



Stay Safe

Health and safety on
reconstruction sites

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Cover illustration: Lewis Kelly, 2019

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..... Stay Safe: Health and Safety on Reconstruction Sites
..... 04/2020
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Stay Safe

Health and Safety on
Reconstruction Sites

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Acknowledgements

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Graphic Design: Lewis Kelly

This project was self-funded, with in-kind contributions from both ETH Zürich–Chair of Sustainable Construction and IFRC-Shelter Research Unit.

Guidance Note

What is the scope of this guidance?

These guidelines provide an essential preparatory and operative checklist for health and safety control on small reconstruction sites. They are intended to help reduce and avoid manageable risks, and to guarantee the health and safety of all people working under staff supervision, from consultants to those affected by disaster. The topics are listed according to their importance for the prevention and reduction of accidents, and impact upon the minimisation of negative health consequences.

Who is this guidance for?

The International Federation works increasingly in natural disasters and in complex and rapidly changing political and social environments. In such contexts, promoting awareness of basic safety measures is important to ensure the safety and well-being of all Red Cross and Red Crescent personnel, whether they are Federation-employed delegates, staff-on-loan, local staff during working hours, volunteers working with the International Federation, visitors, consultants or family members accompanying delegates. The focus of this guidance is on sharing good practice for the management of small building sites, aiming at improving health and safety practices of small communities, to reflect, simplify, and apply professional practice to local community interventions.

‘Stay safe: Health and Safety on Reconstruction Sites’, together with the accompanying IFRC publication ‘International first aid and resuscitation guidelines 2016’ provides the necessary tools to implement and maintain a basic safety framework adaptable to any specific context.

Refer to:

» *IFRC, (2016). International first aid and resuscitation guidelines.*

1. Introduction

The International Federation, through its senior field managers, has an obligation to ensure that its operations are conducted within an effective security framework.

This requires managers to understand the environment they are operating in, to conduct a robust risk assessment and to develop sound security plans that mitigate those risks. It is not sufficient however to simply develop plans: managers must implement and oversee operations in accordance with such plans, while actively promoting safety measures' enforcement. This requires all personnel to understand and master the security framework.

Safety measures will be most effective when field managers nurture daily safety and health culture in their operations. Safety must become an integral element of any implementation rather than a side consideration, so as to become a habit for all individuals involved in reconstruction projects.

The IFRC-Shelter Research Unit in collaboration with ETH Zürich – Chair of Sustainable Construction designed this guidance to assist managers by providing a set of basic rules for the establishment of an effective operational security framework, which can be easily adopted by all individuals involved in reconstruction works and further communicated down the line or to newcomers.

This manual is part of a toolkit, completed by a safety and threat checklist, a training module, and supporting illustrations to be distributed in the field.

To distribute these illustrations on site, **print out the accompanying posters** at a large scale and place them in visible locations, to make them available for those who don't have access to the guidelines.

1. Introduction

1.1 Non-fatal Injuries

The building sector continuously exposes its workers to threats and risks due to the nature of tasks performed, which can involve heavy loads, physical stress and interaction with blades, chemicals and the possibility of falling from heights. This has resulted in the sector having the highest fatality rate among any other, followed by transportation and agriculture. Most of the accidents affecting construction workers can be avoided, and it is often the worker's responsibility to manage the threat and implement safety measures in order to reduce risks.

Due to the variety of accidents leading to severe injuries, spanning from slipping to handling and falling, it is important to be aware of all the threats posed by working on a building site, and act accordingly.

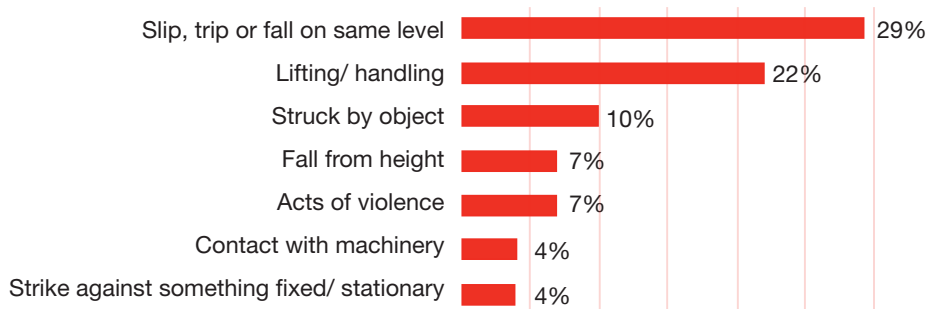


Fig. 1 Non fatal injurers to construction workers by most common accident types, Heath and Safety Executive HSE 2016

Individuals operating in this sector often are not aware of the risks they face while working on a construction site. Moreover, although it is not possible to have a precise figure due to their informal nature, construction sites in low-income countries are far more dangerous than in industrialized countries where regulations are more likely to be enforced.

Refer to:

- » *BLS, Bureau of Labor Statistics (2007). National Census of Fatal Occupational Injuries in 2006*
- » *Health and Safety Executive, (2006). Health and safety in construction.*
- » *Sawacha et al. (1999). Factors affecting safety performance on construction sites. Int J of Proj Man. 17(5):309-315.*
- » *ILO, (1999) a. ILO Estimates Over 1 Million Work-Related Fatalities Each Year*

1.2 Roles and responsibilities: Project Manager

The Project Manager is in charge of the planning and execution of the reconstruction. Depending on the kind of reconstruction, he/she might be assisted by a specialist in a certain area of the construction industry, for example a carpenter, or likewise might only hire unskilled volunteers. In any case, to guarantee that a minimum of health and safety rules are adopted on a reconstruction site, the Project Manager should;

- Be an example of security whenever on site;
- Pass on the most important aspects of this guideline to the supervisor/volunteers;
- Organize and conduct safety training programmes
- Involve the supervisor and/or the volunteers in the planning process as soon as possible;
- Hand out appropriate Personal Protection Equipment (PPE) depending on the task being performed; (see section 12 on PPE)
- Do safety inspections whenever on site;
- Make sure that a complete first aid kit is within reasonable reach (see section 10 on Wellbeing and first aid)

1. Introduction

1.3 Roles and responsibilities: Supervisor

The Supervisor is the one whose main responsibility is the promotion of safety and health. His/ her duties should include;

- The organization and conduct of safety training programmes, including induction training for all volunteers who will work on reconstruction sites;
- Participating in pre-site planning and risk assessment;
- Making sure that working conditions and equipment are safe;
- Making sure that necessary Personal Protective Equipment (PPE) is available and used;
- Doing safety inspections (workplace safety measures are implemented) whenever on site;
- Being an example of security whenever on site;

1.4 Roles and responsibilities: Volunteers

Volunteers in the construction have to be introduced and trained in the health and safety guidelines for construction sites in order to:

- Train the beneficiaries in the topic of health and safety on construction sites;
- Do safety inspections;
- Be an example of security;

1.5 Roles and responsibilities: Workers

Beneficiaries (Workers) are the ones who will rebuild their homes. The Project Manager will give them the necessary instructions concerning the reconstruction guidelines, and will be trained by the supervisor / volunteer on health and safety measures.

The beneficiaries will be involved directly in site meetings and calls, such as:

- “Safety roll call” every morning before starting to work including task assignment and check of PPE (Personal Protective Equipment);
- “Tool-box briefing”, a five- to ten-minute session with the supervisor just prior to starting a task -> talk about safety problems likely to be encountered and potential solutions to those problems;

2. General behaviour on a construction site

When working on a construction site, independently of the role covered, the following procedures should be followed:

- Think before doing any task;
- Ask for help if you do not know how to do a task;
- Avoid working alone;
- Take care of yourself and others;
- Rest if you are tired;
- Do not smoke;
- No alcohol;
- No drugs

2.1 The STOP-principle

The risk management on construction sites is based on the so-called STOP-Principle, which aims to identify possible hazards on site and indicates the appropriate safety measures. The same can be done for specific tasks.

The acronym of STOP stands for:

Substitution: Can dangerous substances be substituted with less or non-dangerous substances?

Technology: Can technical equipment be used and reduce risk at the same time? (Eg. instead of having to carry heavy loads to use a barrow for moving heavy loads around on the construction site).

Organization: Can a better task organization reduce hazards? (Eg. limit the number of people subject to the threat).

PPE: Which parts of the PPE have to be used while performing a specific task? (See the extended PPE section 12).

Refer to:

- » *Healthy Workplaces, (2018). European Agency for Safety and Health at Work - Legislative framework on dangerous substances in workplaces.*

3. Safety of Workplace

3.1 Site layout and housekeeping

Before starting to work on site, the following must be considered:

- The order in which work will be done and to any especially hazardous operations or processes;
- Site security - the site should be fenced in to keep out unauthorized persons and children in particular; the fence should be at least 2 m high and without gaps or holes. Where this is not possible make sure access on site is restricted to workers only.
- Artificial lighting at places where work continues, or workers pass after dark;
- Storage areas for materials and equipment;
- Arrangements to keep the site tidy and for collection and removal of waste (see section 3 on Site Tidiness and 4 on debris and Waste Management);
- Wellbeing facilities as WC, potable and service water, first aid kit (see section 10 on Wellbeing);

Refer to:

- » *Health and Safety Executive, (1997). Protecting the public Your next move.*
- » *Health and Safety Executive, (2006). Health and safety in construction.*
- » *Health and Safety Executive, (2007). Managing health and safety in construction*
- » *Health and Safety Executive, (2017). Health and safety statistics for the construction sector in Great Britain*

3.2 Site tidiness - Housekeeping

An untidy site is the underlying cause of many accidents due to tripping, slipping or falling over materials and equipment, which have been lying around, or due to stepping on nails which have been left projecting from timber. Therefore, be sure to take the following steps:

- ✓ Deposit waste material at a signed disposal point; see section 4 on Waste and Debris disposal.
- ✓ Clean up as you go – do not leave rubbish and scrap for the next person to clear;
- ✓ Keep passages, working platforms and stairways clear of equipment and materials not in immediate use;
- ✓ Cover /protect / fence floor openings and floor holes;
- ✓ Clean up spilled oil or grease;
- ✓ Remove or hammer down any nails you see projecting from timber;

Remember: An untidy site is a dangerous site!

Refer to:

- » *Health and Safety Executive, (1997). Protecting the public Your next move.*
- » *OHSB, (2004). Occupational Safety and Health Branch Labour Department - Safety Handbook for Construction Site Workers*

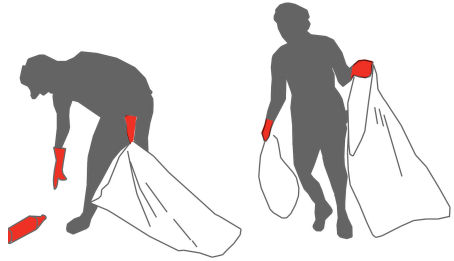
3. Safety of workplace

SITE TIDINESS

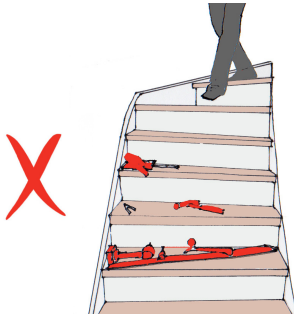
- 1** Deposit waste material at a signed disposal point



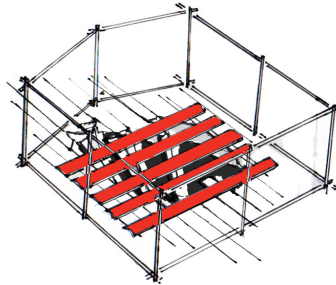
- 2** Clean up as you go



- 3** Keep passages, working platforms and stairways clear of equipment and materials not in immediate use



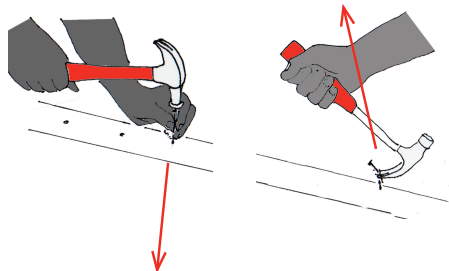
- 4** Cover /protect / fence floor openings and floor holes;



- 5** Clean up spilled oil or grease



- 6** Remove or hammer down any nails you see projecting from timber



4. Debris and waste management

Debris and waste management go hand in hand. Where there is debris there is also waste. Consequently, once what is recyclable has been triaged, the leftover waste must be taken care of.

4.1 Debris management

Debris can be a major hindrance to reconstruction and in addition, it can pose a public health risk if it is mixed with hazardous wastes such as asbestos, oils and chemicals, which is very likely to be the case.

Debris handling provides opportunities as well, including rubble reuse and recycling. In order to circumvent legal issues such as value and ownership, a simple on-site processing of debris is often the best solution, as it allows people affected by the disaster to use their own debris to rebuild, while reducing the capital required for reconstruction.

On-site debris management can be performed as follows:

- ✓ Use the appropriate PPE for separating materials, which can be reused and recycled or upcycled from waste;
- ✓ Organise debris by type, e.g. household items, personal possessions, bricks, broken concrete, wood, roofing, wiring and piping, vegetative matter and other types of waste;
- ✓ Determine if hazardous materials are present and classify them by type;
- ✓ Determine the quantities of different types of material;

4. Debris and waste management

- ✓ Dispose of waste correctly. Asbestos has to be disposed of separately (see section 5 on Asbestos);
- ✓ Prepare material for reuse/recycling for construction:
 - » Clean material which can be reused directly (e.g. bricks);
 - » Break down broken concrete in order to reuse
 - » Prepare wooden boards for reuse (e.g. remove nails);
 - » If there is no direct reuse to be made on site, consider trading with neighbours or selling to constructors
- ✓ Wash hands after working with any kind of debris;

Refer to:

- » *CARE International and ProAct Network, (2004). Quick Guide Post-Disaster Debris Management*

Minimum PPE:

Closed shoes, coated gloves, N-95 respirator, safety glasses when needed)

Optimal PPE:

Toe-reinforced shoes, rubber hard work gloves, P100 filter respirator, disposable apron, safety goggles when needed

4.2 Waste management

It is important to manage waste in a correct way while reconstruction is underway. **Waste management capacity building will rest with the affected community.** In order to undertake waste management correctly, a disposal site is required.

Waste management can be carried out as follows:

- Separate and label waste according to:
 - » Chemical waste
 - » Inflammable waste
 - » Asbestos
 - » Batteries
 - » Organic waste
- Dispose of waste according to specific procedures.
- Wash your hands after disposal

Minimum PPE:

Closed shoes, coated gloves, N-95 respirator.

Optimal PPE:

Toe-reinforced shoes, rubber hard work gloves, P100 filter respirator , disposable apron, safety goggles when needed

Refer to:

- » <https://itemscatalogue.redcross.int/water-and-habitat--6/water-and-sanitation--27/sanitation--95.aspx>
- » *Ashmore J, Bassiouni M, Bjerregard M., (2004). Planning centralised building waste management programmes in response to large disaster*

4. Debris and waste management

- » *Davis J, Lambert R., (1999). Engineering in Emergencies, A practical guide for relief workers.*
- » *Sphere, (2011). The Sphere Handbook | Shelter and settlement standard 4: Construction*

4.3 Human remains management

Even though human remains management is not part of the tasks assigned to the shelter and settlements operations, it is possible for these responsibilities to be encountered in a post-disaster area. If this is the case, **immediately contact the person in charge of mass fatalities management** for the ongoing emergency. Provide him/her with all the required information in order to carry on a respectful and safe management of the body and get notified about the local body identification and collection point.

The real threats associated with human remains disposal are small, as uniquely related to direct contact with human blood, body fluids and fecal materials, that can eventually lead to tuberculosis, HIV or diarrheal disease. Psychological traumas deriving from this operation are possible, and need to be treated seriously.

To act safely, and promote the same precautions among your co-workers:

- ✓ Always use the appropriate PPE when in contact with human remains (boots, gloves). Consider making face masks available (even though not necessary) to reduce anxiety (dead bodies do not spread diseases as commonly thought)
- ✓ Wash hands with soap and water after handling bodies or remains
- ✓ Make body bags available (if not, plastic sheets, bed sheets or anything available) for each body and/or limb to be managed individually.

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- ✓ In order to facilitate later identification, label the bags with time and location of the human remains collection and do not separate the bodies / remains from the attached belongings (ID, jewels, cloths)
- ✓ Ventilate closed spaces where bodies were found
- ✓ Make sure drinking water supplies haven't been contaminated by human remains contact. If so, label them as contaminated and deny the access to them.

DO NOT

- ✗ Do not wipe your face with your hands while disposing remains
- ✗ Do not try to match human limbs
- ✗ Do not proceed with temporary burials or spontaneous storage unless strictly instructed by the responsible of fatalities management of the emergency operation.

For more information on human remains management please refer to the following links:

- » <https://www.icrc.org/en/publication/0858-operational-best-practices-regarding-management-human-remains-and-information-dead>
- » https://www.icrc.org/en/download/file/20079/irrc_866_10.pdf
- » <https://itemscatalogue.redcross.int/food-and-livelihood--3/household--8/cleaning-products--19/garbage-and-rubble-bags--APACBAGP01.aspx>
- » Tidball-Binz M., (2007). *Managing the dead in catastrophes*, pp421-42
- » ICRC, (2004). *Operational best practices regarding the management of human remains and information on the dead by non-specialists*.

5. Hazardous substances

There are two main hazardous substances likely to be encountered on a (re-)construction site: cement and asbestos.

5.1 Cement

Cement is a well-known cause of skin conditions such as irritant and allergic contact dermatitis, and can cause cement burns or ulceration of the skin.

When working with cement:

- ✓ Protect the skin from contact with cement by wearing proper PPE;
- ✓ Immediately wash off any dust or freshly mixed cement that comes into contact with the skin;
- ✓ Be careful with your eyes. If any cement gets into your eyes, rinse them immediately with warm water.

DO NOT

- ✗ Take care not to breathe in cement dust, nor dust created by the surface treatment of hardened concrete (a substance with high silica content);
- ✗ Do not touch your eyes/mouth or exposed skin if handling wet/dry cement

Refer to:

- » ILO, (1992). *Safety and Health in Construction*

5.2 Asbestos

During reconstruction and especially during demolition operations, materials containing asbestos can get damaged, releasing fibres into the air. **Breathing in these fibres can cause serious diseases.** These diseases take a long time to develop and so are not immediately noticeable, though once diagnosed are often too late to treat. Therefore, all exposed individuals need to be protected through acknowledged procedures.

You are likely to find asbestos in the following situations:

- Asbestos cement, which is found as:
 - » Corrugated sheets (roofing and cladding of buildings);
 - » Gutters and downpipes;
- Asbestos insulating board used in a wide variety of places such as:
 - » Structural steelwork;
 - » Cladding on walls, ceilings;
 - » Internal walls and partitions;

Generally, if it is not clear whether a material might contain asbestos, an asbestos expert will need to be appointed to perform a laboratory analysis. In a post-disaster situation such analysis may not be possible due to pressures on time and funding, as well as the availability of experts to undertake the surveys given the scale of the work. For these reasons, it is safer for all on site to assume that the material contains asbestos, and take the precautionary measures necessary in treating it as such.

Refer to:

- » *Health and Safety Executive, (2002). A short guide to managing asbestos in premises INDG223*

5. Hazardous substances

- » *ILO, (1992). Safety and Health in Construction*
- » *ILO, (1999) b. Safety, health and welfare on construction sites*
- » *Shelter Center, (2010). Asbestos in Emergencies: Safer Handling and Breaking the Cycle*

Follow the following rules to limit exposure to asbestos while working with it:

- ✓ Wear PPE, especially a respirator against the dust;
- ✓ Before starting major demolition work, remove material likely to have asbestos. This helps ensure that asbestos is not disturbed and minimises exposure to it;
- ✓ Separate asbestos work areas from other general work areas;
- ✓ Suppress dust by using wet methods of removal (use hand tools, no power tools unless it has ventilation);
- ✓ Bag asbestos waste immediately and dump it at an approved waste disposal site (it cannot be dumped with other waste);

DO NOT

- ✗ Do not breathe in possible asbestos dust;
- ✗ Do not break elements possibly containing asbestos unless properly equipped by PPE;
- ✗ Do not dispose of asbestos with generic debris waste;

For more detailed information on how to deal with asbestos in emergencies:

- » https://www.humanitarianlibrary.org/sites/default/files/2014/02/ProAct-Asbestos_in_Emergencies_03-03-10.pdf

6. Fire precautions

Fire is a threat on any construction site, and the risk of a fire igniting must be kept as low as possible. Good housekeeping, and the awareness and storage of flammable materials will help reduce the risk of fire.

To avoid fire:

- ✓ Control heat by covering and storing materials correctly;
- ✓ Store and move combustible materials (eg. paper, wood, packaging) away from heat sources;
- ✓ Keep fuel in containers until needed;
- ✓ Make sure lights and heaters are switched off at the end of the day / when leaving the work place;
- ✓ Maintain and check your electrical tools and cables daily

In case of fire:

- ✓ Raise the alarm by shouting ‘fire, fire’;
- ✓ Close doors and windows behind you to starve the fire of oxygen
- ✓ Evacuate the area;

DO NOT

- ✗ Do not smoke on site;
- ✗ Do not leave inflammables (eg. wood, paper, paint, cans) near heat sources;
- ✗ Do not leave electrical tools running while leaving the work place

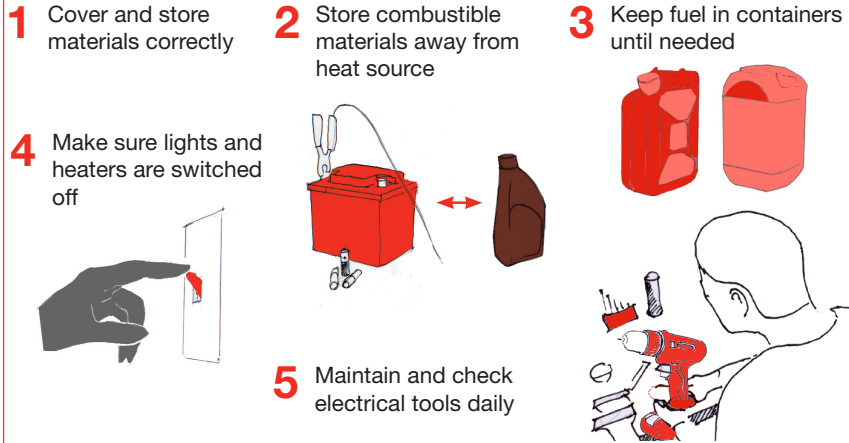
Refer to:

- » *Spillane J., Oyedele L., (2013). Strategies for effective management of health and safety in confined site construction. Australas J Constr Econ Build. 13(4):50–64*

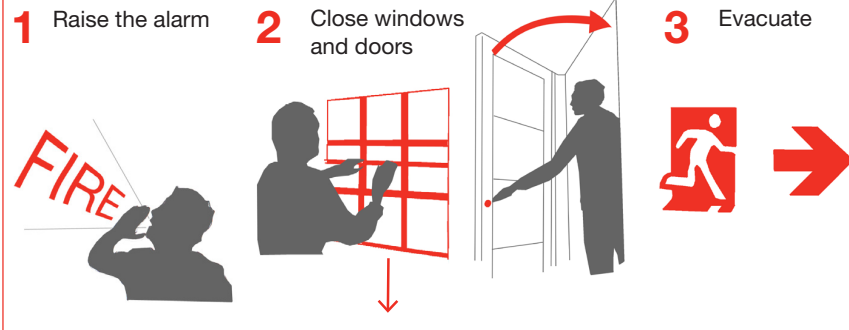
6. Fire precautions

FIRE PRECAUTIONS

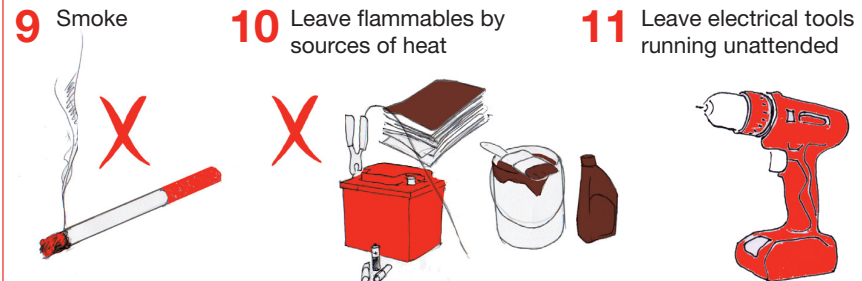
TO AVOID FIRE

- 1** Cover and store materials correctly
 - 2** Store combustible materials away from heat source
 - 3** Keep fuel in containers until needed
 - 4** Make sure lights and heaters are switched off
 - 5** Maintain and check electrical tools daily
- 

IN CASE OF FIRE

- 1** Raise the alarm
 - 2** Close windows and doors
 - 3** Evacuate
- 

DO NOT

- 9** Smoke
 - 10** Leave flammables by sources of heat
 - 11** Leave electrical tools running unattended
- 

7. Working at heights

Falling from height is one of the main causes of death and serious injury on construction sites. Where work cannot be safely done from the ground or from the building / structure being worked upon, it is better to use adequately constructed scaffolding rather than a ladder. Prior to working at height the following rules apply:

- ✓ Properly plan the task;
- ✓ Take account of the weather;
- ✓ Control the risk of falling objects;
- ✓ Inspect the at-height working areas before use;

DO NOT

- ✗ Do not allow any work to be undertaken beneath the at-height working area;
- ✗ Do not purposefully drop any tool or objects from height;
- ✗ Do not perform any task at height if feeling tired or dizzy

Refer to:

- » *ILO, (1992). Safety and Health in Construction.*
- » *ILO, (1999) b. Safety, health and welfare on construction sites*
- » *OSHA, (2013). Fact Sheet Reducing Falls in Construction: Safe Use of Stepladders*

7. Working at heights

7.1 Use of scaffolding

Scaffolding should be erected, altered and dismantled only by trained and competent workers, and under supervision. Moreover, the workers responsible for erecting the scaffolding must check and approve its suitability for use on a daily basis, before others can be allowed to climb upon it.

Check the scaffolding every day before releasing it for use!

Whatever the material used (whether steel, aluminium, wood or bamboo etc.), the principles of safe scaffolding remain invaried:

- ✓ It should provide adequate strength to support the weight and stress which the processes and workers will place upon it;
- ✓ It should be securely anchored or tied to the building;
- ✓ It should be designed to prevent workers and materials from falling:

The following points should be kept in mind while erecting a scaffolding:

- ✓ The space between the edge of the working platform and the face of the building should be as small as possible;
- ✓ Place the uprights of the scaffolding on firm and level ground;
- ✓ The base plates at their feet should rest on timber sole boards, ensuring that the load carried by each upright is distributed over a fairly large area and so prevents the upright from sinking into the ground;
- ✓ Erect secure guard rails and toe boards at every point at which you or material may fall >2 m;
- ✓ Erect scaffoldings up to the lower level of the roof to save anyone who slips down a roof slope;

STAY SAFE: Health and safety on reconstruction sites

- ✓ Use bracings to stiffen the scaffold and to prevent sideways movement (e.g. in zig-zag fashion);
- ✓ The scaffold boards which make up the working platform should rest squarely and evenly on transoms (nail them together), minimising the risk of tripping;

DO NOT

- ✗ Do not allow planks to overhang beyond the structure by more than four times the board's thickness, otherwise it may tip when stepped upon.
- ✗ Do not use materials which can shatter or move as a base plate (e.g. bricks or broken paving stones);

Refer to:

- » *Health and Safety Executive, (2006). Health and safety in construction.*
- » *Safe Work Australia, (2014). General Guide for Scaffolds and Scaffolding Work*
- » *OHS Insider, (2014). Scaffolding Safety Guide*
- » *Buildings Department, (2004). Guidelines on the Design and Construction of Bamboo Scaffolds - Introduction*

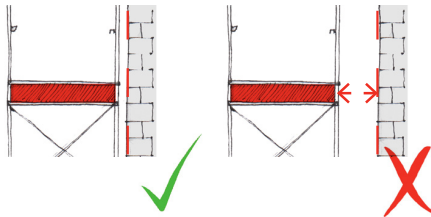
Scaffolding can be made in a variety of materials, such as steel, wood, and bamboo. For more information on how to build a simple low-tech but safe scaffolding with bamboo please refer to:

- » <https://www.humanitarianlibrary.org/sites/default/files/2014/06/bambooScaffolds.pdf>
- » [https://www.labour.gov.hk/eng/public/os/D SafetyGuideBambooScaffolding.pdf](https://www.labour.gov.hk/eng/public/os/D%20SafetyGuideBambooScaffolding.pdf)

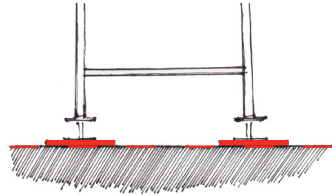
7. Working at heights

SCAFFOLDING SAFE USE

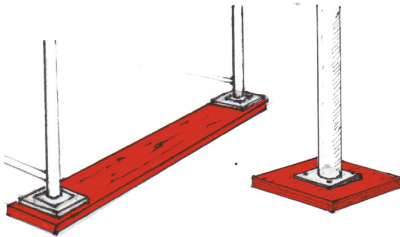
1 Platform close to building



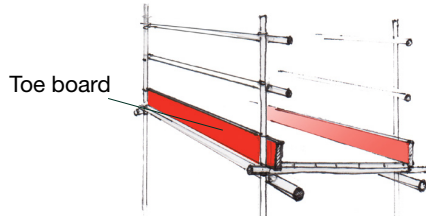
2 Uprights on firm and level ground



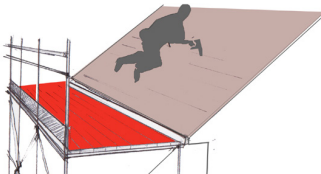
3 Base plates on timber sole boards



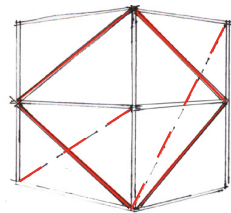
4 Secure guard rails and toe boards where >2m drop



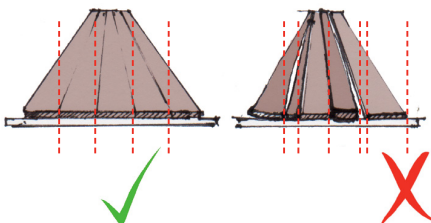
5 Scaffolding to lower level of roof



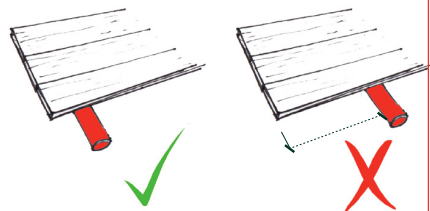
6 Bracing to stiffen the scaffold



7 Even and square scaffold boards



8 Overhangs not more than 4x thickness of board



7.2 Use of ladders

Before stepping on a ladder, erect and secure your ladder as follows:

- ✓ Make sure there are no overhead electrical conductors with which the ladder might make contact;
- ✓ Place the ladder at a safe angle of about 75° to the horizontal, that is about 1 m out at the base for every 4 m height;
- ✓ Foot your ladder on a firm and level base, if the ground is soft, put down a board;
- ✓ If possible, bury the foot of the ladder;
- ✓ Rest the head of the ladder against a solid surface able to withstand the loads imposed on it;
- ✓ Tie or lash your ladder at the top;
- ✓ Make sure that your footwear is free from mud or grease;

The ladder has to be lashed or footed before anybody can climb on it!

While using a ladder:

- ✓ The ladder should extend at least 1m above the highest rung on which you have to stand in order to work, unless there is a suitable handhold to provide you with equivalent support. This reduces the risk of over-balancing;
- ✓ When climbing or descending, face the ladder;
- ✓ Only one person can climb and descend at a time;
- ✓ Only one person can work from it at a time;
- ✓ Make sure one hand is left free while climbing; carrying tools or material up a ladder is difficult and dangerous (fall of the ladder as well as the possibility of dropping items on passers-by)
- ✓ It requires two workers for use – one on the ladder and the other at

7. Working at heights

the bottom – if not lashed at the top. Only effective if the ladder is not more than 5 m in length;

- ✓ Carry your tools in a holster or bag when climbing ladders so as to leave both hands free to grip the stiles;
- ✓ Use a wire rope hoist to carry materials while climbing ladders;
- ✓ Move the ladder in case you would have to overreach -> stops the risk of over-balancing;

Taking care of your ladder includes:

- ✓ Regular inspections and removal of damaged ones from service;
- ✓ Checking timber ladders for splits or cracks, splintering or warping. Checking metal ladders for mechanical damage - look for missing, loose or worn rungs;
- ✓ Properly store ladders after use;

DO NOT

- ✗ Do not climb up/down if somebody else is using the ladder at the same time
- ✗ Do not climb with tools in your hands
- ✗ Do not use the ladder on your own if the ladder is not leashed or footed

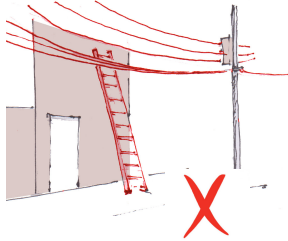
For more information on how to work safely from a ladder please refer to:

- » <https://www.ihsa.ca/PDFs/Products/Id/SPG19.pdf>
- » <https://www.mmu.ac.uk/health-and-safety/manual/pdf/ladders-06.pdf>
- » *IHSA, (2011). Ladder Safety Safe Practice Guide*
- » *Manchester Metropolitan University, (2006). Safe use of ladders and step ladders*

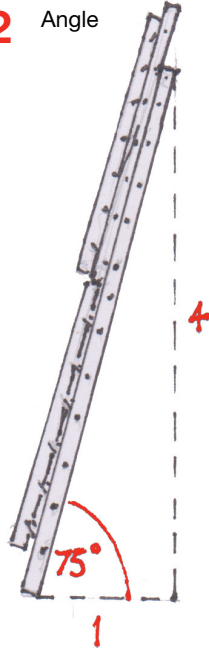
STAY SAFE: Health and safety on reconstruction sites

LADDER SAFE USE

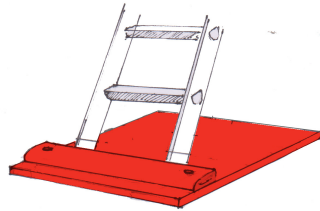
1 Electricity lines



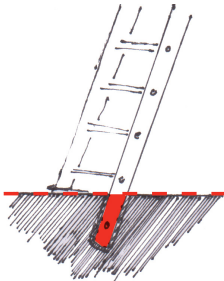
2 Angle



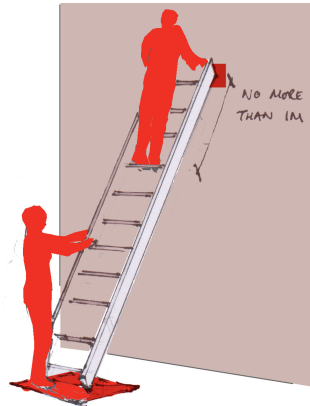
3 Base



4 Dug into ground



5 Top secured

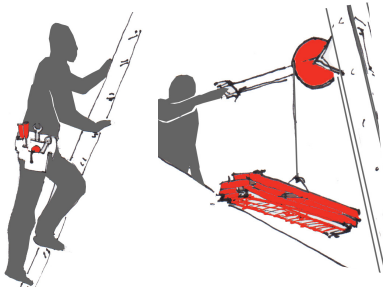


6 Clean footwear



7 Face ladder, one at a time on ladder

8 Toolbag and hoist



9 Don't overreach, move ladder



7. Working at heights

7.3 Roof work

While working on roofs the main three hazards are; falling from the edge of roofs; falling through openings in roofs; and falling through fragile roof material. Therefore, in order to minimize the risk of a fall, act accordingly:

- ✓ Make sure you know which parts of the roof may be fragile (e.g. rusted corrugated iron sheeting, unreinforced insulating slabs and asbestos cement sheeting). If in doubt, use at least two crawling boards or roof ladders (one is available to stand on while you are moving the other one);
- ✓ Use roof ladders or crawl boards in order to spread the load of your weight while moving up and down the roof slope;
- ✓ Move materials and tools up by line;
- ✓ Erect guard-rails and toe boards to protect and mark edges and openings on a roof (from a height of 2 m);
- ✓ On a large roof where work does not have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided. Such barriers should be positioned at least 2 m from the edge.

DO NOT

- ✗ Do not work on the edge of the roof;
- ✗ Do not stay on the roof unless you are working there;
- ✗ Do not overreach;

For more detailed information on working at heights please refer to:

- » https://www.sitesafe.org.nz/globalassets/guides-and-resources/best-practice-guides/best_practice_guidelines_for_working_at_heightnz.pdf
- » *Health and Safety Executive, (2008). Working on roofs INDG284*

STAY SAFE: Health and safety on reconstruction sites

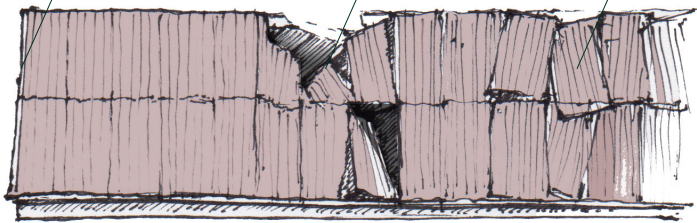
ROOF WORK

3 MAIN HAZARDS

1 EDGES

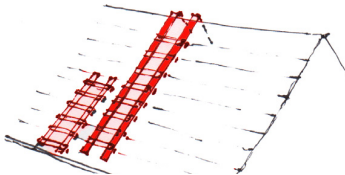
2 OPENINGS

3 FRAGILE MATERIAL

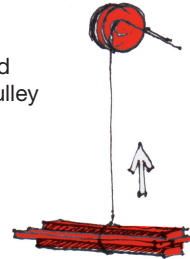


WORKING AT HEIGHT

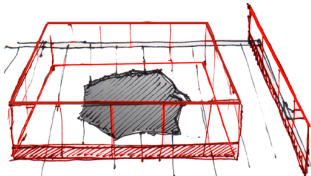
1 Use 2x crawling boards or roof ladders



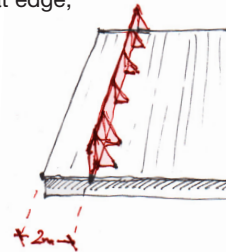
2 Move materials and tools up by line/ pulley



3 Erect guardrails and toe boards around edges and openings

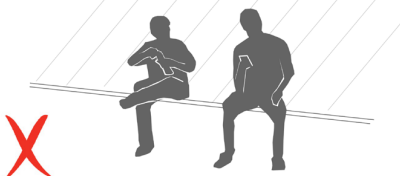


4 Where no work at edge, erect a barrier

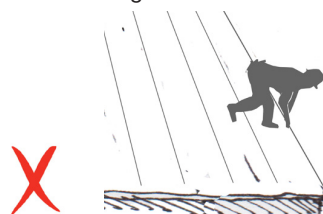


DO NOT

5 Stay on roof unless working there



6 Work on edge of roof / overreach



8. Demolition of buildings

Before demolition can start:

- ✓ Verify that the building is vacant
- ✓ Turn off all electric, gas, water and steam service lines, or otherwise control them outside the construction site before work commences.
- ✓ If it is necessary to maintain any electric power, water or other services during demolition operations, adequately protect them against damage.
- ✓ As far as practicable, signal and fence the danger zone around the building to protect the public (2 m fence with access gate secured outside working hours).
- ✓ Spray with water at suitable intervals where necessary to reduce airborne dust.
- ✓ Maintain foundation walls serving as retaining walls until the adjoining structure has been braced, and the earth removed or supported by sheet piling or sheathing.

8.1 Demolition of walls

Walls should be demolished storey by storey beginning at the roof and working downwards.

Where necessary, unsupported walls should be prevented from falling by means such as shoring and ties.

8.2 Demolition of floors

When necessary to prevent danger, workers demolishing floors should be provided with planking or walkways on which to stand or move.

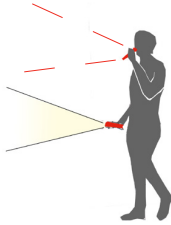
Openings through which material is dropped should be adequately fenced or barricaded to reduce danger of accidents.

8. Demolition of buildings

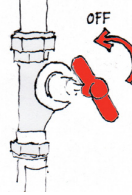
SAFE DEMOLITION

BEFORE

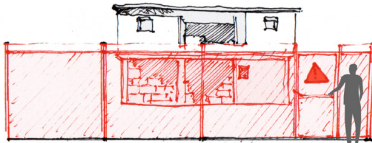
- 1** Verify that the building is vacant



- 2** Switch off electric, gas, water and steam service lines



- 3** Fence the danger zone around the building with a 2m high fence



- 4** Spray with water at suitable intervals where necessary to reduce dust

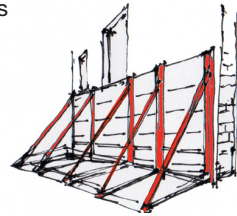


WALLS

- 5** Walls should be demolished storey by storey

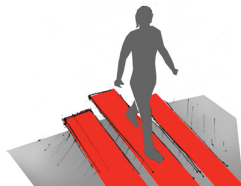


- 6** Unsupported walls should be prevented from falling by shoring and ties

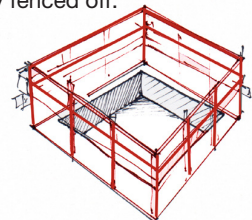


FLOORS

- 7** There should be planking / walkways on which to stand and move



- 8** Openings for material should be adequately fenced off.



9. Physical risk factors: working position and using tools

The physical risk factors include manual handling, noise, heat, cold, radiation and vibration.

9.1 Working posture

Uncomfortable working positions lead to fatigue and to less efficient work, resulting in more time spent on tasks. In order to minimize that:

- ✓ Arrange to sit whenever possible (sometimes standing is unavoidable);
- ✓ Keep materials, tools and controls within your reach;
- ✓ Make sure you are close enough to the task;

9.2 Manual handling and weight lifting

Manual handling is a routine activity on construction sites and carries a high degree of risk; next to falls from height, manual handling is one of the most common causes of accidents. Before lifting and carrying, make sure the following indications and procedures are followed:

- ✓ Put heavy loads on wheels whenever possible instead of carrying
- ✓ Check the weight of the load before lifting it; female: 15 kg; male: 20–25 kg; 2 people - 35–50 kg; 3 people 40–75 kg; 4 people 40–100 kg
- ✓ Reduce the load if the work is to be repeated multiple times
- ✓ Remove or secure loose objects on the load;
- ✓ Seek assistance if the load is too heavy or awkward for one person
- ✓ Make sure that there is a clear walkway to your destination and a safe stacking place;

9. Physical risk factors: working position and using tools

Adopt the following posture indications:

- ✓ Apply the right lifting technique whenever lifting a load:
- ✓ Stand close to the load on a firm footing and with feet about 30 cm apart;
- ✓ Bend the knees and keep your back as straight as you can;
- ✓ Take a firm grip on the load;
- ✓ Breathe in and throw the shoulders backwards;
- ✓ Straighten the legs, continuing to keep the back as straight as you can;
- ✓ Make sure that your view is not obstructed by the load;
- ✓ Keep the load close to the body;
- ✓ Lift slowly and smoothly;

DO NOT

- ✗ Twist the spine to turn; move your feet instead
- ✗ Do not lift something too heavy for you
- ✗ Do not lift loads higher than is necessary

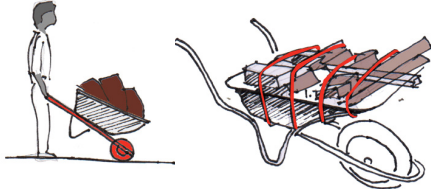
Refer to:

- » Ergonomics Plus, (n.d.) *Proper Lifting Techniques*
- » *Health and Safety Executive, (2012). Manual handling at work - A brief guide*
- » *Maiti R, Ray GG. (2004). Determination of maximum acceptable weight of lift by adult Indian female workers. Int J of Ind Erg. 34(6) 483-495*
- » *Sawacha et al. (1999). Factors affecting safety performance on construction sites. Int J of Proj Man. 17(5):309-315.*
- » *Safety Office U of HK., (2006) Manual Handling and Lifting Safety Office - Manual Handling and Lifting*

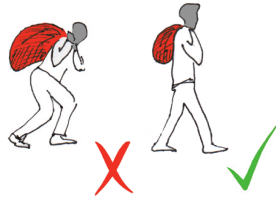
POSTURE & LIFTING WEIGHTS

MANUAL HANDLING & WEIGHTS

1 Put heavy loads on wheels whenever possible.



2 Reduce load if repeated lifting



3 Remove or secure loose objects

4 Get assistance if load is unmanageable

5 Make sure there is a clear path to destination

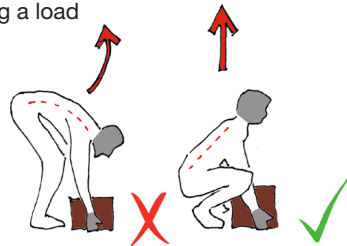


POSTURE

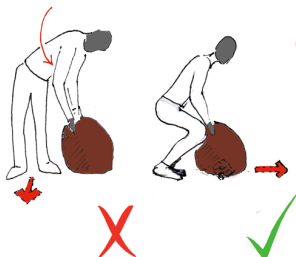
6 Arrange to sit whenever possible.



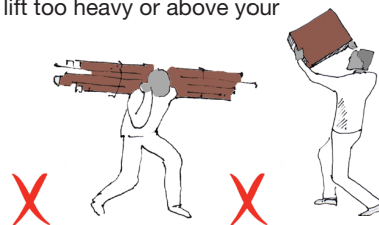
7 Apply the right lifting technique when lifting a load



8 Don't twist to lift



9 Don't lift too heavy or above your head



9.3 Hand tools

Accidents with hand tools nearly always result from bad handling, carelessness, lack of knowledge about the use of tools, ignorance of safety precautions and failure to maintain tools and store them properly.

When working with hand tools:

- ✓ Use the right tool for the right job, including the proper PPE
- ✓ Immediately remove, repair or replace damaged tools;
- ✓ Carry tools in tool holders / belts and not in the pockets of your clothing;
- ✓ Clean tools from grease and dirt;

Refer to:

- » <https://itemscatalogue.redcross.int/logistics--5/tools-and-hardware--24/general-purpose-tools--42.aspx>

9.4 Electrical tools

Electrical hazards are different from other types of hazards on a construction site as they strike without advanced warning. This can result in severe injuries, namely electric shocks and burns.

Before using any electrical equipment:

- ✓ Inspect it for any defects;
- ✓ Make sure leads and cables are kept out of the way of other workers and are not in contact with water;
- ✓ Check that the wires are covered by insulation, and that this is not worn or broken;

STAY SAFE: Health and safety on reconstruction sites

- ✓ Check that the fuse and plug are correct;
- ✓ Provide the power generator with an overriding power switch to avoid accidental remote starting during maintenance.

While using the electrical tool:

- ✓ Make sure the tool is set at the right speed for the job;
- ✓ Make sure the moving part of the tool is fully stopped before putting it down.

DO NOT

- ✗ Never work on live wires and cables (uninsulated)
- ✗ Never use makeshift connections to equipment or plugs by sticking bare wires into sockets or contacts;
- ✗ Work in a wet environment

In case of accident involving electrical tool or unwired cable, cut off the current immediately, before helping the victim!

If not possible, use a non-conductive objective to move the electricity source away from the injured person.

For more information on safe handling of electrical tools please refer to:

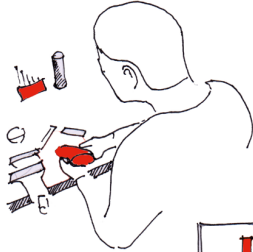
- » <https://www.ihsa.ca/PDFs/Products/Id/W328.pdf>
- » *ILO, (1992). Safety and Health in Construction.*

9. Physical risk factors: working position and using tools

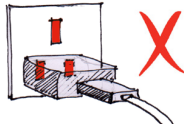
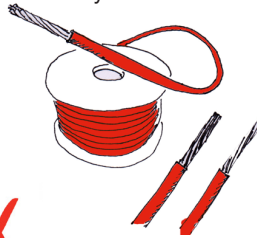
SAFE ELECTRICAL TOOLS

BEFORE USING EQUIPMENT

1 Inspect for defects

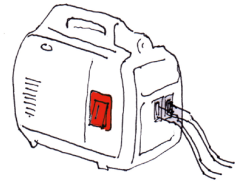


2 Make sure leads and cables are dry, out of way of workers, and covered by insulation.



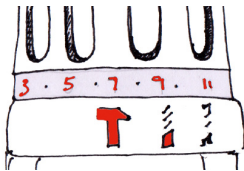
3 Check that there is a correct fuse and plug

5 Provide power generator with overriding power switch to prevent accidental starting

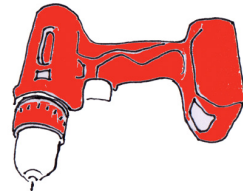


WHILST USING EQUIPMENT

6 Make sure the tool is set at the right speed for the job

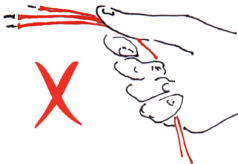


7 Make sure the moving part of the tool is fully stopped before putting it down

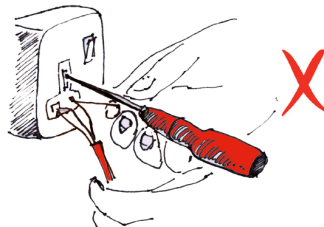


DO NOT

8 Never work on live wires and uninsulated cables



9 Never use makeshift connections to equipment or plugs



10 Do not work in a wet environment



9.5 Wood working

Wood working mostly consists of cutting and assembling timber elements with the help of electrical tools as saws, blades and drills. This has the potential to lead to severe injuries, through coming into contact with moving blades, or through sawdust, wood chips and splinters that can injure eyes or lead to respiratory problems.

Before starting any wood work make sure of the following:

- ✓ Circular saws are provided with rigid and adjustable hood guards for the saw blades;
- ✓ The width of the opening in the table for the saw blade is as small as practicable;
- ✓ The portable circular saw is automatically covered when the blade is running;
- ✓ The person using the machine knows how to do it properly;

While doing wood work:

- ✓ Make sure you have enough space all around the machine to handle large boards and long planks;
- ✓ Ensure to use the blade-guard while in use to avoid sawdust and splinters getting into your eyes;

DO NOT

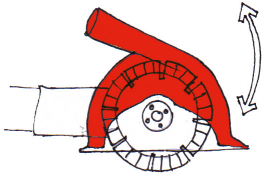
- ✗ Do not remove shavings and sawdust from the machine or its proximities by hand whilst the machine is working;
- ✗ Do not use any machine if you don't know how to. **ASK FIRST.**

9. Physical risk factors: working position and using tools

SAFE WOODWORKING

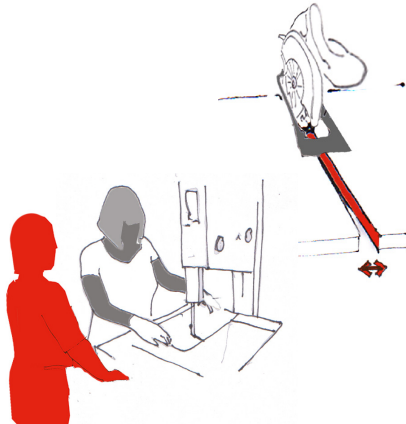
BEFORE STARTING WORK

- 1 Make sure circular saws are provided with rigid and adjustable hood guards for the saw blades,
- 2 Ensure that the width of the opening in the table for the saw blade is as small as practicable.



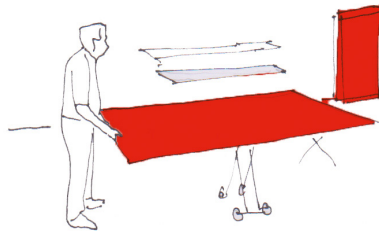
- 3 Ensure that the portable saw is automatically covered when the blade is running.

- 4 Ensure that the person running the machine knows how to do it properly



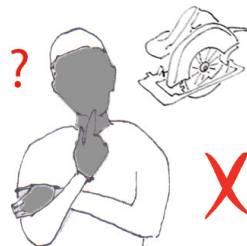
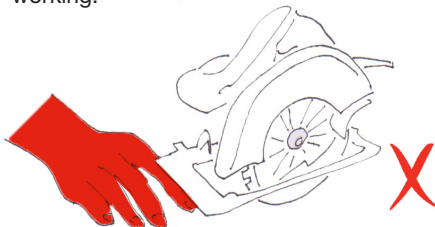
WHILE DOING WOODWORK

- 5 Ensure there is enough space around the machine to handle large boards and long planks.
- 6 Use the blade-guard while in use to avoid getting splinters and sawdust in your eyes.



DO NOT

- 7 Do not remove sawdust and shavings by hand while machine is working.
- 8 Do not use any machinery if you don't know how to. Ask first



10. Chemical risk factors

A high number of chemical substances are used at any construction site. These chemical substances can be found in:

- Adhesives;
- Cleaning agents for brickwork and stonework;
- Decorative/protective treatments for timber, bamboo and metals (e.g. fungicides);
- Cements and grouts;
- Solvents;
- Paints

Chemicals can be solid or liquid, or in the form of airborne dust, vapour, fumes or gas, and can enter your body in a number of ways. Depending on the type of substance, the route into your body can be through:

- Inhalation or breathing in;
- Ingestion or swallowing;
- Absorption through the skin;

If you know what chemicals you are using and the risks they pose, accident and ill health from the use of chemicals can be prevented by following the established safe practice in handling them.

10. Chemical risk factors

Before dealing with hazardous chemical substances:

- Substitute any dangerous chemical with a harmless or less dangerous one if possible (part of the planning process);
- Where allergic effects caused by certain materials could be reduced by introducing other additives, necessary steps should be taken to make use of these additives preferably at the manufacturing stage (e.g. adding iron sulphate to cement and cement products containing hexavalent chromium).
- Provide good ventilation or work in the open air;
- When it is necessary to deal with proven carcinogenic substances, particularly in work involving bituminous or tar asphalt, asbestos fibres, pitch, some heavy oils, and some aromatic solvents, strict measures should be taken to avoid inhalation and skin contact (see *section 5 on hazardous substances*). Inform all the workers involved about the threat, as they might not be aware.

If dangerous chemicals have to be used, follow the following basic safety measures to protect yourself from danger:

- Check that you and your coworkers are wearing the correct PPE before handling chemicals in order to avoid skin contact and protect eyes and mouth;
- Keep containers of chemicals in a separate and secure store;
- Make sure there is a label on the container which tells you its contents, to ensure you know what it is. If there is no label on the container, do not use the content;
- Hold a cloth over the cap or lid when opening containers, as some volatile liquids tend to spurt up when it is released;
- Use only the amount needed for the particular job;
- If there is spillage of chemicals on the ground or floor, soak it up with dry sand;

STAY SAFE: Health and safety on reconstruction sites

- Wash yourself immediately after the use of chemicals;
- If the skin comes into contact with chemicals, rinse immediately with plenty of clean running water;
- If the eyes come into contact with chemicals, they should be flushed out thoroughly with water and should receive immediate medical attention;
- If you are burned by a chemical, or feel unwell (e.g. dizziness, vomiting and headaches) after using a chemical, seek medical attention at once;

DO NOT

- Eat or smoke while working with chemicals;

Refer to:

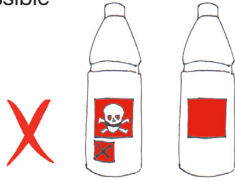
- » *Ashmore J, Bassiouni M, Bjerregard M., (2004). Planning centralised building waste management programmes in response to large disaster*
- » <https://itemscatalogue.redcross.int/water-and-habitat--6/water-and-sanitation--27/sanitation--95/set-protective-clothes--KSANSPROSP.aspx>
- » *UNEP & OCHA, (2011). Disaster Waste Management Guidelines*

10. Chemical risk factors

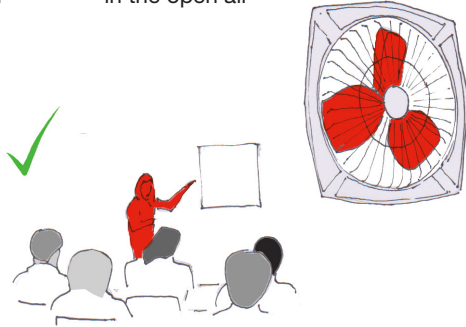
CHEMICAL HANDLING

BEFORE DEALING WITH CHEMICALS

- 1** Substitute any dangerous chemical for a harmless one if possible



- 2** Provide good ventilation or work in the open air



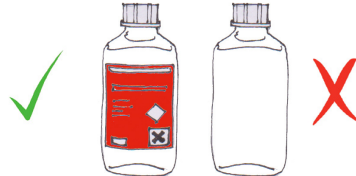
- 3** Inform all workers about any threats through substances

WHEN USING CHEMICALS

- 4** Keep containers of chemicals in a separate and secure store

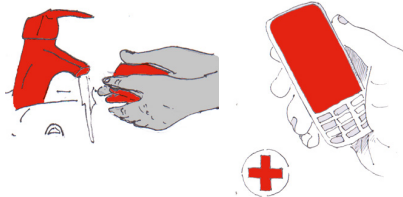
- 5** Make sure there is a label on the container or don't use it

- 6** Hold a cloth over the cap as you open it in case of spurting



- 7** If there is spillage on the floor, soak it up with sand

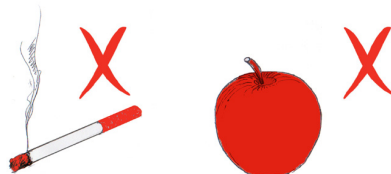
- 8** Wash yourself immediately after use of chemicals. If there is contact with the eyes, rinse immediately.



- 9** If you are burned or feel unwell, seek medical attention

DO NOT

- 10** Do not eat or smoke while using chemicals



11. Biological risk factors

Biological agents are abundant in the environment but rarely visible, and hence the risks they pose are not always obvious. However, exposure to biological agents may lead to acute and chronic, sometimes life-threatening diseases. Biological risk vehicles can be found in:

- During demolition and remodelling of buildings (presence of fungi (e.g. mold))
- Natural or organic materials like soil, clay, plant materials;
- Organic dust (e.g. paper dust, pollen);
- Waste, wastewater;
- Blood and other body fluids;
- Animals and substances of animal and human origin;
- While working in health care facilities;
- During removal of plant, trees and other foliage;
- Where there are rodents, insects and birds;

What to do to prevent contamination and transmission from biological agents:

- Provide easily accessible sanitation for workers;
- Provide necessary information to the workers, as threats are often not visible
- Act against vectors, such as rats and insects;
- In case of serious threat, consider chemical prophylaxis and immunisation;
- Get information on the availability of antidotes and suitable preventive and curative medicine, mainly in rural areas; keep them

11. Biological risk factors

on site if possible and if the threat is extended

- Eliminate sources of moisture to prevent the growth of mold;

Refer to:

- » *Eduard et al. (2012). Bioaerosol exposure assessment in the workplace: the past, present and recent advances. J Env Monit. 14(2):334*
- » *ILO, (1992). Safety and Health in Construction.*
- » *OSHAcademy, (2019). Health Hazards in Construction - Biological Hazards*

11.1 Molds

Especially in case of high humidity (e.g. after a water damage or a flood) mold seems likely to grow and become a problem. If you find mold on your construction site, follow the following steps:

Clean up the mold in the following order:

- Make sure the working area is well ventilated;
- Use the correct respirator against airborne mold (N-95 respirator);
- Put mold damaged materials in a plastic bag and dispose of them;
- Clean mold from hard surfaces using detergent and water;
- Make sure to dry the surface completely afterwards;
- Disinfect the surface with ¼ cup household bleach per 1 gallon of clean water;

Refer to:

- » <https://itemscatalogue.redcross.int/food-and-livelihood--3/household--8/cleaning-products--19/detergent-cleaning-liquid--HHYGDETE01.aspx>

12. Personal Protective Equipment (PPE)

PPE (personal protective equipment) is only to be used as last resort. The safety and health of the workers must be first safeguarded by measures to eliminate workplace risks at source, through technical or organisational means.

Moreover, collective protective measures covering numbers of workers on a construction site must have priority over protective measures applying to individuals (example: reducing the number of people working under a specific threat vs. distributing PPE for that threat to a bigger number of workers employed for the task).

Keep in mind the limitation of PPE:

- PPE only protects the wearer;
- It is ineffective if not working or fitted properly;
- The use of PPE always restricts the wearer to some degree;

Nevertheless, safety helmets and proper footwear should be used on all construction sites.

How to correctly use PPE:

- Make sure all aspects fit properly and are comfortable;
- Wear them all the time you are subject to a threat;
- Wear them with clean hands;
- Keep PPE clean and in a safe place;
- Look out for damage and substitute them if needed.

12. Protective personal equipment

Never allow exemptions from wearing PPE for those jobs that “only take a few minutes”

Refer to:

- » *Health and Safety Executive, (1997). Protecting the public Your next move.*
- » *Health and Safety Executive, (1992). Personal protective equipment at work*
- » *Health and Safety Executive, (2006). Health and safety in construction.*
- » *ILO, (1992). Safety and Health in Construction.*
- » *OSHA, (n.d.) b., Respiratory protection in construction: an overview of hazards; OSHA's program requirements*
- » *Mc Quaid J, Cantrell G, States K, Davis S. (© 2020). Personal Protective Equipment (PPE) for Construction*

A list of relevant items can be found at:

- » <https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12.aspx>

PPE is available for protecting the worker against different threats. According to the risk related to the operational construction task, identify the appropriate PPE for the task between the following:

12.1 Head protection

Protecting employees from potential head injuries is a key element of any safety program. A head injury can impair an employee for life or it can be fatal. Wearing a safety helmet or hard hat is one of the easiest ways to protect an employee from head injury, protecting from impact and penetration hazards as well as from electrical shock and burn hazards.

Hazard:

- Falling objects;
- Sharp projections;
- Bumps to your head from fixed object;
- Accidental head contact with electrical hazards;

Due to the possible difficulty to provide all the workers with a proper helmet, make sure you restrict access to areas where objects might fall from the top only to people provided with a proper safety helmet.


Refer to:

- » <https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12/helmet-builder--APROHELM.aspx>
- » Princeton Edu. (© 2020a). *Head Protection*.
- » OSHA, (2004). *Personal Protective Equipment*

12. Protective personal equipment

Helmet options

Types of head PPE according to the threat

Hard hat 	Type 1	<p>Reduce the force of impact resulting from a blow only to the top of the head. E.g. a hammer or nail gun falling from above</p>
	Type 2	<p>Reduce the force of lateral impact resulting from a blow which may be received off-center, from the side, or to the top of the head. E.g. contact with the sharp corner of a side beam.</p>
	Class G	<p>Considered for general use and offer protection against low-voltage electrical conductors up to 2,200 volts (phase to ground).</p>
	Class E	<p>Intended for electrical work and offer protection against exposed high-voltage electrical conductors up to 20,000 volts (phase to ground).</p>
	Class C	<p>Do not offer any electrical protection and are often electrically conductive</p>
Bump cap		<p>Do not offer protection against falling or flying objects. However, bump caps provide excellent protection against accidental impact with fixed objects, such as exposed pipes or beams. They should be worn when working in areas with low overhead hazards. Bump caps do not have an ANSI designation.</p>

12.2 Foot protection

Feet are to be protected all the times while on a construction site, as they are subject to frequent risk independently from the task performed. The beneficiaries might be used to work with open shoes and flip-flop. Make them aware of the main risks and make sure they use closed shoes while on site if suitable foot PPE is not available for all.

Remember PPE should fit, or it makes movements and balancing harder.

Hazard:

- Penetration of the sole by nails which have not been knocked down or removed;
- Crushing by falling materials.
- Tripping

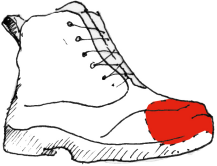
Options: Your proper footwear should have an impenetrable sole + uppers with a steel toe-cap;

Refer to:

- » *Princeton Edu. (© 2020b). Foot Protection.*
- » *<https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12/rubber-boots--APROBOOT.aspx>*

12. Protective personal equipment

Type of foot protection PPE:

<p>Safety-toed shoes</p> 	<p>Safety-toed footwear must meet the minimum compression and impact performance standards or provide equivalent protection.</p>	<p>Protect against falling, crushing or rolling hazards.</p>
<p>Toe guards</p>	<p>fit over the toes of regular shoes. They may be made of steel, aluminum, or plastic.</p>	<p>Protect the toes from impact and compression hazards</p>
<p>Rubber overshoes</p>	<p>Fit over regular shoes. Are used for concrete work and areas where flooding is a concern</p>	<p>Keep foot dry</p>
<p>Slip-resistant soles</p>	<p>Shoes with slip-resistant soles should be used in areas where slips and falls on wet floors are most likely.</p>	<p>Protect against tripping and falling</p>
<p>Leggings</p>	<p>Or high socks in case leggings are not available. Safety snaps allow leggings to be removed quickly.</p>	<p>Protect the lower legs and feet from heat hazards such as molten metal or welding sparks</p>

12.3 Hands/arms protection

In construction, more injuries are caused to hands and wrists than to any other part of the body (e.g. open wounds, abrasions, fractures, strains, dislocation, burns and even amputations).

It is essential that employees use gloves specifically designed for the hazards and tasks found in their workplace because gloves designed for one function may not protect against a different hazard, even though they may appear to be an appropriate form of protection.

Gloves, as for any other PPE, need to fit properly or could end up impeding proper movements of the worker. In general, gloves fall into four groups:

- Gloves made of leather, canvas or metal mesh;
- Fabric and coated fabric gloves;
- Chemical- and liquid-resistant gloves;
- Insulating rubber gloves.

Hazard:

- Contact with rough, sharp or jagged surfaces;
- Contact with or splashes from hot, corrosive or toxic substances such as bitumen and resins;

Refer to:

- » *ILO, (1999) b. Safety, health and welfare on construction sites*
- » *OSHA, (n.d.) a., Electric Power eTool: Personal Protective Equipment (PPE) - Insulating Gloves and Sleeves*
- » *<https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12/gloves-protection--APRO-GLOV.aspx>*

12. Protective personal equipment

Type of hand/arm protection PPE

Leather/canvas/
metal mesh
gloves



Leather
gloves

Protect against sparks, moderate heat, blows, chips and rough objects.

Aluminized
gloves

Reflective and insulating protection against heat and require an insert made of synthetic materials to protect against heat and cold.

Aramid fiber
gloves

Protect against heat and cold, are cut and abrasion resistant and wear well.

Synthetic
gloves

Protection against heat and cold, are cut- and abrasive-resistant and may withstand some diluted acids. These materials do not stand up against alkalis and solvents.

Fabric and
Coated Fabric
Gloves



Fabric gloves

Protect against dirt, slivers, chafing and abrasions. They do not provide sufficient protection for use with rough, sharp or heavy materials.

Coated fabric
gloves

Normally made from cotton flannel with napping on one side. By coating the unnapped side with plastic, fabric gloves are transformed into general-purpose hand protection offering slip-resistant qualities.

STAY SAFE: Health and safety on reconstruction sites

Chemical- and Liquid-Resistant Gloves	Butyl gloves	Made of a synthetic rubber and protect against a wide variety of chemicals, such as peroxide, rocket fuels, highly corrosive acids
	Latex rubber gloves	Comfortable to wear, which makes them a popular general-purpose glove, In addition to resisting abrasions caused by grinding and polishing, these gloves protect employees’ hands from most water solutions of acids, alkalis, salts and ketones.
	Neoprene gloves	Offer protection when working with oils, greases, acids, caustics and alcohols but are generally not recommended for use with strong oxidizing agents, aromatic solvents, ketones and acetates.
Insulating gloves	Insulating rubber gloves	Usually combined with leather sleeve coverage. Protecting during electric work, insulating gloves and sleeves must be rated for the voltage to which a worker will be exposed (phase to ground or phase to phase)

12. Protective personal equipment

12.4 Skin protection

Hazard:

- Corrosive or toxic chemicals;
- Wet cement;
- Abrasion;
- Ultraviolet radiation;

Options: long-sleeved shirts and full-length trousers, sunblock, apron, Gloves,

Refer to:

- » *Health and Safety Executive, (2006). Health and safety in construction*
- » *Hughes P, Ferrett E. (2007). Introduction to Health and Safety in Construction*

12.5 Eye protection

Eye injuries occur as a result of flying material, dust or radiation while carrying out the following jobs:

- Breaking, cutting, drilling, dressing or laying of stone, concrete and brickwork with hand tools;
- Chipping and dressing painted or corroded surfaces;
- Cutting off or cutting out cold rivets and bolts;
- Welding and cutting of metals;
- Options: goggles, safety glasses or shields for welding


Refer to:

- » *Health and Safety Executive, (2006). Health and safety in construction*
- » *Princeton Edu. (© 2020c). Eye and Face Protection. Office of Environmental Health and Safety*

There are different type of eye protection. Please refer to the following indications to make sure you use the correct PPE for the threat you are exposed to:

12. Protective personal equipment

Types of eye protection PPE

<p>Safety Glasses</p> 	<p>Safety glasses have safety frames constructed of metal or plastic and impact-resistant lenses. Side protection is required.</p>
<p>Chemical Splash</p>	<p>Tight fitting eye protection that completely covers the eyes, eye sockets and facial area surrounding the eyes. Provides protection from impact, dust and splashes</p>
<p>Goggles</p>	<p>Dust goggles, sometimes called direct ventilated goggles, are tight fitting eye protection designed to resist the passage of large particles into the goggles.</p>
<p>Dust Goggles</p>	<p>These shields are fluid resistant or impervious and provide splash protection from biological material, such as human or non-human primate body fluids.</p>
<p>Fluid Resistant Shields</p>	<p>These shields do not provide protection against chemicals or impact hazards and do not comply with specific norms</p>
<p>Face Shields</p>	<p>These shields extend from the eyebrows to below the chin and across the width of the employee's head. Face shields protect against potential splashes or sprays of hazardous liquids. When worn for protection against UV, must be specifically designed to protect the face and eyes from hazardous radiation.</p>

STAY SAFE: Health and safety on reconstruction sites

Welding Shields

Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, welding shields protect eyes from burns caused by infrared or intense radiant light; they also protect both the eyes and the face from flying sparks, metal splatter and slag chips produced during welding, brazing, soldering and cutting operations.

Type of eye protection in relation to the hazard:

Machining and Physical Hazards	Chips, particles, dust, glass shards	Safety glasses
	Metal or glass, heat, sparks, glare	Dust goggles, reflective face shield
	Cutting/connecting glass tubing	Safety glasses
	Welding operations	See welding specifications *
Chemicals	Hazardous light chemicals / small amount of hazardous liquid chemical	Safety glasses
	Hazardous chemicals that pose a splash hazard	Chemical splash goggles
	Explosive materials	Chemical splash goggles and face shield

12. Protective personal equipment

Biological Material	Potentially infectious materials, including human and non-human primate material, outside of a biosafety cabinet	Safety glasses plus mask or face shield
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Refer to:

- » <https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12/goggles-protection--APROGLAS.aspx>

For more information on eye protection for welding, see the OSHA Eye protection During Welding Fact Sheet :

- » <https://www.osha.gov/Publications/OSHAfactsheet-eyeprotection-during-welding.pdf>

Contact lenses are safe to wear in most hazardous environments. However, they do not offer any eye protection. If an exposure to a hazardous substance occurs while wearing contact lenses, remove the lens immediately while rinsing the eye(s).

Most prescription glasses do not meet the requirements for eye and face protection. If you wear corrective glasses, you can purchase safety glasses that are designed to be worn over your eyeglasses

12.6 Hearing protection

Exposure to noise may sometimes be unavoidable, but hearing loss is 100 percent preventable through safety measures.

Hazard:

- If you are working at or near a noisy machine:
- If you have to shout to make yourself heard by someone about 1 m away, signal this to the project manager

Options: appropriate earmuffs or ear plugs

Single-use earplugs	Made of waxed cotton, foam, silicone rubber or fiberglass wool. They are self-forming.
Pre-formed or molded earplugs	Must be individually fitted by a professional and can be disposable or reusable. Reusable plugs should be cleaned after each use.
Earmuffs	Require a perfect seal around the ear. Glasses, facial hair, long hair or facial movements such as chewing may reduce the protective value of earmuffs.

Refer to:

- » <https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12/ear-noise-protection--APRO-EARP.aspx>
- » *Health and Safety Executive, (2006). Health and safety in construction*
- » *IHSA, (n.d.). Don't let your noise ruin your hearing*

12. Protective personal equipment

12.7 Respiratory protection

When there are respiratory hazards at your work site, your employer must use several methods to reduce your exposure to them, including:

- Engineering controls (such as local exhaust ventilation);
- Work practice controls (such as using wet-cutting techniques);
- Administrative controls (such as minimizing the number of workers exposed to the hazard).

When you and your co-workers cannot be adequately protected from respiratory hazards through use of these methods, you have to be provided with an appropriate respirator to protect your health.

If in doubt about the presence of toxic substances in the atmosphere, a respirator must be worn.

It is important to use the correct type respirator: respirators which are of the wrong type and not properly fitting are dangerous.

Hazard:

- Rock crushing and handling;
- Dismantling buildings containing asbestos insulation;
- Welding or cutting zinc, lead, nickel or cadmium;
- Paint spraying;
- Blasting

Options: half-faced mask with filters of three types;

- For protection against airborne particles, e.g. stone dust, a coarse filter should be fitted in the cartridge (These filters have a specific lifetime and should be changed as necessary);
- For protection against gases and fumes, e.g. when using paints containing solvents, a filter containing activated carbon will be necessary;
- A combination filter containing both a dust and a gas filter (Cartridges must be replaced regularly);

In addition:

- Safety harnesses with independently secured lifelines where protection against falls cannot be provided by other appropriate means.
- Life vests and life preservers where there is a danger of falling into water.
- Distinguishing clothing or reflective devices or otherwise conspicuously visible material when there is regular exposure to danger from moving vehicles or when working at heights

For more information on respiratory PPE please refer to the HSA Guide to Respiratory Protective Equipment, Emergency Items Catalogue, and to the OSHA trainings;

- » https://www.hsa.ie/eng/Publications_and_Forms/Publications/Chemical_and_Hazardous_Substances/Respiratory%20Protective%20Equipment.pdf
- » <https://itemscatalogue.redcross.int/logistics--5/personnel-security-equipment--15/body-protection--12/mask-protection--APROMASK.aspx>
- » https://www.osha.gov/video/respiratory_protection/construction_transcript.html

12. Protective personal equipment

For further detailed information on PPE please refer to:

- » http://www.ilo.org/safework/info/instr/WCMS_110237/lang--en/index.htm
- » *Health and Safety Executive, (2006). Health and safety in construction*
- » *HSA - Health and Safety Authority, (2010). A Guide to Respiratory Protective Equipment*
- » *ILO, (1999) b. Safety, health and welfare on construction sites*
- » *Mc Quaid et al. (© 2020). Personal Protective Equipment (PPE) for Construction*
- » *OSHA, (n.d.) b., Respiratory protection in construction: an overview of hazards; OSHA's program requirements*

DEBRIS MANAGEMENT PPE

EYES

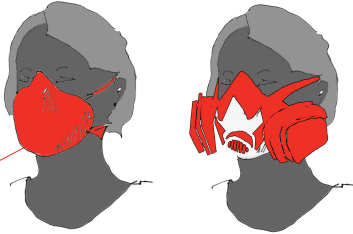
Minimum:
Safety glasses when needed



MASK

Minimum
N-95 respirator

Optimal
P-100 respirator



GLOVES

Minimum
Coated gloves



Optimal
Rubber hard work gloves



APRON

Optimal:
Disposable apron



FOOTWEAR

Minimum
Closed shoes

Optimal
Steel toe-capped boots

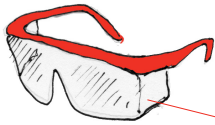


12. Protective personal equipment

WASTE MANAGEMENT PPE

EYES

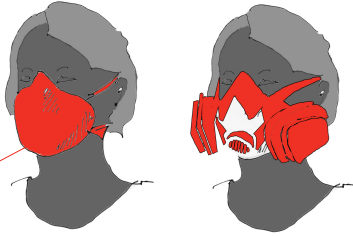
Minimum:
Safety glasses when needed



MASK

Minimum:
N-95 respirator

Optimal:
P-100 respirator



GLOVES

Minimum:
Coated gloves



Optimal:
Rubber hard work gloves



APRON

Optimal:
Disposable apron



FOOTWEAR

Minimum:
Closed shoes

Optimal:
Steel toe-capped boots



HUMAN REMAINS MANAGEMENT PPE

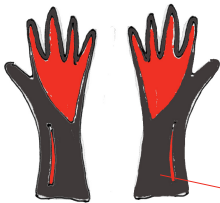
MASK

Optimal:
N-95 respirator if required by operator to reduce psychological stress



GLOVES

Minimum:
Hard work waterproof gloves



Optimal:
Hard work rubber / waterproof / surgical gloves

OVERALL

Optimal:
Disposable overall



FOOTWEAR

Minimum:
Closed shoes

Optimal:
Heavy boots with rubber overshoes

12. Protective personal equipment

CEMENT HANDLING PPE

LONG SLEEVES

Minimum:
Long-sleeved clothing



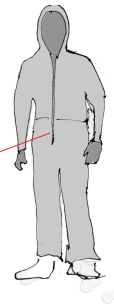
MASK

Minimum:
N-95 respirator



OVERALL

Optimal:
Overall coverup



GLOVES

Minimum:
Coated gloves

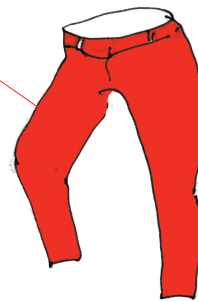


Optimal:
Rubber hard work gloves



TROUSERS

Minimum:
Long-sleeved clothing



FOOTWEAR

Minimum:
Closed shoes



Optimal:
Anti-slip boots



STAY SAFE: Health and safety on reconstruction sites

ASBESTOS HANDLING PPE

EYES

Minimum:
Safety glasses when needed



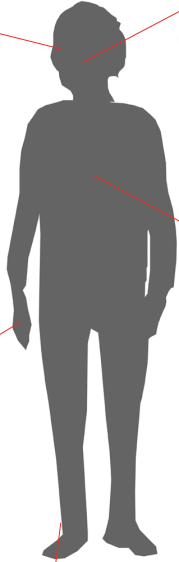
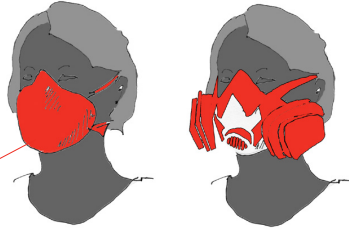
Optimum:
Safety front and side goggles



MASK

Minimum:
N-95 respirator

Optimal:
Half piece particulate P2
filter (cartridge) respirator



OVERALL

Optimal:
Disposable overall



GLOVES

Minimum:
Coated gloves



FOOTWEAR

Minimum:
Closed shoes

Optimal:
Rubber boots



12. Protective personal equipment

WORKING AT HEIGHTS PPE

HI-VIS

Optimal:
High-visibility vest



HEAD PROTECTION

Minimum:
Hard hat

Optimal:
Hard hat with chin strap



GLOVES

Minimum:
Coated gloves



Optimal:
Leather gloves



HARNES

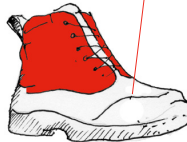
Optimal:
Safety harness



FOOTWEAR

Minimum:
Closed shoes

Optimal:
Steel toe-capped boots



DEMOLITION OF FLOORS PPE

EYES

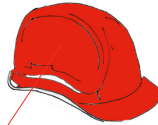
Minimum:
Safety glasses when needed



HEAD

Minimum:
Hard hat

Optimal:
Hard hat with chin strap



HI-VIS

Optimal:
High-visibility vest



HEARING

Minimum:
Hearing protection



GLOVES

Minimum:
Coated gloves



Optimal:
Leather gloves



MASK

Minimum:
N-95 respirator



FOOTWEAR

Minimum:
Closed shoes

Optimal:
Steel toe-capped boots



12. Protective personal equipment

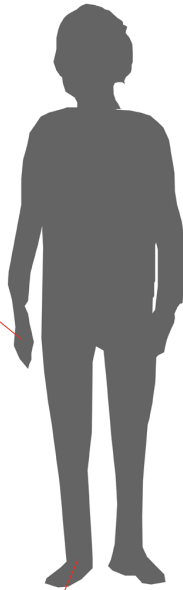
ELECTRICAL TOOLS PPE

GLOVES

Minimum:
Coated gloves



Optimal:
Insulating/leather/
aluminized gloves



FOOTWEAR

Minimum:
Rubber sole shoes

Optimal:
Rubber overshoes

WOOD-WORKING PPE

MASK

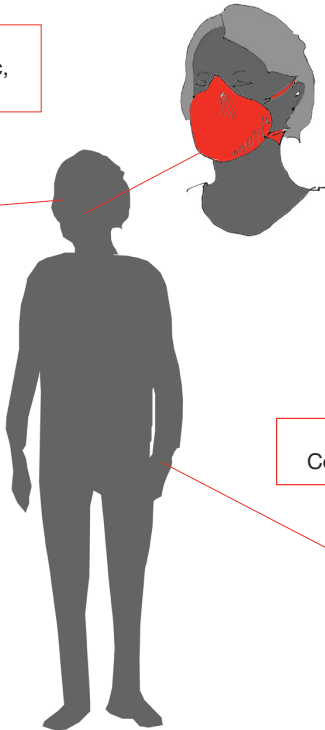
Minimum:
N-95 respirator

EYES

Minimum:
Safety glasses - clear rigid plastic,
front and sides protection



Optimum:
Safety goggles



GLOVES

Minimum:
Coated fabric gloves



Optimal:
Cut-resistant synthetic gloves



12. Protective personal equipment

BIOLOGICAL CONTAMINATION PPE

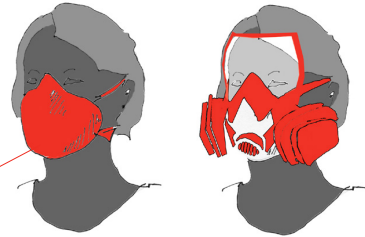
MASK

Minimum:
N-95 respirator

Optimal:
P-100 respirator with
face shield

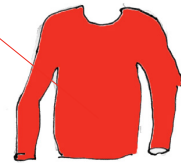
EYES

Minimum:
Chemical splash goggles



PROTECTIVE CLOTHING

Minimum:
Protective clothing



GLOVES

Minimum:
Latex rubber/synthetic/
neoprene gloves



Optimal:
Disposable apron (in addition)



MOLD HANDLING PPE

MASK

Minimum:
N-95 respirator

Optimal:
P-100 respirator with
face shield

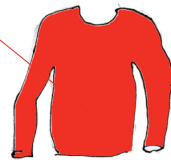
EYES

Minimum:
Chemical splash goggles



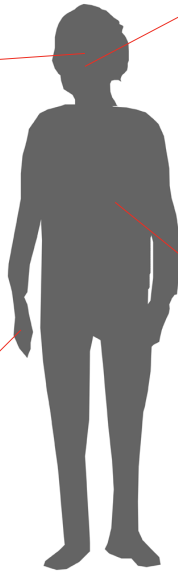
PROTECTIVE CLOTHING

Minimum:
Protective clothing



GLOVES

Minimum:
Latex rubber/synthetic/
neoprene gloves



Optimal:
Disposable apron (in addition)



13. Wellbeing and First Aid

Working on a construction site involves much manual or physical activity. It is also hazardous and dirty. Therefore, welfare facilities improve effectiveness and consequently efficiency.

13.1 Wellbeing facilities

Well-being facilities include:

- Potable water
- Service water
- Restrooms
- Shelter

Refer to:

- » *ILO, (1999) b. Safety, health and welfare on construction sites*

13.1.1 Potable water

Make 2.2 – 3 litres potable water /person per day available on site.

The consequences of dehydration are often underestimated. If you experience any of the following signs of dehydration, or notice it in a coworker, drink water or encourage the other to do so. If they persist for 30 mins afterwards, seek for medical assistance.

Refer to:

- » *IFRC, (2008). Household water treatment and safe storage in emergencies.*

Signs of dehydration:

- Headache
- Dry skin
- Passing less urine than normal / dark yellow urine
- Tiredness
- Dizziness
- Body cramping
- Dry mouth / extreme thirst
- Sunken eyes

In identifying safe potable water, consider only sealed water bottles or containers, or purified water. If that is not possible, or in case of doubt, cook the water before drinking or use the SoDis-method of solar water disinfection if possible.

For more information on water treatment and storage in emergencies please refer to:

- » <https://itemscatalogue.redcross.int/water-and-habitat--6/water-and-sanitation--27/water-treatment-products--122.aspx>
- » <http://www.ifrc.org/Global/Publications/disasters/142100-hwt-en.pdf>
- » IFRC, (2008). *Household water treatment and safe storage in emergencies*

13.1.2 Service water

Service water needs to be available in the very proximity of the building site for washing hands (between tasks), face, eyes, washing hands before meals and washing skin in case of contact with irritants (see section 6.2 on Hazards). **Consider 12 liters / person per day.**

13. Wellbeing and first aid

Refer to:

- » *IFRC, (2008). Household water treatment and safe storage in emergencies*
- » *UNHCR (2017). Emergency Handbook*

For details on water supply, distribution, sanitation and purification systems please refer to:

- » <https://itemscatalogue.redcross.int/water-and-habitat--6/water-and-sanitation--27/water-testing--120.aspx>
- » <https://itemscatalogue.redcross.int/water-and-habitat--6/water-and-sanitation--27/water-treatment-equipment--121.aspx>
- » <https://itemscatalogue.redcross.int/water-and-habitat--6/water-and-sanitation--27/water-tanks--119.aspx>
- » https://www.ifrc.org/PageFiles/95884/D.01.03.%20Handbook%20for%20Emergencies_UNHCR.pdf

13.1.3 Rest-rooms

Rest-rooms should be available in the vicinity of the building site, and workers should be informed about their location. They should be equipped with a basin for washing hands.

13.1.4 Shelter

Shelter is needed to provide a safe and clean space to eat, rest and protect from sun and rain. Meal serving areas should be situated away from the construction site to minimize contact with:

- Dirt & dust;
- Dangerous substances;

Regardless of the work which has been done, hands need to be washed prior to eating.

13.2 First Aid

13.2.1 First Aid Kit

A complete First Aid kit or box need to be available on site. Its location must be sign-posted and there should be clear pictograms to make it easily identifiable at a first glance. Make sure of the following:

- The first aid kit is kept clean, closed, away from dust and water;
- The kit is always complete (once a part is used, it gets immediately substituted);
- Clear instructions are contained;
- Its location is clearly sign-posted and known by the workers on site;
- One person is responsible for the kit (maintenance, check of expiration dates regularly, proper use);

Necessary Kit content:

- Iodine povidone 10% solution 5 ml (staff use only)
- Non sterile gloves n 10, size M
- Protection mask for mouth resuscitation procedure, reusable
- Scissors
- Wound plasters
- Bandage, elastic
- Bandage, gauze (various size)
- Rescue sheet (silver/gold insulating foil (210 x 160 cm)
- Plaster strip kit

13. Wellbeing and first aid

- Compressed, aluminized 10x110 cm
- Compress, gauze 0x10 cm
- Adhesive bandage various sizes

Refer to:

- » <https://itemscatalogue.redcross.int/health--4/health-kits-and-sets--7/first-aid-kits--36/kit-first-aiders-bag-material--KMEDKFAI01B.aspx>
- » <https://itemscatalogue.redcross.int/health--4/health-kits-and-sets--7/first-aid-kits--36/kit-advanced-emergency-care-health-prof-incl-bpack--KMEDKEMEHP.aspx>

DO NOT

- ✘ Do not leave the kit open in the dust / dirt / in the rain
- ✘ Do not forget to replace the used parts of the kit ASAP
- ✘ Do not leave the kit around heat sources

13.2.2 First Aid: How to act

In case of an accident on site, you can help by:

- Calling someone on site who is trained in first aid;
- Making sure that no one else can get injured from the same cause;
- Providing life-saving first aid, even if you are not a trained first-aiders;

If there is no trained first-aiders on site or it takes too long for him/her to come, it is up to you to assist the injured person. Follow these instructions:

- Use the mouth-to-mouth method if breathing has stopped;
- Stop heavy bleeding by direct pressure on the wound and by raising the injured limb;

STAY SAFE: Health and safety on reconstruction sites

- Flush a burn from corrosives and cool it with water for at least 10 minutes;
- Keep the injured person warm by covering him/her with a blanket;
- Lay the injured person on his/her side if in shock to avoid suffocation;
- Immobilize a broken limb by bandaging it to two sticks;

DO NOT

- Do not move an injured person, as there is possibility of a neck or back injury. Move them only to remove them from danger;
- Do not remove any foreign object embedded in the body

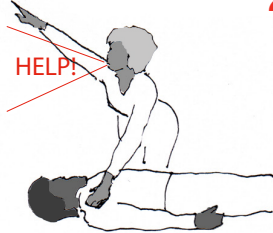
For more information on first aid please refer to:

- » *http://www.ifrc.org/Global/Publications/Health/First-Aid-2016-Guidelines_EN.pdf*
- » *Health and Safety Executive, (2007). Managing health and safety in construction*
- » *IFRC, (2003). Stay safe - The International Federation's guide for security managers*
- » *IFRC, (2016). International first aid and resuscitation guidelines.*
- » *ILO, (1999) b. Safety, health and welfare on construction sites*

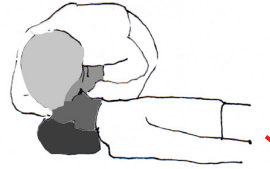
13. Wellbeing and first aid

FIRST AID

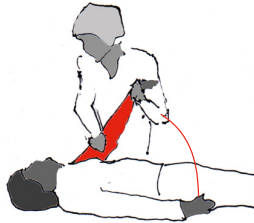
- 1** Call for someone who is first aid trained.



- 2** Use mouth-to-mouth if breathing has stopped



- 3** Stop heavy bleeding by applying direct pressure on the wound and raising injured limb



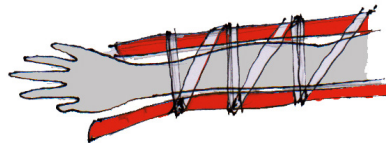
- 4** Flush a burn from corrosives with cool water for 10 minutes



- 5** Lay the injured person on their side to prevent suffocation. Keep them warm with a blanket



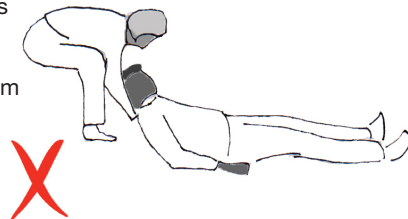
- 6** Immobilize a broken limb by bandaging it to two sticks



DO NOT

- 7** Do not move an injured person, unless to remove them from danger.

Do not remove any foreign objects from their body.



14. Training modules

The training is divided into two types of session:

- Induction training;
- Tool-box briefing or on the job training

14.1 Induction training

The aim of the induction training is to transfer the basic knowledge of health and safety requirements such as:

- Key disciplines on site;
- Key risks on site, workers need to be aware of;
- Training on the PPE;
- What to do in an emergency (fire, first aid);

Key discipline on site:

The term 'key discipline on site' refers to the rules under the *Section 2 'General behaviour on a construction site'*. At the same time, the site layout including the welfare facilities can be introduced to the workers, and at this point the housekeeping rules according to *Section 3.2 'Site tidiness – Housekeeping'* should be introduced.

Key risks on site that workers need to be aware of:

- Asbestos and other possible hazardous substances and hazards related to debris and waste management;
- Possibility of slips, trips and falls if housekeeping is not done properly;
- Manual handling

14. Training

These are the key risks which can be expected at any site. Others such as working at height and working with different tools should be introduced in tool-box briefings for the specific task where certain tools are used and work at height is performed.

Training on PPE:

It is recommended to introduce the workers to the following parts of the PPE at this point:

- Skin protection
- Head protection - helmet
- Foot protection - safety shoes
- Gloves

Long clothes need to be worn because of dangerous hazards as well as because of the sun (in summer). Helmet and safety boots are to be worn at all times on the construction sites. Gloves will be used for nearly all tasks on a construction site except if instinctive feeling is needed. The other parts of the PPE such as eye protection, hearing protection and the respirators can be introduced when needed. That means depending on the task during the on the job trainings.

Emergencies - fire and first aid:

The workers need to be informed on how to prevent a fire in the first place and what to do in case of a fire. The induction training can be closed by a simple first aid course as given in the guideline in *Section 13.2 'First Aid'*.

14.2 Tool-box briefing or on the job training

In the tool-box briefings or on the job training the workers are introduced to a certain task and therefore to different risks depending on the task at hand. Consequently, the tool-box briefings take place every time there is a new task with different risks.

The aim is not only to introduce the new task to the workers but also to get the workers involved in the discussion about hazards they might encounter while performing the task. They should be asked to participate in the discussions about first, what will be the possible hazards and then what can I do about it.

For these kind of discussions, the STOP-principle should be used (see *section 2.1 on STOP principle*)

Bibliography

Ashmore J, Bassiouni M, Bjerregard M., (2004). *Planning centralised building waste management programmes in response to large disaster* [Internet]. [cited 2018 Oct 3]. Available from: www.sheltercentre.org

Becker, I. (2019). Interview. Switzerland

BLS, Bureau of Labor Statistics (2007). *National Census of Fatal Occupational Injuries in 2006* [Internet]. Washington; 2007 [cited 2018 Oct 11]. Available from: <http://www.bls.gov/iif/oshcoi1.htm>

Buildings Department, (2004). *Guidelines on the Design and Construction of Bamboo Scaffolds - Introduction*. [cited 2018 Oct 3]; Available from: <https://www.humanitarianlibrary.org/sites/default/files/2014/06/bambooScaffolds.pdf>

CARE International and ProAct Network, (2004). *Quick Guide Post-Disaster Debris Management* [Internet]. [cited 2018 Oct 11]. Available from: https://postconflict.unep.ch/humanitarianaction/documents/02_05-04_01-03.pdf

Davis J, Lambert R., (1999). *Engineering in Emergencies, A practical guide for relief workers*. Second Edition [Internet]. [cited 2018 Oct 3]. Available from: www.itdgpublishing.org.uk

Eduard W, Heederik D, Duchaine C, Green BJ. (2012). Bioaerosol exposure assessment in the workplace: the past, present and recent advances. *J Environmental Monitoring* [Internet]. **14**(2):334. [cited 2018 Oct 12]; Available from: <http://xlink.rsc.org/?DOI=c2em10717a>

Ergonomics Plus, (n.d.) *Proper Lifting Techniques* [Internet]. [cited 2019

Jan 21]. Available from: <https://ergo-plus.com/wp-content/uploads/WA-Handout-Proper-Lifting-Techniques.pdf>

Health and Safety Executive, (1992). *Personal protective equipment at work* [Internet]. [cited 2018 Oct 12]. Available from: www.nationalarchives.gov.uk/doc/open-government-licence/

Health and Safety Executive, (1997). *Protecting the public Your next move*. HSE Books [Internet]. [cited 2018 Oct 11]. Available from: www.hsebooks.co.uk

Health and Safety Executive, (2002). *A short guide to managing asbestos in premises INDG223* [Internet]. [cited 2018 Oct 11]. Available from: [https://www.opw.ie/en/media/Short Guide to managing asbestos in premises\(HSE\).pdf](https://www.opw.ie/en/media/Short%20Guide%20to%20managing%20asbestos%20in%20premises(HSE).pdf)

Health and Safety Executive, (2006). *Health and safety in construction. HSE Books* [Internet]. [cited 2018 Oct 11]. Available from: www.nationalarchives.gov.uk/doc/open-government-licence/

Health and Safety Executive, (2007). *Managing health and safety in construction* [Internet]. [cited 2019 Jan 21]. Available from: www.nationalarchives.gov.uk/doc/open-government-licence/

Health and Safety Executive, (2008). *Working on roofs INDG284* [Internet]. [cited 2018 Oct 12]. Available from: <http://www.hse.gov.uk/pubns/indg284.pdf>

Health and Safety Executive, (2012). *Manual handling at work - A brief guide* [Internet]. [cited 2018 Oct 12]. Available from: www.hse.gov.uk/statistics/causdis/musculoskeletal/index.htm.

Health and Safety Executive, (2017). *Health and safety statistics for the construction sector in Great Britain* [Internet]. [cited 2018 Oct 9].

Bibliography

Available from: www.hse.gov.uk/statistics/industry/construction/construction.pdf.

Health and Safety Executive, (2019). *Manual handling assessment charts (the MAC tool)* [Internet]. [cited 2018 Oct 3]. Available from: <https://www.hse.gov.uk/msd/mac/>

Healthy Workplaces, (2018). *European Agency for Safety and Health at Work - Legislative framework on dangerous substances in workplaces*. Available from: <https://healthy-workplaces.eu/en/tools-and-publications/publications/info-sheet-legislative-framework-dangerous-substances-workplaces>

HSA - Health and Safety Authority, (2010). *A Guide to Respiratory Protective Equipment* [Internet]. [cited 2018 Oct 12]. Available from: https://www.hsa.ie/eng/Publications_and_Forms/Publications/Chemical_and_Hazardous_Substances/Respiratory_Protective_Equipment.pdf

Hughes P, Ferrett E. (2007). *Introduction to Health and Safety in Construction*. 2nd Edn. Butterworth-Heinemann, Oxford.

ICRC, (2004). *Operational best practices regarding the management of human remains and information on the dead by non-specialists*. [Internet]. Available from: <https://www.icrc.org/en/publication/0858-operational-best-practices-regarding-management-human-remains-and-information-dead>

IFRC, (2003). *Stay safe - The International Federation's guide for security managers* [Internet]. Geneva, Switzerland; [cited 2018 Oct 3]. Available from: www.ifrc.org

IFRC, (2008). *Household water treatment and safe storage in emergencies*. [Internet]. Available from: <https://www.ifrc.org/Global/Publications/disasters/142100-hwt-en.pdf>

IFRC, (2016). *International first aid and resuscitation guidelines*. [Internet]. Geneva; [cited 2018 Oct 12]. Available from: http://www.ifrc.org/Global/Publications/Health/First-Aid-2016-Guidelines_EN.pdf

IHSA, (n.d.). *Don't let your noise ruin your hearing* [Internet]. [cited 2018 Oct 12]. Available from: <https://www.ihsa.ca/PDFs/Products/Id/W700.pdf>

IHSA, (2011). *Ladder Safety Safe Practice Guide* [Internet]. [cited 2018 Oct 12]. Available from: <https://www.ihsa.ca/PDFs/Products/Id/SPG19.pdf>

ILO, (1992). *Safety and Health in Construction*. Geneva, Switzerland. Available from: https://www.ilo.org/global/topics/safety-and-health-at-work/normative-instruments/code-of-practice/WCMS_107826/lang--en/index.htm

ILO, (1999) a. *ILO Estimates Over 1 Million Work-Related Fatalities Each Year* [Internet]. [cited 2018 Oct 9]. Available from: https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_007969/lang--en/index.htm

ILO, (1999) b. *Safety, health and welfare on construction sites* [Internet]. Geneva. [cited 2018 Oct 11]. Available from: https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/instructionalmaterial/wcms_110237.pdf

Labour Department HK, (2018). *Region G of the H Kong special A. Work Safety of Bamboo Scaffolds Dismantling of bamboo scaffolds* [Internet]. Hong Kong. [cited 2018 Oct 12]. Available from: http://www.labour.gov.hk/eng/public/content2_8.htm.

Layton, (© 2020). *Want to Beat the Heat and Stay Energized? Drink Water* [Internet]. [cited 2018 Oct 3]. Available from: <http://www.laytoncom->

Bibliography

panies.com/news/drink-water.htm

Maiti R, Ray GG. (2004). Determination of maximum acceptable weight of lift by adult Indian female workers. *International Journal of Industrial Ergonomics* [Internet]. **34**(6) 483-495 [cited 2018 Oct 3]. Available from: <http://dspace.library.iitb.ac.in/jspui/bitstream/10054/1345/1/5717.pdf>

Manchester Metropolitan University, (2006). *Safe use of ladders and step ladders* [Internet]. Manchester. [cited 2018 Oct 11]. Available from: <https://www.mmu.ac.uk/health-and-safety/manual/pdf/ladders-06.pdf>

Mc Quaid J, Cantrell G, States K, Davis S. (© 2020). *Personal Protective Equipment (PPE) for Construction* | Office of Environmental Health and Safety [Internet]. [cited 2018 Oct 12]. Available from: <https://ehs.princeton.edu/workplace-construction/construction-safety/personal-protective-equipment-ppe>

OHS Insider, (2014). *Scaffolding Safety Guide* [Internet]. [cited 2018 Oct 12]. Available from: <http://ohsinsider.com/wp-content/uploads/2014/06/Scaffolding-Safety-Guide.pdf>

OHSB, (2004). *Occupational Safety and Health Branch Labour Department - Safety Handbook for Construction Site Workers* [Internet]. [cited 2018 Oct 11]. Available from: <https://www.labour.gov.hk/eng/public/os/D/ConstructionSite.pdf>

OSHA, (n.d.) a., *Electric Power eTool: Personal Protective Equipment (PPE) - Insulating Gloves and Sleeves* [Internet]. [cited 2018 Oct 12]. Available from: https://www.osha.gov/SLTC/etools/electric_power/ppe_insulatinggloves_sleeves.html

OSHA, (n.d.) b., *Respiratory protection in construction: an overview of*

hazards; OSHA's program requirements [Internet]. [cited 2018 Oct 12]. Available from: https://www.osha.gov/video/respiratory_protection/construction_transcript.html

OSHA, (2004). *Personal Protective Equipment* [Internet]. [cited 2018 Oct 12]. Available from: <https://www.osha.gov/Publications/osha3151.pdf>

OSHA, (2013). *Fact Sheet Reducing Falls in Construction: Safe Use of Stepladders* [Internet]. [cited 2019 Jan 21]. Available from: www.osha.gov/dcsp/

OSHAcademy, (2019). *Health Hazards in Construction - Biological Hazards - OSHAcademy free online training* [Internet]. [cited 2018 Oct 12]. Available from: <https://www.oshatrain.org/courses/mods/850m3.html>

Princeton Edu. (© 2020a). *Head Protection*. Office of Environmental Health and Safety [Internet]. [cited 2018 Oct 12]. Available from: <https://ehs.princeton.edu/workplace-construction/workplace-safety/physical-safety/personal-protective-equipment-ppe/head-protection>

Princeton Edu. (© 2020b). *Foot Protection*. Office of Environmental Health and Safety [Internet]. [cited 2018 Oct 12]. Available from: <https://ehs.princeton.edu/workplace-construction/workplace-safety/physical-safety/personal-protective-equipment-ppe/foot-protection>

Princeton Edu. (© 2020c). *Eye and Face Protection*. Office of Environmental Health and Safety [Internet]. [cited 2018 Oct 12]. Available from: <https://ehs.princeton.edu/workplace-construction/workplace-safety/physical-safety/personal-protective-equipment-ppe/eye-and-face-protection>

Safe Work Australia, (2014). *General Guide for Scaffolds and Scaffolding Work* [Internet]. [cited 2018 Oct 12]. Available from: www.swa.gov.au

Bibliography

Safety Office U of HK., (2006) *Manual Handling and Lifting Safety Office - Manual Handling and Lifting* [Internet]. Hong Kong; [cited 2018 Oct 3]. Available from: <http://www.safety.hku.hk/homepage/pdf/MHAL.pdf>

Sawacha E, Naoum S, Fong D., (1999). Factors affecting safety performance on construction sites. *International Journal of Project Management*. **17**(5):309-315. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0263786398000428>

Shelter Center, (2010). *Asbestos in Emergencies: Safer Handling and Breaking the Cycle* [Internet]. Geneva; [cited 2018 Oct 3]. Available from: www.sheltercentre.org

Sphere, (2011). *The Sphere Handbook | Shelter and settlement standard 4: Construction* [Internet]. Available from: <internal-pdf://0.0.1.107/shelter-and-settlement-standard-4-construction.html>

Spillane J., Oyedele L., (2013). Strategies for effective management of health and safety in confined site construction. *Australas J Constr Econ Build* [Internet]. **13**(4):50–64. Available from: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84890665122&partnerID=40&md5=2b2839ccc0bb05c8e9561cb6f70b948d>

Tidball-Binz M., (2007). Managing the dead in catastrophes: Guiding principles and practical recommendations for first responders. *Int Rev Red Cross*. **89**(866):421–42.

UNEP & OCHA, (2011). *Disaster Waste Management Guidelines* [Internet]. Geneva; [cited 2018 Oct 3]. Available from: <http://ochaonline.un.org/ochaunep>

UNHCR (2017). *Emergency Handbook* [Internet]. Geneva, Switzerland: United Nations; Available from: <https://emergency.unhcr.org/>

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