

# foreword

## **Work involving varied tasks: an ergonomic analysis process for WMSD prevention**

Prevention of musculoskeletal disorders (WMSDs) associated with work involving varied or long-cycle tasks poses a major challenge for ergonomists and for the Health and Safety network practitioners. Analyzing this type of work is relatively complex, due in part to the greater number of tasks performed by the same operator and to their organization, which varies according to production needs. Aware of the difficulties encountered by practitioners and faced with a lack of analytical methods adapted to their needs, we decided while conducting our research to develop and validate an ergonomic analysis process for work involving varied tasks. Our research involved two companies in the metal products manufacturing sector.

This guide is based on the expertise acquired in our research, and continues the work undertaken in two previous guides produced in collaboration with ASP Métal Électrique. The first guide, “Work-Related Musculoskeletal Disorders (WMSDs) – a better understanding for more effective prevention” deals with musculoskeletal disorders, their characteristics, their causes and the means of preventing them. The second guide, “ERGO groups – a tool for WMSD prevention”, intended for industries faced with the problem of work-related musculoskeletal disorders (WMSDs), presents a participatory ergonomic approach designed to prevent musculoskeletal disorders and improve working conditions.

This third guide offers ergonomists an ergonomic analysis process in which the field of application focuses on work activities characterized by long cycles or varied tasks. To some extent, it completes the previous process -- described in the second guide -- that applies to repetitive work involving short cycles.



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# presentation

## The process

Each stage of the process is described in one of the sections of Chapter 2. At the beginning of each of these sections, there is a synoptic table of the stage, including the goals pursued, the action plan and the know-how.

The explanations regarding the process are organized according to the goals pursued in each stage. The attainment of these goals depends on implementation of the proposed action plan. However, to materialize the action plan and assist in its implementation, we provide ergonomists with know-how arising from our experience in companies. They can adapt this know-how to the context of their own interventions to obtain the expected results.

The know-how is presented in boxes, beginning with the tools specific to the process, which were validated during the research projects. In the body of the text, these tools also serve as illustrations of how they can be used. Their complete versions are found in the “Tools” section at the end of the document. The know-how is also presented in less formal guises, such as lists of criteria to assist in decision-making, quick references, questions and examples derived from our practice.

# introduction

## Work involving varied tasks: an ergonomic analysis process for WMSD prevention

Musculoskeletal disorders (MSDs), mainly those of the upper limbs, have long been associated with short-cycle tasks repeated over a long shift period. They were therefore called repetitive strain injuries (RSI). However, musculoskeletal disorders related to the various body regions have also been found in other types of work, involving varied tasks or longer cycles.

### Long-cycle tasks and work involving varied tasks

Long-cycle tasks are characterized by the presence of a work cycle, meaning that there is a beginning and an end to the sequence of operations and that all of these operations repeat over time. However, in the case of long cycles, the operations are not always the same and do not always occur in the same order. The work cycle may extend over several hours or several days. This type of work is carried out by industrial process and machine operators.

Work involving varied tasks is distinguished by a wide variety of tasks that are part of the operator's expertise and know-how. For example, it is encountered in trades (electricians, mechanics) and machinery maintenance workers. This type of work involves a set of tasks that each of which underlies a large number of operations that are not always organized in a specific work cycle. These tasks can be performed at locations that vary considerably from one another. For example, a mechanic is required to perform different tasks, such as maintaining and repairing equipment throughout the plant.

### Purpose of this guide

This guide presents an ergonomic analysis process for preventing WMSDs and safety problems associated with varied or long-cycle tasks. It is not designed to analyze the activities of workers involved in several jobs in rotation.

### Who will use this guide?

The guide is intended for ergonomists responsible for work analysis. It can also be used by business and healthcare network stakeholders and by decision-makers who will be involved in an intervention.

### Contents of the guide

Chapter 1 explains the context in which the process applies and how to adapt it to different modes of intervention.

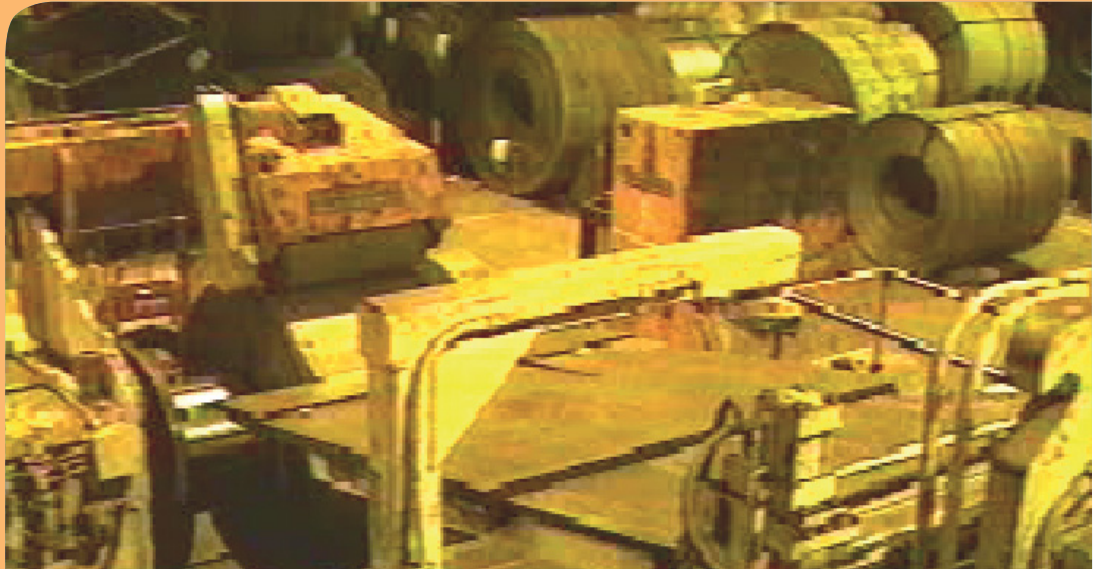
Chapter 2 describes each stage of the process in detail.

Chapter 3 guides the practitioner in assessing the intervention



# chapter 1

## Context for using the process



The purpose of the process set out in this guide is to facilitate ergonomic analysis of work involving varied or long-cycle tasks involving WMSD risk factors. We should specify from the start that ergonomic analysis involves a complete intervention. This means that it begins with documentation of the problems (interviews, observation, identification of the problems). It ends when the work has been transformed (seeking and implementing solutions) and when there has been follow-up on the changes introduced at the workstation.

Thus, this process bears a certain similarity to the process dedicated to ergonomic analysis of short-cycle tasks, which we published in a previous guide: “ERGO groups – a tool for WMSD prevention”. The basic stages of both processes are similar. However, the basic concepts and the tools used in the previous process have been revised and adapted to work involving varied or long-cycle tasks.

When should this process be used?

This process should be used in a work environment involving varied or long-cycle tasks associated with musculoskeletal disorders. The process will be used successfully only if there is a will to solve the problem and if the company is willing to invest the required energy and resources.

## Does the company have an WMSD problem?

It is important to position musculoskeletal disorders (WMSDs) in time and map them throughout the production process. Are the work-related WMSD problems observed at multiple workstations or does the problem affect only a specific workstation? Similarly, are the problems observed in one work activity or sector of the company, or in several? Is the emergence of WMSDs due to a recent change in the plant or has the problem set in gradually? If this assessment is not done, it is preferable to opt for tools targeting the workstations at risk, such as questionnaires focusing on WMSD symptoms.



### Do I have an WMSD problem?

#### How to determine

- In-depth accident analysis
- At what workstations has the company had the most accidents or WMSDs?
- Do operators report pain related to their work? If so, at what workstations?
- Is absenteeism or staff turnover higher at certain workstations? If so, at what workstations and why?

After determining the scope of the WMSD problem, the company is ready to decide how it wishes to and will intervene. It must establish intervention goals and set up a schedule. The final assessment will validate whether these goals have been achieved.

*Assessment of WMSD problems*

## Can the company satisfy the requirements of the process?

The process requires three levels of involvement by the company's management: participation on the steering committee of a company officer and his/her union counterpart; leaves for the operators of the position being analyzed, the supervisor and the technical specialists whose expertise is required at certain stages of the analysis; allocation of a budget to implement solutions.

An ergonomic analysis process always involves management support and participation of company personnel. In our experience, if the company's management believes that the analysis is necessary and expects results, the process will be credible and promote cooperation by all involved. In addition, the participation of the plant's operators and technical personnel is essential to the development and implementation of the solutions. The tremendous knowledge these people possess is indispensable.

The company should be serious in this endeavour and make a commitment to implement some of the solutions that will be developed following the workstation analysis. Otherwise, this is a waste of time for everyone and creates greatly demotivates the operators.

It is important to plan realistic deadlines, because the adoption of this process takes time. Sometimes it is necessary to meet suppliers, perform tests and trials, wait for a production shut-down, and consider the vacation period. Implementing solutions may often take several weeks.

## Suggestions to reduce delays

In the case of very complex tasks, such as those of an electrician, determine whether it is possible to split the analysis according to his principal tasks. However, this can be done only if the work involves tasks that are relatively independent and if the problem is clearly associated with a specific context (location, equipment, task, etc.).

If several workstations have to be analyzed, do not wait for all the solutions to be implemented at the workstation studied before starting analysis of another workstation.

## Choosing the intervention mode

The company chooses the appropriate intervention mode according to the urgency of its needs, its internal expertise in prevention and its financial means. To facilitate participation by the company's personnel, we propose two intervention modes: the ERGO group and the workstation committee. Given the complexity of work involving varied tasks, it is essential that the intervention be accompanied by an expert trained in ergonomics.

The ERGO group, as defined in the previous guide, is relevant if there are several workstations to be analyzed, because it favours taking responsibility for WMSD problems over the long term. It has the advantage of involving and training company personnel. Consequently, the expertise acquired by the ERGO group participants in workstation analysis stays within the company.

The workstation committee is quicker, because the ergonomist alone performs the stages of data gathering. However, if one is concerned about both efficiency and speed, the ergonomist cannot implement all the stages unassisted. It is essential to create a workstation committee to benefit from the unique expertise of the plant's workers. The participants in the workstation committee are integrated into the analysis during identification of the problems (stage 3 of the process) and participate in seeking solutions. This workstation committee is provisional and is dissolved at the end of the intervention.

To facilitate selection of the intervention mode, the following table compares the two intervention modes and the role the ergonomist must play in each mode.

### Comparison between the two intervention modes and the ergonomist's role

<b>ERGO group</b>	<b>Workstation committee</b>
Permanent group	Provisional committee for 1 workstation
Group receives initial training on the entire process	Committee receives shorter training
Participants in the group collaborate in every stage of the process.	Participants intervene during the stages of identifying the problems and seeking solutions
Longer workstation analysis	Quicker workstation analysis
All stages of the process benefit from the group's expertise	Less leave time for operators, technical specialists
Expertise is created within the company	Committee dissolved, expertise lost
<b>Ergonomist's role</b>	<b>Ergonomist's role</b>
Provides basic training to the group	Responsible for the analysis and the workstation committee
Coordinates production of the analysis and is responsible for the group's operation	Carries out the data gathering stages and coordinates the stages of diagnosis, implementing solutions and follow-up
Contributes to development of the group's autonomy	Presents the results of the analysis to the steering committee
Represents the group and presents the results of the analysis to the steering committee	

## Structures to be set up

After selecting the intervention mode appropriate to its needs, the company moves on to the next stage – setting up the committees that will carry out and provide support for the analysis.

### Steering committee

The parity steering committee is composed of a management representative (plant manager, personnel manager), a union representative (union president or his/her representative) or a worker representative (as the case may be), and the ergonomist in charge of the analysis. Its mandate is to support the ERGO group or the workstation committee in its work, make the decisions that will facilitate the analysis (leave for operators, technical specialists, access to information) and allocate a budget for implementation of the solutions it will have accepted. The steering committee is the decision-making structure for the intervention.

### ERGO group

The ERGO group is created at the beginning of the intervention and is coached by the ergonomist. It is composed of a nucleus to which workstation collaborators and occasional collaborators are attached (see following figure). The ERGO group retains the same nucleus as long as possible so that its members acquire more expertise and autonomy. For more information on setting up an ERGO group, see Chapter 1 of the previous guide “ERGO groups – a tool for WMSDs prevention”.

### Workstation committee

The ergonomist creates the workstation committee at the beginning of the problem identification stage (stage 3 of the process). The committee should not have less than five participants. As in the case of the ERGO group, company experts participate in certain committee meetings as occasional collaborators, depending on the type of problems encountered during the analysis. The advantage of this committee is that it is disbanded at each workstation, thus reducing its members’ involvement. On the other hand, the expertise acquired by the participants does not play a role in the analysis of other workstations.

