



Risk factors associated with pushing and pulling loads

There are a number of risk factors associated with pushing and pulling of loads. To make it easy to remember, it can be broken down to **TILE**, which stands for **T**ask, **I**ndividual, **L**oad and **E**nvironment. The following are some risk factors within these categories that could contribute to a pushing and pulling related injury. You should consider these risk factors when carrying out your risk assessments.

Task

- Steep slopes and rough surfaces can increase the amount of force required to push/pull a load.
- The risk also increases over longer distances and when the frequency of pushing/pulling does not provide sufficient rest/recovery time.
- Obstacles can create risks by the worker trying to avoid collision.
- Large amounts of effort to starting or stop the load moving or even to keep it moving.
- Repetitive pushing and pulling.
- Position of the hands is comfortable for the worker. The hands are best positioned between the waist and shoulder height.

Individual

- Workers may have different characteristics and capabilities. For example, a tall worker may have to adopt an awkward posture to push a trolley with low handles, while a shorter worker may have difficulty seeing over the load.
- Individual concerns such as pregnancy may temporarily reduce the amount of force a worker can safely handle.
- The task may require unusual capability, if this is so think about how and who should carry out the task.
- Specialised training or instruction maybe needed.
- This task may pose a risk on those with a physical or mental disability.

Load

- Consider the weight of the load and the weight of the equipment being used by the worker.
- Ensure the load is not excessive and that it is sufficiently stable for negotiating and slopes, corners or rough surfaces that may be encountered.
- Plan the route and ensure the worker can safely see over the load.
- Check if the load and wheeled equipment isn't too bulky for the route.

Environment

- Environmental factors such as temperature, lighting and air currents can increase the risk of pushing/pulling.
- Hot and humid environments (like a bakery) can lead to the early onset of fatigue.
- Strong air movements can increase pushing forces and reduce the stability of the load.

- Very cold environments can also increase the risk.
- Environments where there is poor or bright lighting can affect the worker's judgement.
- Floor surfaces that are clean and dry can help reduce the force needed to move a load.
- Constraints on posture may cause problems for the worker, which could affect the task and injure the worker.
- Confined spaces and narrow passages/doorways could provoke a tripping/trapping/abrasions injury.

In addition to the above there are other factors, which should also be considered:

Equipment

- Ensure that the correct equipment is provided for the task and it is fit for purpose.
- There should be a maintenance programme and a well promoted fault reporting system.
- Ensure that the wheels suit the flooring and environment i.e. are the wheels on the device suited to a hot environment or carpets.
- Handle height in relation to the different users can be a risk factor for their posture, they may find it uncomfortable and/or unable to apply a suitable grip.
- Lack of good handles can increase the amount of undue effort needed to move the load.
- If the equipment is without brakes it could be difficult to stop. If it has brakes but the brakes are poor/ineffective this could also make it difficult to stop.

- Is posture hindered by Personal Protective Equipment, if so is it really needed or can the task be done in a different way?

Work organisation and psychosocial factors

- This effects the workers psychological reaction to work and the environment, such factors as high workload demands, short deadlines and lack of control and working methods.
- Poor communication with managers and employees can lead to an unhappy workforce and this could have an effect on the production.
- Organisation 'change' can have an effect on the workforce, this could effect their motivation if no mechanisms are in place to prevent this.

Planning a push/pull risk assessment

The questions below are an example of what you should be asking as part of your risk assessment. Try to consider all the questions below before undertaking a pushing and pulling activity and complete a suitable and sufficient risk assessment.

Questions on the task

- Is the route as short as possible?
- Is the task known to be demanding for employees? That is, do they dislike a particular job or task?
- Is the route clear of obstacles?
- Does the task involve negotiating kerbs, steps or slopes?
- Are there maintenance procedures in place?
- Does the task need a lot of effort to get the load moving and kept moving?
- Are there sudden movements to start or stop the load?
- Are there any one handed operations?

- Is there movement at high speed or over long distances?
- Is there repetitive pushing/pulling?

Questions on the load

- How heavy is the laden trolley and how much force is exerted?
- Is the load stable and secure?
- Is the load too bulky for the route or trolley?
- Can you see over the load?
- Are there good handholds?

Questions on the environment

- Does the task take place in a very hot or cold environment? (Repetitive pushing and pulling activities within hot and humid temperatures can lead to the early onset of fatigue).
- Does the task take place in windy locations where the load may become unstable?
- Is the lighting adequate – not too dim and not too bright?
- Are there constraints on body posture/positioning?
- Are there confined spaces/narrow doorways?
- Are there surfaces or edges to cause cuts/abrasions/burns to hands or body?
- Any rutted/damaged/slippery floors?
- Any trapping or tripping hazards?

Questions on individual capabilities

- Does the worker have a musculoskeletal injury (ache or pain), which might be aggravated?
- Does the worker have any loose clothing that may get entangled in the device?
- Does the worker adopt the correct upright posture for the operation?
- Does the task require unusual capabilities?
- Does it cause a hazard to those with a health problem or those who are pregnant?
- Is there a need for special information/training?

Questions on the equipment

- Is your device fit for purpose – is the device the correct type for the operation?
- Is it well maintained and do the wheels and castors rotate freely?
- Are the wheels on the device suited to the floor surface? E.g. are the wheels large enough to minimise rolling resistance?
- Is the handle height on your device between your waist and your shoulder height?
- Are there any brakes? If so, are they effective?
- Are the handle grips in good order and comfortable?
- Is movement or posture hindered by clothing or personal protective equipment?
- Is there an absence of the correct/suitable PPE being worn?

- If on wheels/castors – are they
 - unsuitable for the type of load?
 - unsuitable for the floor surface/work environment?
 - difficult to steer?
 - easily damaged or defective?
 - without brakes or difficult to stop?
 - with brakes, but the brakes are poor/ ineffective?

Questions on work organisation and psychosocial factors

- Do workers feel that there has been a lack of consideration given to the planning and scheduling of tasks/rest breaks?
- Do workers feel that there is poor communication between management and employees (eg they're not involved in risk assessments or when purchasing equipment)?
- Are there sudden changes in workload, or seasonal changes in volume without mechanisms for dealing with the change?
- Do workers feel they have been given insufficient training and information in order to carry out the task successfully?

Doing a risk assessment

How do I know if I need to assess the risk in more detail?

The guideline figures for stopping/starting a load and for keeping a load in motion are provided in guidance booklet L23 “Manual Handling”. If these guideline figures are exceeded a full risk assessment should be made.

Guideline figures for pushing and pulling

	men	women
For stopping or starting a load	20 kg (ie about 200 Newtons)	15 kg (ie about 150 Newtons)
For keeping load in motion	10 kg (ie about 100 Newtons)	7 kg (ie about 70 Newtons)

However, these figures assume that the force is applied using where the hands are positioned between knuckle and shoulder height and the distance involved is no more than about 20m whether the load is slid, rolled or supported on wheels. If these assumptions are not met, then a more detailed assessment is needed. Also, a detailed risk assessment should be carried out if risk factors such as uneven floors, confined spaces or trapping hazards are present.

The amount of force that is needed to move a load over a flat, level surface using a well maintained handling aid is at least 2% of the load weight.

Example - Load weight is 200kg; the force needed to move this is 4kg.

However, this force may be larger if the conditions are not perfect e.g. wheels are not in the right position, or the device is poorly maintained. Moving weights over soft or uneven surfaces can require greater forces to move the load.

On uneven surfaces, the force needed to move a load could increase to 10% of the load weight. Using larger wheels could offset this. Pushing and pulling forces will also increase if a ramp or slope is to be negotiated.

There is no specific limit to the distance a load can be pushed or pulled as long as there are sufficient breaks for rest or recovery.

- ❑ Remember: the use of these guidelines does not affect the employer's duty to avoid or reduce the risk of injury where this is reasonably practical. The guideline figures therefore should not be regarded as weight limits or approved figures for safe pushing and pulling operations.