



## Can you handle it?

**Manual handling and vibration pose significant risks to construction workers, with musculoskeletal injury at the top of the list. Reduce the hazards, with the help of our guide.**

**Manual handling is a common activity on construction sites. Unfortunately, it is also a major cause of musculoskeletal injury.**

**If construction workers lift heavy or awkward materials or equipment, carry out repetitive strenuous activities, use damaging or vibrating equipment or work in awkward positions, this can put their bodies under a great deal of strain. This, in turn, makes them particularly vulnerable to musculoskeletal injury.**

**As designers are involved at the earliest stages of a project, they are well placed to identify the musculoskeletal risks. They are also in an ideal position to help eliminate or control them.**

**Life outside the tick box.**

# Musculoskeletal injury

## **What is it?**

The term 'musculoskeletal injury' covers a wide range of injuries to, and disorders of, the musculoskeletal system. They can cause a great deal of pain and discomfort – and, in very serious cases, may even result in permanent disability.

Common types of musculoskeletal injury include:

**Back injury** – caused by the lifting and carrying of plant and materials, or working in awkward positions

**Work-related upper-limb disorder (WRULD)** – caused by carrying out repetitive tasks over long periods

**Hand-arm vibration syndrome (HAVS)** – caused by exposure to vibration from plant and machinery

## **What causes it?**

Broadly speaking, any activity that requires a person to work under strain, or in a non-ergonomic position, has the potential to cause or contribute to musculoskeletal injury.

Many musculoskeletal injuries are cumulative, meaning that they manifest themselves over time, rather than resulting from a single handling operation.

Activities that pose an especial risk to construction workers include:

- **Laying high-density blocks**
- **Installing heavy windows**
- **Manoeuvring heavy components while laying paving and kerbstones**
- **Working while bent over** – for example when:
  - Undertaking concrete work that involves hand-spreading, vibrating, cutting joints or hand-floating large areas of concrete
  - Steel-fixing – especially in ground slabs
- **Working while stretching** – for example when:
  - Fixing services in ceiling spaces
  - Steel-fixing in retaining walls
- **Using tools that vibrate** – for example when:
  - Breaking out concrete
  - Scabbling concrete
  - Pressure washing
  - Compacting
- **Using handheld diggers or breakers**

Workers, contractors and designers can all contribute to the risk of injury. Workers may not recognise that carrying out tasks in a particular way – often, the way that they have always carried them out – may result in ill-health. Meanwhile, a contractor's choice of work methods is likely to be driven by factors such as time, budget, planning and the nature of the site – rather than the possible effects of those methods on the health of site workers. And designers can contribute to the risk by giving insufficient consideration to it at the design stage.





## Controlling the hazard by design

When designing a project, you should assess how your requirements may affect the health of site workers. In some cases, it may be possible to discuss likely construction methods with the contractor. Otherwise, it will be for you to consider how the work is likely to be constructed.

Bear in mind that the risks posed by manual handling can be affected by the following:

- **The magnitude of the load**
- **Incorrect posture** – for example twisting, stooping or reaching while handling the load
- **The time for which the load is supported**
- **The time for which the incorrect posture is adopted**
- **The distance of the load from the body**
- **Ease of grasping** – for example, extra effort will be required to handle loads that are large, rounded, greasy or smooth

So, you should take these factors into account when assessing the risks.

### ***Altering your design to eliminate or minimise risk***

There are a number of ways that designers can reduce or remove some of the risks associated with manual handling. These include:

- **Eliminating the need to manhandle heavy components** – for example by selecting off-site construction methods or limiting the weight of components
- **Designing to allow the use of mechanical, rather than manual, handling methods.** For example, you could use layouts that provide sufficient space for mechanical plant, and detail components whose sizes are compatible with the machines currently available
- **Avoiding specifications that require the use of:**
  - Handheld vibrating tools such as needle guns or power saws
  - Tools that are heavy or awkward to use, such as concrete drills or pneumatic breakers
- **Avoiding specifications that require people to work in awkward or cramped conditions**
- **Detailing the works to allow for maximum off-site prefabrication** – for example by:
  - Using reinforcing mesh instead of individual bars
  - Detailing reinforcement to allow fabrication in a more accessible situation
- **Dimensioning the works to allow the use of non-handheld tools for cutting, excavation and compaction.** For example:
  - Size trench widths to allow remotely-controlled compaction
  - Ensure that trench widths are not narrower than minimum excavator bucket sizes
  - Detail reinforcing mesh so that it arrives on site in the correct size, to avoid cutting on site

Designers should also ensure that layouts and dimensions of buildings and structures, and their clearances, allow good access for building and maintenance tasks. For example:

- **Heights of work should fit with module sizes of temporary works equipment (TWE).** See Design Guide **CON306 Temporary works** for more on this
- **Corridor widths should allow the use of mobile TWE**
- **Service runs could be designed at heights that correspond with TWE module heights**
- **Service runs should be detailed with enough space around them to enable them to be grasped properly**



## Controlling the hazard by information

Where it is not possible to eliminate hazardous operations from a design, it is essential that you communicate these hazards to the contractor and others involved in the project. You can do this through meetings and by marking up drawings, and you must also include details within the preconstruction information and in the construction phase plan.

### Examples of risk-control measures

Activity	Health risk	Possible control measures
Laying block pavements	WRULD (work-related upper limb disorder)	Design for machine-laying – space, component size etc
Bricklaying	WRULD	Design to reduce long-duration repetition
Tying reinforcement	WRULD Back injury	Use welded mesh – detail to allow prefabrication and lifting-in
Block-laying	Back injury	Use lighter blocks
Materials handling	Back injury	Allow adequate space for available machines, and specify low-weight packages
Working in small or awkward spaces	Back injury Other musculoskeletal injury	Dimension height and width to fit TWE modules, and size reinforced concrete components to minimise pushing and pulling while fixing reinforcing bars
Use of hand tools, for example in: • Reinforced concrete work • Compaction	HAVS (hand-arm vibration syndrome)	Design for: • Use of crack-inducers or non-scabbled joints • Remote compaction
Pile cropping	HAVS	Design spacing and pile reinforcing bars for machine-cropping
Cutting, for example: • Chases • Joints in reinforced concrete • Blocks	HAVS	Design to: • Provide ducts and detail box-outs • Use crack-inducers • Minimise number of cuts

**Note:** this table is not exhaustive, and is intended for guidance only. It is for the designer to identify the risks and set out the appropriate control measures.

## Useful resources

L153 Managing Health and Safety in Construction

L23 Manual Handling (Regulations and ACoP) and Guidance

INDG 171 - Upper Limb Disorders- A brief guide

L140 Hand-arm vibration The Control of Vibration at Work Regulations 2005 and Guidance

There are other HSE information sheets that give guidance on dealing with musculoskeletal injury. These are available from HSE Books.

## See elsewhere on SID:

CON306 Temporary works

CON301.1 Manual handling information

CON309 Concrete blocks

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