Introduction

Work-related musculoskeletal disorders (MSDs), including manual handling injuries, are the most common type of occupational ill health in the UK and their prevention is a priority for HSE. It is important to remember that:

- things can be done to prevent MSDs;
- preventative measures are cost-effective;
- you cannot prevent all MSDs, so early reporting of symptoms, proper treatment and suitable rehabilitation is essential.

The steps to follow

The Manual Handling Operations Regulations 1992 (as amended) establish a clear hierarchy of measures for dealing with risks from manual handling. These are:

- avoid hazardous manual handling operations so far as reasonably practicable;
- assess any hazardous manual handling operations that cannot be avoided; and
- reduce the risk of injury so far as reasonably practicable.

The MAC

The Manual Handling Assessment Charts (MAC) is a new tool designed to help health and safety inspectors assess the most common risk factors in lifting (and lowering), carrying and team handling operations. Employers, safety officers, safety representatives and others may also find the MAC useful to identify high-risk manual handling operations and help them complete their risk assessments.

Structure of the MAC

There are three types of assessment that can be carried out with the MAC:

- lifting operations pages 2-5;
- carrying operations pages 6-9;
- team handling operations pages 9-11.

For each type of assessment there is an assessment guide and a flow chart. There is a score sheet to complete on page 12.

Note:
The MAC is not appropriate for some manual handling operations, for example those that involve pushing and pulling. Its use does not comprise a full risk assessment (see Manual handling, ‘Further reading’). You must consider individual and psychosocial issues when completing the score sheet. Also, the MAC is not designed to assess risks from workplace upper limb disorders (see Upper limb disorders in the workplace, see ‘Further reading’).
How to complete a MAC assessment

- Spend some time observing the task to ensure that what you are seeing is representative of normal working procedures. Consult employees and safety representatives during the assessment process. Where several people do the same task, make sure you have some insight into the demands of the job from all workers’ perspective. It may help to videotape the task so you can view it over again, away from the workplace, if necessary.
- Select the appropriate type of assessment (i.e., lifting, carrying or team handling). If a task involves lifting and carrying, consider both.
- Ensure you read the assessment guide before you make your assessment.
- Follow the appropriate assessment guide and flowchart to determine the level of risk for each risk factor. Information on risk reduction can be found on the website (see address below). The levels of risk are classified below:

<table>
<thead>
<tr>
<th>Colour Band</th>
<th>Level of Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>G = GREEN</td>
<td>Low level of risk</td>
</tr>
<tr>
<td>A = AMBER</td>
<td>Medium level of risk</td>
</tr>
<tr>
<td>R = RED</td>
<td>High level of risk</td>
</tr>
<tr>
<td>P = PURPLE</td>
<td>Very high level of risk</td>
</tr>
</tbody>
</table>

The vulnerability of special risk groups (e.g., pregnant women, young workers etc) should be considered where appropriate.

This may expose a significant proportion of the working population to risk of injury.

Such operations may represent a serious risk of injury and should come under close scrutiny, particularly when the entire weight of the load is supported by one person.

- Enter the colour band and corresponding numerical score on the score sheet on page 12. The colour bands help determine which elements of the task require attention.
- Add up the total score. The total scores help prioritise those tasks that need most urgent attention and help check the effectiveness of those improvements.
- Enter the remaining task information asked for on the score sheet.

Remember:
The purpose of the assessment is to identify and then reduce the overall level of risk of the task.

Further information on the MAC, including online training, can be found at http://www.hse.gov.uk/msd/mac/index.htm

Assessment guide for lifting operations

A Load weight/frequency

Note the weight of the load and the repetition rate of the lifting operation. Read off the risk banding on the graph on page 4 and enter the colour band and numerical score on the score sheet. If the colour band is purple, the task should be examined very closely, such operations may represent a serious risk of injury and should come under close scrutiny, particularly when the entire weight of the load is supported by one person. Note: High frequency handling operations of light weights will fall within the GREEN zone, but may be associated with upper limb...
problems. Please refer to *Upper limb disorders in the workplace* (see ‘Further reading’) for advice on further assessment.

**B Hand distance from the lower back**

Observe the task and examine the horizontal distance between the operative’s hands and their lower back. Always assess the ‘worst case scenario’. Use the following to guide your assessment:

![Hand distance images](image)

**C Vertical lift region**

Observe the position of the operative’s hands at the start of the lift and as the lift progresses. Always assess the ‘worst case scenario’. Use the following illustrations as a guide:

![Vertical lift region images](image)

**D Trunk twisting and sideways bending**

Observe the operative’s trunk as the load is lifted. If the trunk twists in relation to the hips and thighs or the operative leans to one side as the load is lifted, the colour band is amber and the numerical score is 1. If the trunk both twists and bends to the side as the load is lifted the colour band is red and the numerical score is 2.

**E Postural constraints**

If the movements of the operative are unhindered, the colour band is green and the numerical score is 0. If the operative adopts restricted postures during the lift because of the space available (e.g., a narrow gap between pallet load and hopper) or the workstation design (e.g., an excessively high monorail conveyor), the colour band is amber and the numerical score is 1. If the posture is severely restricted, the colour band is red and the numerical score is 3 (e.g., work in confined areas such as baggage holds).
F  Grip on the load

<table>
<thead>
<tr>
<th>GOOD</th>
<th>REASONABLE</th>
<th>POOR</th>
</tr>
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<tbody>
<tr>
<td>G/0</td>
<td>A/1</td>
<td>R/2</td>
</tr>
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</table>

Containers with well-designed handles or handholds, fit for purpose

Containers with poor handles or handholds

Containers of poor design. Loose parts, irregular objects, bulky or difficult to handle

Loose parts enabling comfortable grip

Fingers to be clamped at 90 degrees under the container

Non-rigid sacks or unpredictable loads

G  Floor surface

<table>
<thead>
<tr>
<th>Dry and clean floor in good condition</th>
<th>Dry floor but in poor condition, worn or uneven</th>
<th>Contaminated/wet or steep sloping floor or unstable footing</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/0</td>
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<td>R/2</td>
</tr>
</tbody>
</table>

H  Other environmental factors

Observe the work environment and score if the lifting operation takes place: in extremes of temperature; with strong air movements; or in extreme lighting conditions (dark, bright or poor contrast). If one of the risk factors are present score 1, if two or more of the risk factors are present score 2.

Load weight/frequency graph for lifting operations
Please insert the colour and numerical scores on the score sheet on page 12.
Assessment guide for carrying operations

A Load weight/frequency

Note the weight of the load and the frequency of the carrying operation. Read off the risk banding on the graph on page 9 and enter the colour band and numerical score on the score sheet. If the colour band is purple the task should be examined very closely, such operations may represent a serious risk of injury and should come under close scrutiny, particularly when the entire weight of the load is carried by one person.

B Hand distance from the lower back

Observe the task and examine the horizontal distance between the operative’s hands and their lower back. Always assess the ‘worst case scenario’. Use the following illustrations to guide your assessment:

C Asymmetrical trunk/load

The operative’s posture and the stability of the load are risk factors associated with musculoskeletal injury. The following illustrations should guide your assessment.

D Postural constraints

If the operative’s movements are unhindered, the colour band is green and the numerical score is 0. If the operative adopts restricted postures during the carry (eg a narrow doorway making the operative turn or move the load to get through), the colour band is amber and the numerical score is 1. If the posture is severely restricted, the colour band is red and the numerical score is 3 (eg carrying loads in a forward bent posture in areas with low ceilings such as cellars).
E  Grip on load

<table>
<thead>
<tr>
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<th>POOR</th>
</tr>
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<td>Containers of poor design. Loose parts, irregular objects, bulky or difficult to handle</td>
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<tr>
<td>Loose parts enabling comfortable grip</td>
<td>Fingers to be clamped at 90 degrees under the container</td>
<td>Non-rigid sacks or unpredictable loads</td>
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F  Floor surface

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<td>A/1</td>
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</tr>
</tbody>
</table>

G  Other environmental factors

Observe the work environment and score if the carrying operation takes place: in extremes of temperature; with strong air movements; or in extreme lighting conditions (dark, bright or poor contrast). If one of the risk factors are present score 1, if two or more of the risk factors are present score 2.

H  Carry distance

Observe the task and estimate the total distance that the load is carried (not the distance ‘as the crow flies’). 

I  Obstacles en route

Observe the route. If the operator has to carry a load up a steep slope, up steps, through closed doors or around tripping hazards, the coloured band is amber and the numerical score is 2. If the task involves carrying the load up ladders, enter ‘R’ (red) for the colour band and 3 for the numerical score. If the task involves more than one of the risk factors (ie a steep slope and then up ladders) total the scores on the score sheet. Enter the ladder height data and/or the angle in the task description box on the score sheet.
# Manual Handling Assessment Charts

## Carrying Operation

### A. Load weight/frequency (see graph on p9)

- **Load symmetrical in front/two hands**
  - **Score**: 0

- **Asymmetrical or offset load/hands**
  - **Score**: 1

- **CLOSE: upper arm vertical/trunk upright**
  - **Score**: 2

- **MODERATE: upper arm angled or trunk bent forward**
  - **Score**: 3

- **FAR: upper arm angled and trunk bent forward**
  - **Score**: 4

### B. Hand distance from lower back

- **Load symmetrical in front/two hands**
  - **Score**: 0

- **Asymmetrical or offset load/hands**
  - **Score**: 1

- **Close: upper arm vertical/trunk upright**
  - **Score**: 2

- **Moderate: upper arm angled or trunk bent forward**
  - **Score**: 3

- **Far: upper arm angled and trunk bent forward**
  - **Score**: 4

### C. Asymmetrical trunk/load

- **None**
  - **Score**: 0

- **Restricted**
  - **Score**: 1

- **Severely restricted**
  - **Score**: 2

### D. Postural constraints

- **Good**
  - **Score**: 0

- **Reasonable**
  - **Score**: 1

- **Poor**
  - **Score**: 2

### E. Grip on the load

- **Good**
  - **Score**: 0

- **Reasonable**
  - **Score**: 1

- **Poor**
  - **Score**: 2

### F. Floor surface

- **Dry and in good condition**
  - **Score**: 0

- **Dry but in poor condition or uneven**
  - **Score**: 1

- **Contaminated, wet, sloping or unstable**
  - **Score**: 2

### G. Other environmental factors

- **No factors present**
  - **Score**: 0

- **One factor present**
  - **Score**: 1

- **Two or more factors present**
  - **Score**: 2

### H. Carry distance

- **2 m-4 m**
  - **Score**: 0

- **4 m-10 m**
  - **Score**: 1

- **10 m or more**
  - **Score**: 2

### I. Obstacles en route

- **No obstacles or carry route is flat**
  - **Score**: 0

- **Steep slope**
  - **Score**: 1

- **Trip hazards or steps**
  - **Score**: 2

### Please insert the colour and numerical scores on the score sheet on page 12.
Assessment guide for team handling operations

A  Load weight

Note the weight of the load and the number of operatives performing the task. Enter the colour band and numerical score on the score sheet. If the colour band is purple the task should be examined very closely, such operations may represent a serious risk of injury and should come under close scrutiny, particularly when the entire weight of the load is supported by the team.

B  Hand distance from the lower back

Observe the task and examine the horizontal distance between each operatives’ hands and their lower back. Always assess the ‘worst case scenario’. Use the following illustrations to guide your assessment:

CLOSE: Upper arms aligned vertically and upright trunk  G/0
MODERATE: Upper arms angled away from body  A/3
MODERATE: Trunk bent forward  A/3
FAR: Upper arms angled away from body and trunk bent forward  R/6
C  **Vertical lift region**

Observe the position of the operatives’ hands at the start of the lift and as the lift progresses. Always assess the ‘worst case scenario’. Use the following illustrations as a guide:

[Images of lift positions: Above knee and/or below elbow height (G/0), Below knee and/or above elbow height (A/1), Floor level or below (A/1), At head height or above (R/3)]

D  **Trunk twisting and sideways bending**

Observe the operatives’ trunks as they lift the load. If the trunk twists in relation to the hips and thighs or if the operatives lean to one side as the load is lifted, the colour band is amber and the numerical score is 1. If the trunk both twists and bends to the side as the load is lifted, the colour band is red and the numerical score is 2.

E  **Postural constraints**

If the movements of the operatives are unhindered, the colour band is green and the numerical score is 0. If the operatives adopt restricted postures during the lift because of the space available (e.g., narrow space between team members) or the workstation design (e.g., an excessively high monorail conveyor), the colour band is amber and the numerical score is 1. If the postures are severely restricted, the colour band is red and the numerical score is 3 (e.g., work in confined areas such as baggage holds).

F  **Grip on load**

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</tr>
</thead>
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- Containers with well-designed handles or handholds, fit for purpose
- Containers with poor handles or handholds
- Containers of poor design. Loose parts, irregular objects, bulky or difficult to handle

- Loose parts enabling comfortable grip
- Fingers to be clamped at 90 degrees under the container
- Non-rigid sacks or unpredictable loads

G  **Floor surface**

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</thead>
<tbody>
<tr>
<td>G/0</td>
<td>A/1</td>
<td>R/2</td>
</tr>
</tbody>
</table>

- Dry and clean floor in good condition
- Dry floor but in poor condition, worn or uneven
- Contaminated/wet or steep sloping floor or unstable footing

H Other environmental factors

Observe the work environment and score if the lifting operation takes place: in extremes of temperature; with strong air movements; or in extreme lighting conditions (dark, bright or poor contrast). If one of the risk factors are present score 1, if two or more of the risk factors are present score 2.

I Communication, co-ordination and control

Communication between the operatives is essential when lifting as part of a team. Examples of good communication would be that you may hear the operatives counting ‘one, two, three’ etc prior to the lift. Look to see if the team have control of the load, that it is lifted smoothly, and that all members lift together. An uncoordinated team lift may leave one member of the team bearing the entire weight.
Further reading

ISBN 978 0 7176 2823 0

Upper limb disorders in the workplace HSG60 (Second edition) HSE Books 2002
ISBN 978 0 7176 1978 8

Further information on the MAC, including on-line training, can be found at www.hse.gov.uk/msd

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For information about health and safety ring HSE’s Infoline Tel: 0845 345 0055 Fax: 0845 408 9566 Textphone: 0845 408 9577 e-mail: hse.infoline@natbrit.com or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

This leaflet is available in priced packs of 10 from HSE Books, ISBN 978 0 7176 2741 7. Single free copies are also available from HSE Books.

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### MAC: Score sheet

**Company name:**

<table>
<thead>
<tr>
<th>Task Description:</th>
<th></th>
</tr>
</thead>
</table>

**Insert the colour band and numerical score for each of the risk factors in the boxes below, referring to your assessment, using the tool.**

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Colour band (G, A, R or P)</th>
<th>Numerical score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load weight and lift/carry frequency</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Hand distance from the lower back</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Vertical lift region</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Trunk twisting/sideways bending Asymmetrical trunk/load (carrying)</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Postural constraints</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Grip on the load</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Floor surface</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Other environmental factors</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Carry distance</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Obstacles en route (carrying only)</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Communication and co-ordination (team handling only)</td>
<td>Lift</td>
<td>Carry</td>
</tr>
<tr>
<td>Other risk factors, eg individual factors, psychosocial factors etc (see website - address on page 12)</td>
<td>Lift</td>
<td>Carry</td>
</tr>
</tbody>
</table>

TOTAL SCORE: __________

**Are there indications that the task is high risk?**

(Tick the appropriate boxes)

- Task has a history of manual handling incidents (e.g., company accident book, RIDDOR reports).
- Task is known to be hard work or high risk.
- Employees doing the work show signs that they are finding it hard work (e.g., breathing heavily, red-faced, sweating).
- Other indications, if so what? ____________________________

**Date:** __________

**Signature:** __________