8. MODULE
Manual Material Handling – Injured

- Introduction
- Data
- Report and recommendations

INTRODUCTION

Scope of application. The *Injured MMH* module allows you to analyze tasks that involve the manual material **lifting** in the case of workers with **low back injuries**, in order to minimize the risk of recurrent disorders when returning to work.

It is important to point out the following:

- The procedure is only applicable to load lifting tasks whose *frequency* < 1 lift/min and *duration* < 2 h/day.

- Lumbar injuries, in this case, only include musculoskeletal overexertion, sprains, and non-specific low back pain. People with lumbar disorders that affect the intervertebral disc and other pathologies of the spine require measures that fall beyond the scope of this procedure.

- The criteria are intended to be used as a guide and not to replace the professional's opinion. The guide does not aim to be a diagnostic or medical assessment tool.

- In principle, it is advisable to follow these criteria for a minimum of 3 months when returning to work after a lumbar injury.

Contents. From both the load mass and certain handling conditions, the risk level of the task is estimated and, when required, recommendations to reduce risk are offered.

Source. This procedure is based on a research study developed by the University of Ohio [Ferguson, Marras and Burr, 2005]. Such study quantitatively analyzed the load of the lumbar spine in patients with low back pain and asymptomatic subjects under various lifting conditions, and such load was compared to particular tolerance limits of the spine established as a reference.

DATA

The analysis starts by selecting the *Injured MMH* module in the *New task* window (Figure 1).

This opens the main window of this module (Figure 2), which shows both the input and the results calculated by the application.
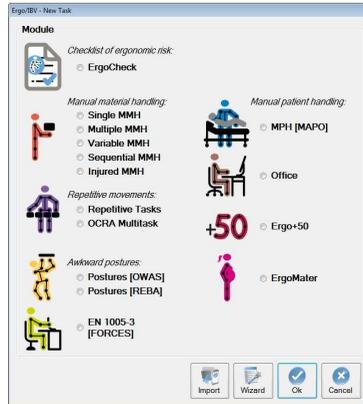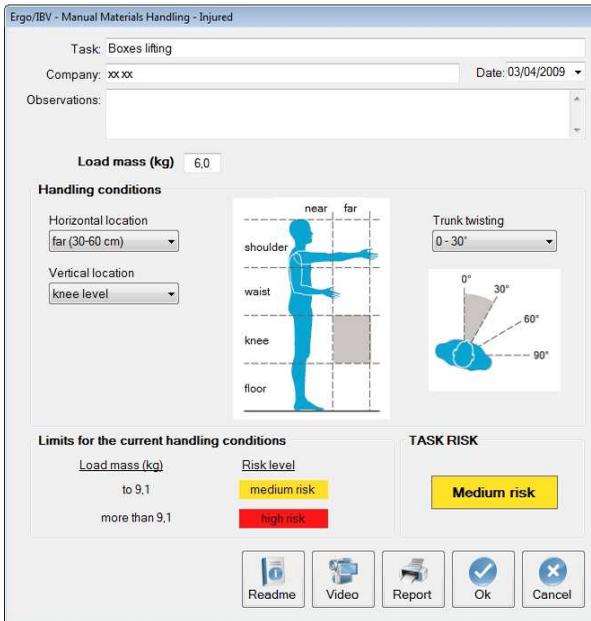

Figure 1. Access to the Injured MMH module

Figure 2. Injured MMH – Main window

Ergo/IBV
Ergonomic risk assessment

Identification. The following identification data of the case are entered in the heading:

- **Task**. Assign a name to the task that is being analyzed.

- **Company**. Enter the name of the company or work center where the task is performed.

- **Date**. Specify the date when the analysis is carried out.

- **Observations**. Note any clarifications on the case (details of the task, company department, video recorded, etc.).

Variables. In addition to the identification data, the variables defining the task are then entered, which are as follows:

- **Load mass**. Specify, in kilograms, the weight of the object lifted.

- **Handling conditions**. Specify the conditions under which the load is handled by selecting the desired option in the drop-down menu or by clicking on the appropriate area of the figure. If loads are handled in more than one area, consider the most unfavorable conditions. These variables are determined at the origin of the lifting, that is, when the load is picked up (or at the destination, if it is considered to be more unfavorable than the origin), and they are the following:

  o **Horizontal position**. Distance of horizontal reach of the load, defined as: *near (≤30 cm)* or *far (30-60 cm)*.

  o **Vertical position**. Height from which the load is lifted, defined as: f*loor level, knee level, waist level or shoulder level.*

  o **Trunk twisting**. Asymmetry of the task or rotation angle of the trunk, specified in degrees: *0-30º*, *30-60º* or *60-90º*.

Calculations. Once the variables are entered, the program calculates and offers the following data in the window:

- **Limits for the current handling conditions**. The risk level of different loads mass under the handling conditions previously entered is specified. For example, Figure 2 shows that, for the selected handling conditions, a load up to 9.1 kg would pose a medium risk,

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whereas more than 9.1 kg would involve a high risk. This information can be useful when making changes to reduce the level of risk.

- **Risk of the task**. Finally, the risk level of the task analyzed is shown, that is, the risk that the load mass and the handling conditions specified imply. For example, in the previous case (Figure 2), the 6 kg that are handled under the conditions specified pose a medium risk.

Both types of results consider three levels of risk with their respective color codes associated, whose interpretation is the following:

- o *Low risk* (green). Acceptable situation.
- o *Medium risk* (yellow). It is advisable to apply measures to obtain an acceptable situation.
- o *High risk* (red). Unacceptable situation. Measures to reduce risk are required.

Instructions. Click on the *Read me* button at the bottom of the main window to access the window with the instructions on the use of the *Injured MMH* module, which were already mentioned in the previous text.

REPORT AND RECOMMENDATIONS

Clicking the *Report* button in the main window of this module generates a report of the task that contains the following sections:

- **Identification**. It includes the location (work folder where the task was saved), date, name of the task and the company, and the evaluator's observations. If a video source was configured, an image of the task can also be included.

- **Variables** (Figure 3). It shows the variables of the task entered by the evaluator, that is, the load mass and the handling conditions.

- **Limits for the current handling conditions** (Figure 3). It offers the level of risk that different loads mass would have under the current handling conditions, with the associated color code.

- **Risk of the task** (Figure 3). It shows the risk level of the task being analyzed, with the corresponding color code and its interpretation.

- **Recommendations** (Figure 4). When the case requires it (medium or high risk level), the report also includes a section of recommendations, which are general measures that can help reduce the risk level of the task.

VARIABLES

Load mass (kg)	6,0	Handling conditions _____

Horizontal location	far (30-60 cm)
Vertical location	knee level
Trunk twisting	0 - 30°

LIMITS for the current handling conditions

Load mass (kg)	Risk level
to 9,1	medium risk
more than 9,1	high risk

TASK RISK

Medium risk

Evaluator (name and signature)

Interpretation of the Risk level

Low risk	Acceptable situation.
Medium risk	It is advisable to implement measures to achieve an acceptable situation.
High risk	Unacceptable situation. It is necessary to implement measures to reduce risk.

Figure 4. Injured MMH – Report (variables, limits and risk)

RECOMMENDATIONS

• Remove any unnecessary manual materials liftings.
• If you cannot remove the lifting, consider automating the task or using mechanical devices to help the handling. Devices such as cranes and handlers can eliminate the forces on the spine associated with manual materials handling and reduce the chance of back injuries.
• If the material is manipulated manually, design the work in order to reduce body overloading to the extent possible. Consider the following:
    · The lifting of the load should be performed as close as possible to the body. Some measures to reduce reach distances are: to remove any barriers such as the sides of the containers or boxes, to use rotating platforms for loads on pallets, and to use containers with tilt function to facilitate access to the inside.
    · The load should be placed as close as possible to waist level, for example, by using lifting tables to locate the load at such level.
    · The need to rotate the trunk should be reduced by relocating the point of origin and destination of the load.
    · The load mass to be lifted should be reduced in order to be acceptable (according to the criteria of this procedure).

Figure 4. Injured MMH – Report (recommendations)