NEBOSH

Health and Safety Management for Construction (UK)

Unit NC1: Construction management

Unit NC2: Construction case study

SAMPLE MATERIAL

RMS Publishing Ltd

Suite 3, Victoria House,
Lower High Street, Stourbridge, West Midlands DY8 1TA
Tel: +44 (0) 1384 447927 Email: sales@rmspublishing.co.uk

RMS PUBLISHING

Load

The nature of a load can contribute to increased manual handling risks due to its size, weight, centre of gravity, stability, how easy it is to grip and any hazardous surfaces (sharp, hot, substance contamination) or contents it may have. Manual handling risks related to the load can be minimised by considering the design of the load, for example, designing it to be smaller by concentrating the substances contained in it or breaking the load up into suitable, smaller sized containers. It might also mean designing in handles or features that make it easier to grip the load, such as 'sticky grip' areas on plastic sacks.

To minimise manual handling risks related to the load, consideration should therefore be given to control measures that take account of the load's weight, size, grip and whether it is sharp or hot and its stability. Each of these risk factors and control measures to minimise the risks are outlined below.

Weight

Regulation 4 of the Manual Handling Operations Regulations (MHOR) 1992 states that employers shall:

> "take appropriate steps to provide any of those employees who are undertaking any such manual handling operations with general indications and, where it is reasonably practicable to do so, precise information on –
>
> (a) the weight of each load, and
>
> (b) the heaviest side of any load whose centre of gravity is not positioned centrally."

Figure 8-29: Requirement to provide an indication of weight of loads for manual handling.
Source: Manual Handling Operations Regulations (MHOR) 1992.

Generally, the heavier the load the higher the risk of injury. Therefore, risks can be minimised by ensuring workers only manually handle loads of a reasonable weight. Many countries have used simple maximum weight limits for the lifting of loads. However, this has been found to be an over-simplistic approach. Research has identified that it is not possible to set a simple, specific weight limit for all manual handling tasks because the individual capability of workers and the task being conducted greatly influence what is an acceptable weight. Many of the weight limits set by countries have tended to be too high for average workers and work practices.

Work in the UK has confirmed that the load weight limit adopted by the USA (23kg) is an effective weight limit to reduce risk and the maximum weight limit approach was adapted in the UK to reflect the fact that workers may lift from different positions and that there are differences in the lifting capacity of women and men. This work has been published as the UK Health and Safety Executive's (HSE) lifting guidelines. In the UK, therefore, a single maximum weight limit has been removed from legislation and replaced by the HSE lifting guidelines. The UK guidelines set out an *approximate* boundary within which manual handling operations are unlikely to create a significant risk of injury.

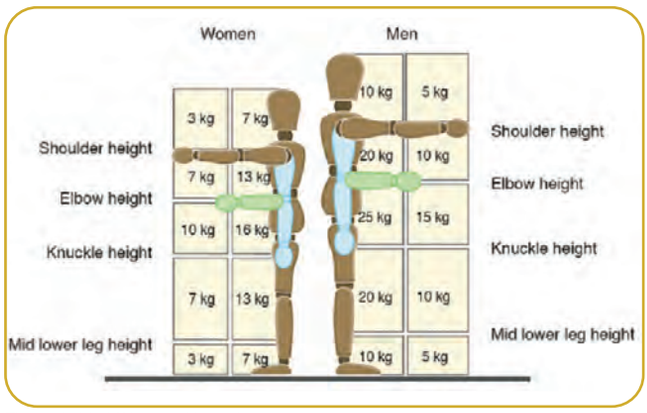

Figure 8-30: Lifting and lowering.
Source: HSE, Guidance L23.

The UK guideline figures are not absolute weight limits. They may be exceeded where a more detailed assessment shows it is safe to do so. However, the guideline figures should not normally be exceeded by more than a factor of about two. The guideline figures for weight will give reasonable protection to nearly all men and between one half and two thirds of women.

It should be remembered that one of the main methods used to reduce the risks from manual handling is to change the load by repackaging it into smaller weights or breaking a bulk load down into smaller batches. This solution avoids the need to lift heavy loads. However, it will increase the frequency of manual handling movements and may lead to a significant repetitive movement risk.

It is often better to find ways of using lightweight materials, for example, replacing pre-cast concrete kerbs and drainage blocks with plastic equivalents.

The HSE explain the benefits of changing the material and design of a load in their case study related to trench blocks used for straight runs of foundations.

Figure 8-31: Lightweight plastic kerbs.
Source: HSE, COH14.

©RMS

First-aiders and first aid equipment

FAR 1981 Regulation 3(2) states that in order to provide first-aid to injured or ill workers:

> "an employer shall provide, or ensure that there is provided, such number of suitable persons as is adequate and appropriate in the circumstances for rendering first-aid to his employees if they are injured or become ill at work; and for this purpose a person shall not be suitable unless he has undergone such training and has such qualifications as may be appropriate in the circumstances of that case."

Figure 3-14: Appointment of suitable persons.
Source: Health and Safety (First-Aid) Regulations (FAR) 1981.

A first-aid needs assessment should help to employers decide how many people are required and what first-aid training they should have. For example, the employer should consider whether first-aiders should be trained in emergency first-aid at work (EFAW) only or receive standard first-aid at work (FAW) training.

In appropriate circumstances an employer can provide an 'appointed person' instead of a first-aider. The 'appointed person' is someone appointed by the employer to take charge of the situation (for example, to call an ambulance) if a serious injury occurs in the absence of a first-aider.

The employer must also ensure that an adequate quantity of suitable first-aid equipment is provided. Employers are usually expected to meet minimum requirements and take account of the particular circumstances related to their work activities. The number of first-aid kits provided and their contents will be influenced by the level of hazard related to the workplace and the number of workers the first-aid box/container is to cover.

British Standard BS 8599-1:2011 'Workplace first-aid kits; specification for the contents of workplace first-aid kits' (BS 8599) outlines a guide for employers to decide the most suitable size and number of first-aid kits for their workplace, presuming there are no special risks in the workplace, see ***Figure 3-17.***

Category	Number of workers at location	Suggested number and type of suitable person
Low hazard For example, offices, shops, libraries	Less than 25	At least one appointed person
	25-50	At least one first-aider trained in EFAW
	More than 50	At least one first-aider trained in FAW for every 100 employed (or part thereof)
Higher hazard For example, light engineering and assembly work, food processing, warehousing, extensive work with dangerous machinery or sharp instruments, construction, chemical manufacture	Less than 5	At least one appointed person
	5-50	At least one first-aider trained in EFAW or FAW depending on the type of injuries that might occur
	More than 50	At least one first-aider trained in FAW for every 50 employed (or part thereof)

Figure 3-15 (Above): Suggested number and type of suitable first-aid person.
Source: HSE.

Figure 3-16: First-aid kit.
Source: RMS.

Size of first-aid kit	Small	Medium	Large
Low hazard workplaces (offices, shops, etc.)	Less than 25 workers	25-100 workers	Over 100 workers, 1 large per 100 workers
Higher hazard workplaces (light engineering and assembly work, food processing, warehousing, extensive work with dangerous machinery or sharp instruments, construction, chemical processing, etc.)	Less than 5 workers	5-25 workers	Over 25 workers, 1 large per 25 workers

Figure 3-17: Suggested size of first-aid kit for different workplaces and numbers of workers.
Source: BS 8599.

©RMS

There should be provision of a safe way to get into and out of the driving/passenger position and any other parts of the vehicle that need to be accessed regularly. Access features on vehicles, such as ladders, steps or walkways, should have the same basic features as site-based access systems.

Vehicles should have seats that are safe and comfortable, where they are necessary. Guards should be fitted round dangerous parts of the vehicle/plant, for example, power take-offs, chain drives and exposed hot exhaust pipes.

Figure 6-47: Safe operating platform.
Source: SRTS Limited.

Consider fitting a horn, vehicle lights, reflectors, reversing lights and possibly other warning devices, for example, rotating beacons or reversing alarms. Painting and marking vehicles in distinct colours may be necessary to make the vehicle stand out against the workplace background.

Visibility from vehicles/reversing aids

It is important that drivers are able to see clearly around their vehicle, to allow them to identify hazards and avoid them. Driver visibility is often restricted to the side or rear of the vehicle. Side visibility can be improved greatly with the addition of extra mirrors to the sides of the vehicle. These mirrors provide a good low-level view, assisting with parking and the identification of hazards close to the vehicle sides. Vehicles that have limited driver visibility behind the vehicle may be provided with an extra supplementary mirror that improves vision. For example, a mobile crane may have limited visibility from the driving cab and a mirror in the centre/rear of the vehicle to aid the driver's vision.

A variety of other reversing aids are now in common use for vehicles that travel on ordinary roads. These include simple proximity detectors to the front and rear of the vehicle that trigger an audible alarm when the vehicle approaches an object. The audible alarm tone usually varies as the vehicle gets closer to the object. More sophisticated devices will distinguish between front and rear detection by the use of different sounds.

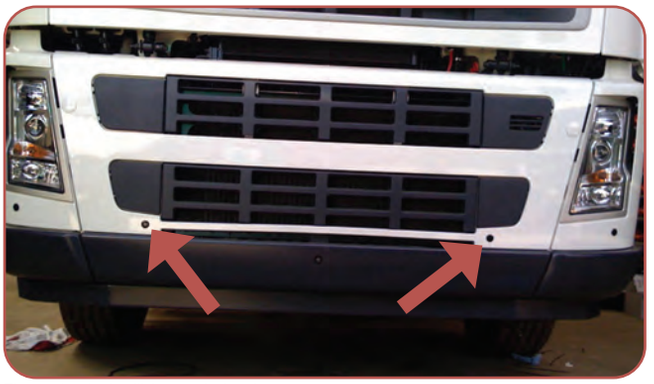

Figure 6-48: Audible proximity detectors.
Source: Transport support.

Figure 6-49: Reversing camera systems.
Source: Transport support.

In addition, the device may also display a schematic on a screen in the vehicle cab, indicating the precise direction of the obstruction to the driver.

Further advances in detection methods for vehicles include the use of cameras to the rear or sides of the vehicle with a clear display available to the driver in the cab.

CASE STUDY

A construction site worker was injured by a 360° excavator, which was operating in a poorly organised construction site.

The site worker was carrying out construction activities when the reversing excavator hit him and the track went over his right leg. The excavator was not fitted with devices to improve visibility from the cab, such as rear-mounted convex mirrors or closed-circuit television (CCTV), and the driver had not received formal excavator training. The excavator had been working within 3-4 metres of the injured worker on a daily basis, had knocked him once before and would often lift material over the worker's head.

©RMS

FALL ARREST EQUIPMENT

Harnesses

There may be circumstances in which it is not practicable for guardrails etc. to be provided, for example, where guardrails are taken down for short periods to land materials.

In this situation if people approach an open edge from which they would be liable to fall two metres or more, a suitably attached harness and temporary horizontal lifeline could allow safe working. When using harnesses and temporary horizontal lifelines, ensure:

- An emergency rescue system must be in place before a harness and lanyard is used to protect against a fall.
- A harness will not prevent a fall - it can only minimise the injury if there is a fall. The person who falls may be injured by the impact load to the body when the line goes tight or when they strike against parts of the structure during the fall. An energy absorber fitted to the energy-absorbing lanyard can reduce the risk of injury from impact loads.
- Where possible the energy-absorbing lanyard should be attached above the wearer to reduce the fall distance. Extra free movement can be provided by running temporary horizontal lifelines or inertia reels. Any attachment point must be capable of withstanding the impact load in the event of a fall. Consider how to recover anyone who does fall.
- Anyone who needs to attach themselves should be able to do so from a safe position. They need to be able to attach themselves before they move into a position where they are relying on the protection provided by the harness.
- That there is an adequate fall height to allow the system to operate and arrest the fall.
- A twin lanyard is used where necessary, in situations where the wearer needs to move about. A twin lanyard allows the wearer to clip on one lanyard in a different position before unclipping the other lanyard.
- Installation of equipment to which harnesses will be fixed, for example, a suitable anchor, must be inspected regularly.
- Everyone who uses a harness must be instructed in how to check, wear and adjust it before use and how to connect themselves to the structure or safety line as appropriate.
- The equipment is thoroughly examined at intervals of no more than every six months.

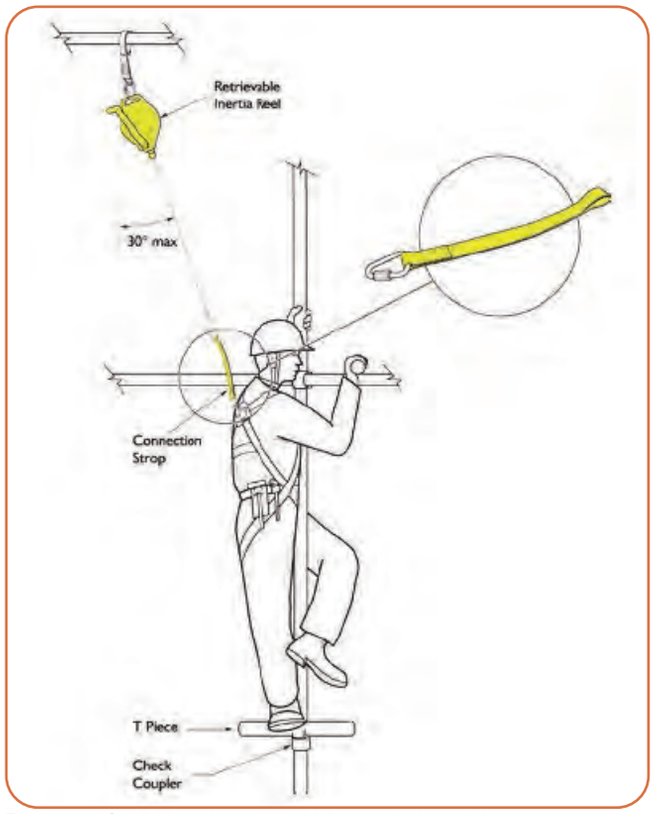

Figure 7-73: Scaffolder using personal fall arrest device with harness.
Source: NASC.

Retractable types of fall arresters tested against EN360 are tested with a 100Kg mass and have to produce an arrest force of less than 6kN. Therefore users greater than 100Kg (15 stone 10 lbs.) in weight should refer to the manufacturer's instruction for use and if not covered within the instruction should contact the manufacturer and obtain information for users weighing greater than 100Kg.

Safety nets

Safety nets are used in a variety of applications where other forms of protection are not reasonably practicable - such as steel erecting and roof work where site personnel are at risk of falling through fragile roofs onto solid surfaces or structures (steel work) below.

Figure 7-74: Safety nets under partially completed roof.
Source: RMS.

©RMS

REVIEW

What control measures could be used to help reduce noise levels in a workplace? Explain the 'two metre' rule in relation to noise in the workplace.

PERSONAL HEARING PROTECTION

Purpose

The purpose of personal hearing protection is to protect the user from the adverse effects on hearing caused by exposure to high levels of noise. All hearing protection must be capable of reducing exposure to below the acceptable noise level set nationally by the competent authority, for example, 85 dB(A) averaged over 8 hours.

The provision of hearing protection should only be considered after all attempts to reduce the exposure to noise by other means have proved ineffective in reducing noise levels satisfactorily, or where exposure above any nationally imposed action levels requiring hearing protection to be provided exists.

Figure 13-15: Helmet mounted ear muffs.
Source: RPA.

Figure 13-16: Ear muff with two-way communication.
Source: Davro Online Safety.

Custom-fit earplugs

A wide range of custom-fit earplugs is now available for people who work in noisy environments such as working with machinery, maintenance activities or musicians.

Custom-made earplugs ensure a perfect seal to the ear canal. The fit is designed to replicate the exact shape of each individual ear canal and this ensures a comfortable fit, greatly reducing workers' reluctance to wear them.

Custom-fit earplugs require impressions of the ear to be taken first by a trained audiologist so that a proper seal can be created. Normally it takes four to six weeks to make the earplugs after the impressions are taken.

Figure 13-17: Custom-fit earplugs.
Source: Wikimedia Commons.

Earmuffs:	Application:	Limitations:
These completely cover the ear and can be: • Banded. • Helmet mounted. • Communication muffs.	• Worn on the outside of the ear so less chance of infection. • Clearly visible therefore easy to monitor. • Can be integrated into other forms of personal protective equipment (PPE), for example, head protection.	• Can be uncomfortable when worn for long periods. • Incompatibility with other forms of PPE. • Effectiveness may be compromised by, for example, long hair, spectacles. • Requires correct storage facilities and regular maintenance.
Earplugs:	**Application:**	**Limitations:**
These are inserted in the ear canal and can be: • Pre-moulded. • User formable. • Custom moulded. • Banded plugs.	• Easy to use and store - but must be inserted correctly. • Available in many materials and designs, disposable. • Relatively lightweight and comfortable. Can be worn for long periods.	• They are subject to hygiene problems unless care is taken to keep them clean. • Correct size may be required. Should be determined by a competent person. • Interferes with communication. • Worn inside the ear, difficult to monitor.

Figure 13-18: Application and limitations of various types of hearing protection.
Source: RMS.