Manual handling solutions in woodworking

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Introduction

This leaflet describes what employers and others who have control of manual handling activities may need to do to protect their employees in the workplace. It will also be useful to employees and their representatives.

What are the problems?

In woodworking, manual handling causes approximately 30% of the work-related injuries reported each year. As well as the obvious strains and sprains, handling can also result in lacerations and fractures. Most injuries arise from stresses and strains over a period of time rather than from a single event and some result in permanent disablement.

What are the causes?

Manual handling problems often stem from poor workplace or job design. Among the most common examples of risky activities are jobs involving: heavy or awkward loads; difficulty in gripping; excessive use of force; repetition; twisting and other awkward postures.

What is the cost?

Costs to the company can come from: loss of production; poor product quality; sickness payments; accident injury claims and higher insurance premiums; high staff turnover; and retraining. Costs to the individual are: pain; possible permanent disability; time off work; and loss of earnings.

What needs to be done: Assessing the risk

The Manual Handling Operations Regulations 1992 (as amended)[1] set out a clear hierarchy of measures:

- Avoid hazardous manual handling so far as reasonably practicable.
- Assess any hazardous handling operations that cannot be avoided.
- Reduce the risk of injury so far as reasonably practicable.

The Regulations cover ‘the transporting or supporting of loads by hand or bodily force’. For example, they cover the handling of board and panel products as well as moving containers of paint or timber preservatives. See the guidance booklet on the Regulations for an example of an assessment checklist.

Avoiding manual handling

Ask the following questions:

- Is manual handling necessary?
- Could the desired result be achieved another way?
- Can the operations be mechanised or automated?

The main risk factors associated with manual handling activities are:

- the task – twisting, stooping, strenuous pushing and pulling etc;
- the load – excessive weight, unusual size, awkward shape, instability, difficulty of grasp;
- the work environment – constraints on posture, poor floor surfaces, hot, cold or humid conditions;
- individual capabilities – health problems, the effects of protective equipment and clothing.

Assess the risks

The Manual Handling Regulations do not cover the physical effort required in work which does not involve transporting or supporting a load, for example the actions involved in the operation of the controls of woodworking machinery or the use of hand-held tools such as nail or spray guns. Nevertheless, if the machinist cannot reach the controls easily, or operating the controls needs excessive force, injury can result. These risks should be considered in the risk assessment required by the Management of Health and Safety at Work Regulations 1999.[2]

In deciding whether an activity presents a risk, consider the following:

- Is excessive force required?
- Are there any complaints of aches and pains from workers? Check with safety committees and look at your records of sickness absence.
- Is there any evidence of improvised changes to controls or equipment?
- Does the work require awkward postures such as stooping or stretching?
- Is there enough space to move around?
- Are there any reports of accidents or injuries associated with manual handling?
- Ask the employees which tasks are the most arduous.

Handling solutions

Many manual handling solutions involve the use of some form of work equipment. Where you use work equipment to reduce the risks of manual handling you should ensure that it is safe and suitable for the purpose for which it is intended as required by the Provision and Use of Work Equipment Regulations 1998 (PUWER 98).[3,4]

A study of handling in the woodworking industry identified several common tasks where handling injury risks were evident. The following examples illustrate possible ways of reducing or eliminating them.

Workbench and machine table height

Problem: Poor working posture can lead to a variety of problems such as pains in the lower back, shoulder or neck. Spending the day stooped over a workbench or machine table that is at an unsuitable height is one example.

Solutions: The many solutions available include:

- For a workbench that is too low the simplest solution is to make some wooden blocks to place beneath the bench legs. These should hold the bench in a secure position so that it does not wobble. Tilting the top of the bench or table brings the workpiece closer still to the body and reduces the need for reaching and stooping.
- Vacuum workstands are available which can be used instead of the traditional workbench. Large flat workpieces and even doors and window frames can be held on such equipment. Working height is easily adjustable (typically between 750 to 1100 mm). The suction pads that hold the workpiece can be swivelled (by 90°) and rotated (360°), allowing the workpiece to be worked at easily (see Figure 1). For larger workpieces, height-adjustable vacuum workbenches are available. On these, the workpiece mounting can be swivelled and locked at any angle too suit the job in hand. A number of other non-vacuum designs of workstand are also available.
- It is also important that machinery is at the correct height. For example, with a lathe the ideal machine height can be found by checking that the tip of the operator's elbow, with their arm bent, aligns with the centre of the headstock (see Figure 2); with a band saw, the hand should rest comfortably on the table (when standing upright with the small of the back tucked in).

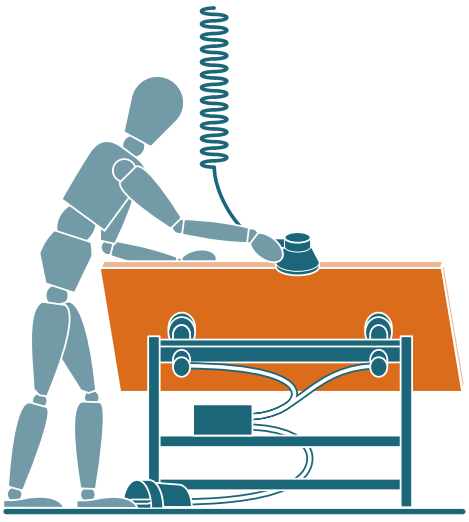

Figure 1 Vacuum workbench

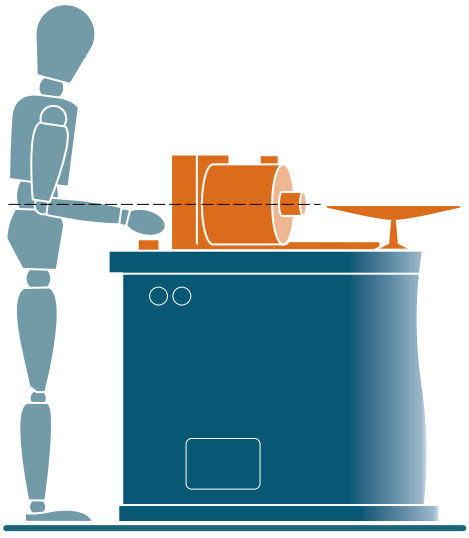

Figure 2 Checking lathe for correct working height

On band re-saws, the lower band wheel (pulley) is traditionally positioned in a pit below floor level. Several newer 'pitless' designs now exist, ie the band wheel is above floor level which can mean that the machine table can be too high for comfortable use. One solution is to raise the operator's working position, taking care not to introduce tripping and falling hazards.

Handling of tooling for use on woodworking machines

Problem: The handling of tooling for woodworking machines presents some obvious hazards as it is extremely sharp. Tooling can also be heavy, difficult to grip (eg there may be no easy handhold due to the positioning of the cutters on a moulding block) and awkward to carry (eg a blade for a band re-saw).

Solution: Wear suitable gloves when handling tooling, ie thick enough to prevent projecting cutters/knives from cutting the skin as well as providing an adequate grip. Where possible, tooling should be stored as closely as possible to machinery so that the carrying distance is limited. When transporting tooling for longer distances, eg for sharpening, it should be moved in a protective carrier (such as a wooden box) or on a trolley. When moving an unsupported band saw blade around the factory, rather than carrying it over the shoulder, use a simple transit board (see Figure 3). Secure the blade to the board and carry it with the teeth pointing away from the body.

The European standard for the design and manufacture of woodworking machinery tooling, EN 847-1:2005,[5] states that 'Detachable tools which weigh more than 15 kg shall be designed so that they can be fitted with attachments for handling (eg threaded holes) or be shaped in such a way that a standard handling device can easily be attached.'

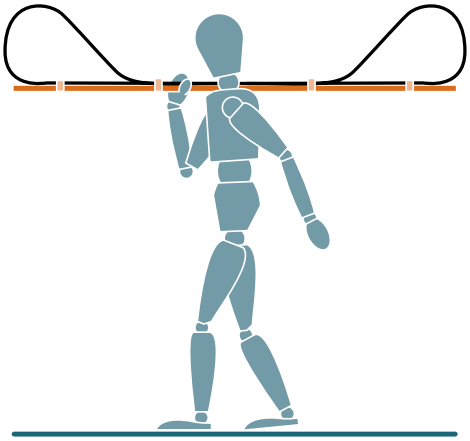

Figure 3 Band saw blade transit board

Handling of round timber

Problem: Positioning and moving round timber can be difficult due to the need to bend and the difficulty in getting a good grip.

Solution: Log tongs can be used to help handle round timber (see Figure 4). As well as helping to grip the timber they reduce the need for bending. They speed up the job and repay their cost very quickly.

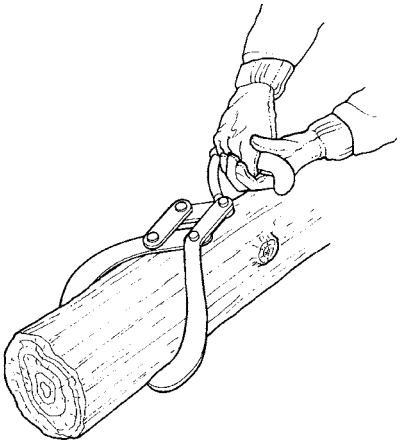

Figure 4 Log tongs

Handling wood-based panel products

Problem: The large size and weight of wood-based panel products (chipboard, MDF etc) present very real handling hazards in many parts of the industry. Wooden sheets generally have a standard size of 2440 x 1220 mm (or divisions of) and can range in thickness from 3 mm to 35 mm. A single 18 mm thick plywood sheet of this size weighs approximately 30 kg.

Solutions: There are a number of solutions to this problem:

- **Lifting hooks** – These enable one person to move smaller panels without the need to bend and enable the panel to be properly gripped. All that is needed is an adjustable steel rod (60–80 cm long) with a hook on one end and a handle on the other (see Figure 5). A variety of other similar devices are also available for this task, such as handles incorporating roller-grips at one end.

- **Panel trolleys** – These are available with locking casters, tilting bed, moveable fence and a rise and fall table (see Figure 6). They enable a single machinist to load, manoeuvre and machine a large number of panels. Once loaded with panels and moved to a machine, the top panel can be adjusted to the height of the machine table and machined.

Figure 5 Lifting hook

The trolley is then gradually raised to allow easy feeding of subsequent panels. Such trolleys also have many other uses including:

- extension tables;
- sliding beds for machines;
- general-purpose trolley (eg for transporting large jigs for computer numerical control (CNC) routing machines etc);
- moveable work table;
- loading vehicles.

Such devices increase productivity and save time and money – with rapid cost recovery. Care needs to be taken to ensure that trolleys are well maintained otherwise new handling risks may be introduced.

A video showing the use of panel handling aids and trolleys can be seen on HSE's woodworking website www.hse.gov.uk/woodworking/manualhandling.htm

- **Vacuum-handling systems** – A wide variety of equipment is available for stacking, handling and turning board products. These have many uses such as feeding machines like beam panel saws, wall saws and CNC routers. Where large boards need to be turned so that both sides can be machined, special turners are available that will turn panels through 180°. This type of equipment has many advantages – it is easy to use, fast, does not damage the boards and can be operated by a single person.

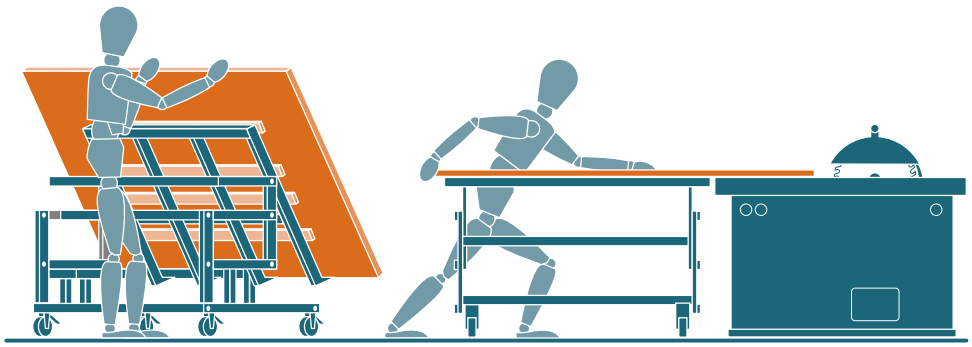

Figure 6 Panel trolley

Handling lengths of timber, wooden components and planks

Problem: Transfer of long lengths of timber, eg between woodworking machines where a lack of space means fork-lift trucks cannot be used.

Solution: An extending trolley made from scaffold-tube with a turntable-type front axle is one option. The trolley can be pushed or pulled manually by one person. Such devices can be made by most jobbing fabrication engineers. Care should be taken to stack lengths of timber or finished components safely on trolleys (if necessary band the timber with suitable strapping before moving the trolley). This reduces the risk of timber falling from the trolley. An over-stacked trolley can also require excessive exertion to move it.

As an alternative to a trolley, vacuum-handling devices are available for handling planks of wood (minimum plank width about 100 mm) – even for wood that is badly warped. Vacuum-handling devices are even available for moving bonded joists or beams that are up to 24 m long and over 1000 kg.

Movement of assembled furniture and joinery

Problem: Assembled furniture and joinery, such as office desks, can be very heavy and difficult to manually move from the workbench down to the floor.

Solution: For the manufacture of furniture such as office desks, one cheap DIY solution involves fitting two curved rockers (or runners) to the workbench on which the furniture is assembled. Once assembled, the item of furniture is clamped to the bench. The bench is then inverted through 180° using the rockers, depositing the furniture the right way up on to the floor. Vacuum-handling devices are also suitable for this task – these can cope with everything from assembled furniture to staircases (see Figure 7).

Use of nail guns

Problem: Nail guns are used extensively, for example in the manufacture and repair of pallets and in the furniture industry. Guns of 4 kg or more are not uncommon – these have to be held in a variety of awkward positions at the same time as exerting considerable physical effort. Fatigue and shoulder problems can result.

Solution: The weight of the gun can be reduced by providing a suspension system. This involves holding the gun on an inertial balance system suspended above the workstation. This takes most of the weight of the gun and the operator then simply has to move it to the various points where a nail or staple is required (see Figure 8). The task can be made easier still by positioning the workbench to the optimum angle to allow the work item to be easily accessed – reducing the need to reach or stoop.

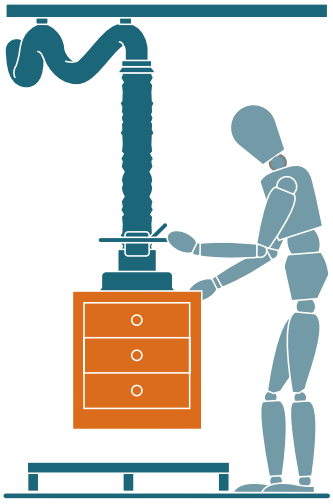

Figure 7 Vacuum-handling device

Inspection of wooden pallets

Problem: Pallets are heavy – typically between 20 and 30 kg – and awkward to handle because they are so large. The fact that they are often made out of roughly sawn timber increases the risk of a splinter injury. There is also the risk of nails protruding from the pallet which could puncture the skin.

Solution: A range of vacuum-handling devices are available specifically for the pallet making industry, for example for pallet moving, turning and to aid the pallet inspecting process. With these devices, operatives are able to inspect up to 1350 pallets per shift with minimum handling effort (see Figure 9).

Feeding timber into roof-truss saws

Problem: Manual loading of the conveyor of a roof-truss saw with extremely long and heavy timbers.

Solution: Timber stock should be placed close to the machine to reduce manual handling. Trestles or roller supports between the timber stock and the lower in-feed conveyor can then act as a useful pivot point to support the weight of the timber as it is transferred onto the conveyor. This makes the loading of the roof-truss saw a relatively straightforward one-person operation. A similar solution can be applied to the manual loading of other types of woodworking machinery.

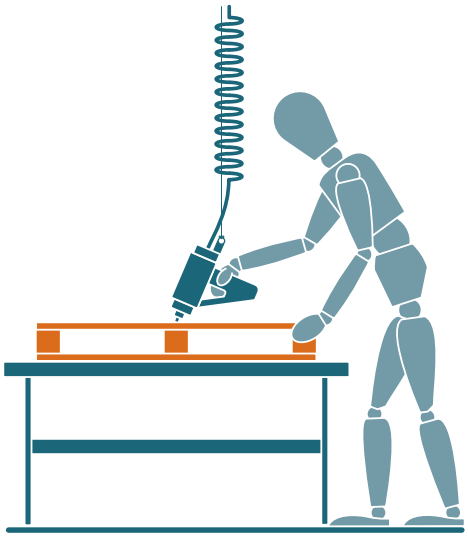

Figure 8 Inertial balance system

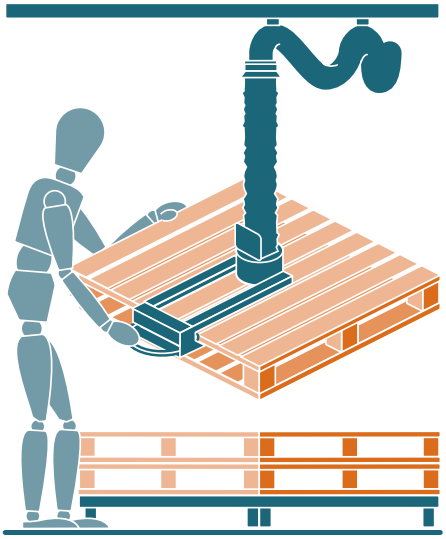

Figure 9 Pallet inspection

References and further reading

1 *Manual handling. Manual Handling Operations Regulations 1992 (as amended). Guidance on Regulations* L23 (Third edition) HSE Books 2004 ISBN 978 0 7176 2823 0 www.hse.gov.uk/pubns/books/l23.htm

2 *Management of health and safety at work. Management of Health and Safety at Work Regulations 1999. Approved Code of Practice and guidance* L21 (Second edition) HSE Books 2000 ISBN 978 0 7176 2488 1 www.hse.gov.uk/pubns/books/l21.htm

3 *Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance* L22 (Third edition) HSE Books 2008 ISBN 978 0 7176 6295 1 www.hse.gov.uk/pubns/books/l22.htm

4 *Safe use of woodworking machinery. Provision and Use of Work Equipment Regulations 1998 as applied to woodworking machinery. Approved Code of Practice and guidance* L114 HSE Books 1998 ISBN 978 0 7176 1630 5 www.hse.gov.uk/pubns/books/L114.htm

5 BS EN 847-1:2005 *Tools for woodworking. Safety requirements. Milling tools, circular saw blades* British Standards Institution

Further reading

Manual handling at work: A brief guide Leaflet INDG143(rev3) HSE Books 2012 www.hse.gov.uk/pubns/INDG143.htm

Ergonomics and human factors at work: A brief guide Leaflet INDG90(rev3) HSE Books 2013 www.hse.gov.uk/pubns/INDG90.htm

Stacking sawn timber and board materials: Safe working practices Woodworking Information Sheet WIS2(rev2) HSE 2013 www.hse.gov.uk/pubns/WIS2.htm

More information on manual handling can be found on HSE's manual handling website www.hse.gov.uk/msd/manualhandling.htm

See also the Manual handling assessment chart (MAC tool) at www.hse.gov.ukmsd/mac/index.htm

More information on health and safety issues for woodworking can be round on HSE's woodworking website www.hse.gov.uk/woodworking/index.htm

Further information

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This leaflet is available at www.hse.gov.uk/pubns/indg318.htm.