:</p> <ul style="list-style-type: none"> <li>• The rings are heavy and require lifting equipment to position them.</li> <li>• Some skill is required to maintain their verticality during excavation.</li> </ul>	<p>For:</p> <ul style="list-style-type: none"> <li>• Safe.</li> <li>• Does not require lifting equipment to install the blocks. (Although this may be required when the water table is reached, to lower pre-cast concrete rings within which excavation can be continued below the water table).</li> </ul> <p>Against:</p> <ul style="list-style-type: none"> <li>• Slow.</li> <li>• To enable later blocks to be threaded onto reinforcing bars cast into earlier blocks it may be necessary to erect staging at ground level; this offers opportunities for accidents, and may cause excessive loading on the edge of the excavation.</li> </ul>

**(C) Method for laterite type soils and solid rock.**

In some soils, such as the decomposed laterite widely encountered in Africa, excavation can often be carried out safely to the water table without need to support the sides. Where this is possible there is likely to be a tradition locally of digging wells in this fashion. **WaterAid only authorises this method of construction where a competent engineer or soil mechanic has certified in writing that ground conditions in the area concerned meet this criteria.**

However, in such cases it is essential to install the well's permanent lining, from water table to ground level, before attempting any excavation below the water table. The lining is likely to be made of pre-cast bricks or blocks, or of concrete placed in situ; any annular space between the lining and the sides of the excavation should be filled with granular material, except for the top few metres where the fill material should be impermeable.

If, in the case of the soil conditions referred to above, it is decided to excavate without a lining then strict instructions must be given, as follows:

1. If there is any noticeable change in the strata through which excavation is proceeding, or if the sides of the excavation appear to be wet, excavation must stop until the well has been inspected by either a competent engineer or soil mechanic, who must decide whether excavation can continue safely or whether the well must first be lined.

2. A maximum depth must be set for each unlined excavation. This may vary from well to well, in the light of information from boreholes, but should not normally exceed ten metres.

### **B.3.2.3. Preventing the sides of a well excavation collapsing during excavation below the water table.**

The permanent lining of the well must be extended below the water table; provision should also be made for deepening the well at a later time should this become necessary.

When excavating below the water table it will be necessary to de-water the excavation to a sufficient extent for the excavators to be able to work. **In most soils this increases greatly the likelihood that any unsupported sides of the excavation will collapse.** It is dangerous, therefore, to attempt to excavate a space below the water table in which to insert, or construct, the permanent lining of the well.

Beneath the water table, excavation can continue safely only within the protection of a pre-cast concrete ring, which is sunk progressively as excavation proceeds. This ring should be either perforated or porous and will form the permanent lining of the well beneath the water table. Its diameter should be suitably smaller than that of the permanent lining above so that the well can be deepened at a later stage by introducing more of the smaller diameter rings and sinking the column of these rings.

(NB. If the permanent lining above the water table is fitted with step irons, allowance must be made for this when calculating the diameter of the smaller pre-cast concrete rings.)

Wells can be de-watered during excavation (or, at least, the inflow of water can be reduced to manageable proportions) by several methods. Pumps powered by petrol or diesel engines must never be used inside shafts (see below).

### **B.3.2.4. Avoiding asphyxiation**

#### **(A) Gas in the excavation**

Before starting work, enquiries should be made as to whether it is thought that any poisonous or inflammable gas is likely to be encountered. Dangerous atmospheres are usually due to lack of oxygen, and consist of nitrogen mixed with varying amounts of carbon dioxide. They can be caused by gases either released from the ground or produced by construction equipment.

Gases in the ground can occur through the following mechanisms:

- Chalk can release carbon dioxide.
- Coal / peat / organic soils can release methane (marsh gas).
- Dry or partially saturated deposits can release "bad air" when the atmospheric pressure drops.

Gases from construction equipment can occur through the following mechanisms:

- Gas or arc welding can produce acetylene; explosives can produce nitrous fumes. Each may cause only minor discomfort at first, but can cause serious illness later.
- Engines or pumps driven by petrol or diesel must **NEVER** be used in wells. The carbon dioxide gas they cause will kill anyone in the shaft within seconds. If they are used at

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ground level their exhaust gases (which are heavier than air and could sink down the shaft) must be diverted well away from the shaft.

Testing for gases and / or foul air should be carried out:

- before entry each day
- before each change of shift
- whenever there is a change in the material through which the shaft is being excavated.

Tests should be carried out using a flame safety lamp, or a candle (but only if there is no danger of inflammable gas)

If the flame dies down or goes out, or if the candle expires, there is insufficient oxygen; if so, no one must re-enter the shaft until the person in charge declares it safe to do so.

Do not use nylon cord to lower the testing equipment because it might generate static electricity which could be dangerous in an explosive atmosphere.

### **(B) Ventilation and supply of fresh air to workers in the shaft**

Workers in a shaft can use up the supply of suitable air quite quickly; only the volume contained in a few feet of shaft above them is available to them. The amount of suitable, breathable, air can be increased by any of the following means:

- The raising and lowering of the skip or kibble being used to remove excavated material.
- The raising and lowering of a bundle of brushwood, as big as the shaft will allow.
- The use of a proprietary air blower, or bellows.
- The use of compressed air, suitably filtered.

The inhalation of dust can cause serious injury to the lungs. If rock is being worked, the generation of dust should be kept to a minimum by keeping the work face damp and dust masks should be worn.

#### **B.3.2.5. Preventing people and objects falling into the well**

- The well shaft should protrude sufficiently far above ground level to make it virtually impossible for children, and difficult for adults, to fall into the well accidentally.
- During construction, as with all excavations (see B.2) the well should be fenced off and the community sensitised to the dangers of allowing children, in particular, to play near the site.
- The well can become contaminated by objects being dropped in, thrown in or blown in. Such contamination should be kept to a minimum by providing a permanent cover across the top of the well, with as small an opening in it as will allow the buckets to be used without difficulty. There should be provision for covering the opening securely when the well is not in use.

If there is only one opening, it should be large enough to allow access should this become necessary.

## B.4. Drilling Operations

Drilling is a very hazardous activity. Drilling operations using mechanical equipment and heavy lifting equipment present particular dangers. In these operations:

- The drilling rig should be set up away from traffic hazards and power transmission lines
- Relevant PPE must be worn (see B.1.3). In this case hard hats are crucial to minimise the dangers of falling objects. Heavy duty boots and eye protection are also recommended.
- Drilling sites can become wet and slippery, care must be taken not to slip and twist ankles.
- Hands must be kept clear of working areas on drilling rigs.
- Ensure loose clothing and long hair are tied back to avoid entanglement in moving equipment.
- Bystanders should be kept back at a safe distance away from the works behind a clearly defined barrier. A community representative can be asked to help control crowds and maintain respect for the barrier.
- Someone with specific training in drilling supervision should be appointed to oversee the works and responsibility for safety clearly laid out in the contract. This supervisor should have basic first aid training.
- The site should be kept tidy to minimise trip hazards
- All pits dug for construction purposes should be filled in after construction

## B.5. Above ground construction

There are many water supply or sanitation systems that require above ground or above water construction, for example, gravity fed water supply, rainwater harvesting tanks and institutional sanitary blocks.

Simple scaffolds will be required to construct these. Scaffolds will be required for a multitude of construction projects such as water tanks on gravity flow schemes and when installing tube wells by the "sludging" method. If the working platform will be more than two metres above ground level, a guard rail should be provided. The platform should be an adequate width for the task to be performed. The material used for scaffolding should be strong enough and should be free from defects. Scaffolds should be braced diagonally.

The access covers in tanks, valve chambers and so forth must be secured so that no one can fall in and no rubbish can enter. (In Nepal, the use of padlocks has been discontinued because children ruin them by forcing material into the keyhole. Instead, a bolt is used with a nut and lock-nut, which requires the use of two spanners to undo it.)

## B.6. Working with faecal sludge

Faecal sludge contains disease-causing bacteria, viruses and other pathogens. Fresh faecal sludge from public toilets and pit latrines contains the highest quantity of infectious organisms. However, sludge from septic tanks also contains bacteria from fresh excreta and a large number of viable worm eggs. In addition to these biological hazards the precautions listed in B.2.2 and B.2.3 should also be applied to sanitation work regarding the collapsing of excavations and the risk of asphyxiation.

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Every effort should be taken to ensure that there is no need for direct contact with the faecal sludge. Where pits are planned to be emptied this means ensuring that the technology used for the emptying provides a barrier between the sludge and the operator. Appropriate training in the use of this technology is very important.

Manual pit emptiers are at high risk of infection from faecal sludge but staff and partners involved in research or monitoring around pit latrines, public toilets or septic tanks should also take the following precautions against exposure.

- Use of appropriate personal protective equipment (PPE) to protect skin from contact with faecal material; this should include gloves, coveralls, rubber boots with a metal sole, safety glasses and safety masks.
- Where possible all staff should have relevant up to date immunisations (e.g. hepatitis A and tetanus)
- Facilities for handwashing should be made available at the point of operation
- Staff and partners should not eat or drink in areas where faecal sludge is stored or processed;
- Limit distances that sludge needs to be transported

## **Appendix C. Safety precautions which MUST be observed by WaterAid staff and which are RECOMMENDED to local partners and anyone else involved in work funded by WaterAid**

### INDEX:

- C.1 Fire risks
- C.2 Use of motor vehicles
- C.3 Use of petrol or diesel engines
- C.4 Use of air-driven tools
- C.5 Provision of first aid kits and first aid training
- C.6 Drilling operations
- C.7 Breaking stones to produce aggregate

### **C.1. Fire risks**

Fires can occur in district offices, stores, domestic buildings, motor vehicles and site installations.

The major causes of fire are:

- electrical faults or over-loading of circuits
- misuse or faulty installation of LPG appliances
- misuse or poor siting of heating appliances
- clothes draped over heaters, to dry them

To guard against fire:

1. Office areas and compounds should be cleared of grass and other vegetation and covered with hardcore or other suitable material.
2. Spaces under offices should, if possible, be enclosed. If this cannot be done, the space should be kept clear of rubbish.
3. Buildings with only one exit should not be used as domestic premises or offices.
4. Propane gas bottles, when not in use, should not be stored inside offices or in any confined space; they should be kept in a locked compound, at least 4 metres away from any occupied building, with a fence at least 2 metres high.
5. All gas appliances (cookers, rings, etc) must be fitted with a control tap and the length of hose, from bottle to appliance, should be as short as possible.
6. There should be one fire extinguisher for every 250 square feet of office space.

<b>Place of use</b>	<b>Type of extinguisher</b>
Kitchen	Dry powder or CO <sub>2</sub> and fire blanket
Offices with photocopiers and computers	CO <sub>2</sub>



Petrol/diesel tanks	Foam or dry powder and sand
Generators or weld sets	Dry powder or CO <sub>2</sub>
LPG storage	Dry powder

Table 3 Types of fire extinguishers by place of use

7. Fire extinguishers should be fitted in motor vehicles and provided in domestic accommodation.
8. Fire extinguishers deteriorate; they should be serviced yearly.

## C.2. Use of motor vehicles

Accidents associated with driving, particularly at night, are common. To reduce the likelihood of accidents occurring, and to reduce the likelihood of injury should accidents occur:

- Seat belts should be fitted and should always be worn when driving or being driven.
- Journeys should always be planned to be completed during daylight hours. Driving at night should be avoided in all but very exceptional circumstances.
- To avoid fatigue, consideration should be given to employing a driver.
- Vehicles should be equipped with a fire extinguisher, a first aid kit and a purpose-made tow rope.
- Vehicles should be maintained regularly by someone competent to do so.
- Before each journey a standard check should be made of the FOLWTB type (Fuel, Oil, Lights, Water, Tyres, Brakes)
- A vehicle's load must be properly secured.

Accidents can occur during even quite simple repair operations. Therefore:

- Do not run the engine in a confined space.
- Do not wear a tie when working on an engine.
- Do not jack up a vehicle on a soft or uneven surface.
- If working beneath a vehicle, do not rely on jacks to keep the vehicle off the ground; axle stands or some other robust means of support must be used.
- If the vehicle is stationary on a slope, wheel chocks must be used before maintenance / repair work is attempted.

## C.3. Use of petrol or diesel engines

When using petrol or diesel engines the following precautions should be taken:

- If an engine requires the use of a starting handle to operate, staff should be instructed in the safe way of doing this (when starting up a diesel engine by hand there is a considerable risk of accidents from the kick-back of the starting handle following a back-fire; this can be minimised by gripping the starting handle with the fingers but not the thumb, which should be on the same side of the handle as the palm).
- In any country there are likely to be regulations about the storage of petrol, which should be observed. Petrol should be kept in a store in an isolated position, with no source of

ignition in it. The store should be, as far as possible, fire proof and should be equipped with a suitable fire-extinguisher.

- Petrol should not be used in a confined space; nor should petrol or diesel engines, because of the deadly carbon monoxide gas they produce.
- Petrol should not be used to start a fire, nor should it be thrown on a fire.
- Hands should not be washed in petrol.

## **C.4. Use of air-driven tools**

When using tools operated by compressed air, the following precautions should be taken:

- All spindles, drive shafts, fan blades, fan belts, etc. on all compressors must be guarded completely.
- Before any air tool is used, the air line should be inspected to make sure it has no splits or holes.
- All joints on air lines must be made with properly matched connections; improvisations must not be permitted.
- The air supply to a tool must be switched off if the tool is left unattended, before it is disconnected, when it is being transported or when it is being repaired.

## **C.5. The provision of first aid kits and first aid training**

The number of workers on a typical rural water supply project is probably fewer than the minimum number for which there will be any statutory requirement to provide first aid facilities. However, such sites are likely to be far away from the nearest medical post or doctor and so the provision of some simple medical supplies and some training in their use could be more important than usual.

WaterAid insists that a basic first aid kit (see below) is maintained in each of its offices and in each of its vehicles and that WaterAid's staff are trained in its use.

WaterAid also expects its Country Directors to make recommendations to partners on the provision of first aid kits on project sites and training on their use. Such recommendations would include the suggestion that, on every project site, the supervisor who is resident there during construction work should know how to summon medical help, if it is available locally and quickly, and, if it is not, where to take the victim of an accident for treatment and how to get there.

The commonest accidents (see Introduction) are due to:

- Persons falling.
- Objects falling on to persons.
- Persons striking objects.
- Lifting or carrying heavy loads.
- Using hand tools.

Other ways accidents occur include:

- In excavations, through the collapse of earth.
- In hand dug wells, asphyxiation due to lack of oxygen or the presence of poisonous or explosive gases.

First aid is the immediate and temporary care given to the victim of an accident.

Appropriate training to be given to supervisors would cover the first aid to be given to deal with cases of:

- Crushed or broken bones or joints.
- Severe external bleeding, such as from an artery.
- Less severe external bleeding.
- Unconsciousness.
- Respiratory failure.

The contents of first aid boxes should match the skill of the persons likely to be administering the first aid. A simple first aid box might contain:

**For deep wounds:**

5 aseptic individual dressings (dressing packs), which should not be opened until immediately before use.

**For superficial wounds:**

- 15 plaster dressings of medium size, each covered with gauze to be removed before use (instructions for use with every 3 dressings).
- 1 small bottle of antiseptic solution and 1 small pack of cotton wool for cleaning wounds
- 1 small bismuth burn bandage.
- 1 triangular dressing, with instructions for use printed on it.
- 6 finger stalls.
- 6 safety pins.
- 1 pair of scissors.

A first aid kit must be constantly maintained – if anything is used it must be replaced as soon as possible.

## **C.6. Breaking stones to produce aggregate**

The breaking of large stones into small stone chips or 'aggregate' for concrete, using sledge hammers and masons hammers, is a common activity on many project sites. The safety risks of this activity are twofold, namely:

- Damage to an eye from flying stone chips
- Damage to fingers if smaller pieces of stone have to be held in place by one hand whilst being struck with a masons hammer.

Where stone breaking for aggregate is required on a project site, the following precautions should be taken:

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- The potential dangers of the activity should be explained to partners and, through partners, to workers involved in the activity.
- Safety goggles should be provided to anyone involved in stone breaking.
- Stone holding tools (a metal ring with a handle within which a stone may be confined whilst being hit by a hammer) should be provided to anyone involved in stone breaking.

## **Appendix D. Other suggested safety precautions for consideration**

The staff of WaterAid's local partners are recommended to consider the following safety precautions on construction projects, where appropriate. WaterAid considers these safety precautions to be desirable rather than mandatory, primarily because of the practical difficulties associated with ensuring their enforcement in practice.

### INDEX:

- D.1 Tidiness on project sites
- D.2 Use of hand tools
- D.3 Lifting heavy loads by hand
- D.4 Use of scaffolds
- D.5 Working over water
- D.6 Use of hand-operated winches
- D.7 Use of ropes and chains
- D.8 Handling medical waste and sanitation at healthcare facilities

### **D.1. Tidiness on project sites**

Many accidents are caused by people tripping over, or colliding with, objects which they had not noticed.

Project sites should be kept neat and tidy; materials and equipment should be stored properly and scrap material, waste and debris should be removed at frequent intervals.

### **D.2. Use of hand tools**

Avoid poor quality tools; blunt saws and chisels can be more dangerous than sharp ones.

The cutting edges of tools should be kept sharp; when not in use, and when being carried or transported (especially on a bicycle), they should be kept in sheathes.

Do not economise on cost by buying, for instance, hammer heads without shafts. People will fit makeshift shafts or handles of poor quality; either these will break or, more likely, the head will be inadequately fastened and will fly off and hit someone.

Shovels used to mix concrete by hand can be made dangerously sharp quite quickly by the abrasive action of the sand and stones.

Bare toes can easily be cut off by a sharp shovel or injured by a pick; protective footwear should be considered, although it should be realised that in some communities such articles may well be kept for special social occasions.

People can injure themselves, and others, by using tools with which they are not familiar. Simple trade tests should be considered, to find out whether more training is necessary before someone is allowed to use a tool.

Spanners or wrenches used for tightening or loosening nuts should be of the correct size; attempts should not be made to adjust the size by inserting a nail or other object. Spanners with worn jaws should be taken out of service.

Hand tools should not be left lying around in places from which they might fall and injure someone below.

### D.3. Lifting heavy loads by hand

Injuries can easily be caused by attempting to lift, or move, heavy objects. No one should be required, or allowed, to lift or carry loads which are so heavy that they might injure them.

Some countries have legislation governing the maximum weights which can be carried though some countries have no such legislation.

For loads that will be carried regularly, the following guidelines should be considered, although it must be recognised that in countries with a tradition of carrying heavy loads it is likely that local people will know their own capabilities and will set their own standards.

Weight (in Kg)	Action
Below 16	No special action.
16 - 34	Procedures should be set up to identify persons unable to carry such weights regularly without risk.
34 – 55	Unless regular handling of such weights can be limited to trained individuals, suitably supervised, mechanical handling should be used.
Above 55	Use mechanical handling systems.

Table 4 Actions required to lift given weight

Successful lifting depends on the skilful use of the right muscles, not on brute force. The correct position for lifting is:

- Back straight.
- Chin in.
- Arms close to the body.
- Feet slightly apart.

When lifting:

- Bend knees and lift with the legs.



- Grip with palms of hands, not first fingers.
- Avoid lifting from floor level or above shoulder height, especially heavy loads
- Keep the heaviest side of the load next to the body.

In general:

- Size the job up; look for jagged edges, etc.
- Ensure clear access.
- Beware of slippery surfaces.
- Instructions to be given by one person only.
- Adjust storage areas to minimise the need to carry out such movements
- Consider how you can minimise carrying distances

Unloading from a lorry:

- A platform can help by reducing the distance from lorry to ground.
- Ramps can be useful, but they must be strong, well supported and chocked to prevent slipping.
- Make sure there are enough people to do the job.

## **D.4. Working over water**

When working over, or adjacent to, water there is always a danger of falling in, being carried away by the current, or drowning. Precautions to take are:

- Working platforms must be made secure; to avoid tripping, they should have flat surfaces and should be kept clear of tackle, tools and other obstructions.
- If high winds or swells are likely, toe boards, guard rails and hand ropes should be fitted.
- Safety nets or safety belts should be available and should be used when necessary.
- Life jackets should be worn.
- Lifebuoys, fitted with grablines and an adequate length of lifeline, should be placed in strategic positions.
- Consideration should be given to having a rescue boat nearby which, if provided, should be manned when work is in progress. The boat should be of suitable size and power and its crew should be competent. It should not be used as a workboat.

## **D.5. Use of hand-operated winches**

Hand-operated winches where the drum is rotated by a crank handle, either directly or through a toothed transmission mechanism and gearing, have two main sources of danger:

1. The engaged transmission may become disengaged by accidental displacement of the gear shaft, so that the load descends freely, and
2. The crank handle may kick back, and break the arm of the operator.

There should be a built-in kick-back preventer. The simplest consists of a ratchet wheel in which a pawl is inserted while the load is raised. However, this is effective only during raising the load and

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must be removed while lowering it. Preferable are kick-back preventers which allow the pawl to remain engaged during lowering; these have a clutch, either between the handle and the ratchet wheel or between the ratchet wheel and the driving shaft, which works automatically in such a way that while the load is being raised, or held, the pawl is engaged, but the handle is disengaged while the load is being lowered. Thus during lowering the handle is kept still and the load is held by the brake.

If the handle has a revolving sheath which is gripped by the operator while using it, care must be taken that there is no point where a hand could be nipped and injured.

Winch drums must have rims to prevent the rope coming off. The size of winch drum must be suitable for the length of rope to be used; at maximum lift there should be at least 2 turns of rope left on the drum and, when fully wound, the top layer of rope should be at least 2 rope diameters below the top of the rim.

Hoist ropes should be steel wire ropes. To prevent damage to them the diameter of the winch drum should be at least 20 times that of the rope and the diameter of the pulley should be 22 times that of the rope.

## **D.6. Use of ropes and chains**

Ropes may be wire ropes or fibre ropes. When new, they should bear durable identification particulars and the maximum permissible load for the rope should be known.

No rope should be lead over sharp edges, or have a load attached directly to it for lifting or have a load imposed on it greater than the maximum permissible load. Only ropes in one piece should be used as hoist ropes on winches.

Wire ropes should not be bent sharply at any point and loads should not be allowed to rest on them on the ground. They should not be allowed to rust and should be lubricated regularly, using recommended lubricants.

Fibre ropes should be stored in dry, well-ventilated places and protected from corrosive substances. They should be dried before they are stored and should be hung on round pegs or brackets, not left on the floor.

A rope that is in a dangerous condition should not be used.

A fibre rope should be considered to be in a dangerous condition if it shows crushing, unravelling, broken strands, large numbers of yarn breakages or damage due to damp storage or corrosion. The appearance of powdered hemp when the rope is coiled is a bad sign.

A wire rope should be considered to be in a dangerous condition if a strand is broken, or there are bulges, signs of crushing, sharp kinks, internal or external rusting or many broken wires.

If testing facilities exist, chains should be tested at regular intervals, should have test certificates and should be marked with the maximum permissible load.

When hoisting with chains or chain slings, they should not be knotted or lead over sharp edges or stretched so that they are damaged. Twisted chains should be untwisted before they are used.

A chain should be taken out of use in any of the following circumstances:

- if it is known, or suspected, that it has been over-loaded
- if it is visibly damaged
- if the whole of it, or one link, has stretched by 5% or more
- if the original link thickness has diminished in any place by more than 10%

## **D.7. Handling medical waste and sanitation at healthcare facilities**

Around 15% of medical waste is considered hazardous material that may be infectious, toxic or radioactive. At medical facilities, a simple **three bin segregation system** (sharps, infectious waste and general waste) is an efficient first step that reduces the most important risks drastically. Ideally no staff should come into direct contact with medical waste. Personal Protective Equipment should be used at all times in situations where this is necessary.

The wastewater from healthcare facilities can be more hazardous than household wastewater. The preferred set-up is to construct separate sewerage systems for wastewater and stormwater and where possible pre-treatment should be carried out prior to discharging any wastewater to any sanitation system. Reuse of treated healthcare wastewater should only be considered if high quality testing can be carried out and if the system will be very highly regulated. Latrines at healthcare facilities should ideally not require manual emptying. Extra care should be taken if this becomes necessary. See B.5.

## Appendix E. Guidance for Country Directors when drafting a country policy

The country policy should have several sections, each of which should be relevant to the particular types of activity which WaterAid supports in that country. The contents will be much the same as those outlined in Appendix B, C and D, but the tenses will need to be changed: instead of stating that something "must" be done, or "should" be done, the country policy will state that it "will" be done. The policy should have the sub-sections listed in the template below.

### Country Programme policy template

#### Cover sheet:

The policy should have a cover sheet with a title that clearly states the scope of the policy. For example, perhaps the title could read as follows:

WaterAid in (name of country) policy on Health and Safety within WaterAid funded construction projects.

The cover sheet should also detail:

- The name of the author
- The name and signature of the person who approved the policy (Head of Region)
- The date the policy was approved

#### Section 1: Policy statement.

This should state WaterAid's intentions in the country. It is likely to be very similar to the policy statement in this document, perhaps something like this:

WaterAid in (Name of country) regards Health and Safety as an integral part of the operations which it supports and intends to take all reasonably practicable measures to ensure the health, safety and welfare at work of all its employees, those of its local partners and others who may be affected by the activities which it supports.

WaterAid's principal aim is to prevent accidents which result in:

- I. the injury or ill-health of any person
- II. damage to, or destruction of, property
- III. operations having to cease
- IV. any other incident which may have a detrimental effect on the efficiency or reputation of WaterAid

#### Section 2: Legislation and references

As a minimum WaterAid activities in country must comply with local legislation. This section should be completed by each Head of Country Programme. The example below is taken from the Ugandan Occupational Health and Safety Act 2006.

Country			Date of issue	
Legislation	Regulation	Requirement	Person Responsible	WaterAid Status
Occupational Health and Safety Act 2006.	Part VIII Section 56 Paragraph (11)	Excavations (fencing)	Programme Partners	Advisory

Possible sources of information on legislation useful in completing this section include:

- Government ministries in the country itself
- The International Labour Organisation country profiles at [http://www.ilo.org/dyn/natlex/country\\_profiles.home](http://www.ilo.org/dyn/natlex/country_profiles.home)
- WaterAid's Programme Support Unit
- Partner organisations.

### Section 3: Organisation and responsibilities

This section should list each member of WaterAid's staff in the country and should state, for each staff member, their individual responsibilities for matters of Health and Safety.

Activity	Requirement	Person(s) Responsible
Updating and communicating policy	Determining whether there are particular statutory requirements, and updates to these, regarding Health and Safety issues that should be incorporated or addressed by the Health and Safety Policy.	Name of person(s) responsible
	Developing the Country Health and Safety Policy and supporting guidance with regard to: <ul style="list-style-type: none"> <li>• Field environment and construction activities</li> </ul>	
	Communicating the contents of site Health and Safety Policies to all WaterAid staff and partners involved in construction activity within WaterAid funded projects.	
	Making available the Organisational Policy On Health and Safety Within WaterAid Funded Construction Projects and the country policy to WaterAid's local partners, explaining the issues involved, ensuring understanding is	

Activity	Requirement	Person(s) Responsible
	achieved and appropriate implementation activities are undertaken.	
Implementation of policy	Implementing the WaterAid Country Health and Safety Policy with regard to:  Field environment and construction activities	
	Provision of support to local partner organisations in implementing the Country Health and Safety Policy with regard to their own activities.	
	Allocation of resources including finance, people and time to ensure that Wateraid activities are carried out in a safe manner.	
	Effective planning of programmes to ensure that projects are delivered in a safe way.	
Risk Assessment	Conducting assessments of significant risks to the Health and Safety of WaterAid employees and ensuring actions are completed.	
First Aid	Providing first aid, in the event of an injury or accident (in the office and in the field); maintenance and re-supply of first aid supplies and emergency equipment.	
Accident Investigation	Reporting accidents.	
	Conducting and recording the results of investigations of accidents involving WaterAid employees.	
Record Keeping	Maintaining a register of health and safety related deadlines e.g.  renewal dates for insurance policies  first aid equipment expiry dates  Ensuring that timely notification of these dates is provided to the member of staff responsible for the relevant item.	
	Recording and cataloguing all reported accidents and Health and Safety related incidents, involving WaterAid staff, partners staff or staff of agencies or companies	

Activity	Requirement	Person(s) Responsible
	contracted to programme or project work, and others directly affected by such programme or project work.	
	Reporting what they see as unsafe items or activities in the office, in the field or on site.	All
Training	Organization of Health and Safety training.	
Monitoring	Monitoring the compliance of WaterAid's staff with the provisions of the WaterAid Health and Safety Policy.	
	Ongoing monitoring of the implementation of the WaterAid Health and Safety Policy on construction sites by WaterAid and partner organisations where appropriate.	
Review	Annual review and, if necessary update, of the country programme construction Health and Safety Policy.	
Audits	Auditing individual projects to assess WaterAid and partner compliance with procedures.	
	Audit country programme H&S systems to ensure legal compliance and adherence to WaterAid procedures	
	Carry out annual safety reviews with WaterAid and partner staff involved in construction activities.	

(If, as a result of encouragement from a Country Director, WaterAid's local partner were to write its own Safety Policy, this section in it would include the responsibilities of the partner's field staff.)

#### **Section 4: Training**

Details should be given of what training will be made available to WaterAid's staff and to the staff of its local partners in the country. Guidance on training can be found in section 2.5 of this policy document.



## **Section 5: Types of construction work to be supported**

This section provides a checklist for the Country Director to ensure that all types of construction work have been considered and covered in the country policy document. It is only necessary to list the types of construction work undertaken by your Country Programme.

## **Section 6: Safety precautions which MUST be observed by everyone involved in work if it is to be funded by WaterAid.**

This is one of the most important sections of the country policy. If any of the work which WaterAid supports in the country is featured in Appendix B to this document, then this section of the country policy should state:

- The type of work to be supported
- How it will be carried out
- Which safety precautions will be observed

In drafting this section, the Country Director will need to refer carefully to Appendix B to this document and select the construction methods and safety precautions which are relevant to the work in the country.

## **Section 7: Safety precautions which MUST be observed by WaterAid staff and which are RECOMMENDED to local partners and anyone else involved in work funded by WaterAid.**

In drafting this section, the Country Director will need to refer carefully to Appendix C to this document and select the safety precautions which are relevant to the work in the country.

## **Section 8: Other suggested safety precautions for consideration.**

In drafting this section, the Country Director will need to refer carefully to Appendix D to this document and select the safety precautions which are relevant to the work in the country.

## **Section 9: Monitoring**

This section should outline details of how implementation of the provisions made in the country policy will be monitored. It should also state who will carry out this monitoring and how details concerning compliance will be passed to the Head of Region.

## **Appendix 1: Accident report**

Attach accident reporting form (copy from Appendix A of this document).