PHYSICAL LOAD GUIDE

5 STEP APPROACH TO ADDRESS THE PHYSICAL WORKLOAD

TNO innovation for life

Investing in healthy, competent, and motivated employees means investing in sustainable employability. Physically demanding work affects sustainable employability. Simple actions, changes to processes, and the use of working aids can relieve physical workload so that employees can be employed more effectively and for longer, thus making them more sustainably employable.

BUT WHAT IS THE BEST APPROACH?

This guide outlines five steps that will help you get started. It is essentially a step-by-step plan for making small improvements. In addition, this guide explains how to tackle situations in which several measures are being implemented simultaneously or in which employees have to start using different working methods. You can use the guide to answer the questions in the adjacent circle. Click on a given question for more information on the issue that is prevalent at your company.

HOW WILL I BENEFIT FROM USING THIS GUIDE?

The Physical Load Guide is a resource that you can use to tackle things in a structured way, for example if your RI&E indicates that you need to do so. Simply follow the steps to identify any indications of physical workload and draw up a plan to address any issues. The physical load is assessed in **step 2**, solutions are devised and selected in **step 3** and then implemented in **step 4**. The guide concludes with a description of how the solutions can be evaluated in **step 5**.

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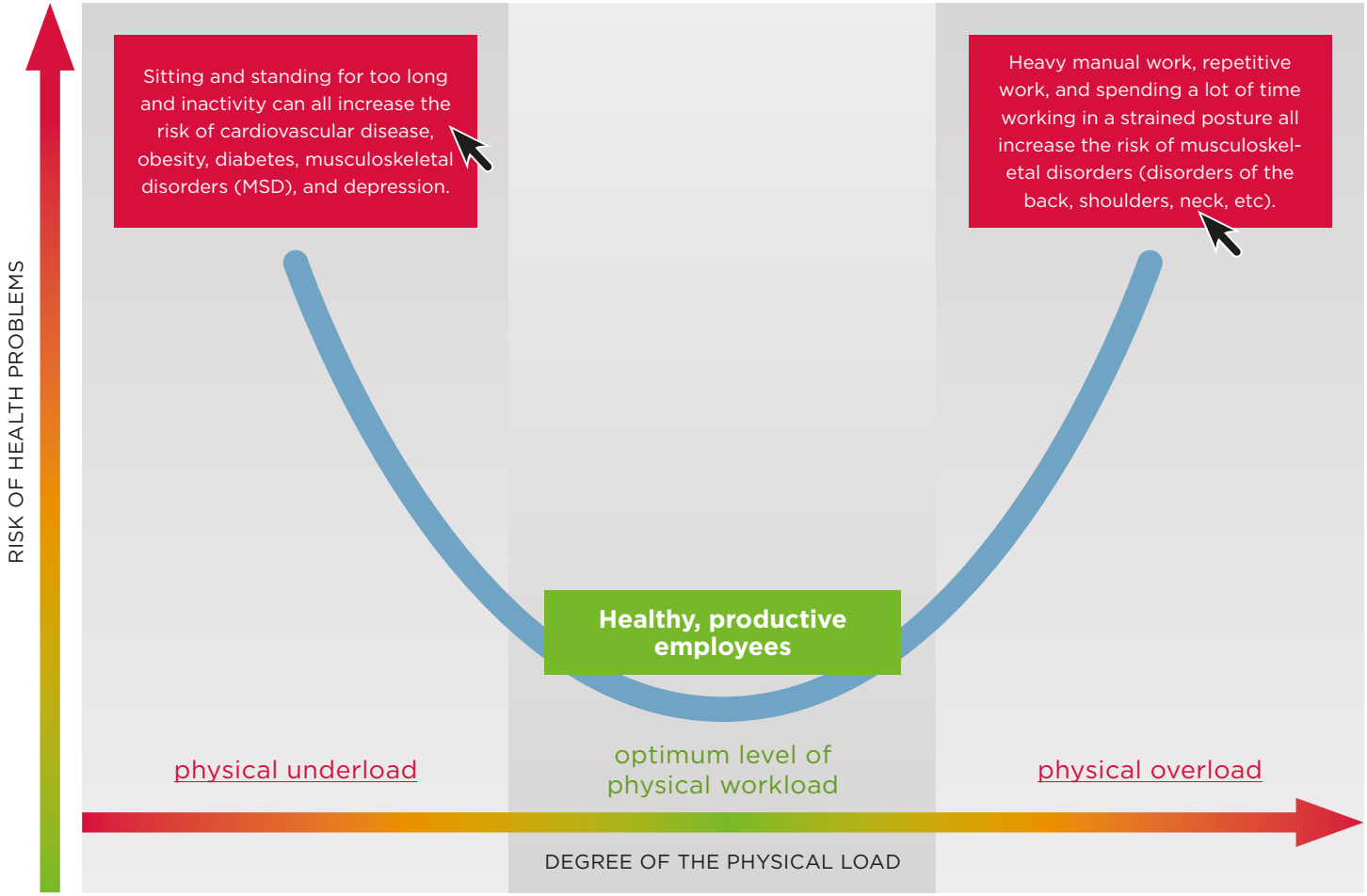
WHAT IS THE PHYSICAL LOAD?

The physical load is the same as physical strain. We can make a distinction between physical overload and physical underload; both of these conditions can lead to health problems; therefore, they are of significance with regard to healthy, sustainable employability. *For a more detailed explanation, click on the texts in the diagram below.*



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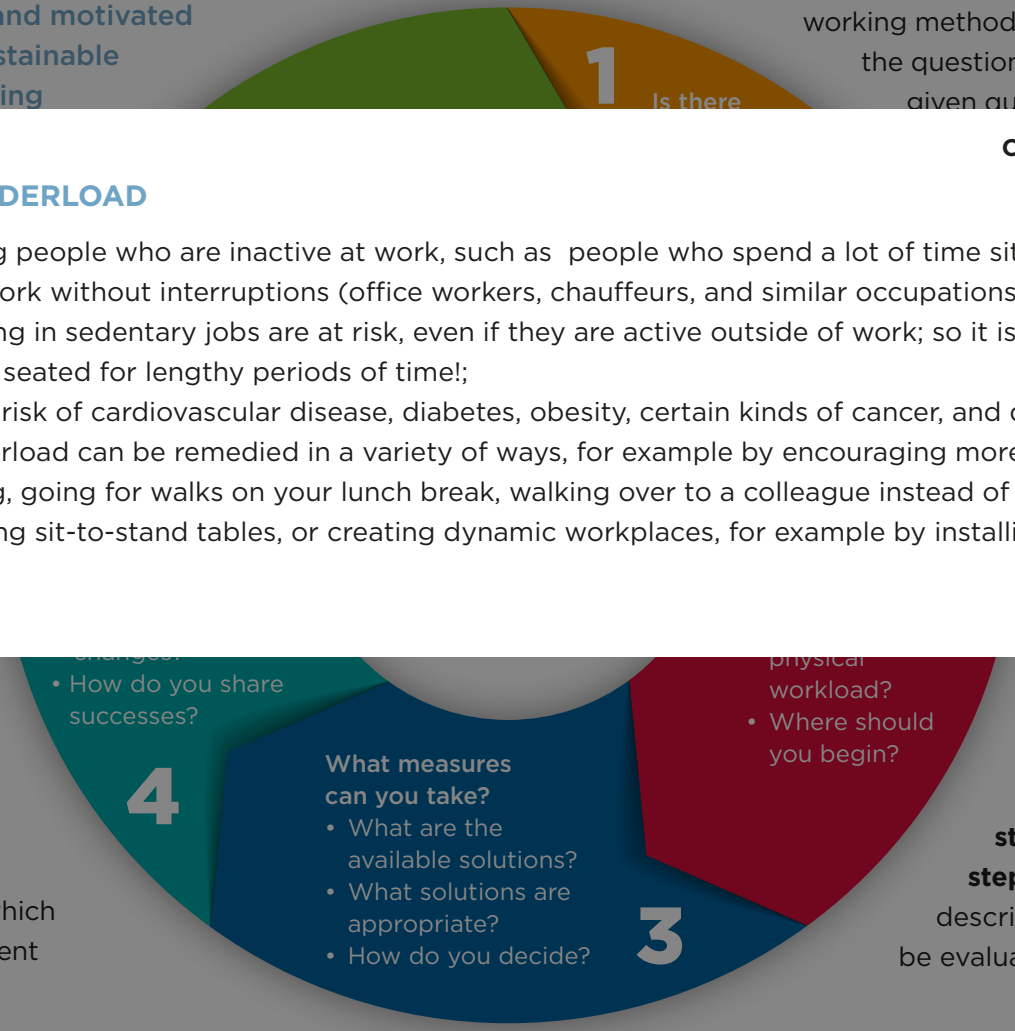

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PHYSICAL UNDERLOAD

- occurs among people who are inactive at work, such as people who spend a lot of time sitting or standing at work without interruptions (office workers, chauffeurs, and similar occupations).
- people working in sedentary jobs are at risk, even if they are active outside of work; so it is important to avoid staying seated for lengthy periods of time!;
- increases the risk of cardiovascular disease, diabetes, obesity, certain kinds of cancer, and depression;
- physical underload can be remedied in a variety of ways, for example by encouraging more active forms of commuting, going for walks on your lunch break, walking over to a colleague instead of sending them an e-mail, using sit-to-stand tables, or creating dynamic workplaces, for example by installing office bicycles, etc.

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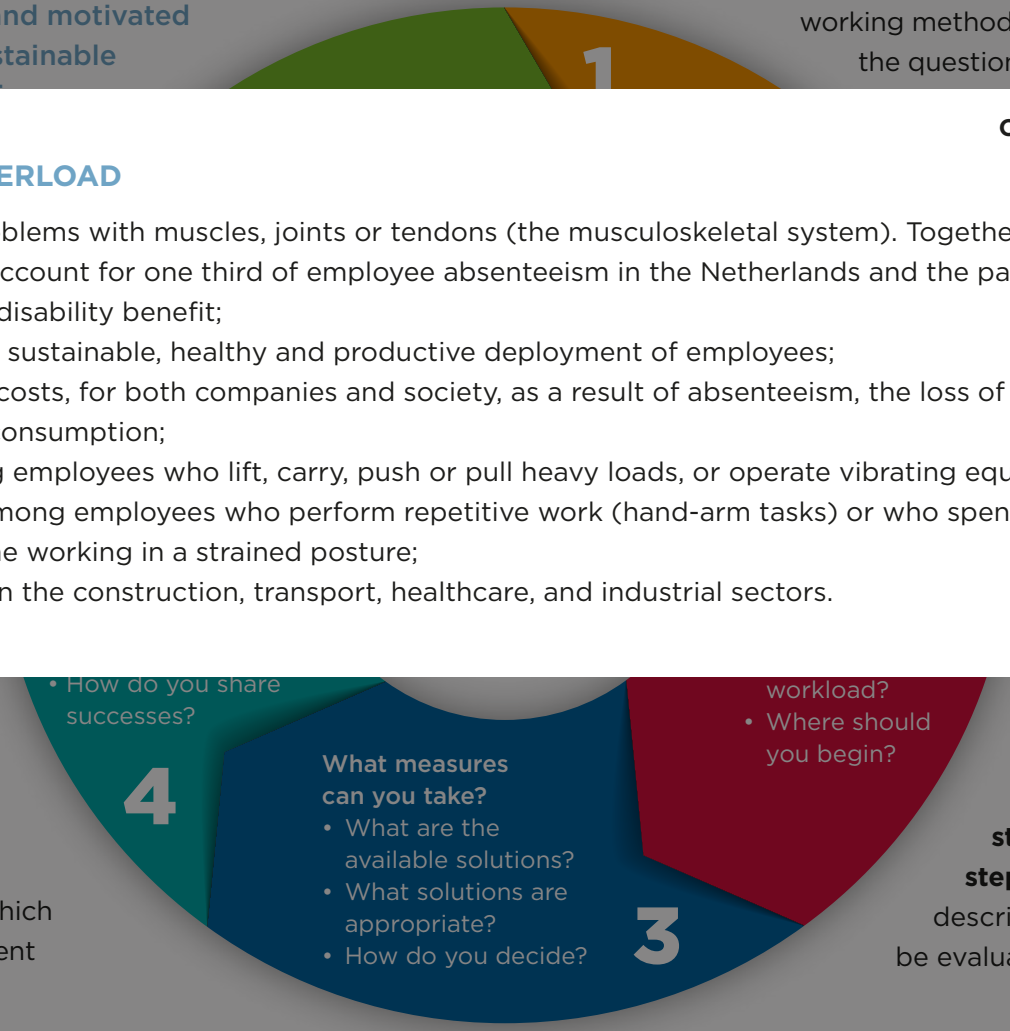

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PHYSICAL OVERLOAD

- can cause problems with muscles, joints or tendons (the musculoskeletal system). Together, these kinds of problems account for one third of employee absenteeism in the Netherlands and the payment of occupational disability benefit;
- can affect the sustainable, healthy and productive deployment of employees;
- leads to high costs, for both companies and society, as a result of absenteeism, the loss of productivity, and medical consumption;
- occurs among employees who lift, carry, push or pull heavy loads, or operate vibrating equipment;
- also occurs among employees who perform repetitive work (hand-arm tasks) or who spend lengthy periods of time working in a strained posture;
- often occurs in the construction, transport, healthcare, and industrial sectors.

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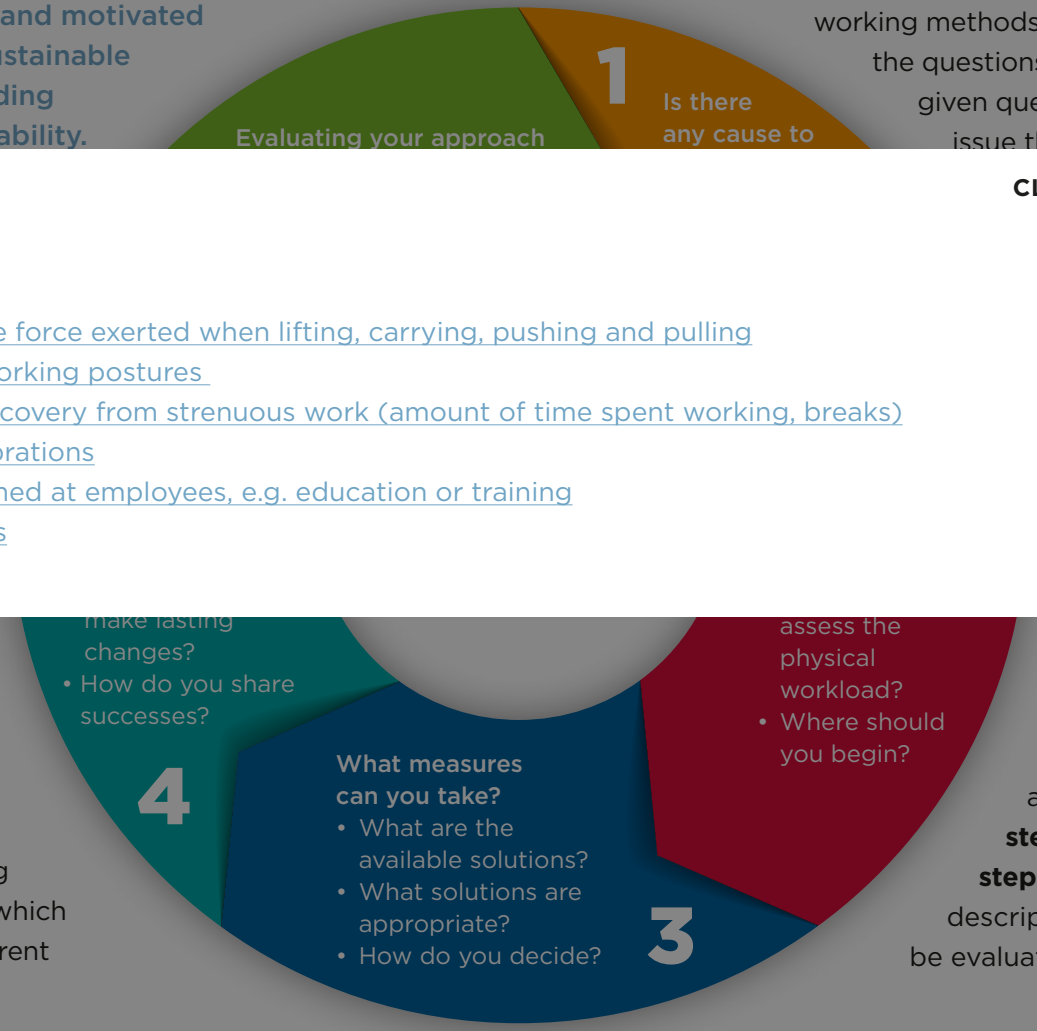

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SOLUTIONS

Solutions for:

- Reducing the force exerted when lifting, carrying, pushing and pulling
- Improving working postures
- Improving recovery from strenuous work (amount of time spent working, breaks)
- Reducing vibrations
- Solutions aimed at employees, e.g. education or training
- Other factors

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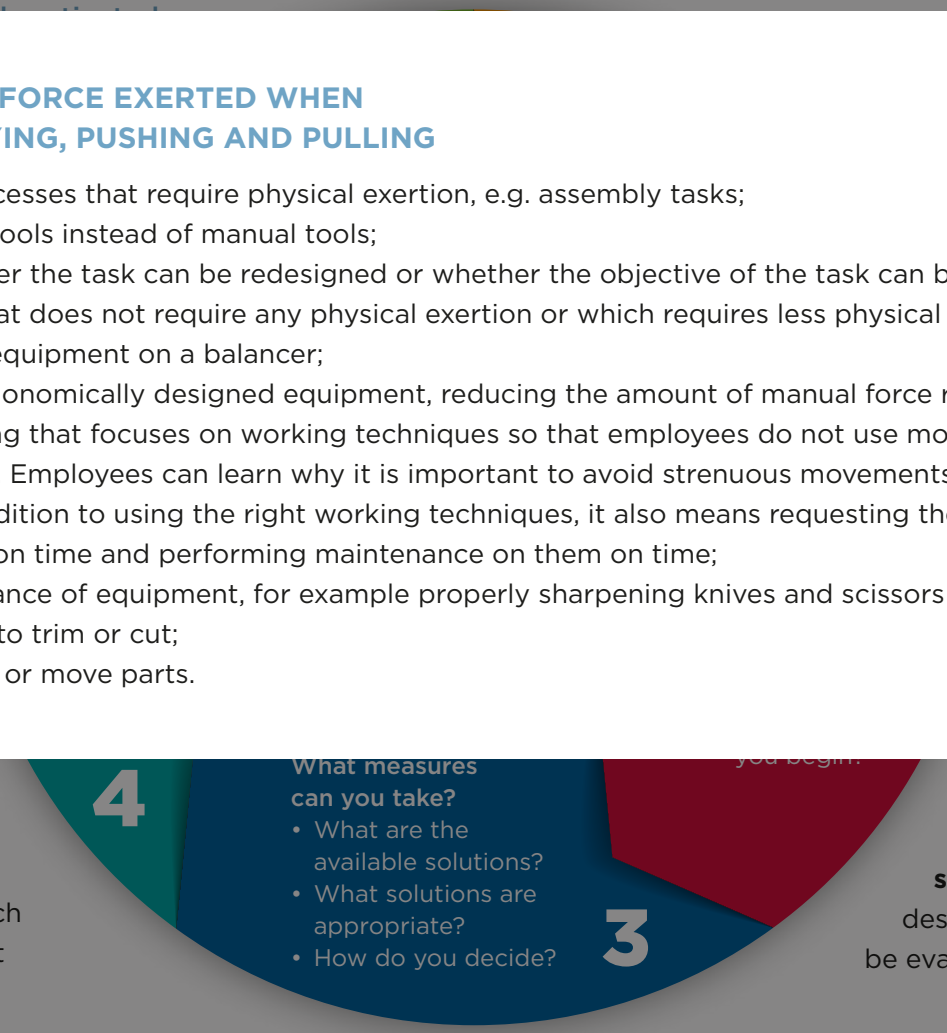

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← SOLUTIONS

REDUCING THE FORCE EXERTED WHEN LIFTING, CARRYING, PUSHING AND PULLING

- automating processes that require physical exertion, e.g. assembly tasks;
- using powered tools instead of manual tools;
- checking whether the task can be redesigned or whether the objective of the task can be achieved in a different way that does not require any physical exertion or which requires less physical exertion;
- hanging heavy equipment on a balancer;
- using better, ergonomically designed equipment, reducing the amount of manual force required;
- providing training that focuses on working techniques so that employees do not use more force than is strictly required. Employees can learn why it is important to avoid strenuous movements and how they can do so. In addition to using the right working techniques, it also means requesting the right equipment and appliances on time and performing maintenance on them on time;
- proper maintenance of equipment, for example properly sharpening knives and scissors to avoid needing too much force to trim or cut;
- using aids to lift or move parts.

IMPROVING WORKING POSTURES

- if manual work is carried out in a strained posture, have the work processed by machines instead;
- improve the design of work stations:
  - optimize the working height: make sure the working height is not too low. Employees should be able to work with their back and head as upright as possible. The working height should not be too high either. Employees should not have to lift their upper arms. If different employees work at the same work station, it should be easy to adjust the working height to the body height of individual employees;
  - materials and equipment should be arranged conveniently (within easy reach, in front of the body), so that employees do not need to reach too far forward, to the side, or backward with their arms (and bend or turn their back) and can remain in a neutral posture insofar as possible;
  - good lighting, without any reflections, mirroring, backlight or shadow effect, so that employees do not need to bend their head forward or turn their head to see what they are working on.
- providing training that focuses on employees' posture at work so that employees understand why it is important and learn how to maintain good posture;
- the prevention officer or occupational health officer could take a few photos or make a few videos of employees (using the employees' own smartphones to ensure privacy) and show them to the employees. It is often difficult to imagine or feel your own posture at work. Pictures are an easy way of 'holding up a mirror' to employees;
- using appliances to ensure the proper working height, such as lift tables (industry), high-low hospital beds (healthcare) and high-low tables (offices);
- using appliances to support the body when working on the ground, such as the brick-laying cart (road paving) and weeding carts (flower bulb sector);
- using ergonomically designed equipment to improve the position of the wrists;
- using kneepads when working in a kneeling position;
- if the work being performed involves standing for lengthy periods of time, check whether this work can also be done sitting or using a standing aid, even if it is only to alternate between sitting and standing;
- prevent breaks in concentration, especially if your work requires a lot of concentration (avoid disruptive sounds and images);
- reduce the precision requirements for the work, by adjusting the task, moving the work closer to your eyes, providing aids such as magnifying glasses, etc.

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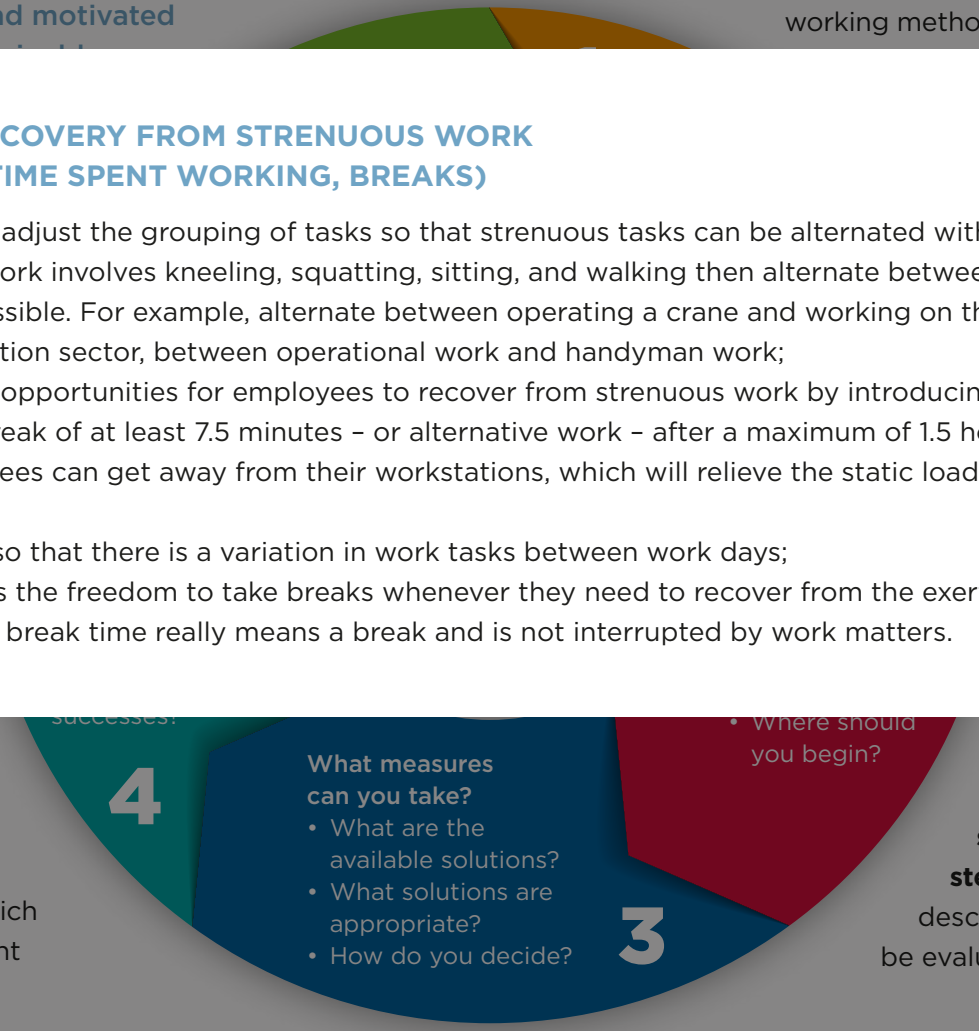

← SOLUTIONS

IMPROVING RECOVERY FROM STRENUOUS WORK (AMOUNT OF TIME SPENT WORKING, BREAKS)

- rotate tasks or adjust the grouping of tasks so that strenuous tasks can be alternated with less strenuous tasks. If your work involves kneeling, squatting, sitting, and walking then alternate between these postures as much as possible. For example, alternate between operating a crane and working on the ground or, in the construction sector, between operational work and handyman work;
- create enough opportunities for employees to recover from strenuous work by introducing breaks; preferably, a break of at least 7.5 minutes – or alternative work – after a maximum of 1.5 hours of work, so that employees can get away from their workstations, which will relieve the static loading on their muscles;
- vary the work so that there is a variation in work tasks between work days;
- give employees the freedom to take breaks whenever they need to recover from the exertion of the work;
- make sure that break time really means a break and is not interrupted by work matters.

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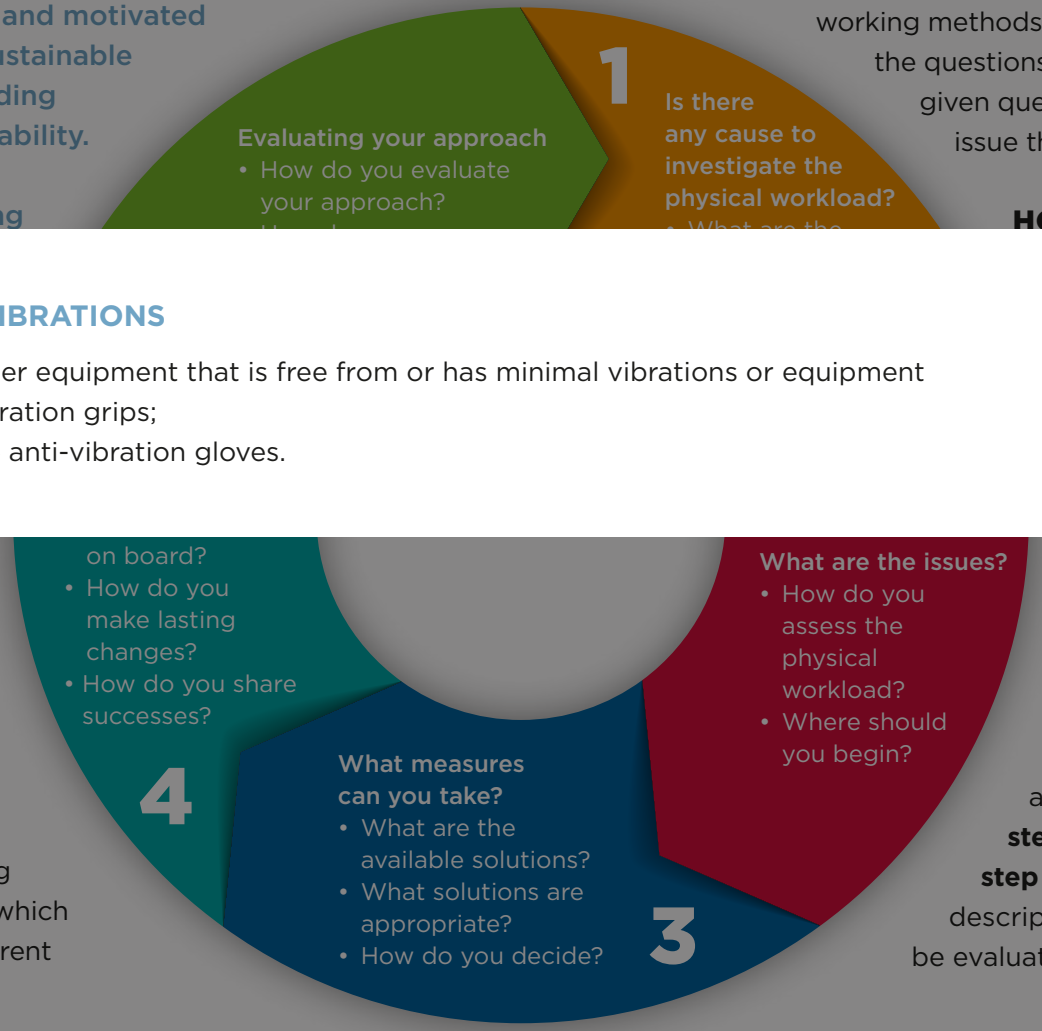

← SOLUTIONS

REDUCING VIBRATIONS

- look into other equipment that is free from or has minimal vibrations or equipment with anti-vibration grips;
- use effective anti-vibration gloves.

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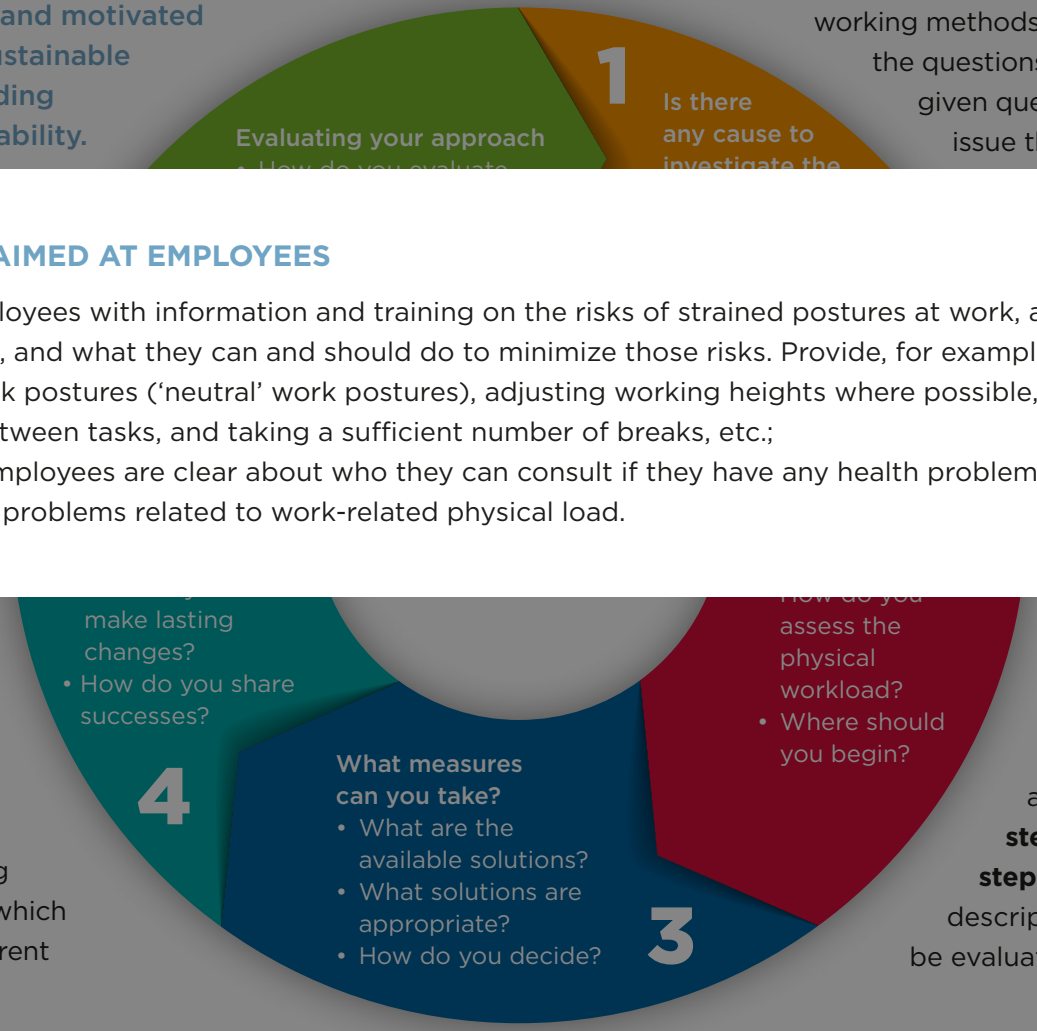

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SOLUTIONS

SOLUTIONS AIMED AT EMPLOYEES

- provide employees with information and training on the risks of strained postures at work, actions that require force, and what they can and should do to minimize those risks. Provide, for example, information on good work postures (‘neutral’ work postures), adjusting working heights where possible, using aids, switching between tasks, and taking a sufficient number of breaks, etc.;
- make sure employees are clear about who they can consult if they have any health problems or any questions or problems related to work-related physical load.

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SOLUTIONS

SOLUTIONS FOR 'OTHER FACTORS'

- breaks: give employees the freedom to take breaks whenever they need to recover from physical load caused by strenuous work ;
- air conditioning: adjust the air conditioning so that employees can work comfortably; make sure to avoid cold or draughts;
- concentration: prevent breaks in concentration, especially if your work requires a lot of concentration; this mainly means avoiding disruptive sounds and images like colleagues walking past; of course, another solution is to try and reduce the concentration requirements for the task;
- contact: make sure to get a good grip so that you don't need to expend more energy than necessary;
- use gloves – thick gloves, if necessary – slippery or poorly designed handles can affect your grip;
- precision: reduce the precision requirements for the work, by adjusting the task, moving the work closer to your eyes, providing aids such as magnifying glasses, etc.;
- precision: instead of setting the pace at which precision work is performed, make sure employees are free to set their own pace (thereby increasing their autonomy);
- precision: provision of proper visual, audio or tactile feedback on the task being performed (for example a beep if something goes wrong);
- precision: avoid wearing gloves – especially thick gloves – when performing precision tasks because that will make it difficult to provide feedback.

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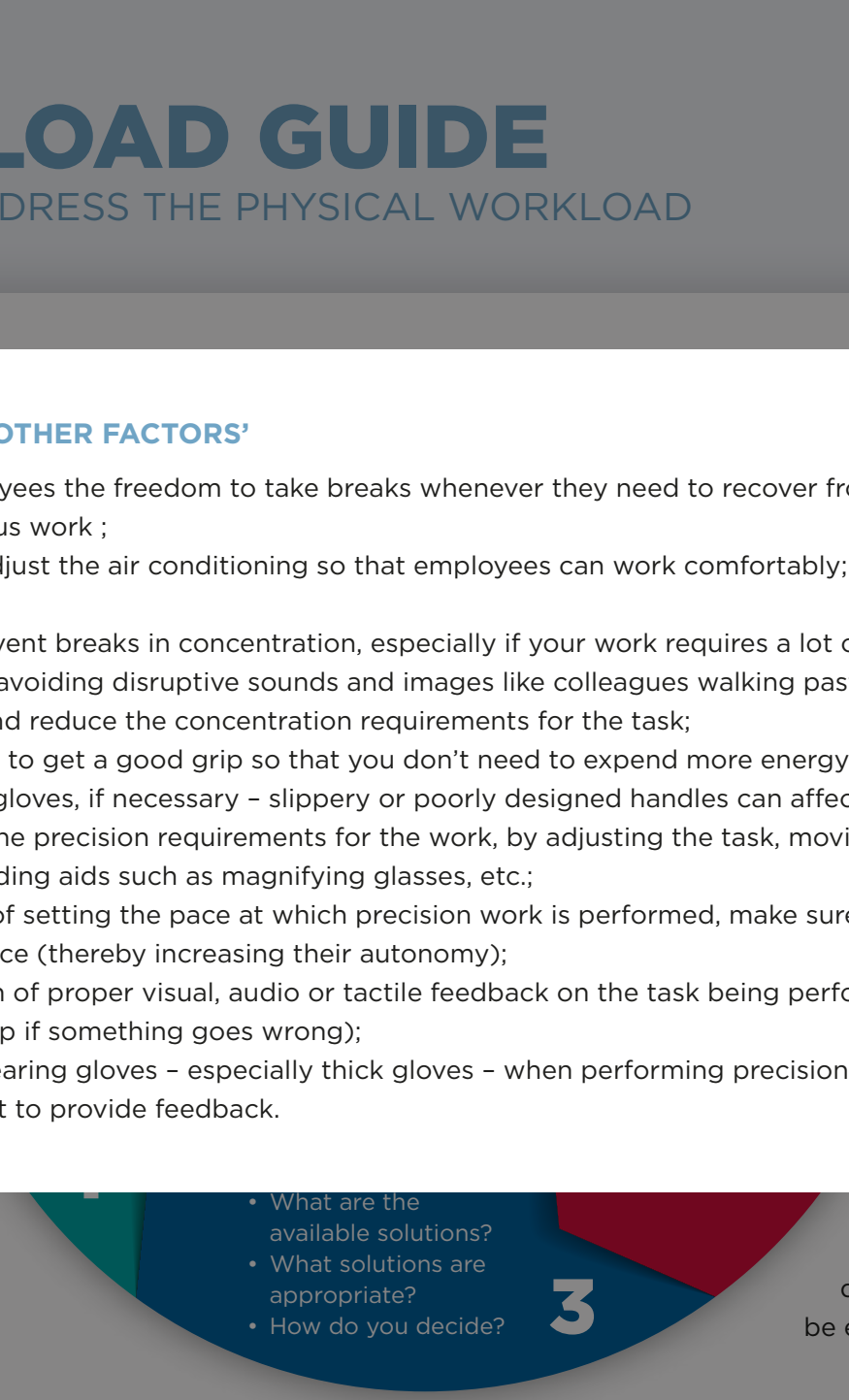

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STEP 1

IS THERE ANY CAUSE TO INVESTIGATE THE PHYSICAL WORKLOAD?

Is there any cause to investigate the physical load and where do I begin? The outcome of this step is a decision on whether or not to address the physical load and draw up an action plan for which there is support, time, and a budget.

WHAT ARE THE INDICATIONS OF PHYSICAL WORKLOAD?

HOW DO YOU DRAW UP AN ACTION PLAN?

WHAT ARE THE INDICATIONS, IF ANY, OF PHYSICAL WORKLOAD?

Physically strenuous work is performed at the organization. But is the work 'regular' heavy work or are the employees at risk of health problems and absenteeism? The latter has consequences for both the employees and the company. So it is important to identify what is already known about the physical load and the health of employees and, on that basis, to decide whether further steps are needed.

Another reason to examine the physical load is if any changes are made to work processes, operating resources, or workstations. In that case you should investigate, at an early stage, what effect those changes will have on the physical load.

As a matter of fact, any action taken to tackle the physical load starts off by collecting (identifying) indications of and facts about the physical load. In practice, therefore, no real action is taken because when you start collecting information, you do not yet know whether there is sufficient cause to start tackling the physical load. Furthermore, the indications which are identified are often needed to decide whether or not to launch a project. So it is important to give proper consideration to launching a project and to the decision to start working on it. In this regard, it is important to examine whether the preconditions have been met.

If they have, an action plan can be drawn up.

BACK TO THE SUMMARY OF THE STEPS

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IDENTIFYING AND COLLECTING AVAILABLE INFORMATION

Different sources can be used to ascertain whether there is cause to take action to reduce the physical workload. For example, you can investigate how many employees have work-related musculoskeletal symptoms or disorders (muscles, bones, joints, and tendons) and whether there is a high level of absenteeism due to these types of problems. A risk assessment and evaluation may reveal that the work they are performing is physically demanding.

The prevention officer, health and safety service, or company doctor will probably be able to tell you more about the 'physically demanding tasks at the company'. And, of course, you can also ask employees about indications like fatigue or specific health problems which are suspected of being caused by physically demanding work. Try to identify the main departments or job groups in which the indications are prevalent. You can do this by walking around the departments, making observations and asking questions, or – more objectively – by distributing a written questionnaire or organizing a group interview for around eight to ten employees.

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DECIDING TO REDUCE THE PHYSICAL WORKLOAD

Once you have identified the indications of and information on the physical load, you might conclude that there is no cause to take any further action. If you are in doubt or see clear reasons to tackle the physical load, it is important to meet the preconditions for taking action. The main preconditions for taking action are:

- support (from both the management and other stakeholders in the organization)
- budget
- time

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PRECONDITIONS FOR LAUNCHING A PROJECT

To gain support and, indirectly, secure the time and the budget, it is important to communicate effectively about the reasons for launching the project. What are the signals or indications? Are they recognized within the organization? And are people in the organization convinced that action is needed and that it will deliver results? Support from decision-makers is needed, because they allocate the budget and because they must support any changes that result from the project. To inspire and convince decision-makers, you can use good examples from measures that were implemented previously (business cases) or you can draw up a cost-benefit analysis. That may reveal that, in addition to having a positive effect on employee health (qualitative benefits), changes could also result in cost savings and/or increased productivity. Agreements can also be made in stages; the initial budget might only be for exploratory purposes (step 1+2) and any further decisions can be taken at a later stage.

It might also be helpful to consider when the right time is to launch a project. It could coincide with another project, such as a renovation, the launch of a new production line, or the procurement of new machinery or equipment.

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COMMUNICATION

It is a good idea to inform your entire organization (employees, managers, team leaders, support staff) once the decision is made to examine the physical workload. You can do so:

- during work meetings and team meetings
- via an internal mailing list or the internet
- by way of a periodic article on this topic.

You should make it clear that the action being taken is important to the organization – and why. It is preferable that you include the top boss in your communication about the decision. Timing is important. On the one hand, it is important to inform people as soon as possible that the organization will be taking action to tackle the physical load. However, there should not be too much time between the announcement and the first action that is to be taken.

Make sure that all those involved receive regular updates while the project is being implemented. Try to keep communication clear and specific. For example, name the work group members who can be contacted if anyone has any questions and clearly indicate the options for replying to/making suggestions about the action to be taken. Describe the key points of the first steps, the timetable, and the times at which employee input would be welcomed. Make sure that communication is not overly negative, abstract, or impersonal, that it does not contain any contradictory messages and keep an eye out for any questions or difficulties that employees may be facing. Communication should convey the message that reducing the physical workload is the shared responsibility of managers and employees.
The plan must specify who is responsible for communication, what parties should be involved, the times at which communications will be issued and the channels that will be used for those communications.
For example, collect good examples or catchy statements and take photographs or video recordings, all of which can be used in subsequent presentations.

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QUESTIONNAIRES OR GROUP INTERVIEWS

You can organize a questionnaire or group interview for your own company. The advantage of this is that you are familiar with the work and departments in your own company. The questions will feel familiar and so the answers will be specific. The main questions that need to be asked are:

- are there any health problems? If so, in what body parts are they present?
- how bad are the health problems and how common are they? Are the health problems more common in certain jobs or departments than in the rest of the company?
- do the employees believe that their health problems are related to their job or to specific work they perform?

Standardized questionnaires are available for these type of questions.

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or workstations. In that case you should investigate, at an early stage, what effect those changes will have on the physical load.

If they have, an action plan can be drawn up.

BACK TO THE SUMMARY OF THE STEPS

STEP 1

IS THERE ANY CAUSE TO INVESTIGATE THE PHYSICAL WORKLOAD?

Is there any cause to investigate the physical load and where do I begin? The outcome of this step is a decision on whether or not to address the physical load and draw up an action plan for which there is support, time, and a budget.

WHAT ARE THE INDICATIONS OF PHYSICAL WORKLOAD?

HOW DO YOU DRAW UP AN ACTION PLAN?

HOW DO YOU DRAW UP AN ACTION PLAN?

To ensure that activities take place as planned, you should draw up an action plan. Pick a suitable name for the project.

THE ACTION PLAN SHOULD SPECIFY:

- the reason for taking action or the nature of the problem
- the goal of the project and the agreements made by the working group; they should be formulated in such a way that they can be evaluated at a later date
- a schedule that specifies the milestones and points at which decisions need to be made; try to refer to ongoing issues, e.g. HR issues, and start off with a department that is 'suffering' the most
- how to evaluate the progress
- the division of tasks
- the manner in which communication with the rest of the organization takes place while the project is being implemented.

The plan essentially covers all five steps of this guide. The working group can examine what action needs to be taken for each step, how and when this will take place, and who will be responsible for the activities. The more specific the actions in the work plan, the easier it will be to follow the plan and achieve results. Submit the plan to the relevant parties for review and approval.

BACK TO THE SUMMARY OF THE STEPS

STEP 1

IS THERE ANY CAUSE TO INVESTIGATE THE PHYSICAL WORKLOAD?

WHAT ARE THE INDICATIONS OF PHYSICAL WORKLOA

HOW DO YOU DRAW UP AN ACTION PLAN

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HOW DO YOU PUT A WORKING GROUP TOGETHER?

Depending on the size of the organization, a working group will ideally comprise three to eight people. Make sure the working group properly represents the organization or department. You should ask employees to be part of the working group, because they know what happens on the shop floor. But it is also a good idea to involve other parties. For example:

- people who are authorized to implemented organizational changes (e.g. board members or high-level managers)
- people who are responsible for health and safety at work and in the organization (e.g. prevention officers)
- people who represent employee interests (e.g. Works Council members or staff representatives)
- someone who directly manages a department or group of employees.

It might also be a good idea to involve external individuals in the working group. Take, for example, an external consultant (e.g. an ergonomist) with knowledge of the physical load who can supervise work sessions. Of course, this could also be someone from the organization who has experience in this area (an internal ergonomist). A trade organization can provide advice on information and solutions from the sector. Discuss the various roles of the team members as soon as the project starts. Take, for example, the role of the chairman, the minute taker, and someone who is responsible for communicating with the organization. Another role might be to keep supporters of the project up to date. A good way of ensuring that you assign the various roles to the right people is to start off by asking yourself why someone is part of the working group, what qualities the participants have, and what each of them would like to get out of the process personally.

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- the manner in which communication with the rest of the organization takes place while the project is being implemented.

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STEP 2

WHAT ARE THE ISSUES?

You have decided to start a project on physical workload. The next step aims to obtain an understanding of the current physical workload, possible risks of developing musculoskeletal disorders and their causes.

HOW DO YOU ASSESS THE PHYSICAL LOAD?

WHERE SHOULD WE BEGIN?

"IF YOU KNOW WHAT THE RISKS ARE – AND WHAT CAUSES THEM – YOU CAN FORMULATE AND IMPLEMENT TARGETED MEASURES."

HOW DO YOU ASSESS THE PHYSICAL LOAD?

You can use the physical load checklist to make an initial, comprehensive risk assessment that examines all aspects of the physical load. The physical load checklist provides an insight into the potential risks associated with all kinds of physical exertion (lifting/carrying, pushing/pulling, working postures, hand-arm load, etc.). After completing the checklist, you will also be given suggestions about what tools can be used for subsequent, more detailed analyses of specific aspects of the physical load.
Various sectors have developed sector-specific instruments for this purpose. Alternatively, it is part of RI&E for your sector. Please consult the RI&E or health and safety catalogue for your sector or the website of a trade organization. These kinds of assessments often produce a score or benchmark which indicates whether there is an increased risk of health problems and, if so, the extent of that risk. In many cases there is no score but rather a checklist detailing aspects that are of significance.
If you already know the main causes, you can opt for an assessment that examines the causes in question in greater detail. For example, you could use the Working Posture Risk Assessment Tool (WRAP) for those working in strained postures, or the Hand-Arm Risk assessment Method (HARM) to assess the risks involved in hand-arm tasks.

BY WHOM AND WITH WHOM?

The risks assessment can be carried out by the organization's prevention officer or health and safety officer. Of course, someone from the working group must be involved. No prior knowledge of ergonomics is needed for most of the tools. If you do not have any time to carry out an assessment or if a more detailed analysis is needed, you can contact the health and safety expert or a consultant. It is important to share the results of the assessment. Hold a discussion with the working group about the best time and the best way to do this. At the end of this step record in the plan what issues will be addressed.
In addition to performing a risk assessment, a group interview with employees might provide information about the underlying causes. That will allow you to evaluate the results of the risk assessment, so you can be sure that the list of issues includes all of the issues that employees are experiencing.

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PHYSICAL LOAD CHECKLIST

The checklist includes the following aspects of the physical load:

- lifting and carrying
- pushing and pulling
- hand-arm tasks
- working postures
- working at a screen (visual display unit)
- vibrations (hand-arm vibrations and whole body vibrations)
- physical exhaustion
- inactivity

The checklist is made up of yes/no questions that do not require measurements of any kind. The results provide an overview of the risks associated with the task being assessed. If there are indications of a potential risk, the checklist will refer you to a tool that provides more details on the relevant topic. In this way, you can map out the underlying causes of any issues in order to find the most appropriate solutions.

For more information and to view the checklist, click here.

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WHERE SHOULD WE BEGIN?

Once all of the assessments have been carried out, you will need to make certain decisions. You cannot tackle everything at once. The issues affecting the most employees and/or entailing the biggest risks are the top priorities.

MAKING DECISIONS

How do you know what to tackle first? In order to decide what issues are the top priorities, you should look at the extent of the risk and the risk group, and at the severity of the risk. The first thing you will need to do is to examine the collected data thoroughly. What are the various risk groups that can be identified? How big are these groups? Are any of the groups subject to multiple risks? How big are the identified risks? The issues affecting the most employees and/or entailing the biggest risks are the top priorities.

Do not lose sight of the overall situation. You might be able to bundle solutions or the best choice might be to implement a solution at a higher level, for example by modifying working methods or the ways in which work is organized. This will probably have a bigger impact. If you need to escalate an issue within the organization, then explain the situation and your findings to the decision-makers. They will be able to support you with the next steps.

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STEP 3

WHAT CAN YOU DO ABOUT IT?

WHAT ARE THE AVAILABLE SOLUTIONS?
WHAT SOLUTIONS ARE APPROPRIATE?
HOW DO YOU DECIDE?

You have obtained an insight into the extent of and the causes of the physical workload. This step will provide you with an insight into the different types of solutions and explain to select the right measures.

WHAT ARE THE AVAILABLE SOLUTIONS?

The next step is to identify any existing solutions to the issues within the organization. The health and safety catalogue (Dutch guides with possible health and safety risk reduction measures) describes sector-specific solutions that have previously been formulated for a lot of issues.

Roughly speaking, there are three types of solutions:

- **technical solutions**, i.e. ergonomic improvements to work stations and work equipment or the introduction of aids (lifting aids, balancers, transport carts), so that less manual force is required or employees can maintain better working postures.
- **organizational solutions** such as improvements to work processes, task rotation, extra breaks, or reorganizing breaks
- **individual solutions** like providing information on risks and training employees on the proper use of existing aids.

You can consult a variety of sources to find existing solutions for your sector. There are also several general solutions for issues like:

- Working postures
- Length of time spent working and breaks
- Actions that require force
- Vibrations
- Employees
- Other factors

Different solutions can complement each other.

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WHAT SOLUTIONS ARE APPROPRIATE?

HOW DO YOU DECIDE?

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SOURCES THAT DESCRIBE EXISTING SOLUTIONS

- health and safety manuals containing solutions for your industry or sector
- the website of the trade organization for your industry or sector will often contain information on the health and safety manual or solutions to the health and safety risks within your industry or sector
- trade union websites; FNV, CNV, VCP
- the European Agency for Safety and Health at Work has listed good practices in Europe
- Inpreventie, a knowledge platform created by and for Dutch prevention officers
- Arboportaal ('Health and Safety Portal'), everything you need to know about working conditions, provided by the Ministry of Social Affairs and Employment.

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less manual force is required or employees can maintain better working postures.

- **organizational solutions** such as improvements to work processes, task rotation, extra breaks, or reorganizing breaks
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SOLUTIONS FOR WORKING POSTURES

- if manual work is carried out in a strained posture, have the work processed by machines instead;
- improve the design of work stations:
  - optimize the working height: make sure the working height is not too low. Employees should be able to work with their back and head as upright as possible. The working height should not be too high either. Employees should not have to lift their upper arms. If different employees work at the same work station, it should be easy to adjust the working height to the body height of individual employees;
  - materials and equipment should be arranged conveniently (within easy reach, in front of the body), so that employees do not need to reach too far forward, to the side, or backward with their arms (and bend or turn their back) and can remain in a neutral posture insofar as possible;
  - good lighting, without any reflections, mirroring, backlight or shadow effect, so that employees do not need to bend their head forward or turn their head to see what they are working on.
- providing training that focuses on employees' posture at work so that employees understand why it is important and learn how to maintain good posture;
- the prevention officer or occupational health officer could take a few photos or make a few videos of employees (using the employees' own smartphones to ensure privacy) and show them to the employees. It is often difficult to imagine or feel your own posture at work. Pictures are an easy way of 'holding up a mirror' to employees;
- using appliances to ensure the proper working height, such as lift tables (industry), high-low hospital beds (healthcare) and high-low tables (offices);
- using appliances to support the body when working on the ground, such as the brick-laying cart (road paving) and weeding carts (flower bulb sector);
- using ergonomically designed equipment to improve the position of the wrists;
- using kneepads when working in a kneeling position;
- if the work being performed involves standing for lengthy periods of time, check whether this work can also be done sitting or using a standing aid, even if it is only to alternate between sitting and standing;
- prevent breaks in concentration, especially if your work requires a lot of concentration (avoid disruptive sounds and images);
- reduce the precision requirements for the work, by adjusting the task, moving the work closer to your eyes, providing aids such as magnifying glasses, etc.

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You have obtained an insight into the extent of and the causes of the physical workload. This step will provide you with an insight into the different types of solutions and explain to select the right measures.

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SOLUTIONS FOR LENGTH OF TIME SPENT WORKING AND BREAKS

- rotate tasks or adjust the grouping of tasks so that strenuous tasks can be alternated with less strenuous tasks. If your work involves kneeling, squatting, sitting, and walking then alternate between these postures as much as possible. For example, alternate between operating a crane and working on the ground or, in the construction sector, between operational work and handyman work;
- create enough opportunities for employees to recover from strenuous work by introducing breaks; preferably, a break of at least 7.5 minutes – or alternative work – after a maximum of 1.5 hours of work, so that employees can get away from their workstations, which will relieve the static loading on their muscles;
- vary the work so that there is a variation in work tasks between work days;
- give employees the freedom to take breaks whenever they need to recover from the exertion of the work;
- make sure that break time really means a break and is not interrupted by work matters.

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- **organizational solutions** such as improvements to work processes, task rotation, extra breaks, or reorganizing breaks
- **individual solutions** like providing information on risks and training employees on the proper use of existing aids.

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SOLUTIONS FOR ACTIONS THAT REQUIRE FORCE

- automating processes that require physical exertion, e.g. assembly tasks;
- using powered tools instead of manual tools;
- checking whether the task can be redesigned or whether the objective of the task can be achieved in a different way that does not require any physical exertion or which requires less physical exertion;
- hanging heavy equipment on a balancer;
- using better, ergonomically designed equipment, reducing the amount of manual force required;
- providing training that focuses on working techniques so that employees do not use more force than is strictly required. Employees can learn why it is important to avoid strenuous movements and how they can do so. In addition to using the right working techniques, it also means requesting the right equipment and appliances on time and performing maintenance on them on time;
- proper maintenance of equipment, for example properly sharpening knives and scissors to avoid needing too much force to trim or cut;
- using aids to lift or move parts.

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- **individual solutions** like providing information on risks and training employees on the proper use of existing aids.

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work stations and work equipment or the introduction of aids (lifting aids, balancers, transport carts), so that less manual force is required or employees can maintain better working postures.
- **organizational solutions** such as improvements to work processes, task rotation, extra breaks, or reorganizing breaks
- **individual solutions** like providing information on risks and training employees on the proper use of existing aids.

Different solutions can complement each other.

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SOLUTIONS FOR VIBRATIONS

- look into other equipment that is free from or has minimal vibrations or equipment with anti-vibration grips;
- use effective anti-vibration gloves.

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SOLUTIONS AIMED AT EMPLOYEES

- provide employees with information and training on the risks of strained postures at work, actions that require force, and what they can and should do to minimize those risks. Provide, for example, information on good work postures ('neutral' work postures), adjusting working heights where possible, using aids, switching between tasks, and taking a sufficient number of breaks, etc.;
- make sure employees are clear about who they can consult if they have any health problems or any questions or problems related to work-related physical load.

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of aids (lifting aids, balancers, transport carts), so that less manual force is required or employees can maintain better working postures.
- **organizational solutions** such as improvements to work processes, task rotation, extra breaks, or reorganizing breaks
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- **individual solutions** like providing information on risks and training employees on the proper use of existing aids.

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SOLUTIONS FOR 'OTHER FACTORS'

- breaks: give employees the freedom to take breaks whenever they need to recover from physical load caused by strenuous work ;
- air conditioning: adjust the air conditioning so that employees can work comfortably; make sure to avoid cold or draughts;
- concentration: prevent breaks in concentration, especially if your work requires a lot of concentration; this mainly means avoiding disruptive sounds and images like colleagues walking past; of course, another solution is to try and reduce the concentration requirements for the task;
- contact: make sure to get a good grip so that you don't need to expend more energy than necessary;
- use gloves – thick gloves, if necessary – slippery or poorly designed handles can affect your grip;
- precision: reduce the precision requirements for the work, by adjusting the task, moving the work closer to your eyes, providing aids such as magnifying glasses, etc.;
- precision: instead of setting the pace at which precision work is performed, make sure employees are free to set their own pace (thereby increasing their autonomy);
- precision: provision of proper visual, audio or tactile feedback on the task being performed (for example a beep if something goes wrong);
- precision: avoid wearing gloves – especially thick gloves – when performing precision tasks because that will make it difficult to provide feedback.

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WHAT SOLUTIONS ARE APPROPRIATE?

Ideally, solutions will tackle problems at their source (see occupational hygiene strategy): solutions that reduce the demands of physical tasks. There are no standard solutions. The ideal approach always depends on the situation.

See what measures are most appropriate for your unique set of issues. The best way to do this is together with colleagues who face the issues in question. That way, you can draw on their experience and you create support for the measures to be taken. After all, these colleagues will be the ones working with the solutions. To this end, you can organize a 'participatory work session'. Ideally, you should not just involve those employees who perform heavy manual work but also other parties such as members of the working group, line managers, someone from the purchasing department, and the people who decide on the work processes. Depending on the type of work involved, it might also be a good idea to involve the suppliers of materials in this process.

DISCUSS THE FOLLOWING QUESTIONS WITH THE GROUP IN RELATION TO EACH ISSUE:

- how effective are the existing solutions?
- how feasible are the solutions from a practical point of view?
- are the costs associated with the solution high or low?
- are there any other associated benefits or disadvantages?

You might need to come up with new solutions. To that end, you could use the so-called world-café method. Define the parameters in advance:

- the maximum budget
- the policy to which the solutions should conform
- deadlines for decisions and implementation.

The result of this type of approach will be a solution that everyone can identify with. However, that does not always mean a ready-made solution! Sometimes it might be necessary to:

- design a new technical solution or have one designed
- introduce an organizational solution that will impact the work process
- arrange to provide appropriate training and/or information.

Click here for an overview of information on subsidies and support for companies.

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OCCUPATIONAL HYGIENE STRATEGY

The occupational hygiene strategy is as follows:

- **Measures at source** – The first thing employers must do is remove the problem. Example: eliminate the manual lifting of heavy loads by automating the task or by reorganizing one of the production processes in such a way that the task is no longer necessary.
- **Collective measures** – If measures cannot be taken at the source, the employer must implement collective measure to reduce the risks. Example: introduce transport carts so that loads no longer need to be carried manually across long distances.
- **Individual measures** – If collective measures fail to produce a satisfactory solution, the employer will need to take individual measures. Organize the work in such a way that employees are less at risk (e.g. introduce task rotation or adjust the job, reduce working hours, or increase breaks).

The measures at the various levels have an explicitly hierarchical sequence. That means that the employer must first investigate the options at higher levels of its organization before deciding to implement measures at lower levels. Levels can only be reduced if there are good reasons – i.e. technical, operational, and economic reasons – for doing so. This is referred to as the principle of reasonableness. These considerations must be made for each level of the organization every time a decision is made. Different measures from different levels of the organization can be combined in order to reduce risks.

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PARTICIPATORY WORK SESSION INVOLVING EMPLOYEES IN CHOOSING THE RIGHT SOLUTIONS

Participatory ergonomics is a method of using participation to develop ergonomic innovations. The main features of a participatory approach are as follows:

- the goal is to adjust the environment to accommodate people
- explicit consideration is given to who to involve and how to involve them
- a process-based approach is taken, for example by using a step-by-step plan.

So it is important to include all parties involved in the task for which an improvement is being sought. This usually involves employees and managers, and staff from facilities services, IT, or the purchase department. Involving various parties means they can immediately give their thoughts on the feasibility of solutions and on potential modifications that can be made. That way, there is a better chance of gaining support than if an external solution is implemented. This approach also allows for contact between users, designers, and developers.

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WORLD-CAFÉ METHOD

With the world café method, participants sit around a table in two or more groups of three to five people. On each table there is a large sheet of white paper which has one of the issues written in the middle of it. A number of rounds now take place, each lasting 20-30 minutes:

1. During the first round each group must come up with solutions to issues assigned to them and write their ideas down using a blue pen. All kinds of solutions are possible, i.e. technical, organizational and individual solutions. However, the groups should aim to find solutions that remove the problem (for example, if materials are arranged more effectively, people will not have to overreach to pick up the components of a product).
2. In round two, the groups switch to the next table and write critical comments about the proposed solutions using a red pen. For example, it does not work because the components are too big to allow all of them to be placed near employees.
3. In the third round the groups return to the tables at which they started in round I. After reading the criticisms of their proposed solutions, they will use a green pen to write down the preconditions that need to be met for their previous ideas to succeed. For each solution and each criticism, the groups will write down what is needed to make the solution a success and why the solution has a chance of succeeding. For example, a portion of the components could be placed within easy reach of employees. Once they are gone, they can be replenished. That way, the necessary components are within easy reach once again and employees do not need to overreach.

After the last round the various groups will gather to present the results of their tables to each other. A team member from each group will summarize the issue they tackled, the solutions they came up with, and what they believe is needed to make the solution a success. The other participants may give a brief response. Finally, all of the sheets of paper detailing the solutions and preconditions will be hung on the wall. For each issue, every employee must mark one or two solutions which they think have the most chance of succeeding. They can do so based on their gut feeling but it would be even better if they used the criteria below. Discuss the results of this exercise in prioritization and then finish up the session with an explanation of what will be done with the proposed solutions, by whom, and within what time frame (input for the work plan).

You could also have an external agency supervise you when using this method.

More information on the method.

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LINKS TO SUPPORT AND SUBSIDIES FOR COMPANIES

ONDERNEMERSPLEIN ('ENTREPRENEURS' SQUARE')

You can find the answers to all of your business questions in one place: Ondernemersplein.nl.
What standards do technical solutions need to comply with? For example, see:

- Standards
- CE-marking

KAMER VAN KOOPHANDEL (DUTCH CHAMBER OF COMMERCE)

The Kamer van Koophandel provides entrepreneurs with support in several areas, including innovation:
How can I finance my innovative idea?

NETHERLANDS ENTERPRISE AGENCY (RVO)

You can find a guide to subsidies on the RVO website

HIGHER LEVEL

A virtual meeting place where entrepreneurs and experts can help each other out.

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members of the working group, line managers, someone from the purchasing department, and the people who decide on the work processes. Depending on the type of work involved, it might also be a good idea to involve the suppliers of materials in this process.

necessary to:

- design a new technical solution or have one designed
- introduce an organizational solution that will impact the work process
- arrange to provide appropriate training and/or information.

Click here for an overview of information on subsidies and support for companies.

BACK TO THE SUMMARY OF THE STEPS

STEP 3

WHAT CAN YOU DO ABOUT IT?

WHAT ARE THE AVAILABLE SOLUTIONS?
WHAT SOLUTIONS ARE APPROPRIATE?
HOW DO YOU DECIDE?

You have obtained an insight into the extent of and the causes of the physical workload. This step will provide you with an insight into the different types of solutions and explain to select the right measures.

HOW TO MAKE YOUR DECISION

Often it is not possible or even desirable to implement all of the formulated solutions in one go. Therefore, it is advisable for you to distinguish between measures that you want to take immediately and more long-term measures. You can use various criteria to make your decision.

Do not lose sight of the overall situation. You might be able to bundle solutions or the best choice might be to implement a solution at a higher level, for example by modifying working methods or the ways in which work is organized. This will probably have a bigger impact.
If you need to escalate an issue within the organization, then explain the situation and your findings to the decision-makers. They will be able to support you with the next steps.

WHO CAN HELP?

You can list, select, and prioritize the proposed solutions with the help of the working group. Advisers from your sector organization or industrial association may be able to advise you on how to collect 'good examples' in the area of physical load. In the work plan you should record what measures and actions will be taken by whom and within what time frame.
Make sure there are enough financial resources available to implement the measures.

If this step does not produce any appropriate measures, or if you assign this step to an external party, you can enlist the services of a health and safety service or adviser.

BACK TO THE SUMMARY OF THE STEPS

STEP 3

WHAT CAN YOU DO ABOUT IT?

WHAT ARE THE AVAILABLE SOLUTIONS?
WHAT SOLUTIONS ARE APPROPRIATE?
HOW DO YOU DECIDE?

CLOSE TEXT BOX ✖

CRITERIA TO HELP YOU MAKE YOUR DECISION

You can identify the best solutions by answering the following questions:

- **Level of risk**: start off by implementing solutions to the priority issues from step 2.
- **Effectiveness**: With regard to the priority issues, what measures are the most effective at reducing the physical workload? The effect that you can expect depends on the type of measure: measures at source, like automation, introducing lifting aids, or redesigning production lines may eliminate the physical load entirely, while information often only has a small effect.
- **Costs/benefits**: what costs are associated with this solution (procurement costs, maintenance costs, training time, working time)? Ideally, the costs and benefits should be weighed up before deciding on a solution. Click here for more information on how to perform a cost-benefit analysis
- **Feasibility**: is the solution appropriate for the work process; does it take more time than the traditional working method or is it faster; do any preconditions need to be met for the solution to succeed and, if so, have they been met?
- **Conduct/culture**: Is the solution in line with the company's culture? Will employees encourage each other to use the solution or will they have difficulty doing so?
- **Unwanted side effects**: Does the solution create any new problems? What are the practical, financial, or health and safety-related consequences?
- **Opponents**: Are there any opponents to the solution? If so, what are their reasons? Can anything be done to remedy this?

Investigate which of the above reasons, and any other reasons, employees have for using or not using working aids. That way, you can avoid a situation in which employees do not avail themselves of the measures that you implement.

BACK TO THE SUMMARY OF THE STEPS

STEP 4

IMPLEMENTING SOLUTIONS

In this step you will implement changes in the organization. You will also evaluate and monitor the progress of these changes. In this regard, it is important to share success stories.

WHAT DO YOU PLAN TO DO?

Your plan of action should describe who will do what – and when. You are now going to implement this plan. Give proper consideration to the planning schedule, e.g. the transport of working aids. If your planning is not feasible, you will be unable to implement the plans you have made. You could start off by testing your selected measures as part of a pilot project. That way, you can implement your approach in stages. You can then incorporate any lessons you learn when implementing the approach throughout the company.

Make sure that everyone knows who is in charge of implementation and that he/she monitors its progress. It is important for everyone to know who is responsible for what. In this respect, you should also provide the management with information on a regular basis.

BACK TO THE SUMMARY OF THE STEPS

STEP 4

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WHAT DO YOU PLAN TO DO?

HOW DO YOU GET EVERYONE ON BOARD?

HOW DO YOU MAINTAIN THE CHANGES?

HOW DO YOU SHARE SUCCESS STORIES?

HOW DO YOU GET EVERYONE ON BOARD?

First of all, everyone should be aware of the measures being implemented. Check the following points:

- is everyone clear about the benefits of and the need for the measures? Make sure that you can easily explain why the measures are being taken, what the objective is, and why these particular measures were chosen.
- are employees clear about what is expected of them? Clarify the role of employees.
- are employees clear about who they can contact if they have any questions, ideas, or suggestions and do they know who is in charge?

Is there any resistance among employees? Resistance is part of change. Click here for tips on dealing with resistance.

Sometimes employees need training on how best to use the new working method or working aid.

An effective approach to training will:

- convey information on the nature of and the need for the new behaviour;
- demonstrate the uses of the new behaviour (model learning);
- practice skills and feedback (role play, etc.)
- follow-up supervision of how the new behaviour is used in practice ('coaching'). This follow-up is particularly important when it comes to implementing what has been learnt in practice.

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DEALING WITH RESISTANCE

Is there any resistance among employees? Resistance is part of change. In particular, if people have been doing work in a certain way for a very long time, they will need time to start doing it in a different way ('we've always done things this way, so why should we change it now?'). Engage employees in conversation, try to listen to their resistance and ask questions. Make sure to get a clear picture of what the employees consider to be disadvantages and explain to them the advantages of the new procedures. Also explain the pros and cons of failing to intervene (incidentally, this does not need to be the same for everyone) To this end, use the criteria from step 3. The culture within an organization also plays a role in this ('it's uncool to use a working aid'). Employees whom others in the group look up to could help change things.

If employees enjoy learning a 'new behaviour,' that will help them to master it and at a certain point, it will become automatic for them. So, it is important to highlight successful experiences with the new behaviour. Employees will more readily accept measures that require changes in behaviour if they have had positive experiences with the measures. So it is important to aim for a number of 'quick wins'. The sooner you can report on an initial success, the better.

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HOW DO YOU MAINTAIN THE CHANGES?

After the implementation stage, measures also need to be maintained. Employees' experiences using the new method will strengthen their self-confidence. One way of encouraging users to keep using the new working aids or methods is for participants from the working group to give feedback on their experiences.

New measures or methods are at risk of failure if trained staff leave the organization or if your budget runs out. So it is important to incorporate the new working method into the organization's policy as well as topics like maintenance, in terms of both finance and the training and supervision of new staff with regard to using the working method. Experienced users within the organization can be appointed as internal supervisors for new users who need to be trained up (the 'master-apprentice' model).

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IMPLEMENTING SOLUTIONS

WHAT DO YOU PLAN TO DO?
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HOW DO YOU SHARE SUCCESS STORIES?

People mainly learn from positive experiences. Therefore, it is important to communicate regularly about the progress of the approach and, in particular, the results that have been achieved. To that end, the results also need to be determined on a regular basis.

Ask yourself the following questions:

- do I have a good overview of the progress and the initial results?
- are employees well-informed about the progress and the initial results?
- are the results in line with the expectations?
- have I spoken to people to hear about the small successes and improvements they have noticed since the measures or solutions were implemented?
- have successes been celebrated?

HIGHLIGHTING SUCCESS STORIES

To highlight success stories, consider publishing them in a newsletter, on a website or message board, or discussing them at a team meeting.

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STEP 5

EVALUATING YOUR APPROACH

HOW DO I EVALUATE MY ORGANIZATION'S APPROACH?

HOW DO I SAFEGUARD MY ORGANIZATION'S APPROACH?

You have invested a lot of energy in implementing the measures or solutions but has this had the desired effect? In the evaluation you should answer questions like:

HOW DO I EVALUATE MY ORGANIZATION'S APPROACH?

- are employees availing themselves of the options provided by the measure?
- have previously formulated objectives, like reducing musculoskeletal symptoms or absenteeism, been achieved?
- did the implementation process run smoothly or are further adjustments needed?
- how can the use and effectiveness of the measures be improved, if necessary?

For a proper evaluation of the organization's approach, it is important to state what you wish to evaluate, how you want to do that, who will do it, and when. Regular evaluations will reveal how successful and effective the measures have been and provide information on what is needed to adjust the organization's approach. It is important to monitor the progress of the organization's approach on a continuous basis. Slightly more formal evaluations can also be carried out in order to determine what the project has accomplished to date.

You can use an evaluation to examine the status of any issues or objectives that you have previously identified. In addition, evaluations can provide information about the level of satisfaction with measures and clarify the underlying reasons for the success or failure of the critical success factors. For example, a measure could have the potential to be effective but might be unsuitable for the organization. Or the measure might not have been properly implemented. Evaluations provide information on the effectiveness of a measure (was the physical load reduced?) and on its implementation (is the solution been used properly and satisfactorily and did the measure reach everyone within the organization?).

If you have already completed a risk assessment or a questionnaire (in step 1), you can do the same for the evaluation. You can also evaluate the organization's approach by setting up interviews or focus groups with your employees.

MORE ABOUT EVALUATIONS

- Cost-benefit analysis
- Short-term and long-term evaluations

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CLOSE TEXT BOX ✖

RISK ASSESSMENT OR QUESTIONNAIRE

The benefit of using a risk assessment or questionnaire is that you get a very clear picture of the areas in which changes have taken place and the extent of those changes. Make sure you do not overload employees. You do not want them to become fed up of filling in questionnaires. You could make physical load part of periodic research that you conduct among employees. That way, you can observe the physical load trend in the organization over a period of time. If you are more interested in discovering why a measure worked or failed to work, you are better off using interviews or focus groups.

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INTERVIEWS AND FOCUS GROUPS

In interviews or group discussions, you can discuss both the effects of changes and the process involved in changes. For example, you can discuss the extent to which employees still experience a physical load, whether previously identified issues are still present, whether any changes have arisen, and how successful employees consider the measures that were implemented to be. Discuss why certain measures worked or failed to work. Were there any obstacles to implementing the measures? Discuss whether any further changes are needed. If necessary, you can use the answers to these questions to adjust the organization's approach. It might also be informative to ask members of the working group and those who implemented the action plan about their experiences of the process, i.e. what they found to be helpful and where they encountered difficulties, etc. Interviews and focus groups will usually provide you with information about the process. In addition, you can use a risk assessment or questionnaire to quantify the changes.

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HOW DO I SAFEGUARD MY ORGANIZATION'S APPROACH?

You have invested a lot of energy in implementing the measures or solutions but has this had the desired effect? In the evaluation you should answer questions like:

HOW DO I EVALUATE MY ORGANIZATION'S APPROACH?

- are employees availing themselves of the options

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COST-BENEFIT ANALYSIS

While a cost-benefit analysis can be carried out before a measure is implemented, it can also be beneficial to repeat the same analysis once the measures have actually been implemented. By that stage, it will be possible to analyse the actual costs that were incurred, as well as any benefits.

For a proper evaluation of the organization's approach, it is important to state what you wish to evaluate, how you want to do that, who will do it, and when. Regular evaluations will reveal how successful and effective the measures have been and provide information on what is needed to adjust the organization's approach. It is important to monitor the progress of the organization's approach on a continuous basis. Slightly more formal evaluations can also be carried out in order to determine what the project has accomplished to date.

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MORE ABOUT EVALUATIONS

- Cost-benefit analysis
- Short-term and long-term evaluations

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HOW DO I SAFEGUA
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APPROACH?

You have invested a lot of energy in implementing the measures or solutions but has this had the desired effect? In the evaluation you should answer questions like:

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SHORT-TERM AND LONG-TERM EVALUATIONS

It is important to think about when is the best time to perform an evaluation. The benefit of performing an evaluation after a brief period of time, e.g. 3 months, is that the measures will still be fresh in employees' minds and so they can probably give a good account of what went well – and what didn't. This information is valuable in terms of steering the approach in the right direction. Furthermore, it provides a learning opportunity in respect of subsequent change processes. To investigate the success of the approach the organization has taken to address the physical workload, you are better off waiting a bit longer and using a questionnaire. If you evaluate the approach after a longer period of time, e.g. one or two years, that will help you to determine whether the set goals have been achieved and whether the physical load has actually been reduced.

The plan can also specify how the evaluation should be carried out. After the evaluation, the management and shop floor employees like the prevention officer can be put in charge of any follow-up procedures related to the measures that have been taken. At this stage the working group can be disbanded, as the new working methods will simply be part of routine work.

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HOW DO I SAFEGUARD MY ORGANIZATION'S APPROACH?

In order to tackle the physical load properly, it is important to assess where it stands in the day-to-day activities of the organization. The exact nature of that assessment depends on the activities in the organization. For example, the physical load could be a fixed topic at performance reviews, departmental meetings, or team meetings. It is also important to link up the physical load with other health and safety risks in the organization.

You can also make agreements with the company doctor to make the physical load and health complaints and any resulting absenteeism a topic to be discussed by the Social Medical Team (interdisciplinary consultations on absenteeism). In addition, it is important to evaluate the physical work-load in the organization on a regular basis (see step 2). For example, the topic of physical load can be recorded in periodic employee satisfaction surveys. It is important to determine what needs to be done if the physical work-load starts to increase once again. In that case you can restart the cycle at step 2. If you do this regularly, then it will take less and less time to resolve the issues that are causing the physical load.

To safeguard the approach to the physical load at the organization, it is important for the physical load to remain a topic of discussion. This applies to conversations between managers and employees and to conversations that employees hold among themselves.

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EVALUATING YOUR APPROACH

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IS THE PHYSICAL WORKLOAD A PERTINENT TOPIC?

Ask yourself the following questions:

- is it possible to hold a discussion about the physical load at the organization?
- is the physical load addressed at performance reviews or team meetings?
- do I know what sources of information I can use to determine whether the physical load is a problem in my organization?
- after using the Physical Load Guide , have I gained enough knowledge to ensure a continuous approach to the physical load?

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BACK TO THE SUMMARY OF THE STEPS

COST-BENEFIT ANALYSIS

OBJECTIVE OF THE ANALYSIS
SELECTING THE RELEVANT COSTS AND BENEFITS
IDENTIFYING/ ESTIMATING COSTS AND BENEFITS
INTERPRETING AND MAKING A DECISION

The purpose of an intervention is to reduce the physical load but are interventions beneficial? How much does an intervention cost and what are the benefits? Can an intervention result in any other non-financial benefits? One way of answering these questions is to perform a cost-benefit analysis. The challenge is to identify significant benefits or cost-savings. A lot of the solutions and interventions designed to reduce the physical load have such benefits.

WHAT IS A COST-BENEFIT ANALYSIS?

A cost-benefit analysis is a method you can use to obtain a structured overview of costs and benefits. Carrying out a cost-benefit analysis can help you decide on the most appropriate solution from a commercial perspective.

WHEN SHOULD I CARRY OUT A COST-BENEFIT ANALYSIS?

Most cost-benefit analyses are performed before implementing a solution. That way, the results are factored into the decision on a particular solution/ intervention or the way in which a variety of solutions/ interventions are prioritized. A cost-benefit analysis can also be used as a way of evaluating a solution that has been implemented.

HOW TO I CARRY OUT A COST-BENEFIT ANALYSIS?

A cost-benefit analysis of a solution/intervention aimed at tackling the physical load usually compares the current situation with an improved situation in the future. The exact arrangement and scope of the cost-benefit analysis depends very much on the situation. It is important to perform the analysis together with the relevant people from the company to ensure agreement about the costs and benefits and the estimates that have been made (see participatory approach).

Use the adjacent blue arrows to access a step-by-step plan on how to perform a cost-benefit analysis at the organization.

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COST-BENEFIT ANALYSIS

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solutions

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PARTICIPATORY WORK SESSIONS

Participatory ergonomics is a method of using participation to develop ergonomic innovations.
The main features of a participatory approach are as follows:

- the goal is to adjust the environment to accommodate people
- explicit consideration is given to who to involve and how to involve them
- a process-based approach is taken, for example by using a step-by-step plan.

So it is important to include all parties involved in the task for which an improvement is being sought. This usually involves employees and managers, and staff from facilities services, IT, or the purchase department. Involving various parties means they can immediately give their thoughts on the feasibility of solutions and on potential modifications that can be made. That way, there is a better chance of gaining support than if an external solution is implemented. This approach also allows for contact between users, designers, and developers.

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Use the adjacent blue arrows to access a step-by-step plan on how to perform a cost-benefit analysis at the organization.

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COST-BENEFIT ANALYSIS

STEP 1: OBJECTIVE OF THE ANALYSIS

Identify the reasons why you are performing the cost-benefit analysis.
Is it to compare different solutions or to convince the management or employees? Depending on the purpose and scope of the investment, decide whether you will carry out a rough analysis or a detailed analysis.

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COST-BENEFIT ANALYSIS

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SELECTING THE RELEVANT COSTS AND BENEFITS
IDENTIFYING/ ESTIMATING COSTS AND BENEFITS
INTERPRETING AND MAKING A DECISION

STEP 2: SELECTING THE RELEVANT COSTS AND BENEFITS

The next step is to select the relevant aspects.
The aspects that you need to analyse will be different for each intervention. In general, interventions related to the physical load are subject to the same aspects as other investments.

A lot of costs and benefits can be accurately expressed in monetary terms:

Costs:
- One-off investments
- Recurring investments and operating costs

Benefits:
- Productivity
- Avoiding costs related to:
  - Health
  - Safety
  - Liability
  - Quality of work

Other costs are more difficult to express in monetary terms. However, they could be very important when it comes to deciding on an intervention to reduce the physical load.

Benefits which are not immediate financial benefits:
- Employment levels
- Quality of life
- Company's image

Checklist of costs and benefits

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COST-BENEFIT ANALYSIS

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IDENTIFYING/ ESTIMATING COSTS AND BENEFITS
INTERPRETING AND MAKING A DECISION

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l benefits:

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COSTS:

One-off investments
It costs money to buy a product or go on a course. These costs also include any working hours which the management and employees spend planning, preparing, and implementing the project.

Recurring investments/operating costs
These are the costs associated with normal business operations such as energy and maintenance costs, as well as the depreciation and interest costs of investments.

Click here for a detailed overview of potential costs and benefits.

- Health
- Safety
- Liability
- Quality of work

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OBJECTIVE OF THE ANALYSIS
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BENEFITS:

Productivity

An increase in productivity is very beneficial. This is because the work will be carried out faster or fewer people will be required to carry it out. However, a reduction in the physical load may also be followed by a decrease in productivity, for example due to a working aid that takes more time to use. Bear in mind that factors like good management, employee participation, improved work content, employee motivation, and the atmosphere at work all have a major impact on productivity. Make sure that this is also factored into the intervention and any calculations that are made.

Cost avoidance

Certain other costs can be avoided as a result of the intervention. Any costs avoided as a result of reducing the physical load can be classified as benefits

- The human cost: less resilient employees will result in lower productivity levels and increased absenteeism, medical costs, and costs associated with replacement workers.
- Organizational costs: resolving incidents, rescheduling work, etc.
- Additional costs: avoiding the costs associated with disruptions/defects/damage and any associated repairs.

Click here for a detailed overview of potential costs and benefits.

COST-BENEFIT ANALYSIS

OBJECTIVE OF THE ANALYSIS
SELECTING THE RELEVANT COSTS AND BENEFITS
IDENTIFYING/ ESTIMATING COSTS AND BENEFITS
INTERPRETING AND MAKING A DECISION

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BENEFITS WHICH ARE NOT IMMEDIATE FINANCIAL BENEFITS:

Other costs are more difficult to express in monetary terms. However, they could be very important when it comes to deciding on an intervention to reduce the physical load.

Employment levels

These are the costs and benefits associated with who is capable of performing work. For example, an intervention could mean that more people are able to perform work or that employees can return to work sooner than expected. Lower employee turnover levels.

Quality of life

Quality of life is about long-term effects such as being able to continue working for longer or more opportunities for self-development. It also means being less tired at the end of the day and having enough energy left over for exercise or hobbies.

Image

Interventions can also affect your company's image with regard to employees and clients. They send the message that you take the physical load on your employees seriously. More satisfied clients (more reliable services), improved hiring, aligning with clients' values.

Click here for a detailed overview of potential costs and benefits.

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CLOSE TEXT BOX

REDUCED ABSENTEEISM

The effect of reduced absenteeism as a result of a reduction in the physical load can be estimated on the basis of the following data: 15.4% of the total number of absence days last year is attributable to work-related health complaints involving the musculoskeletal system (NEA, 2013). Regardless of the extent of the reduction in absenteeism as a result of the intervention, this specific portion of absenteeism will always be subject to an estimate and may vary per sector and the type of work. Be conservative when estimating the reduction achieved by an intervention/working aid. For example, reduce your estimate by 20%.

The effect on absenteeism of reducing the physical load:

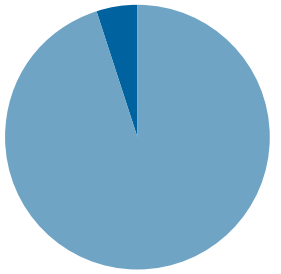
For example, the rate of absenteeism* is:	5%
Rate of work-related absenteeism caused by musculoskeletal disorders (MSD):	15.4% (NEA 2013)
Therefore: absenteeism caused by work-related MSD *problems:*	0.8% (15,4% van 5%)
A reduction accomplished by the use of working aids:	– 20%
Effect of the measures on absenteeism:	– 0.16% (- 20% van 0.8%)

** The rate of absenteeism due to illness is the total number of sick days taken by employees, expressed as a percentage of the total number of work days available to employees during the reporting period.*

The percentage of the effect on absenteeism can be expressed in euros using the total salary of the employees in question.
Example: 4 employees at € 60,000 x – 0.20% = € – 370

PRODUCTIVITY

Increasing productivity can have a much bigger financial impact than reducing the cost of absenteeism. If we assume an absenteeism rate of 5%, then the financial effect of increasing productivity is 19 times more effective (a ratio of 5 to 95); in other words, reducing absenteeism by 0.20% has the same financial benefit as increasing productivity by a much smaller rate of 0.01%.
Although it always pays off to reduce absenteeism, it is also a good idea to critically examine where productivity can be increased.



BACK TO THE SUMMARY OF THE STEPS

COST-BENEFIT ANALYSIS

OBJECTIVE OF THE ANALYSIS
SELECTING THE RELEVANT COSTS AND BENEFITS
IDENTIFYING/ ESTIMATING COSTS AND BENEFITS
INTERPRETING AND MAKING A DECISION

STEP 3: IDENTIFYING AND ESTIMATING COSTS AND BENEFITS

In most cases the costs and benefits of the current situation are already known or easily determined. It is often more difficult to do the same for the improved situation. Therefore, a portion of the costs and benefits will be based on estimates. Try to express costs and benefits as monetary amounts wherever possible. That includes the time which the management and employees spend on the intervention process!

When collecting data on costs and benefits, make sure to indicate whether an amount is an annual amount or a one-off amount. Ultimately, you should calculate the annual amount for all costs and benefits that can be expressed in euros. Therefore, in the case of investments, it is important to calculate the annual depreciation and, if applicable, the average interest expenses per annum.

The results of a cost-benefit analysis can be illustrated in a cost-effectiveness analysis (cash flow effect in euros per annum [+ or -]) and/or in the payback period (PP). What constitutes an acceptable PP varies per company and intervention. An intervention to reduce the physical load which has a payback period of one year will usually be implemented straight away. Most companies consider payback periods of up to three years to be reasonable.

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COST-BENEFIT ANALYSIS

STEP 3: IDENTIFYING AND ESTIMATING COSTS AND BENEFITS

OBJECTIVE OF THE ANALYSIS

SELECTING THE RELEVANT COSTS AND BENEFITS

IDENTIFYING/ ESTIMATING COSTS AND BENEFITS

INTERPRETING AND MAKING A DECISION

CLOSE TEXT BOX ✖

DEPRECIATION AND INTEREST ON INVESTMENTS

If you want to depreciate an investment over several years, e.g. three to five years, you must divide the net investment, i.e. the investment amount - residual value after depreciation, by the number of years over which you are going to depreciate it.

$$\textit{Depreciation per annum} = \frac{\textit{investment amount - residual value after depreciation}}{\textit{depreciation period}}$$

You can also choose to include the interest on the investment. The interest rate could be the interest you pay your bank or the expected return that the asset would otherwise yield.

$$\textit{Average interest expenses per annum} = \frac{\textit{interest rate}}{100} \times \frac{\textit{(investment amount - residual value after depreciation)}}{2} \times \frac{\textit{depreciation period + 1}}{\textit{depreciation period}}$$

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COST-BENEFIT ANALYSIS

STEP 3: IDENTIFYING AND ESTIMATING COSTS AND BENEFITS

CLOSE TEXT BOX ✖

CALCULATING COST-EFFECTIVENESS AND PAYBACK PERIOD

Cost-effectiveness: this is when you add up all costs and benefits. Costs are indicated by a plus sign (+) and benefits are indicated by a minus sign (-). If no costs are incurred in the future situation, this can also be viewed as a benefit and represented by a minus sign. The result is the cash flow effect per annum.

Payback period: the advantage of the PP method is its simplicity. One of its drawbacks is that it does not factor in when the money is received or money that is earned after the PP.

$$\textit{Payback period (PP)} = \frac{\text{all of the costs that facilitate an intervention (in euros)}}{\text{annual benefits (cash flow) as a result of an intervention (in euros per annum)}}$$

The Present Value (PV) method is a somewhat more complicated method that takes these factors into account. This method calculates the current value of an amount that you will only be able to use after a certain period of time by earning interest on your cash flow.
nl.wikipedia.org/wiki/Contante_waarde

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STEP 4: INTERPRETING AND MAKING A DECISION

In general, cost-benefit analyses for interventions with a payback period of less than a year are implemented straight away. A lot of interventions are also implemented with a payback period of up to three years. However, companies may choose to implement interventions that would not appear to be profitable within three years. The non-financial benefits might be so in line with the core values of the company or its clients that implementing the intervention will strengthen its position in the market. The process of performing the analysis with the relevant people is half the battle when it comes to convincing people to support the decision.

QUANTITATIVE BENEFITS VERSUS QUALITATIVE BENEFITS

By performing a cost-benefit analysis, you can make an informed decision about the most appropriate solution. In this regard, the quantitative benefits do not always need to be the deciding factor. In short, performing a cost-benefit analysis entails assumptions and uncertainties. However, such analyses provide insight into all potential costs and benefits in a structured way. A structured method reduces the chance of bias and also allows all of the parties involved to give their opinions. Furthermore, the value of a cost-benefit analysis does not just lie in the final results but also in the arguments used and the overall process of identifying and weighing up potential costs and benefits. Sometimes a shared belief in the arguments that are made is more important than proven causality. Since there are no standardized methods, the results will always depend on the people who perform the analyses and on the assumptions that were made. That does not have to be a problem if it is clear how an analysis was carried out, including the expertise that was used, and the assumptions that were made.

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COST-BENEFIT ANALYSIS

CHECKLIST **COSTS AND BENEFITS**

ASPECT	VARIABLES TO BE CONSIDERED	EXPLANATION OF THE ASSIGNED VALUE	COMMENTS
1) INVESTMENT (€)			
a) consultancy fees	specific consultancy fees for this solution	external consultants: actual costs; in the case of internal consultants: costs charged or time spent x gross salary costs	
b) preparation: selection, decision and ordering	extra time/costs associated with activities carried out for a 'traditional' product	do not value, unless the time would otherwise be monetized in a useful way; then time invested as a fraction of gross salary or, occasionally, as a fraction of turnover.	
c) procurement costs	additional/reduced costs compared with a 'traditional' product	actual amounts	
d) installation, placement	additional/reduced costs; if necessary, making a building suitable for use	actual amounts	
e) cost of learning how to operate a product/work station	additional cost of items like courses, training programmes, training hours, or initial losses associated with temporarily reduced productivity	time invested x gross salary costs + any direct expenditure	
f) investments that do not need to be made	example: adjusting an entrance renders a disabled lift unnecessary; no replacement of obsolete material	actual amount of savings or costs that would have incurred in the absence of an intervention.	
g) divestments	e.g. sale of current machinery, furniture	actual amounts or estimated value.	
h) investment subsidies and such like	e.g. wage subsidies	actual amounts received less any acquisition costs.	

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COST-BENEFIT ANALYSIS

CHECKLIST **KOSTEN EN BATEN**

ASPECT	VARIABLES TO BE CONSIDERED	EXPLANATION OF THE ASSIGNED VALUE	COMMENTS
2) OPERATING COSTS (€)			
a) maintenance costs	additional costs associated with cleaning/preventive maintenance/ repairs/inspections	actual costs; for organization's own staff: time invested x gross wage costs or hourly rate	
b) space required (m^2)	additional m^2 required to implement the measure	m^2 at normal rate charged	
c) energy costs	additional or lower energy costs	actual costs, provided they are substantial	
d) depreciation	a lot of investments are depreciated over a period of more than one year	investment divided by number of years of depreciation	
e) interest charged on the investment	interest is often charged on investments which are depreciated.	if they are recorded: actual interest charges; calculation module for	
f) personnel costs	e.g. more expensive/cheaper staff needed, more or less hours than in the past	difference in gross wage costs, in time spent on tasks	
g) periodic training courses	repeat training courses; training new staff in connection with the intervention		
3) EMPLOYMENT (€/☺)			
a) special groups can be employed	e.g. work is also suitable for less strong people; older people can manage this work for longer	describe in qualitative terms, not in monetary terms	
4) HEALTH (€/☺)			
a) health problems	fewer/more health problems	kwalitatief beschrijven, niet in geld	
b) presenteeism	often difficult to quantify		
c) absenteeism	estimate the effect on absenteeism as a percentage	investigate the effect: hiring agency staff, flex workers, achieving more/ less added value and quantify this	

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CHECKLIST **KOSTEN EN BATEN**

ASPECT	VARIABLES TO BE CONSIDERED	EXPLANATION OF THE ASSIGNED VALUE	COMMENTS
d) work disability	level or in a single organization	majority of costs for employer usually based in absenteeism.	
e) medical consumption	specify the indicative (qualitative) effect; does not affect the organization but does affect society or individuals (health insurance deductible)	do not calculate, almost impossible to estimate	
f) insurance premiums against absenteeism and such like	higher/lower insurance premiums; if they are passed on to the risk bearer, do not include the full saving	calculate/estimate actual amounts	
g) return-to-work	lower costs associated with reintegrating employees who have been absent	reduction x average reintegration costs	
5) SAFETY (€/☺)			
a) safe behaviours	alleen kwalitatief benoemen	not the direct financial aspects	
b) accidents and near accidents	bereddingskosten	quantify the actual costs or the effect: number of reductions x average accident costs	
c) recovery time	verloren werktijd direct na ongeval	hours x gross wage costs	
d) material damage	kosten van herstel + verloren output	actual costs	
e) juridische kosten	In the context of incidents	actual cost of external lawyers; the actual cost of any internal lawyers will be pro-rated for time invested	
f) externe dienstverlening	experts	actual costs	
g) noodprocedures	precautionary measures and follow-up measures	hours x gross salary	

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CHECKLIST **KOSTEN EN BATEN**

ASPECT	VARIABLES TO BE CONSIDERED	EXPLANATION OF THE ASSIGNED VALUE	COMMENTS
6) PERFORMANCE LEVELS (€/☺)			
a) productivity	estimate the increase/decrease in productivity as a percentage; factor in business profile: low-cost provider versus quality provider	basis: added value, or any wage costs	
b) turnaround time	state the effect of this, e.g. better/ worse reliability of services	probably not expressed in monetary terms but try to quantify it, e.g. x% improvement	
c) quality of services	describe positive/negative effects as accurately as possible	probably not expressed in monetary terms but try to quantify it, e.g. x% improvement	
d) quality of products	describe effects as accurately as possible	probably not expressed in monetary terms but try to quantify it, e.g. x% improvement	
e) flexibility	describe positive effects as accurately as possible	probably not expressed in monetary terms but try to quantify it, e.g. x% improvement	
f) staff turnover	estimate the effect on staff turnover	difference (figure) x average cost of staff turnover (recruitment, selection, training) + loss of knowledge/skills	
g) recruitment power on the labour market	state the effect	describe; cannot be expressed in monetary terms	
h) other aspects	lots of other aspects might play a role, e.g. creativity, ability to concentrate, quality of collaboration	examine on a case-by-case basis. Preferable to convert to measurable effects (turnover, added value, etc.)	

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CHECKLIST **KOSTEN EN BATEN**

ASPECT	VARIABLES TO BE CONSIDERED	EXPLANATION OF THE ASSIGNED VALUE	COMMENTS
7) QUALITY OF LIFE (☺)			
a) **a) more healthy life years**	cannot be expressed in monetary terms; give an indication	qualitative	
b) **b) opportunity for self-development**	cannot be expressed in monetary terms; give an indication	qualitative	
8) LIABILITY (€)			
a) **cost of legal advice**	attorneys or other advisers	actual adviser's costs; employee's own working hours x gross wage costs	
b) **trial costs**	court fees and such like	actual amounts	
c) **fine**	sample fines	calculate or estimate the amount of these fines	
d) **recovered damages**	damages recovered from the perpetrator/liable party	indicate the expected amount of the claim/case x incidence	
9) STANDARDS AND VALUES (☺)			
a) **'We take people seriously'**	image	only provide a qualitative indication	
b) **health, safety, and comfort are top priorities**	image	only provide a qualitative indication	

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ACCOUNTABILITY

TNO innovation for life

DEVELOPING THE PHYSICAL LOAD GUIDE

TNO has developed the Physical Load Guide in collaboration with the Ministry of Social Affairs and Employment and a number of social partners.

SHARE YOUR EXPERIENCES WITH THE PHYSICAL LOAD GUIDE

Would you like to share your experiences? Or do you have any questions or comments? If so, please let us know by sending an e-mail to fysiekebelastingbeoordelen@tno.nl.

DO YOU NEED HELP WITH ONE OF THE STEPS IN THE PHYSICAL LOAD GUIDE?

Are you unclear about one of the steps? Your sector or trade organization will often have good tips on dealing with the physical load. If you need more help, please contact TNO by sending an e-mail to fysiekebelastingbeoordelen@tno.nl.