Manual handling assessment charts (the MAC tool)

This is a web-friendly version of leaflet INDG383(rev3), published 11/18

Introduction

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

- there is a lot you can do to prevent them;
- preventative measures are often simple and cost-effective;
- you cannot prevent all MSDs, but where they occur, early reporting of symptoms, proper treatment and suitable rehabilitation are essential.

The Manual Handling Assessment Charts (MAC) is a tool aimed at employers, health and safety managers and safety representatives and is used by health and safety inspectors. The tool will help you assess the most common risk factors in lifting (and lowering), carrying and team handling operations and was developed to identify high-risk manual handling. It will point you towards the factors you need to modify to control these risks.

What does the law say?

The Manual Handling Operations Regulations 1992 set out a clear hierarchy of measures for dealing with risk likely to cause harm from manual handling. These are:

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

Structure of the MAC

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

- lifting operations (pages 3-7);
- carrying operations (pages 8-12);
- team handling operations (pages 13-17).

For each type of assessment there is an assessment guide and a flow chart. There is a score sheet to complete at the end of the tool.

When not to use the MAC

Using the MAC is not appropriate for:

- manual handling operations involving pushing and pulling (see the *Risk Assessment of Pushing and Pulling (RAPP) Tool*[1]);
- assessing people handling (see HOP6 *The guide to the handling of people: A systems approach*[2]);
- assessing workplace risks associated with upper limb disorders (see *Assessment of Repetitive Tasks of the upper limbs (the ART tool)*[3]).

How to complete a MAC assessment

Note: Using the MAC may not comprise a 'suitable and sufficient' risk assessment. You may need to do a full risk assessment when certain conditions apply. Before you start your MAC assessment, **look at the checklist** on the score sheet to see if any of them apply to you. The Appendix of *Manual handling* (L23)[4] explains this in more detail.

G = GREEN - Low level of risk Although the risk is low, consider the exposure levels for vulnerable groups such as pregnant women, disabled, recently injured, young or inexperienced workers.

A = AMBER - Medium level of risk Examine tasks closely.

R = RED - High level of risk Prompt action needed. This may expose a significant proportion of the working population to risk of injury.

P = PURPLE - Unacceptable level of risk Such operations may represent a serious risk of injury and must be improved.

- Identify the tasks to assess. Choose the ones that you know are hard work or that employees complain about.
- Consult employees and their representatives on the manual handling risks from their work and ways to manage and/or control these risks. See INDG232[5] for more information. Aim to gain insight into the demands of the job from the perspectives of all employees carrying out the task.
- Observe the task carefully (videoing may help) and make sure that you look at how it is normally done.
- Select the appropriate type of assessment (lifting, carrying or team handling). If a task involves lifting and carrying, consider both.
- Follow the appropriate assessment guide and flow chart to determine the level of risk for each risk factor. Always assess the worst-case scenario if unsure.
- Enter the colour bands and numerical scores on the score sheet and use them to identify which risk factors need to be examined and the total level of exposure to risk.
- An interactive score sheet is at www.hse.gov.uk/msd/mac/scoresheet.htm.
- Look for ways of modifying the task to reduce the red risk factors to amber or green and to reduce amber risk factors to green.
- If the individual does a number of tasks, assess each one separately.
- Prioritise action by addressing the task with the highest total score first. **The total scores do not relate to specific action levels.**

Look at www.hse.gov.uk/msd/mac for further guidance on using this tool.

Remember: The purpose of the assessment is to identify and then **reduce** the overall level of risk of the task. You need to put measures in place to **control** the risks you have identified. There is space to list your control measures on the score sheet.

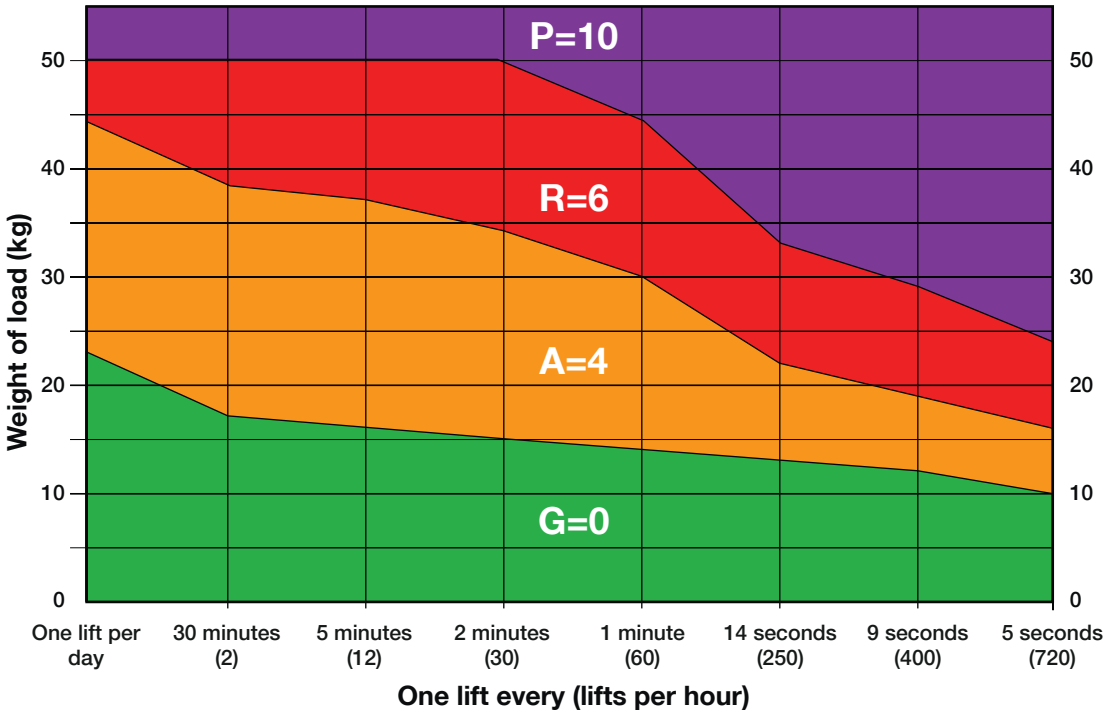
Lifting operations assessment guide

A Load weight/frequency

Note the weight of the load and the frequency (or repetition rate) of the lifting operation. Read the risk band from the graph below and enter the colour band and numerical score onto the score sheet.

If the colour band is purple you should examine the task very closely as it may represent a serious risk of injury and must be improved.

Load weight/frequency graph for lifting operations



To assess lifting at more than once every five seconds you should carry out a full risk assessment.

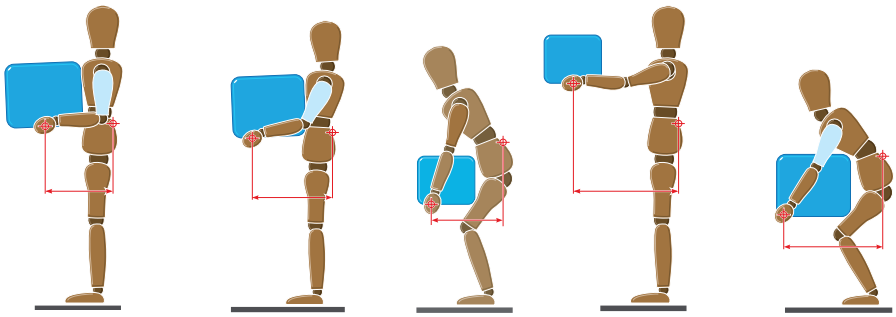
Repetitive handling of light items will fall within the green zone, but may be associated with upper limb problems. For advice on assessing these tasks see *Upper limb disorders in the workplace*[6] and the ART tool.

When a job is complex because load weights vary significantly (eg in order picking/distribution) you can use the *Variable manual handling assessment chart* (V-MAC) tool[7] to assess the load weight/frequency risk factor instead of this graph, before returning to complete your MAC assessment.

Lifting operations assessment guide

B Hand distance from the lower back

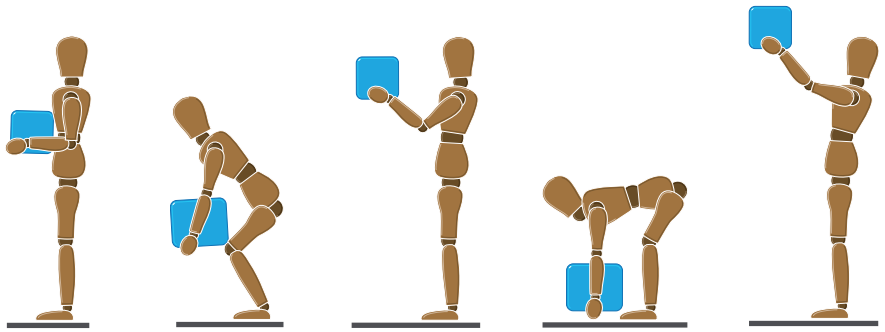
Observe the horizontal distance between the worker's hands and lower back. You should assess the 'worst-case scenario', including picking up and putting down. Use the following illustrations and descriptions as a guide:



Upper arms vertical AND torso upright		Upper arms angled away from torso	Torso bent forward		Torso upright. Arms fully outstretched	Upper arms angled away from torso AND torso bent forward	
Hands close to the low back	G/0	Hands at moderate distance from the low back		A/3	Hands far from the low back		R/6

C Vertical lift zones

Observe the vertical position of the worker's hands at both the start and end of the lift. Record the 'worst-case' colour band/score. Use the following illustrations and descriptions as a guide:

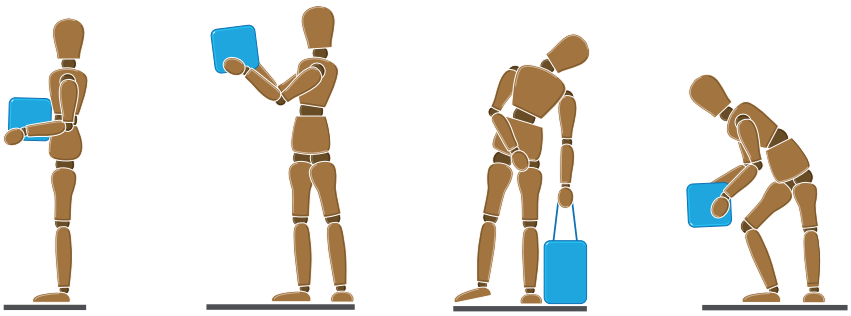


Hands between knee and elbow height	G/0	Hands between knee and floor level	Hands between elbow height and head height	A/1	Hands at floor level or below	Hands at head height or above	R/3

Lifting operations assessment guide

D Torso twisting and sideways bending

Observe the worker's torso as the load is lifted. If the person twists the torso in relation to the hips OR leans to one side as the load is lifted, the colour band is amber and the score is **1**. If the torso both twists AND bends to the side as the load is lifted, the colour band is red and the score is **2**.



Little or no torso twisting or sideways bending	G/0	Torso twisted	Torso bent sideways	A/1	Torso both twisted AND bent sideways	R/2

E Postural constraints

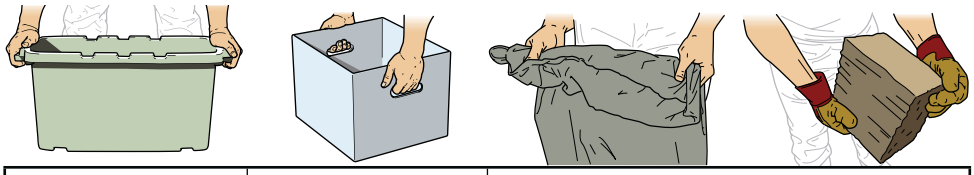
Look for factors that force workers to modify their postures. If their movements are restricted when lifting because of the space available (eg lifting in a narrow aisle or in a crowded or disorganised storage area) or lifting through narrow gaps, the colour band is amber and the score is **1**. If the posture is severely restricted (eg lifting in an area with a low ceiling) the colour band is red and the score is **3**.

No postural constraints	G/0	Restricted posture	A/1	Severely restricted posture	R/3

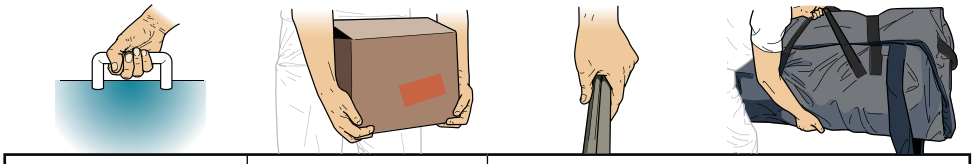
Lifting operations assessment guide

F Grip on the load

Look at the quality of the grip that the worker can use to get hold of and control the load. The worker may need to reposition their hands on the object as a lift progresses. If this is so, assess the 'worst-case scenario'.



Fit-for-purpose handles/ handholds matched to the size and weight of the load	Handles or handholds too small or lack finger clearance or only the fingers support the load	No handles or handhold areas	Rough, slippery or with pressure points



Cylindrical handles or items the whole hand can wrap round comfortably	No handles or handholds but can be held underneath, or has strap or loop handles	Palm, pinch or fingertip grip or force used to keep items together	Irregular, bulky or non-rigid

Good grip	G/0	Reasonable grip	A/1	Poor grip	R/2

G Floor surface

Look at the condition of the floor where the handling task takes place. Note that for outdoor work this will depend on the weather. Always assess the 'worst-case scenario'.

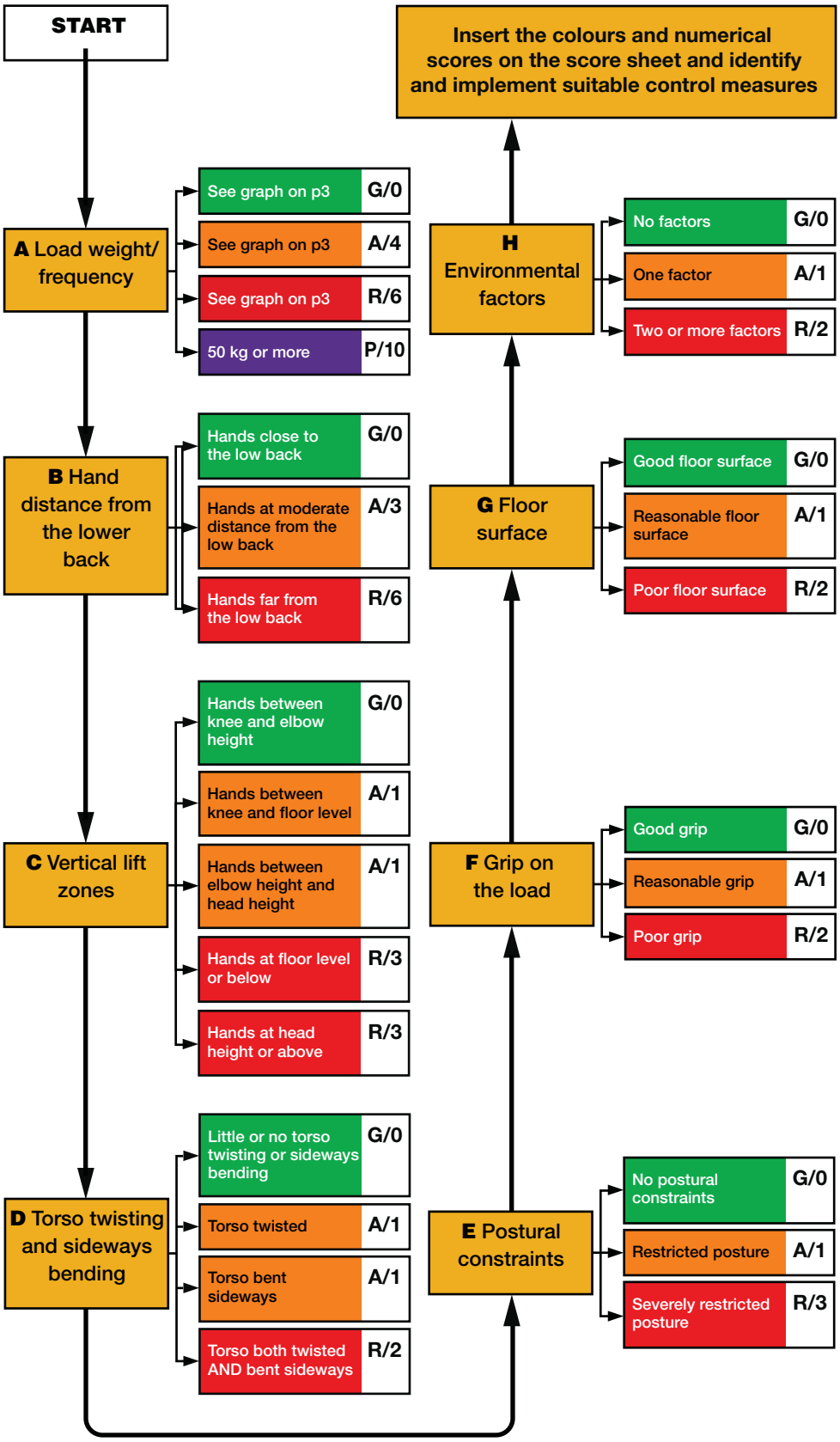
Non-slip, dry, clean, firm, level and undamaged		Mostly dry and clean (damp or some debris), OR reasonably firm OR minor damage		Slippery (greasy, oily, wet, icy) OR much debris OR soft OR unstable OR severe damage	
Good floor surface	G/0	Reasonable floor surface	A/1	Poor floor surface	R/2

H Environmental factors

Observe the work environment and score if the handling 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 is present score **1**, if two or more of the risk factors are present score **2**.

No factors	G/0	One factor	A/1	Two or more factors	R/2

Lifting operations flowchart



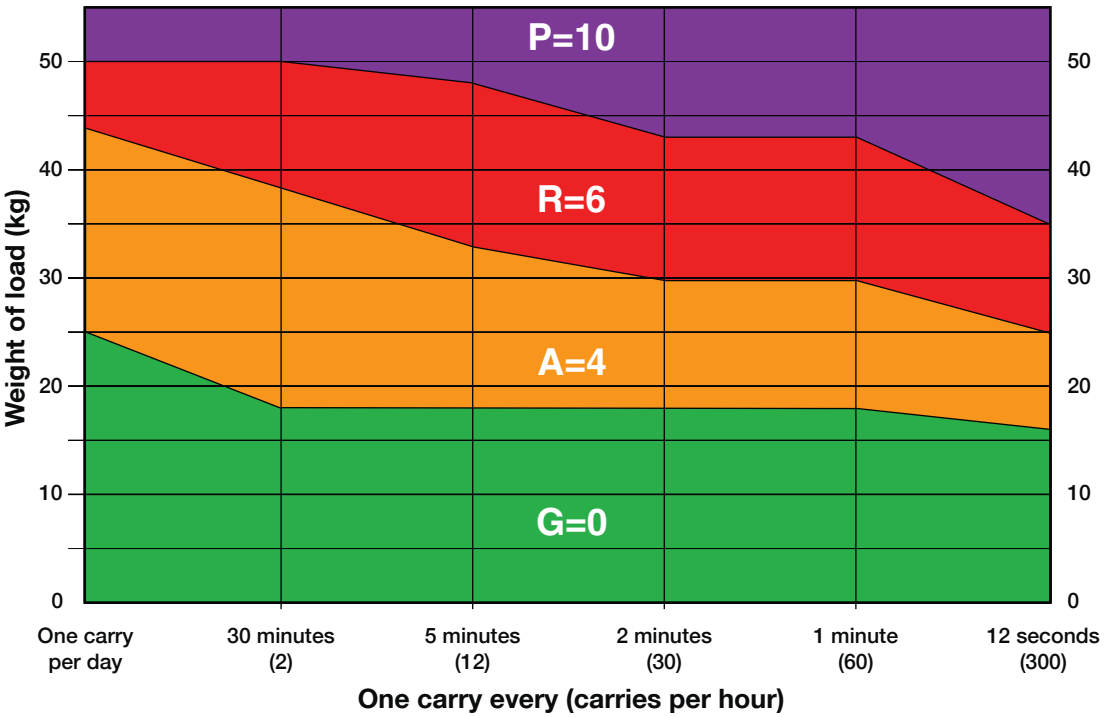
Carrying operations assessment guide

A Load weight/frequency

Note the weight of the load and the frequency (or repetition rate) of the carrying operation. Read the risk band from the graph below and enter the colour band and numerical score onto the score sheet.

If the colour band is purple you should examine the task very closely as it may represent a serious risk of injury and must be improved.

Load weight/frequency graph for carrying operations



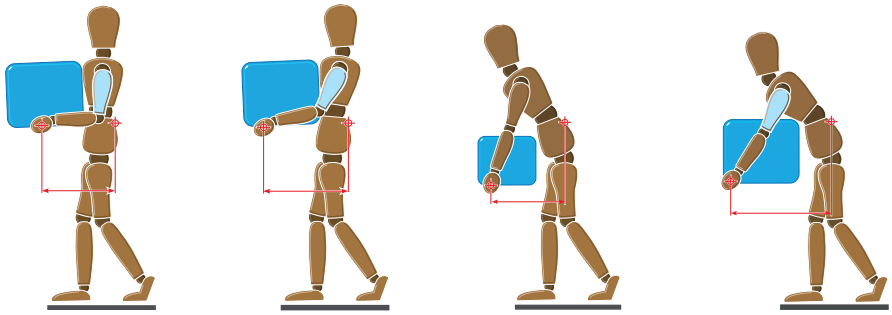
To assess carrying at more than once every 12 seconds you should carry out a full risk assessment.

As the V-MAC[7] takes account of carrying distance, when a job is complex because load weights vary significantly (eg in order picking/distribution) you can use it to assess the load weight/frequency risk factor instead of this graph, before returning to complete your MAC assessment.

Carrying operations assessment guide

B Hand distance from the lower back

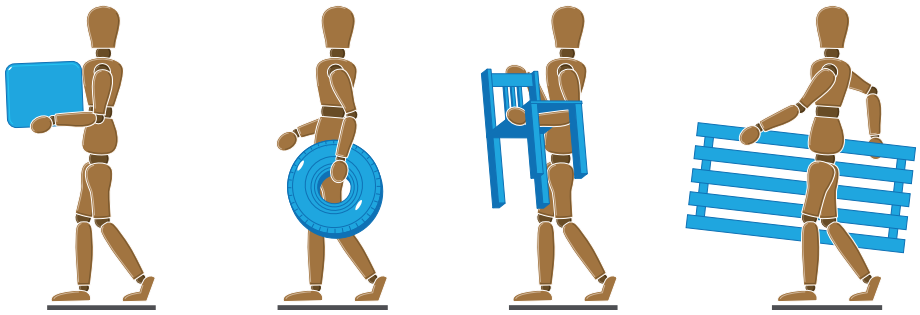
Observe the horizontal distance between the worker's hands and lower back. You should assess the 'worst-case scenario', including the start and finish of the task. Use the following illustrations and descriptions as a guide:



Upper arms vertical AND torso upright		Upper arms angled away from torso	Torso bent forward		Upper arms angled away from torso AND torso bent forward	
Hands close to the low back	G/0	Hands at moderate distance from the low back		A/3	Hands far from the low back	R/6

C Asymmetrical torso or load

When carrying, the posture of the worker's torso and the position of the load are risk factors associated with musculoskeletal injury. Use the following illustrations and descriptions as a guide:



Load AND hands symmetrical in front of the torso	G/0	Torso symmetrical but load is carried to one side	Load not symmetrical	A/1	Two-handed carrying to the side	R/2

D Postural constraints

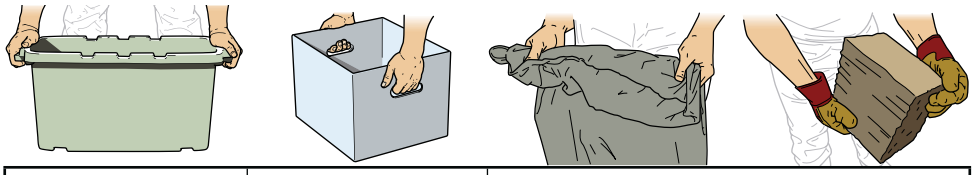
Look for factors that force workers to modify their postures. If their movements are restricted during the carry (eg a narrow doorway forces the worker to turn or move the load to get through) the colour band is amber and the score is **1**. If the posture is severely restricted (eg having to bend forward to carry in an area with a low ceiling), the colour band is red and the score is **3**.

No postural constraints	G/0	Restricted posture	A/1	Severely restricted posture	R/3

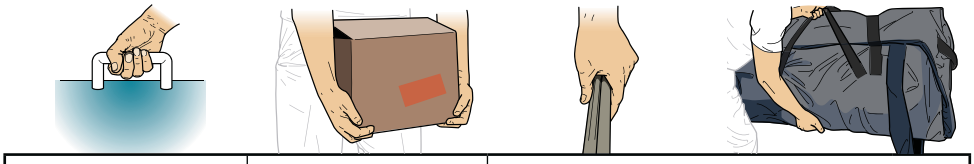
Carrying operations assessment guide

E Grip on the load

Look at the quality of the grip that the worker can use to get hold of and control the load. The worker may need to reposition their hands on the object as a lift progresses. If this is so, assess the 'worst-case scenario'.



Fit-for-purpose handles/ handholds matched to the size and weight of the load	Handles or handholds too small or lack finger clearance or only the fingers support the load	No handles or handhold areas	Rough, slippery or with pressure points



Cylindrical handles or items the whole hand can wrap round comfortably	No handles or handholds but can be held underneath, or has strap or loop handles	Palm, pinch or fingertip grip or force used to keep items together	Irregular, bulky or non-rigid

Good grip	G/0	Reasonable grip	A/1	Poor grip	R/2

F Floor surface

Examine the condition of the floor at the locations where the handling task occurs. Note that for outdoor work this will depend on the weather. Always assess the 'worst-case scenario'.

Non-slip, dry, clean, firm, level and undamaged		Mostly dry and clean (damp or some debris), OR reasonably firm OR minor damage		Slippery (greasy, oily, wet, icy) OR debris in several areas OR soft OR unstable OR severe damage	
Good floor surface	G/0	Reasonable floor surface	A/1	Poor floor surface	R/3

G Carry distance

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

Between 2 m and 4 m	G/0	Between 4 m and 10 m	A/1	Over 10 m	R/2

Carrying operations assessment guide

H Obstacles on route

Count the number of different types of obstacle along the carrying route. If the person has to carry the load up or down a steep slope, up or down steps, through closed doors/narrow doorways or around tripping hazards or round bends and corners, the colour band is amber and the score is **2**. If the task involves carrying items up ladders or past two or more obstacles, the colour band is red and the score is **3**.

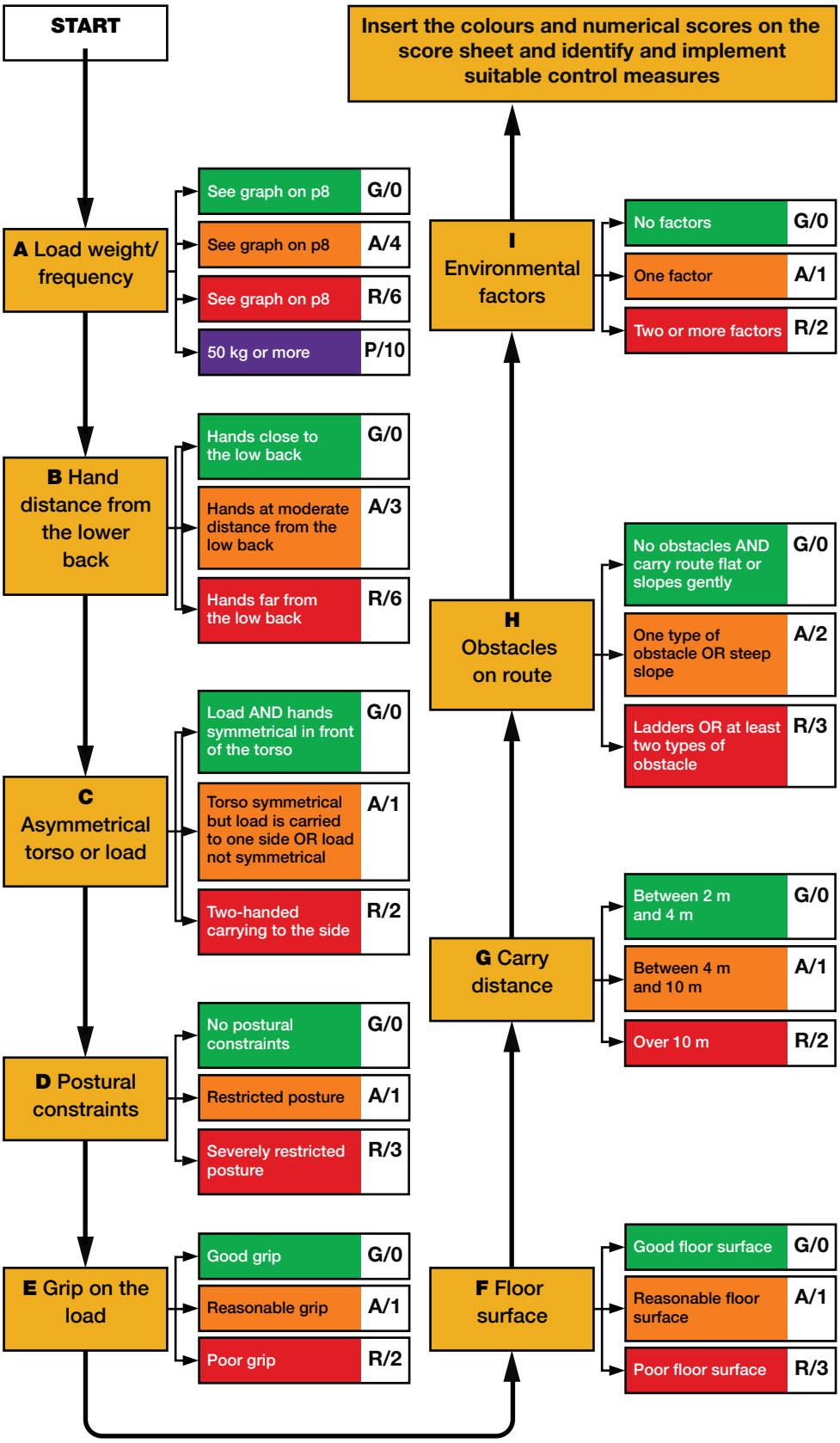
No obstacles AND carry route flat or slopes gently	G/0	One type of obstacle OR steep slope	A/2	Ladders OR at least two types of obstacle	R/3

I 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 is present score **1**, if two or more of the risk factors are present score **2**.

No factors	G/0	One factor	A/1	Two or more factors	R/2

Carrying operations flowchart



Team handling operations assessment guide

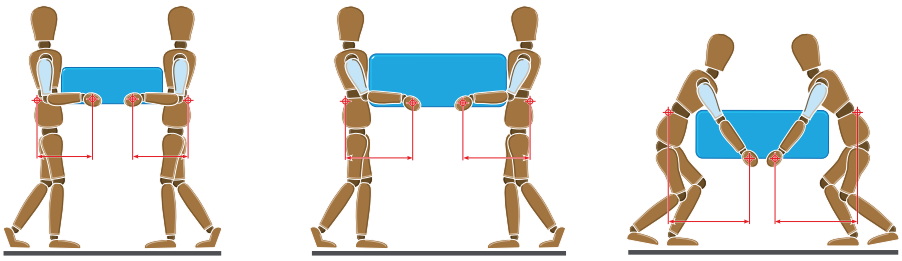
A Load weight

Note the weight of the load and the number of workers performing the task. Enter the colour band and numerical score on the score sheet. For teams of five people or more, a full risk assessment is needed. If the colour band is purple you should examine the task very closely as it may represent a serious risk of injury and must be improved.

2 people < 35 kg 3 people < 55 kg 4 people < 75 kg	G/0	2 people 35–65 kg 3 people 55–95 kg 4 people 75–130 kg	A/4	2 people 65–85 kg 3 people 95–130 kg 4 people 130–170 kg	R/6	2 people > 85 kg 3 people > 130 kg 4 people > 170 kg	P/10

B Hand distance from the lower back

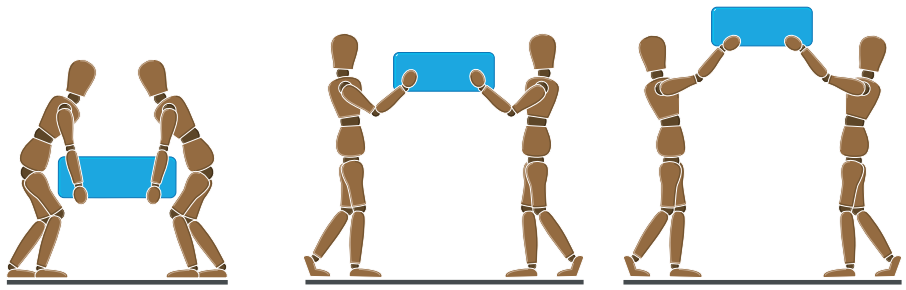
Observe the task and examine the horizontal distance between each worker's hands and their lower back. You should assess the 'worst-case scenario', including picking up and putting down. Use the following illustrations and descriptions as a guide:



Upper arms vertical AND torso upright		Upper arms angled away from torso OR torso bent forward		Upper arms angled away from torso AND torso bent forward	
Hands close to the low back	G/0	Hands at moderate distance from the low back	A/3	Hands far from the low back	R/6

C Vertical lift zones

Observe the vertical positions of the workers' hands at both the start and end of the lift. The effect of stature differences between team members is particularly important when lifting goes above elbow height. Record the 'worst-case' colour band/score. Use the following illustrations and descriptions as a guide:

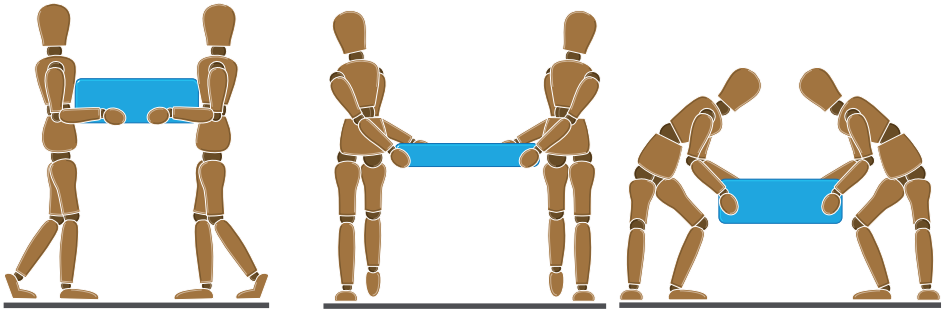


Hands between knee and elbow height	G/0	Hands below knee AND/ OR above elbow height	A/1	Hands at floor level or below OR head height and above	R/3

Team handling operations assessment guide

D Torso twisting and sideways bending

Observe the workers' torsos as they lift the load. If their torsos twist in relation to their hips OR they lean to one side as the load is lifted, the colour band is amber and the score is **1**. If their torsos twist AND bend to the side as they lift the load, the colour band is red and the score is **2**.



Little or no torso twisting or sideways bending	G/0	Torsos either twisted OR bent sideways	A/1	Torsos both twisted AND bent sideways	R/2

E Postural constraints

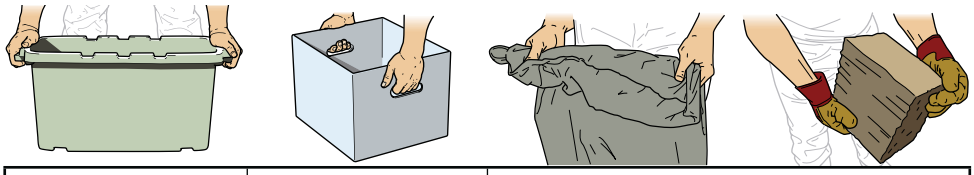
Look for factors that force the team members to modify their postures. If their movements are restricted because of the space available (eg lifting in a narrow aisle or in a crowded or disorganised storage area) or lifting round obstructions, the colour band is amber and the score is **1**. If the postures are severely restricted (eg lifting or carrying in an area with a low ceiling) the colour band is red and the score is **3**.

No postural constraints	G/0	Restricted posture	A/1	Severely restricted posture	R/3

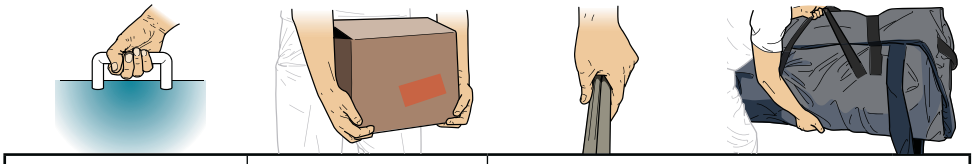
Team handling operations assessment guide

F Grip on the load

Look at the quality of the grip that the workers can use to get hold of and control the load. They may need to reposition their hands on the object as a lift progresses. If this is so, assess the 'worst-case scenario'.



Fit-for-purpose handles/ handholds matched to the size and weight of the load	Handles or handholds too small or lack finger clearance or only the fingers support the load	No handles or handhold areas	Rough, slippery or with pressure points



Cylindrical handles or items the whole hand can wrap round comfortably	No handles or handholds but can be held underneath, or has strap or loop handles	Palm, pinch or fingertip grip or force used to keep items together	Irregular, bulky or non-rigid

Good grip	G/0	Reasonable grip	A/2	Poor grip	R/4

G Floor surface

Examine the condition of the floor at the locations where the handling task occurs. Note that for outdoor work this will depend on the weather. Always assess the 'worst-case scenario'.

Non-slip, dry, clean, firm, level and undamaged		Mostly dry and clean (damp or debris in some areas), OR reasonably firm OR minor damage		Slippery (greasy, oily, wet, icy) OR debris in several areas OR soft OR unstable OR severe damage	
Good floor surface	G/0	Reasonable floor surface	A/1	Poor floor surface	R/3

H Carry distance

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

Between 2 m and 4 m	G/0	Between 4 m and 10 m	A/1	Over 10 m	R/3

Team handling operations assessment guide

I Obstacles on route

Count the number of different types of obstacle along the carrying route. If the team has to carry the load up or down a steep slope, up or down steps, through closed doors/narrow doorways, around tripping hazards or round bends and corners, the colour band is amber and the score is **2**. If the task involves carrying items up ladders or past two or more types of obstacle, the colour band is red and the score is **3**.

No obstacles AND carry route flat or slopes gently	G/0	One type of obstacle OR steep slope	A/2	Ladders OR at least two types of obstacle	R/3

J Communication, co-ordination and control

A good team handling operation will be well planned. Communication between the individuals is essential when lifting as part of a team. An example of good communication would be the workers counting 'one, two, three' before they lift. Look to see if the team has control of the load, that it is lifted smoothly, and that all members lift together. An unco-ordinated team lift may leave one member of the team bearing the entire weight.

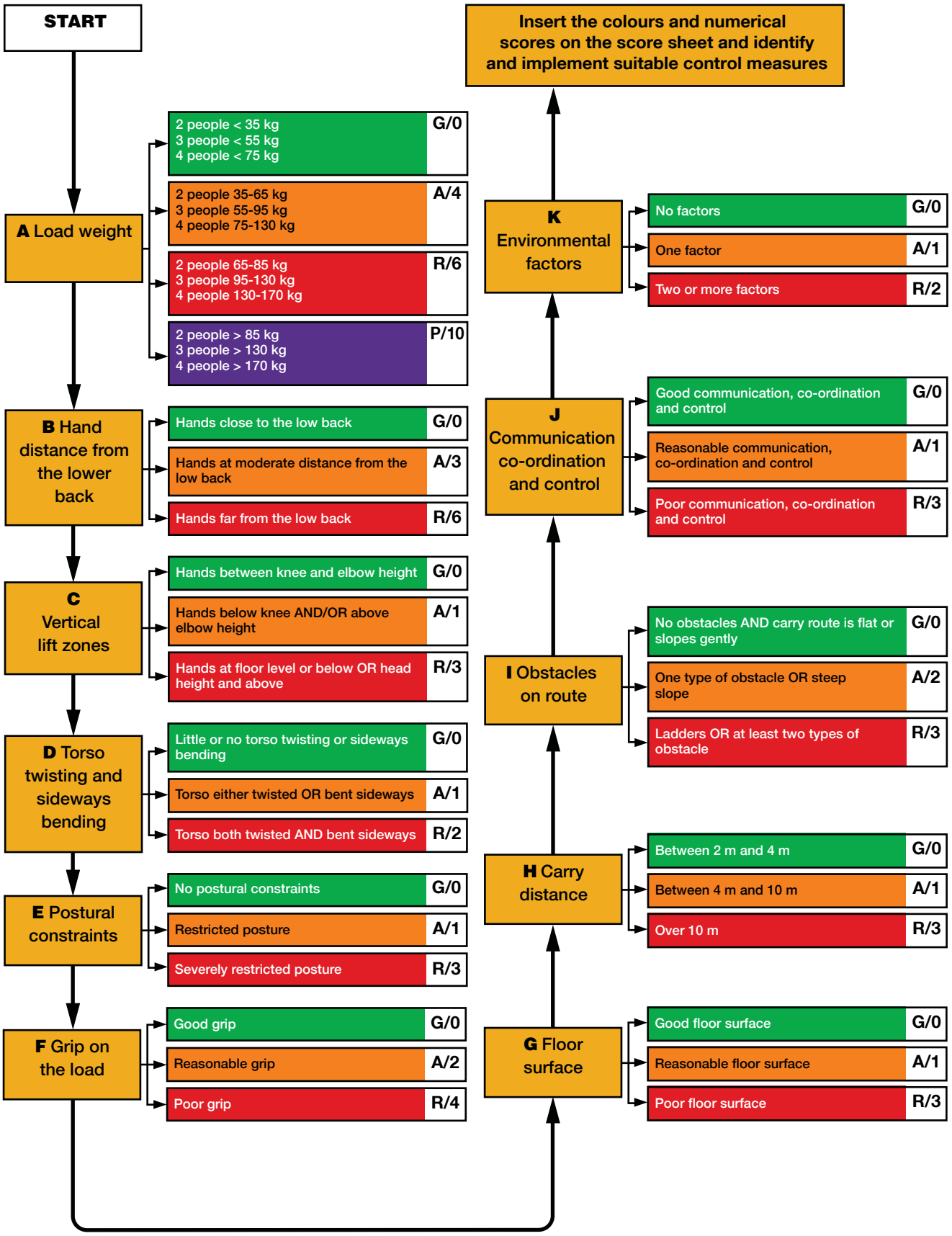
Good communication, co-ordination and control	G/0	Reasonable communication, co-ordination and control	A/1	Poor communication co-ordination and control	R/3

K Environmental factors

Observe the work environment and score if the handling 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 is present score **1**, if two or more of the risk factors are present score **2**.

No factors	G/0	One factor	A/1	Two or more factors	R/2

Team handling operations flowchart



Further reading

1 *The Risk Assessment of Pushing and Pulling Tool – RAPP tool* Leaflet INDG478 HSE Books 2016 www.hse.gov.uk/msd/toolkit.htm

2 *The guide to the handling of people: A systems approach* 6th edition (HOP6) Backcare Trading: Sunbury-on-Thames 2011 www.backcaretrading.org.uk

3 *Assessment of Repetitive Tasks of the upper limbs (the ART tool): Guidance for employers* Leaflet INDG438 HSE Books 2010 www.hse.gov.uk/pubns/indg438.htm

4 *Manual handling. Manual Handling Operations Regulations 1992. Guidance on Regulations* L23 (Fourth edition) HSE Books 2016 www.hse.gov.uk/pubns/books/l23.htm

5 *Consulting employees on health and safety: A brief guide to the law* Leaflet INDG232(rev2) HSE Books 2013 www.hse.gov.uk/pubns/indg232.htm

6 *Upper limb disorders in the workplace* HSG60 (Second edition) HSE Books 2002 www.hse.gov.uk/pubns/books/hsg60.htm

7 *Variable manual handling assessment chart (V-MAC) tool* Excel spreadsheet available via www.hse.gov.uk/msd/mac/vmac/

8 *Manual handling at work. A brief guide* Leaflet INDG143(rev3) HSE Books 2012 www.hse.gov.uk/pubns/indg143.htm

9 *Making the best use of lifting and handling aids* Leaflet INDG398(rev1) HSE Books 2013 www.hse.gov.uk/pubns/indg398.htm

10 *Managing upper limb disorders in your business: A brief guide for employers* Leaflet INDG171(rev2) HSE Books 2013 www.hse.gov.uk/pubns/indg171.htm

Further information

For information about health and safety visit https://books.hse.gov.uk or http://www.hse.gov.uk. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

To report inconsistencies or inaccuracies in this guidance email: commissioning@wlt.com.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

First published 11/18. This leaflet is available at: www.hse.gov.uk/pubns/indg383.htm.

© Crown copyright If you wish to reuse this information visit www.hse.gov.uk/copyright.htm for details.

Score sheet

Company/site

Name/purpose of activity

Location of activity

Team/individuals involved

What items are handled?

When does the task take place (shift/time of day)?

Are there indications that the task is high risk for MSDs?

- ☐ Task has a history of manual handling incidents (eg company accident book, RIDDOR reports) or lost time.
- ☐ Task is known to be strenuous, can be done by only a few people or employees complain about MSD risk.
- ☐ Employees doing the work appear to be struggling or finding it hard work (eg red-faced, sweating) or ask for help.
- ☐ Other indications. If so, what?

List any significant psychosocial factors (eg high workloads, tight deadlines, lack of control over the work and working methods)

Do I need to do a full risk assessment?

Please tick any relevant boxes (see L23 Appendix for more details)

- ☐ The activities involve lifting or lowering at more than 12 lifts per minute/one lift every five seconds or carrying more than once every 12 seconds.
- ☐ The types of handling are not covered by the MAC or are outside the risk filter limits for:
  - handling when seated (5 kg for men and 3 kg for women);
  - carrying on the shoulder without lifting the load first.
- ☐ You have individual employees who may be at significant risk, eg pregnant women, young workers, people new to the workforce or job, those with a significant health problem or a recent manual handling injury.
- ☐ Factors from Schedule 1 of the Manual Handling Operations Regulations not included in the MAC are important:
  - Large vertical movement
  - Risk of sudden movement of loads
  - A rate of work imposed by a process
  - Load unstable or with contents likely to shift
  - Load sharp, hot or otherwise potentially damaging
  - Task requires unusual strength, height etc
  - Task requires special information or training for its safe performance
  - Movement or posture is hindered by personal protective equipment (PPE) or clothing

If you have not ticked any of the boxes, start your MAC assessment.

If you have ticked any of the boxes, you are likely to need to do a full risk assessment using the online checklists at **www.hse.gov.uk/pubns/ck5.pdf**

If you use the MAC and then decide to carry out a full risk assessment, you can use the information you have already got as the basis for that.

Date: **Signature:**

Risk factors	**Colour band (G, A, R or P)**			**Numerical score (for comparison)**			**Possible control measures to reduce the risk of red/amber factors – see http://www.hse.gov.uk/msd/mac/control-measures-scoresheet.htm for more information**
	Lift	Carry	Team	Lift	Carry	Team	
Load weight/frequency							
Hand distance from the lower back							
Vertical lift zones		**N/A**			**N/A**		
Torso twisting and sideways bending OR Asymmetrical torso or load (carrying)							
Postural constraints							
Grip on the load							
Floor surface							
Carry distance	**N/A**			**N/A**			
Obstacles on route	**N/A**			**N/A**			
Communication, co-ordination and control	**N/A**	**N/A**		**N/A**	**N/A**		
Environmental factors							
	Total score:						