Risk assessment of pushing and pulling (RAPP) tool

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Introduction

This tool is designed to help assess the key risks in manual pushing and pulling operations involving whole-body effort, eg moving loaded trolleys or roll cages, or dragging, hauling, sliding or rolling loads.

It is intended to be used alongside the *Manual handling assessment charts (the MAC tool)*[1] which helps assess lifting and carrying operations, and follows a similar approach to that tool. It is aimed at those responsible for health and safety in workplaces and will help you to identify high-risk pushing and pulling activities and check the effectiveness of any risk-reduction measures.

Structure of the tool

There are two types of pushing and pulling operations you can assess using this tool:

- moving loads on wheeled equipment, such as hand trolleys, pump trucks, carts or wheelbarrows (Section A);
- moving loads without wheels, which might involve actions such as dragging/sliding, churning (pivoting and rolling) and rolling (Section B).

For each type of operation there is a flow chart, an assessment guide and a score sheet.

The flow charts provide an overview of the risk factors and assessment process, while the assessment guides provide information to help you determine the level of risk for each factor.

The tool is **not** appropriate for assessing pushing and/or pulling operations involving:

- just the upper limbs, eg pushing buttons/knobs, pulling levers or moving loads which are on a conveyor (see *Upper limb disorders in the workplace* HSG60[2]);
- just the lower limbs, eg pushing on pedals, or with the feet;
- powered handling equipment.

Use of the tool may not comprise a full risk assessment. HSE's guidance booklet L23 *Manual handling. Manual Handling Operations Regulations 1992: Guidance on Regulations*[3] contains more information on conducting full risk assessments. Always consider individual and psychosocial issues when completing the RAPP score sheet.

How to complete an assessment

- Spend some time observing the workers and the work activity to ensure that what you are seeing is representative of normal working practice. Always consider the 'worst-case scenario'.
- Consult employees and safety representatives during the assessment process. Where several people do the same activity, make sure you get the views of workers about the demands of the operation.
- Select the appropriate assessment (ie pushing and pulling wheeled equipment or pushing and pulling items without wheels). If both types occur, consider them separately.
- **Ensure you read the assessment guide before you make your assessment.**
- Follow the appropriate flow chart and assessment guide to determine the level of risk for each risk factor. The levels of risk are:

G = GREEN – Low level of risk

Although the risk is low, consider the effect on vulnerable groups such as pregnant women or young workers, where appropriate.

A = AMBER – Medium level of risk

Examine tasks closely.

R = RED – High or very high level of risk

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

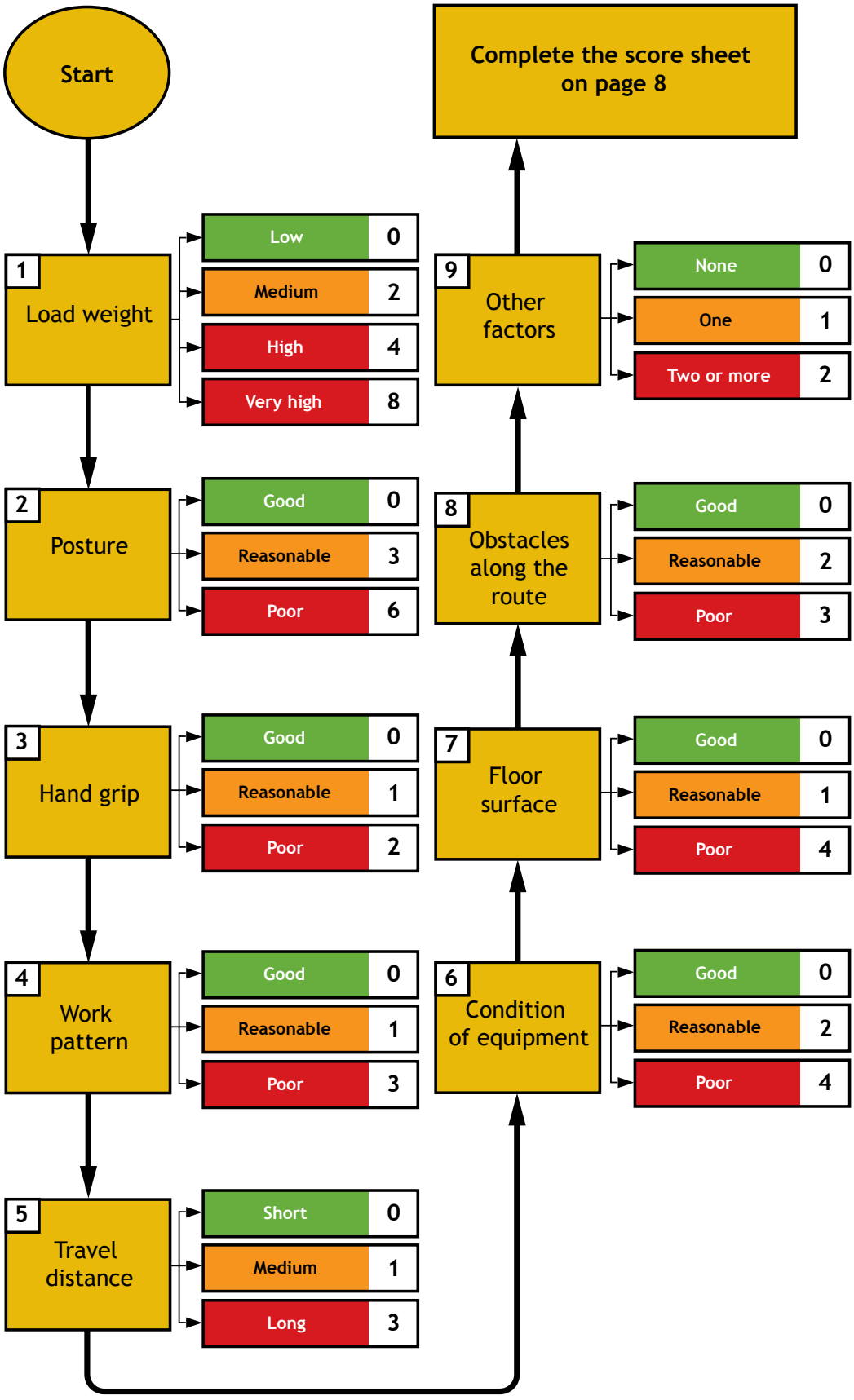
P = PURPLE – Unacceptable

Such operations may represent a serious risk of injury and must be improved.

- Enter the colour band and corresponding numerical score in the appropriate column of the score sheet. Enter the remaining task information asked for on the score sheet.
- Add up the scores to obtain the total score for the operation. The total scores help prioritise those activities/operations that need most urgent attention and help check the effectiveness of any risk-reduction measures. The colour bands help determine which risk factors of the operation require attention.
- The scores can be used for comparison purposes but the total scores do not relate to specific action levels.

Where tasks require attention, first look for solutions where it is reasonably practicable to eliminate the hazard, for example through redesign of the work or automation of the task. Where these measures are not practicable, identify how tasks might be improved to avoid or reduce those factors that score red. Then consider how to reduce the amber scores.

Section A: Pushing or pulling loads on wheeled equipment

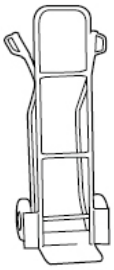


Assessment guide

A-1 Type of equipment/Load weight (kg)

- Identify the type of equipment used – **small**, **medium** or **large** (pages 4 and 5). If different types of equipment are used to move loads, do an assessment for each type.
- If more than one piece of loaded equipment is moved at a time (eg two trolleys), assess the total load moved.
- Find out the total load moved (weight of the equipment and weight of loads carried) from labelling, by asking the workers or by weighing.
- If the same equipment is used to move different loads, then assess the equipment with the heaviest load that is likely to be moved.
- The illustrations in each section are only a guide to help you – they are not comprehensive.

Small with one or two wheels: *eg wheelbarrows, wheelie bins or sack trucks. With this equipment the worker supports some of the load.*



Less than 50 kg	Low G/0
50 kg to 100 kg	Medium A/2
100 kg to 200 kg	High R/4
More than 200 kg	Very high R/8
Load exceeds equipment's rated capacity (manufacturer's recommended maximum weight)	Unacceptable P

Medium, with three or more fixed wheels and/or castors: *eg roll cages, Euro bins.*

Less than 250 kg	Low G/0
250 kg to 500 kg	Medium A/2
500 kg to 750 kg	High R/4
More than 750 kg	Very high R/8
Load exceeds equipment's rated capacity (manufacturer's recommended maximum weight)	Unacceptable P

Large, steerable or running on rails: *eg pallet truck or overhead rail system.*

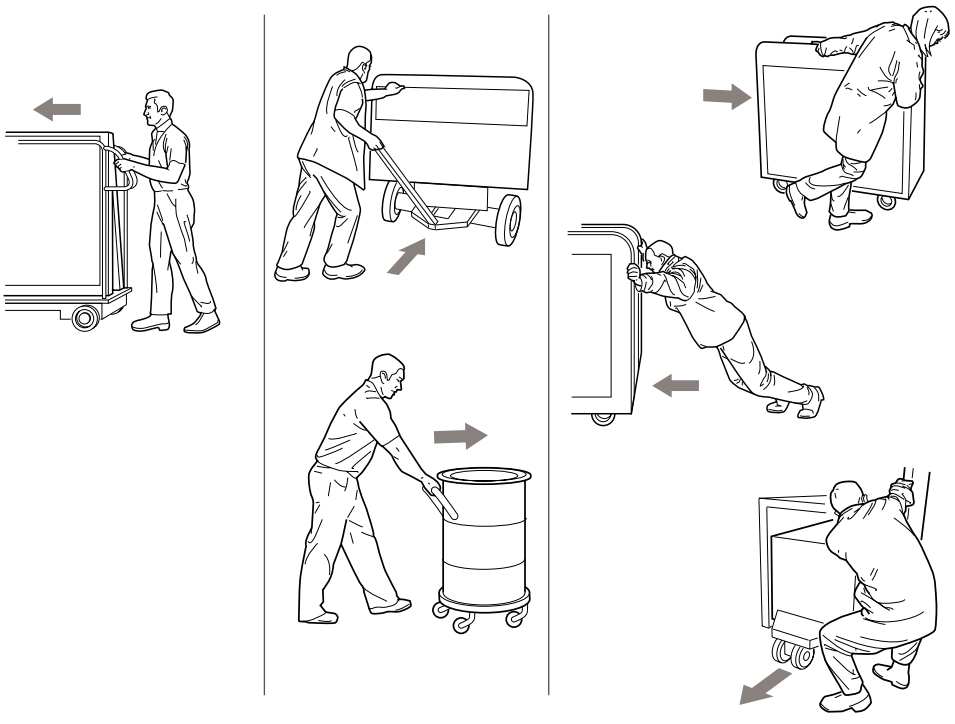
Less than 600 kg	Low G/0
600 kg to 1000 kg	Medium A/2
1000 kg to 1500 kg	High R/4
More than 1500 kg	Very high R/8
Load exceeds equipment's rated capacity (manufacturer's recommended maximum weight)	Unacceptable P

Note: If the load exceeds the rated capacity of the equipment then this is classified P – Unacceptable. In this case, either the weight must be reduced or suitable equipment provided. Do not proceed until this has been improved. There is no score for 'P' on the flow chart or score sheet.

A-2 Posture

Observe the general positions of the hands and the body during the operation.

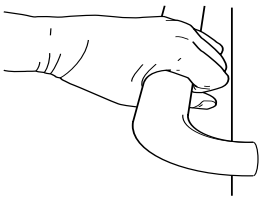
Good G/0	Reasonable A/3	Poor R/6
Torso is largely upright, and	Body is inclined in direction of exertion, or	Body is severely inclined, or worker squats, kneels or needs to push with their back against the load, or
Torso is not twisted, and	Torso is noticeably bent or twisted, or	Torso is severely bent or twisted, or
Hands are between hip and shoulder height	Hands are below hip height	Hands are behind or on one side of body or above shoulder height

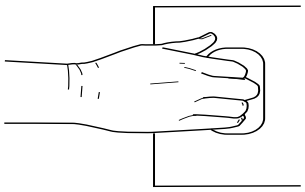


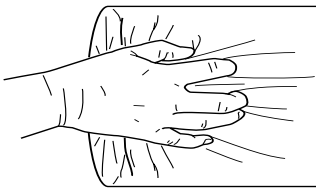
A-3 Hand grip

Observe how the hand(s) grip or contact the equipment during pushing or pulling. If the operation involves both pushing and pulling, assess the hand grip for both actions.

Good G/0	Reasonable A/1	Poor R/2
There are handles or handhold areas which allow a comfortable power grip for pulling or comfortable full-hand contact for pushing	There are handhold areas, but they only allow a partial grip, eg fingers clamped at 90°, or partial hand contact for pushing	There are no handles or the hand contact is uncomfortable







A-4 Work pattern

Observe the work, noting whether the operation is repetitive (five or more transfers per minute) and whether the worker sets the pace of work. Ask workers about their pattern of breaks and other opportunities to rest or recover from the work.

Good G/0	Reasonable A/1	Poor R/3
The work is not repetitive (fewer than five transfers per minute), and	The work is repetitive, but	The work is repetitive, and
The pace of work is set by the worker	There is opportunity for rest or recovery through formal and informal breaks or job rotation	No formal/informal breaks or job rotation opportunities are provided

A-5 Travel distance

Determine the distance from start to finish for a single trip.

- If the operation is not repetitive, do an assessment for the longest trip.
- If the operation is repetitive, determine the average distance for at least five trips.

Short G/0	Medium A/1	Long R/3
10 m or less	Between 10 m and 30 m	More than 30 m

A-6 Condition of equipment

Enquire about the maintenance programme and observe the general state of repair of the equipment (condition of the wheels, bearings and brakes).

Good G/0	Reasonable A/2	Poor R/4
Maintenance is planned and preventive, and	Maintenance occurs only as problems arise, or	Maintenance is not planned (there is no clear system in place), or
Equipment is in a good state of repair	Equipment is in a reasonable state of repair	Equipment is in a poor state of repair

A-7 Floor surface

Identify the condition of the surfaces along the route and determine the level of risk using the following criteria.

Good G/0	Reasonable A/1	Poor R/4
Dry and clean, and	Mostly dry and clean (damp or debris in some areas), or	Contaminated (wet or debris in several areas), or
Level, and	Sloping (gradient is between 3° and 5°), or	Steep slope (gradient is more than 5°), or
Firm, and	Reasonably firm underfoot (eg carpet), or	Soft or unstable underfoot (gravel, sand, mud), or
Good condition (not damaged or uneven)	Poor condition (minor damage)	Very poor condition (severe damage)

A-8 Obstacles along the route

Check the route for obstacles. Note if the equipment is moved over trailing cables, across raised edges, up or down steep ramps (gradient of more than 5°), up or down steps, through closed/narrow doors, screens or confined spaces, around bends and corners or objects. Each type of obstacle should only be counted once no matter how many times it occurs.

Good G/0	Reasonable A/2	Poor R/3
No obstacles	One type of obstacle but no steps or steep ramps	Steps, steep ramps or two or more other types of obstacle

A-9 Other factors

Identify any other factors, for example:

- the equipment or load is unstable;
- the load is large and obstructs the worker's view of where they are moving;
- the equipment or load is sharp, hot or otherwise potentially damaging to touch;
- there are poor lighting conditions;
- there are extreme hot or cold temperatures or high humidity;
- there are gusts of wind or other strong air movements;
- personal protective equipment or clothing makes using the equipment more difficult.

None G/0	One A/1	Two or more R/2
No other factors present	One factor present	Two or more factors present

Score sheet: Pushing or pulling loads on wheeled equipment

Assessor name:		**Date:**	
Company name:		**Location:**	

Detailed description:

Are there indications that the operation is high risk? (Tick appropriate box)

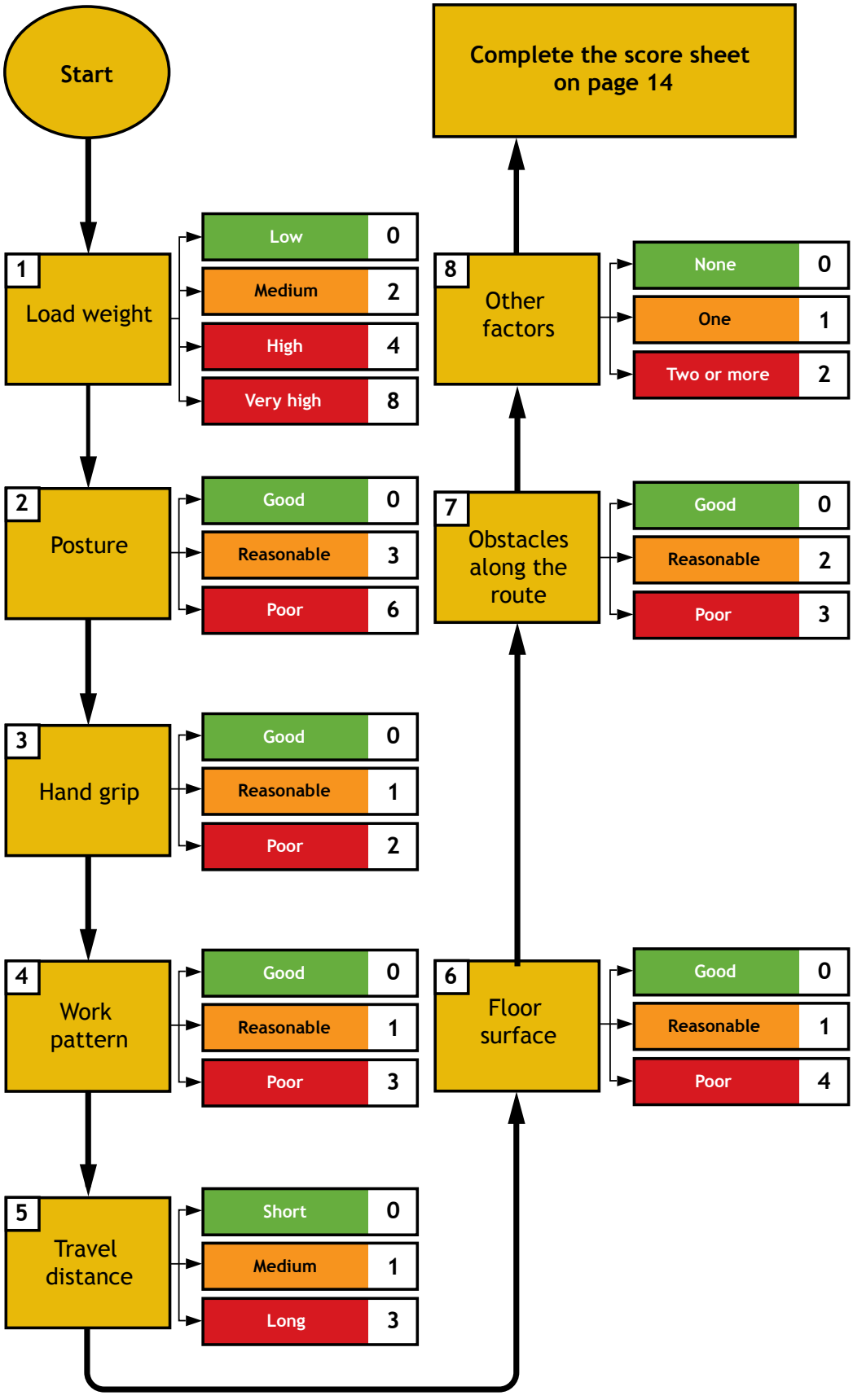
	The operation has a history of incidents (eg company accident book records, RIDDOR reports).
	The operation is known to be hard or high-risk work.
	Employees doing the work show signs that they are finding it hard (eg breathing heavily, red-faced, sweating).
	Discussions with employees doing the operation indicate that some aspects are difficult.
	Other indications, if so, what?

Identify the type of equipment and insert the colour band and numerical score for each of the risk factors in the boxes below

Factors	Small equipment		Medium equipment		Large equipment	
	Colour band (G, A, R)	Numeric score	Colour band (G, A, R)	Numeric score	Colour band (G, A, R)	Numeric score
A-1 Load weight						
A-2 Posture						
A-3 Hand grip						
A-4 Work pattern						
A-5 Travel distance						
A-6 Condition of equipment						
A-7 Floor surface						
A-8 Obstacles on route						
A-9 Other factors						
Total score						

Note individual capability, eg vulnerable workers, or psychosocial issues

Section B: Pushing or pulling loads without wheels

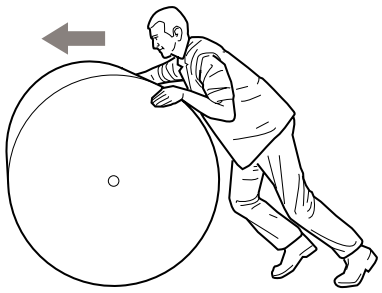


Assessment guide

B-1 Activity/Load weight (kg)

- Identify the work activity. If two or more activities are performed (eg rolling and churning), do an assessment for each type of activity.
- Find out the weight of the load moved (from any labelling provided, by asking the workers or by weighing).
- If two or more loads are moved at a time, assess the total weight moved.
- If you are moving different loads, assess the heaviest load.
- The illustrations in each section are only a guide to help you – they are not comprehensive.

Rolling



Less than 400 kg	Low G/0
400 kg to 600 kg	Medium A/2
600 kg to 1000 kg	High R/4
More than 1000 kg	Very high R/8

Churning *(loads are moved by pivoting/rolling along the base edges)*

Less than 80 kg	Low G/0
80 kg to 120 kg	Medium A/2
120 kg to 150 kg	High R/4
More than 150 kg	Very high R/8

Dragging/hauling or sliding

Less than 25 kg	Low G/0
25 kg to 50 kg	Medium A/2
50 kg to 80 kg	High R/4
More than 80 kg	Very high R/8

B-2 Posture

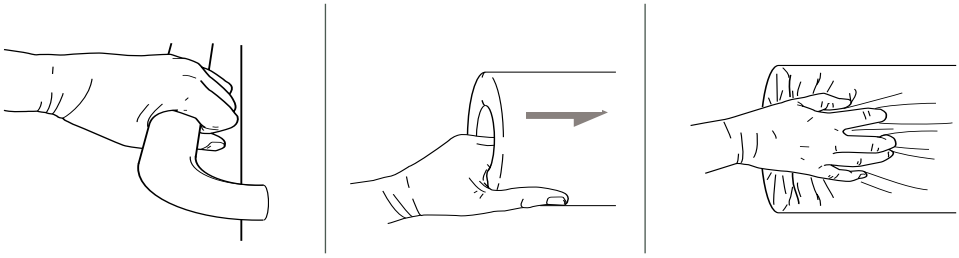
Observe the general positions of the hands and the body during the operation.

Good G/0	Reasonable A/3	Poor R/6
Torso is largely upright, and	Body is inclined in direction of exertion, or	Body is severely inclined, or worker squats, kneels or needs to push with their back against the load, or
Torso is not twisted, and	Torso is noticeably bent or twisted, or	Torso is severely bent or twisted, or
Hands are between hip and shoulder height	Hands are below hip height	Hands are behind or on one side of body or above shoulder height

B-3 Hand grip

Observe how the hand(s) grip or contact the load during pushing or pulling. If the operation involves both pushing and pulling, assess the hand grip for both actions.

Good G/0	Reasonable A/1	Poor R/2
There are handles or handhold areas which allow a comfortable power grip for pulling or comfortable full-hand contact for pushing	There are handhold areas, but they only allow a partial grip, eg fingers clamped at 90°, or partial hand contact for pushing	There are no handles or the hand contact is uncomfortable



B-4 Work pattern

Observe the work, noting whether the operation is repetitive (five or more transfers per minute) and whether the worker sets the pace of work. Ask workers about their pattern of breaks and other opportunities to rest or recover from the work.

Good G/0	Reasonable A/1	Poor R/3
The work is not repetitive (fewer than five transfers per minute), and	The work is repetitive, but	The work is repetitive, and
The pace of work is set by the worker	There is opportunity for rest or recovery through formal and informal breaks or job rotation	No formal/informal breaks or job rotation opportunities are provided

B-5 Travel distance

Determine the distance from start to finish for a single trip.

- If the operation is not repetitive, do an assessment for the longest trip.
- If the operation is repetitive, determine the average distance for at least five trips.

Short G/0	Medium A/1	Long R/3
2 m or less	Between 2 m and 10 m	More than 10 m

B-6 Floor surface

Identify the condition of the surfaces along the route and determine the level of risk using the following criteria.

Good G/0	Reasonable A/1	Poor R/4
Dry and clean, and	Mostly dry and clean (damp or debris in some areas), or	Contaminated (wet or debris in several areas), or
Level, and	Sloping (gradient is between 3° and 5°), or	Steep slope (gradient is more than 5°), or
Firm, and	Reasonably firm underfoot (eg carpet), or	Soft or unstable underfoot (gravel, sand, mud), or
Good condition (not damaged or uneven)	Poor condition (minor damage)	Very poor condition (severe damage)

B-7 Obstacles along the route

Check the route for obstacles. Note if the load is moved over trailing cables, across raised edges, up or down steep ramps (gradient of more than 5°), up or down steps, through closed/narrow doors, screens or confined spaces, around bends and corners or objects. Each type of obstacle should only be counted once no matter how many times it occurs.

Good G/0	Reasonable A/2	Poor R/3
No obstacles	One type of obstacle but no steps or steep ramps	Steps, steep ramps, or two or more other types of obstacle

B-8 Other factors

Identify any other factors, for example:

- the load is unstable;
- the load is large and obstructs the worker's view of where they are moving;
- the load is sharp, hot or otherwise potentially damaging to touch;
- there are poor lighting conditions;
- there are extreme hot or cold temperatures or high humidity;
- there are gusts of wind or other strong air movements;
- personal protective equipment or clothing makes pushing and pulling more difficult.

None G/0	One A/1	Two or more R/2
No other factors present	One factor present	Two or more factors present

Score sheet: Pushing or pulling loads without wheels

Assessor name:		**Date:**	
Company name:		**Location:**	

Detailed description:

Are there indications that the operation is high risk? (Tick appropriate box)

	The operation has a history of incidents (eg company accident book records, RIDDOR reports).
	The operation is known to be hard or high-risk work.
	Employees doing the work show signs that they are finding it hard (eg breathing heavily, red-faced, sweating).
	Discussions with employees doing the operation indicate that some aspects are difficult.
	Other indications, if so, what?

Identify the activity and insert the colour band and numerical score for each of the risk factors in the boxes below

Factors	Rolling		Churning		Dragging	
	Colour band (G, A, R)	Numeric score	Colour band (G, A, R)	Numeric score	Colour band (G, A, R)	Numeric score
B-1 Load weight						
B-2 Posture						
B-3 Hand grip						
B-4 Work pattern						
B-5 Travel distance						
B-6 Floor surface						
B-7 Obstacles on route						
B-8 Other factors						
Total score						

Note individual capability, eg vulnerable workers, or psychosocial issues

Find out more

1 *Manual handling assessment charts (the MAC tool)* Leaflet INDG383(rev2) HSE 2014 www.hse.gov.uk/pubns/indg383.htm

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

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

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit 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.

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.

This leaflet is available at: www.hse.gov.uk/pubns/indg478.htm.