

3. Operation of the application

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- How to use the bookmarks
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- Importing tasks from Ergo/IBV Tool
- How to use the search function
- Wizard to select modules
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- Adding photographs
- How to handle the video
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GENERAL DESCRIPTION OF THE PROGRAM

Ergo/IBV is a Windows application to assess work-related ergonomic risks. An opening image is displayed (Figure 1) which automatically disappears when the program is ready to be run.



Figure 1. Ergo/IBV opening image

The main window of the application shows the icon and the name of the software. There are several areas below the menu bar (Figure 2). The toolbar buttons and the bookmarks drop-down menu are displayed in the upper of the screen, the functions of which are described later. Below the elements previously described, there is a website with relevant information and links.

The rest of the window can change its display mode: **web view** (Figure 2), **assessment view** (Figure 3), where the evaluator can perform the task analysis, and **design view** (Figure 4), where you can examine workstation designs.



Figure 2. Home web view

CASE STUDY	TASK	COMPANY	DATE	MODULE	
Examples Manual Material Handling	A - Container lifting	NNN NNN	16/01/2013	Single MMH - Lifting	
	B - Piece lifting	NNN NNN	17/01/2013	Single MMH - Lifting	
	Boxes lifting	NNN NNN	03/04/2009	Injured MMH	
	Example company NNN NNN	NNN NNN	15/03/2018	ErgoCheck	
	Orders pulper in a warehouse	NNN NNN	03/12/2010	Variable MMH	
	Packaging of products	NNN NNN	10/01/2005	Single MMH - Lifting	
	Pulling a cart	NNN NNN	11/01/2005	Single MMH - Pulling	
	Rotation 1	NNN NNN	01/02/2013	Sequential MMH	
	Shelving boxes	NNN NNN	16/09/2005	Multiple MMH	
	V - Orders pulper	NNN NNN	19/01/2013	Variable MMH	
	Examples MAPO	Community health center Example	XXAP	22/03/2017	MPH [MAPO]
		Example company XXAP	XXAP	15/03/2018	ErgoCheck
		Hospitalization Example	XXAP	14/03/2017	MPH [MAPO]
Examples Postures, Repetitive Movements and Forces	Surgical Unit Example	XXAP	16/03/2017	MPH [MAPO]	
	Employee engine plant automotive sector	VV	28/03/2014	EN FORCES	
	Field collection	VV	27/03/2014	Repetit. Tasks	
	Laundry	VV	30/03/2010	Postures[REBA]	
	Other Workstations company VV	VV	15/03/2018	ErgoCheck	
	Production machine mechanical components	VV	20/05/2009	OCRA	
	Riveting	VV	20/01/2006	Postures[OWAS]	
	Storing oranges	VV	01/08/1997	Repetit. Tasks	
	Workstations company VV	VV	15/03/2018	ErgoCheck	
	Examples Various	Clerk	ZZZ	08/05/2006	Office
Workstations company ZZZ		ZZZ	15/03/2018	ErgoCheck	
Preserved food warehouse - pallet preparation		XXXX	03/03/2021	ErgoMeter	
Classification of materials		ZZZZ	09/03/2021	Ergo-50	

Figure 3. Assessment view

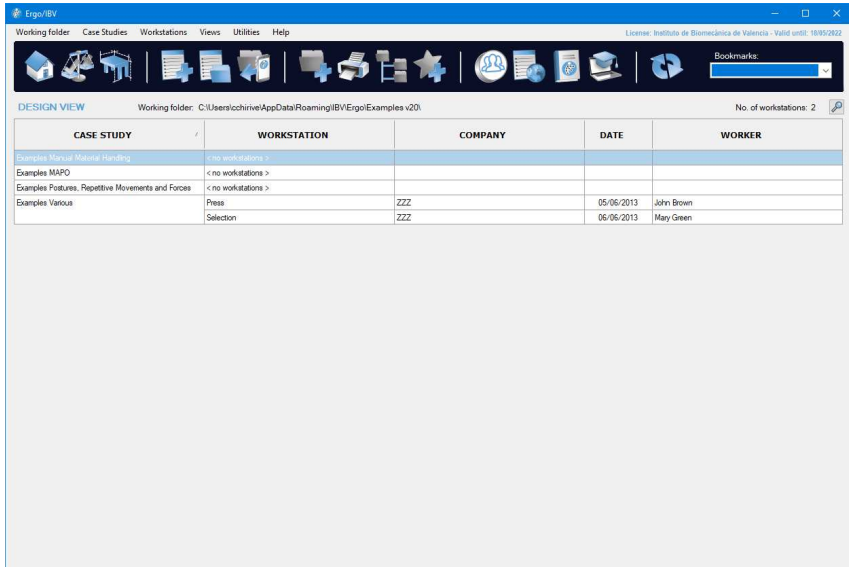


Figure 4. Design view

The following concepts are handled when using the application:

- **Task:** it is an analysis performed using any of the risk assessment *modules* available in the application, which correlates with a file that is saved in the desired *case study* and *working folder*. Each file contains one single task. The names of these tasks are managed by Ergo/IBV and are identified by a prefix based on the task name and the **.ergo** extension.
- **Workstation:** it is a study performed using the *anthropometric design of the workstation module* available in the application, which correlates with a file that is saved in the desired *case study* and *working folder*. Each file contains one single workstation. The names of these files are managed by Ergo/IBV, which identifies them with a prefix based on the task name and the **.ergo** extension.

Important: The names of the files (corresponding to tasks or workstations) should not be changed from Window Explorer because the application will modify each name again when necessary. You should also avoid copying, pasting and deleting the files directly from Windows Explorer; these actions should be carried out from Ergo/IBV.
- **Case study:** it is a group of tasks and/or workstations which correlates with a Windows folder located in a *working folder*.

- **Working folder:** it is the directory where the user works at a given time. In this folder, the user creates case studies and works with tasks or workstations (create, copy, delete, import tasks, etc.). Its content is shown as a list of case studies made up of tasks or workstations. It is possible to change the working folders at any time, from the menu or from the toolbar.

ASSESSMENT VIEW. It shows the list of case studies and tasks in a *working folder* (Figure 3); the header includes the following information:

- **Working folder:** it shows the directory where the user is working, which includes the case studies of the list.
- **Number of tasks:** it shows how many tasks there are on the list.

Each row of the list identifies the following fields (which allows you to reorder the list at any time by clicking the relevant title):

- **Case study:** name of the group of tasks.
- **Task:** name that the evaluator assigned to the task.
- **Company:** name of the company or work center where the task is developed.
- **Date** of the task analysis.
- **Module:** name (full or abbreviated) of the risk assessment module used for the analysis.

DESIGN VIEW. The design view shows the list of workstations in a *working folder* (Figure 4), headed by the following information:

- **Working folder:** it shows the directory where the user is working, which includes the case studies of the list.
- **Number of workstations:** it shows how many workstations there are on the list.

Each row of the list identifies the following fields (which allows you to reorder the list at any time by clicking the relevant title):

- **Case study:** name of the group of workstations.
- **Workstation:** name that the evaluator assigned to the workstation.
- **Company:** name of the company or work center to which the workstation belongs.
- **Date** of the workstation study.

- **Worker:** name (full or abbreviated) or identification code of the worker to whom the workstation under study is to be adapted.

This view may require authentication if data protection is enabled [see chapter "Annex 4: Data Protection"].

MENUS. The menu bar at the top of the window allows you to perform different functions and to obtain information. The menus include the following commands:

Working folder

- *Change working folder:* it opens a dialog where you can select a different working folder.
- *Browse working folder:* it opens Windows file browser in the working folder.
- *Add bookmark:* it allows you to quickly create a bookmark (shortcut) for the current folder.
- *Manage bookmarks:* it opens a window where you can manage the bookmarks of the folders, as it will be later explained [see section "How to use bookmarks"].

Case studies

- *New:* it allows you to create a new case study.
- *Delete:* it permanently deletes the case study selected together with all the tasks and/or workstations that it contains.
- *Change name:* it allows you to change the name of the case study selected.
- *Modify:* it allows you to see or change the data of the case study selected.
- *Report:* it generates a report of the case study selected.

Tasks

This menu is only activated in the *Assessment* view.

- *New:* it creates a new task to be analyzed with one of the assessment *modules* available.
- *Open:* it shows the task selected in order to be viewed or to change its data. It can also be opened by double-clicking the corresponding row of the task list.

- *Delete*: it permanently deletes the selected tasks from the list. When this command is performed from the *Recently used* or *Last search* lists [see “Bookmarks drop down” in this chapter] only the task reference is deleted from the list, not the file associated to the task.
- *Copy*: it allows you create a copy of the selected task, identifying it as a *copy*.
- *Move*: it allows you to change the location of the tasks selected (they are saved in the destination folder and are automatically deleted from the source folder).
- *Search*: it opens a window to find tasks saved in any directory by using different search filters [see “How to use search function” in this chapter].
- *Import*: it allows you to bring tasks into the case study selected; they can be files from both the current version of the software and previous versions [see “Import/Export” in this chapter].
- *Export*: it allows you to save the tasks selected on the current list to another location that must be specified [see “Import/Export” in this chapter].

Workstations

This menu is only active in the *Design* view.

- *New*: it creates a workstation with the module of *anthropometric design of the workstation*.
- *Open*: it shows the selected workstation in order to view it or to change its data. It can also be opened by double-clicking the corresponding row in the list of workstations.
- *Delete*: it permanently deletes the workstations selected from the list. When this command is performed from the *Recently used* or *Last search* lists [see “Bookmarks drop-down” in this chapter], only the workstation reference is deleted from the list, not the file associated to the workstation.
- *Copy*: it allows you create a copy of the selected workstation, identifying it as a *copy*.
- *Move*: it allows you to change the location of the selected workstations (they are saved in the destination folder and are automatically deleted from the source folder).
- *Search*: it opens a window to find workstations saved in any directory by using different search filters [see “How to use the search function” in this chapter].

- *Import*: it allows you to bring workstations into the selected case study [see “*Import/Export*” in this chapter].
- *Export*: it allows you to save the workstations selected from the current list in a different folder which you must specify [see “*Import/Export*” in this chapter].

Views

- *Home*: it opens Ergo/IBV home page.
- *Assessment*: it activates the Assessment view, which shows the list of tasks in the *working folder*.
- *Design*: it activates the Design view, which shows the list of workstations in the *working folder*.

Utilities

- *Client's area*: it opens the web portal developed by the IBV, where occupational health professionals can keep up with the latest developments in the field, obtain relevant documents or exchange views and opinions with other users of the application.
- *Questionnaire manager*: it opens an optional tool that allows the user to collect risk assessment questionnaires through the web to automatically incorporate their data into the Ergo/IBV application. Currently, this tool is only enabled for the questionnaires associated with the *Ergo+50* module of Ergo/IBV [see “*Questionnaire manager*”, in this chapter].
- *Configure* (Figure 5): it shows a configuration window where you can load the image of the company logo (which will be included in all the reports generated by the program); enable and disable the ISO operating mode [see “*ISO analysis mode*” in this chapter]; and set the video source that will be used.

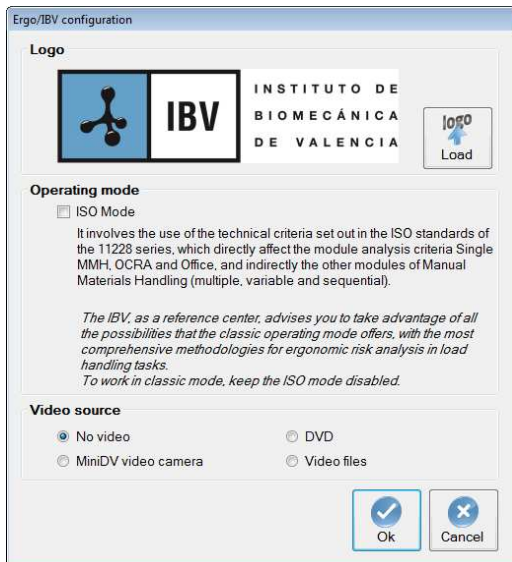


Figure 5. Configuration window (Utilities menu)

- **Change password:** it allows you to change the password of the user identified in the Ergo/IBV session. This command is only visible if the data protection is enabled [see chapter "Annex 4: Data Protection"]
- **License:** it opens a window that shows the data of the license for use.
- **Select printer:** it sets the default printer and specifies the printing conditions.

Help

- **Manual:** it gives online access to all the chapters and annexes that make up this user manual, in PDF format.
- **About** (Figure 6): it provides information on the current version of the program, including the organizations that have worked with the IBV in the development of the application *modules*. It also gives access to the Ergo/IBV license agreement.



Figure 6. About (Help menu)

TOOLBAR. The buttons on the toolbar of the main window are associated with the menu commands already mentioned. Some of these buttons change depending on whether you activate the assessment or the design view.



Open home page. It shows Ergo/IBV home page.



New Task/Workstation. This button creates a task or workstation.



Open Task/Workstation. It shows the task or workstation selected from the list.



Import Tasks from Ergo/IBV Tool. It allows you to create the tasks registered in the mobile application.



New case study. It creates an empty case study in which tasks/workstations can be included.



Report of the case study. It generates a report with the relation tasks/workstations of the case study selected.



Open assessment view. It shows the task list of the last working folder used.



Open design view. It shows the workstation list of the last working folder used.



Change working folder. This button allows you to select a different working folder.



Add bookmark. It allows you to quickly create a bookmark (shortcut) for the current work folder.



Open client area. It allows you to access a portal web for Ergo/IBV clients.



Open questionnaire manager. It allows you to access the questionnaire manager web tool.



Open User Manual. It gives online access to all the chapters and annexes that make up this user manual, in PDF format.



Open Training course. It gives online access to Ergo/IBV course.



Refresh contents. If there was no internet connection when starting, Ergo/IBV checks the connection again. If a web view is active, the current page is reloaded. If the Assessment or Design view is active, then the program will force the update of the list with the contents of the working folder.

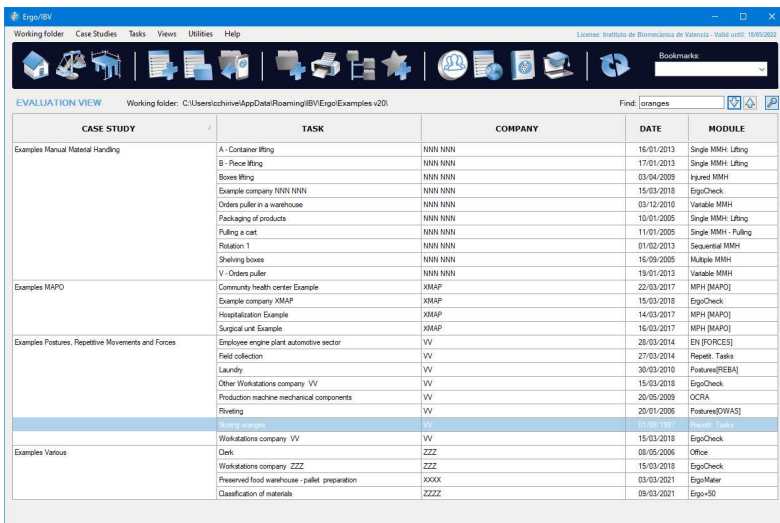
FUNCTIONALITY AVAILABLE IN THE LISTS. There are a number of functions that can be performed on the list of tasks or workstations:

List search. When the list being displayed is very extensive, you can perform a text search (Figure 7) that is activated with the small magnifying glass in the upper right corner of the window.

The search can be used both in the Assessment and the Design View; in the Assessment View it searches in the *Task* and *Company* fields, whereas in the Design View the search is performed in the *Workstation*, *Company* and *Worker* fields.



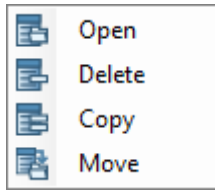
When pressing the “*Search in current list*” button, the “*Find*” box is displayed, in which you must enter the text to be searched for (taking into account accent marks and spelling). Use the “*Search next*” and “*Search previous*” buttons to scroll through the list.



CASE STUDY	TASK	COMPANY	DATE	MODULE
Examples Manual Material Handling	A - Container lifting	NNN NNN	14/01/2013	Single MMH- Lifting
	B - Piece lifting	NNN NNN	17/01/2013	Single MMH- Lifting
	Boxes lifting	NNN NNN	03/04/2009	Injured MMH
	Example company NNN NNN	NNN NNN	15/03/2018	ErgoCheck
	Orders puller in a warehouse	NNN NNN	03/12/2010	Variable MMH
	Packaging of products	NNN NNN	10/01/2005	Single MMH- Lifting
	Pulling a cart	NNN NNN	11/01/2005	Single MMH - Pulling
	Pallet 1	NNN NNN	01/02/2013	Sequential MMH
	Shelving boxes	NNN NNN	14/09 -2005	Multiple MMH
	V - Orders puller	NNN NNN	19/01/2013	Variable MMH
Examples MAPO	Community health center- Example	XMAP	22/03/2017	MPH [MAPO]
	Example company XMAP	XMAP	15/03/2018	ErgoCheck
	Hospitalization Example	XMAP	14/03/2017	MPH [MAPO]
	Surgical unit- Example	XMAP	16/03/2017	MPH [MAPO]
Examples Postures, Repetitive Movements and Forces	Employee engine plant automotive sector	VV	28/03/2014	EN [FORCES]
	Fruit collection	VV	27/03/2014	Repeat- Trape
	Laundry	VV	30/03/2010	Posture[REBA]
	Other Workstations company VV	VV	15/03/2018	ErgoCheck
	Production machine mechanical components	VV	20/05/2009	OCRA
	Riveting	VV	20/01/2006	Postures[DWA5]
	Scoring company	VV	01/06/1997	Repeat- Trape
Examples Various	Workstations company VV	VV	15/03/2018	ErgoCheck
	ZZZ	ZZZ	08/05/2006	Other
	Workstations company ZZZ	ZZZ	15/03/2018	ErgoCheck
	Preserved food warehouse- pallet preparation	XXXX	03/03/2021	ErgoMeter
Classification of materials	ZZZZ	09/03/2021	Ergo+50	

Figure 7. Searching for text in the list

Contextual menu. When you right-click on the list, a context menu appears with the following options:



- *Open*: it shows the task or workstation selected from the list.
- *Delete*: it permanently deletes the selected tasks or workstations from the list.
- *Copy*: it creates a copy of the selected task or workstation.
- *Move*: it allows you to change the location of the tasks or workstations selected.

Drag and Drop. It is also possible to move or copy tasks and workstations by clicking with the left mouse button on an item in the list, dragging and dropping it in another area of the list. If when you release the mouse button the "*Ctrl*" key on the keyboard is pressed, a copy of the dragged element will be made, if it is not pressed, this element will be moved from one case study to another.

HOW TO USE THE BOOKMARKS

A bookmark is a shortcut that facilitates the selection of a *working folder*; its use is optional, and you can create as many bookmarks as desired.

Bookmarks are managed in a specific window which is described below, but some operations can also be performed quickly:

- Creating a bookmark for the current working folder from the “*Working folder | Add bookmark*” menu, as previously mentioned.
- Selecting an existing bookmark to change the working folder from the bookmarks drop-down menu that will be described later.

Bookmark management. There is a window to manage the bookmarks of the folders (Figure 8), which is accessed from the “*Working folder | Manage bookmarks*” menu. This window allows you to select a bookmark in order to change the associated working folder, as well as to create, delete and modify bookmarks.

This window shows the existing bookmarks in tabular form, where each row displays the following information:

- **Alias.** The alias is by default the name of the associated folder, but it can be changed at any time.
- **Favorite.** Check the box if you want to highlight the bookmark as favorite when it is displayed in the drop-down.
- **Location.** It shows the directory containing the associated folder.
- **Date of creation.** It shows when the bookmark was created.
- **Last access.** It shows when the associated folder was last accessed.

The buttons on this window perform the following functions:

- **Delete.** This command deletes the selected bookmark, asking for previous confirmation.
- **New.** This button creates a bookmark for the folder that you specify.
- **Ok.** It accepts all the actions performed in the table and activates the folder of the selected row as working folder.
- **Cancel.** This cancels the changes to the table and cancels the row selection.

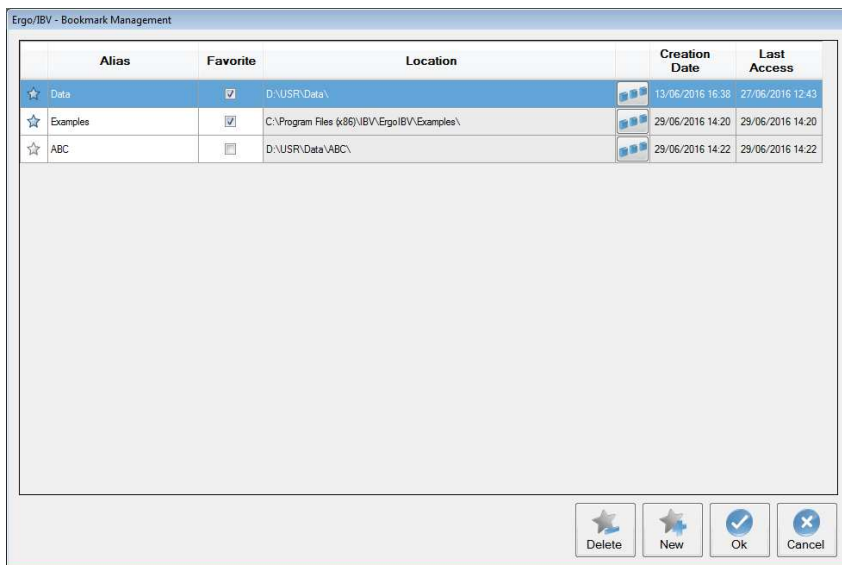


Figure 8. Window for managing bookmarks

Bookmarks drop-down menu. A dropdown in the top left of the main window allows you to change quickly to another working folder that has a bookmark (Figure 9). The drop-down menu contains the folders that have recently been used, identified by their *Alias* and preceded by a star (highlighted in blue, if it is a *Favorite*).

Other shortcuts are also included at the end of the drop-down menu. One of them replicates the functionality of the “Working folder | Add Bookmark” menu, which allows to quickly create a new bookmark for the current working folder (**<Add bookmark>**). The other shortcuts provide special lists that do not correspond with the contents of a single working folder; these lists show tasks if the *Assessment* view is active and workstations if the *Design* view is active:

Design:

- **<Recently used>** (Figure 10) shows the tasks or workstations recently opened by the user, identifying the access date (instead of the analysis date).
- **<Last search>** includes the tasks or workstations found when the search by directory was last used [see section “How to use the search function”].

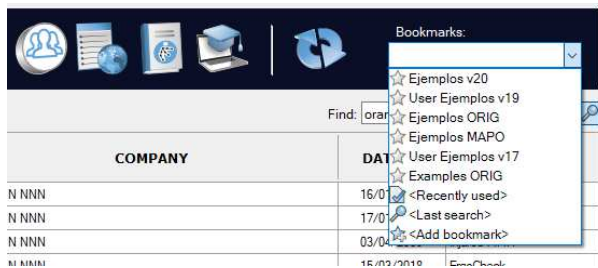


Figure 9. Bookmarks drop-down

TASK	COMPANY	ACCESS DATE	MODULE	LOCATION
reponer	4	28/05/2021 12:52	Puest[REBA]	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
reponer	4	28/05/2021 12:18	Puest[REBA]	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
reponer	4	28/05/2021 12:17	Puest[REBA]	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
reponer	4	28/05/2021 12:12	Puest[DWAS]	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
reponer	4	28/05/2021 12:11	Puest[DWAS]	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Recom	ZZZ	27/05/2021 13:11	ErgoMeter	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Recom	ZZZ	27/05/2021 13:11	ErgoMeter v2004	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Gestión y preparación de pedidos	ZZZ	27/05/2021 13:11	Ergo-50 v2019	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
new		27/05/2021 13:08	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Mayo - 2021		27/05/2021 12:11	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Copa de Preparación de palets (almacen de conservas)	ZZZ	27/05/2021 10:22	ErgoMeter v2004	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
recom	ZZZ	26/05/2021 13:53	ErgoMeter	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Recom	ZZZ	26/05/2021 12:49	ErgoMeter	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Recom	ZZZ	26/05/2021 17:09	ErgoMeter	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Ejemplo Puestos empresa NNN NNN	NNN NNN	19/05/2021 13:31	ErgoCheck	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Estudio inferior (postural)	NNN NNN	19/05/2021 13:30	MMC Simple Levant.	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Ejemplo ADAPTADA PARA MAYOR 2021	ZZZ	19/05/2021 8:53	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Análisis de un caso	NNN NNN	17/05/2021 13:44	MMC Simple Análisis	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
A. Levantamiento contenedor	NNN NNN	14/05/2021 10:28	Simple MMH Lifting	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Copa de Almacenamiento de copas en estanterías	NNN NNN	14/05/2021 10:28	Múltiple MMH	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
Rotación 1	NNN NNN	14/05/2021 10:28	Sequential MMH	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
V. Tráiler pedidos	NNN NNN	14/05/2021 9:55	Variante MMH	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
new		13/05/2021 19:05	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
50		07/05/2021 12:51	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
50		07/05/2021 12:50	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
50		07/05/2021 12:46	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
50		07/05/2021 12:45	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg
49		07/05/2021 13:31	Ergo-50	C:\Users\ochame\AppData\Roaming\IBV\Ergo\Ejemplos v19\Eg

Figure 10. List of the tasks recently used

IMPORT/EXPORT

The Import or Export functions can be used to exchange tasks or workstations among working folders or different users. To import or export task, activate the *Assessment View*, whereas to import or export workstations you must activate the *Design View*.

An option is also available to import tasks created in the mobile application **Ergo/IBV Tool**. This import is explained in more detail in the next section of this chapter.

Export. You can export tasks or workstations from any list in two ways ("Tasks | *Export*" or "Workstations | *Export*"):

- Select a single task/workstation from the list, press "*Export*" and choose the location and name of the file where this task/workstation will be saved.
- Select several tasks/workstations from the list at the same time, press "*Export*" and choose only the location where the tasks/workstations will be saved.

Import. There are also ways to import tasks or workstations to the active working folder ("Tasks" | "*Import*" or "Workstations | *Import*" menu):

- If you want to import only one task/workstation, press "*Import | Task*" or "*Import | Workstation*" and select the desired file.
- If you want to import several tasks/workstations contained in a folder, press the option "*Import | Working folder*" and choose the location of the source folder. This function will not go into the subdirectories of the source folder.

The tasks saved in old formats (prior to version 10) must be first imported to the current version of the application in order to be able to work with them. To do this, there are two options in the "*Tasks | Import | Version 9 and earlier*" menu, only with the *Assessment View* active.

- **File.erg.** This option allows you to import the tasks from a single old file (with **.erg** extension). All the tasks contained in that file will be imported to the active working folder.
- **Bulk import.** You can import all the **.erg** files from the selected folder. In this case, this function will go into the subdirectories of the source folder. The subdirectory structure of the source folder will be reproduced in the directory of the active working folder, and an additional folder for each **.erg** file that is imported (where the tasks contained in that file will be located) will also be created.

The tasks and workstations that have been imported are shown on the *<Recently used>* list, which can be useful after a *Bulk import* (to check which tasks have been imported and where they have been located).

IMPORTING TASKS FROM ERGO/IBV TOOL

The **Ergo/IBV Tool** application is available on Google Play for Android operative system. This application allows the safety expert to obtain at the workstation the necessary data to perform the assessment of the ergonomic risks. The mobile application allows you to create tasks, collect data on the chosen analysis module and get media information (photos, videos, audios, notes and sketches) in order to facilitate further analysis of each task.



The *Ergo/IBV Tool Import tasks* command allows you to create the tasks registered in the mobile application. This command is on the toolbar, in the *Tasks|Import* menu option and in the *New Task* window.

This option opens a window (Figure 11) which shows a list of tasks that are available to be imported. This list is generated by scanning the directory where the tasks from the mobile were downloaded and shows the task name, company, date of creation and module.

You must check on the list all the tasks to be imported and then press the *OK* button. If the module that should be used with a task to be imported has not been specified on the mobile application, or if there are several alternative modules, you will have to select one from the relevant drop-down menu in the *Module* column.

Before importing, the tasks must have downloaded from the mobile device to the computer. If there is no location selected for the downloaded tasks, you must choose a location. To make this task easier, Ergo/IBV includes the following commands:



This button allows you to select the location where the tasks have been downloaded on the computer.



This command refreshes the contents of the task list available in the selected location.



Pressing this button opens a window that guides the user when downloading tasks from the mobile device to the computer.



This command opens Windows file browser in the selected download location, which will show a folder for each task downloaded. Each folder contains the data and media files created for the task.

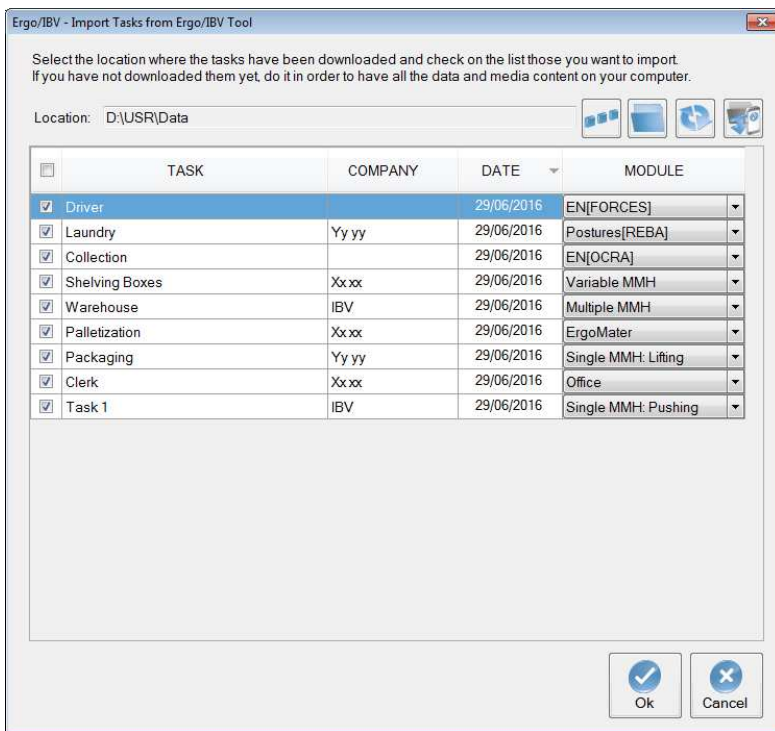


Figure 11. Importing tasks from Ergo/IBV Tool

The *Tasks Download from Ergo/IBV Tool* button shows a window (Figure 12) that guides the user when downloading tasks to the computer.

Ergo/IBV tries to detect the mobile devices connected via a USB port. If more than one is detected, then the relevant one should be selected from the *Detected Devices* drop-down menu.

When a device is detected and selected with the Ergo/IBV Tool application installed, a list of the folders of the tasks detected in that device will be shown. When pressing the download button, all the tasks with all the media files will be copied to the selected location. If the *Delete from the device on download completion* box is activated, Ergo/IBV will delete all the files from the mobile device once they are copied. It is advisable to delete them in order to free the resources of the mobile device.

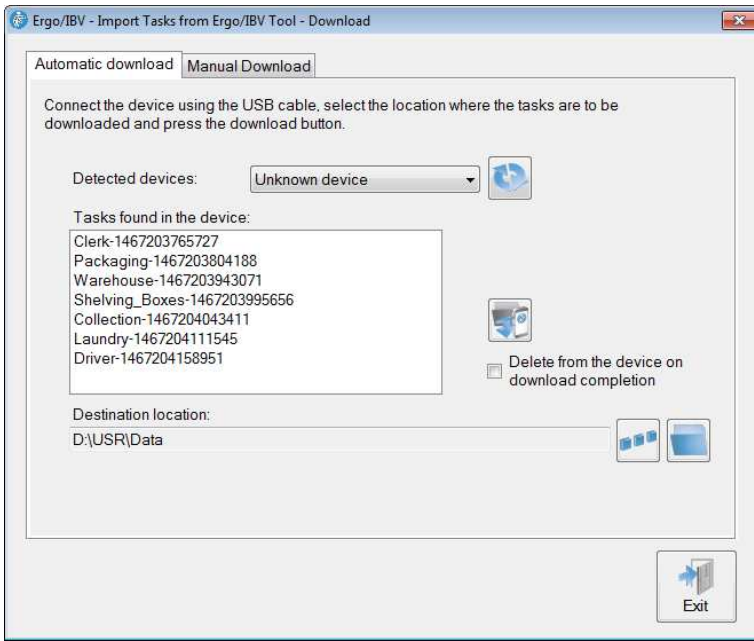


Figure 12. Downloading tasks from Ergo/IBV Tool

The download window shows the following buttons:



This button refreshes the detected devices.



This command allows you to select the computer location where you want to download the tasks from the mobile device.



Pressing this button opens Windows file explorer in the selected download location.



This button starts downloading the tasks from the mobile device to the computer.

If Ergo/IBV does not detect the mobile device, the Manual Download tab offers instructions on how to manually download the tasks.

HOW TO USE THE SEARCH FUNCTION

The program includes the “*Search*” window to find tasks or workstations saved in any directory (Figure 13). You can search for tasks by activating the *Assessment View* and accessing the *Search* command in the *Tasks* menu. If you want to search for workstations, activate the *Design View* and access the *Search* button in the *Workstations* menu. This window can also be accessed from the toolbar (“*Search tasks/workstations*” button).

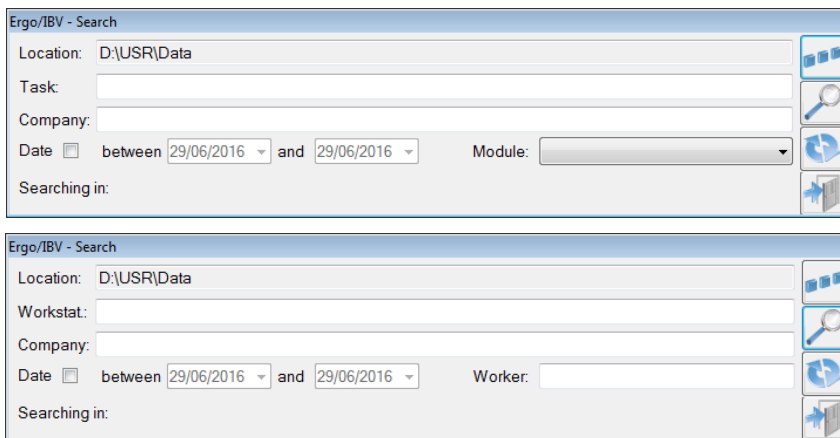


Figure 13. Windows of the task search and the workstation search functions



Select the **Location** where you want to perform the search by pressing the “*Select search location*” button. The directory will be remembered in future searches during the work session.

Task search filters. The following filters can be used when performing a task search, either individually or combined:

- **Task.** Enter the name (full or partial) assigned to the task.
- **Company.** Enter the name (full or partial) of the company or work center where the task is carried out.
- **Date.** Click the cell to enable the boxes in which the analysis date range is specified.
- **Module.** Select from the drop-down menu the risk assessment module used for the analysis.

Workstation search filters. The following filters can be used to perform a workstation search:

- **Workstation.** Enter the name (full or partial) assigned to the workstation.
- **Company.** Enter the name (full or partial) of the company or work center where the workstation is located.
- **Date.** Click the cell to enable the boxes in which the analysis date range is specified.
- **Worker.** Enter the name (full or partial) of the worker to whom the workstation under study is being adapted.



Press the "Start search" button to begin. During the search, the view of the button changes from a magnifying glass to a "Cancel" icon, which allows you to stop the search at any time.



The "Empty search filters" button deletes all the specified search filters so that you can enter new ones.



The "Exit" button closes the search window and takes you back to the main window of the program.

Search results (Figure 14). The results that meet the specified filters are shown as a new list of tasks or workstations, and are identified in the bookmarks drop-down as <Last search>. Each row of results shows the following data:

- **Task** or **Workstation**
- **Company** where the task is performed or the workstation is located.
- **Date** of the analysis.
- **Module** used for the analysis or **Worker** for whom the adaptation of the workstation is being studied.
- **Location** of the folder where the task or the workstation is.

The screenshot shows the Ergo/IBV software interface. At the top, there is a menu bar with 'Working folder', 'Case Studies', 'Tasks', 'Views', 'Utilities', and 'Help'. Below the menu is a toolbar with various icons. The main area is titled 'EVALUATION VIEW' and contains a table with search results. A search bar at the top right of the table area shows 'Find: oranges'. The table has five columns: TASK, COMPANY, DATE, MODULE, and LOCATION. The results list various tasks such as 'Levantamiento colchonador', 'Almacenamiento de cajas en estanterías', 'Arastre de un camo', etc., with their corresponding company codes, dates, modules, and file paths.

TASK	COMPANY	DATE	MODULE	LOCATION
A - Levantamiento colchonador	NNN NNN	16/01/2013	MMC Simple Levant.	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Almacenamiento de cajas en estanterías	NNN NNN	16/09/2004	MMC Multiple	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Arastre de un camo	NNN NNN	01/01/1997	MMC Simple Arastre	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
B - Levantamiento pieza	NNN NNN	17/01/2013	MMC Simple Levant.	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Ejemplo Puestos empresa NNN NNN	NNN NNN	15/03/2018	ErgoCheck	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Empaquetado de productos	NNN NNN	01/01/1997	MMC Simple Levant.	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Levantamiento de cajas	NNN NNN	03/04/2009	MMC Lesionados	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Rotación 1	NNN NNN	01/02/2013	MMC Secuencial	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Trador de peddos en un almacén	NNN NNN	03/12/2010	MMC Variable	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
V - Trador peddos	NNN NNN	19/01/2013	MMC Variable	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Ejemplo ambulatio	XMAP	22/03/2017	MMP (JMAP)	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Ejemplo quimico	XMAP	16/03/2017	MMP (JMAP)	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Ejemplo salas hospitalizacion	XMAP	14/03/2017	MMP (JMAP)	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Ejemplos empresa XMAP	XMAP	15/03/2018	ErgoCheck	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Almacenado de naranjas	VV	01/01/1997	T Repetitivas	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Empleado planta motores sector automoción	VV	28/03/2014	UNE (FIERZAS)	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Lavandería	VV	30/03/2010	Post[REBA]	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Máquina de producción de componentes mecánicos	VV	20/05/2009	OCRA	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Otros Puestos empresa VV	VV	15/03/2018	ErgoCheck	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Puestos empresa VV	VV	15/03/2018	ErgoCheck	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Recolección en campo	VV	27/03/2014	T Repetitivas	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Remachado metálico	VV	01/01/1997	Post(DWAS)	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Administrativa	ZZZ	01/05/2004	Oficina	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Amación conserva- Preparación de palets	XXXX	03/03/2021	ErgoMater	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Clasificación de materiales	ZZZZ	09/03/2021	Ergo+50	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
Puestos empresa ZZZ	ZZZ	15/03/2018	ErgoCheck	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
VARIAS	ZZZ	10/05/2008	Personaal	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE
S - Levantamiento contenedor	NNNN	16/01/2013	MMP Simple Levant.	C:\Users\icohive\AppData\Roaming\IBV\Ergo\Ejemplos v20\EjE

Figure 14. Results of the task search

WIZARD TO SELECT MODULES

The *wizard to select modules* is an Ergo/IBV utility that helps the user during the task assessment by facilitating the selection of the most appropriate modules to be applied. This utility helps you choose the most suitable module(s) to assess the risk of the task you want to analyze. It is an optional utility that is available in the *Assessment* view.

Access. The wizard is accessed from the Ergo/IBV module selection screen (“Task | New Task” menu) (Figure 15).

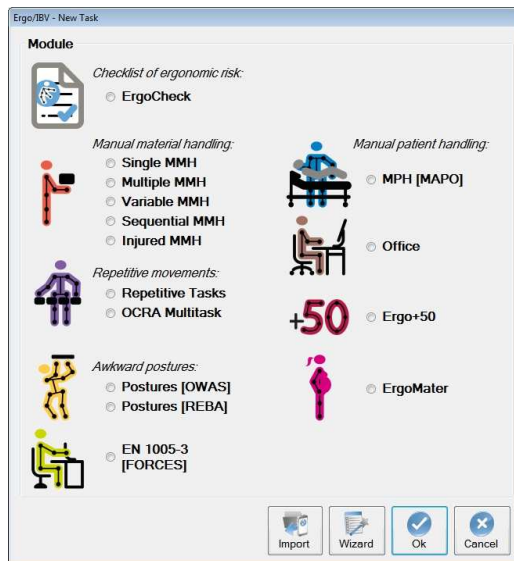


Figure 15. Access to the wizard to select modules

Operation. Access the *New Task* screen and press the *Wizard* button in order to access the utility screen (Figure 16), where a checklist is displayed on which the user must specify the analysis conditions. Check only the applicable box(es).

Ergo/BBV - Module selection wizard

This utility helps you select the most appropriate module/s to assess the risk of the task to be analyzed. It is possible to use more than one module to analyze the same task, because not all the assessment procedures are mutually exclusive. Specify the conditions of the analysis by marking only the relevant boxes.

Conditions	Recommended modules
<input checked="" type="checkbox"/> Initial assessment You want to perform a qualitative initial assessment of the potential ergonomic problems existing in a company, workstation or task. <input checked="" type="checkbox"/> There are workers over 50 in the company	
<input checked="" type="checkbox"/> Pregnant worker performing activities with potential ergonomic risks (related to the manual handling of loads, postures, movements, etc.). <input checked="" type="checkbox"/> Manual handlings of patients are performed (lifting, moving, transferring, etc.)	
<input checked="" type="checkbox"/> Manual lifting of loads > 3 kg <input type="checkbox"/> The person who performs the lifting task has returned to work after suffering a lower back injury (such as musculoskeletal overexertion, strains or non-specific lower back pain). <input type="checkbox"/> Different manual load lifting tasks are performed in a determined sequence or rotation throughout the workday. <input type="checkbox"/> The lifting tasks are always the same: the conditions do not change significantly during the task (for example, loads of equal mass are lifted, always in the same way, from and to the same places, etc.). <input type="checkbox"/> The lifting tasks are different, some conditions change significantly (load mass, position of the load at the point of origin or destination, etc.). <input type="checkbox"/> Handling conditions when lifting vary greatly (for example, when preparing orders in a warehouse where many objects with different weights are lifted, at very different heights and/or depths, with or without trunk rotation, etc.). <input type="checkbox"/> Lifting and carrying loads of > 3 kg are combined.	
<input checked="" type="checkbox"/> Manual pushing or pulling with carts, pallet jacks or any tools used to move loads <input type="checkbox"/> Load pushing/pulling is always the same, the conditions do not change significantly during the task. <input type="checkbox"/> Load pushing/pulling is different, some conditions change significantly during the task (initial or sustained force, distance traveled, grip height, etc.). <input type="checkbox"/> Pushing and pulling is combined.	
<input checked="" type="checkbox"/> Repetitive movements of the upper limbs, in tasks with clearly defined work cycles <input type="checkbox"/> You want to obtain the specific risk for the neck-shoulder area and for the hand-wrist area, separately. <input type="checkbox"/> You want to obtain the overall risk for the upper limbs, and to know the influence of the distribution of the working hours (exact sequence of events and their length in minutes).	
<input checked="" type="checkbox"/> Poor posture of different body areas <input type="checkbox"/> You want to analyze work postures sampled at regular time interval. <input type="checkbox"/> You want to analyze work postures chosen because they are the most frequent and/or most arduous a priori.	
<input checked="" type="checkbox"/> Force application for operating/using the controls/pedals, as well as pushing/pulling objects without wheels, guides or rollers, both in the standing and the sitting position.	
<input checked="" type="checkbox"/> More than 2 daily hours of effective work with display screens	

Figure 16. Wizard main screen

The task information that is going to help define the most suitable module(s) is provided below:

Initial assessment. The user wants to perform a qualitative initial assessment of the potential ergonomic risks that exist in a company, workstation or task.

There are workers over 50 years old in the company.

Pregnant worker performing activities that pose potential ergonomic risks (associated with load manual handling, posture, movements, etc.).

Manual handlings of patients are performed (lifting, moving, transferring, etc.)

Manual load lifting > 3 kg

- The person who performs the lifting task has returned to work after suffering a lower back injury (such as musculoskeletal overexertion, strains or non-specific LBP).
- Different load lifting tasks are performed in a particular sequence or rotation throughout the working day.

- Liftings are the same; their conditions do not change significantly during the task (for example, the loads weigh the same, they are lifted always in the same way, from and to the same places, etc.).
- Load liftings are different; there are significant changes in some conditions (weight, load position in the origin and destination point, etc.).
- The handling conditions of the lifting task vary greatly (for example, when preparing orders in a warehouse, where many objects with different weights are lifted, at very different heights and/or depths, with or without trunk rotation, etc.).
- > 3 kg load lifting and carrying tasks are combined.

Manual load pushing or pulling

- Load pulling and pushing is always the same; the conditions do not change significantly during the task.
- Load pushing/pulling tasks are different; there are significant changes in some conditions (initial or sustained force, distance traveled, grip height, etc.).
- Pushing is combined with pulling.

Repetitive movements of the upper limbs in tasks with clearly defined work cycles

- You want to get the specific risk to the neck-shoulder area and the hand-wrist area, separately.
- You want to get the overall risk for the upper limbs, and know the influence of the distribution of the working hours (exact sequence of events and their duration in minutes).

Poor posture of different body areas

- You want to analyze working postures sampled with a certain regular time interval.
- You want to analyze working postures selected because they are thought to be the most frequent and/or arduous.

Force application for operating/using controls/pedals, as well as pushing/pulling objects without wheels, guides or rollers, both in a standing and a sitting position.

More than 2 daily hours of effective work with display screens.

From the previous information, the program automatically shows which assessment modules should be applied. Figure 17 shows that the evaluator should apply the *Multiple MMH* module to assess lifting and load carrying tasks, and the UNE EN 1005-5 [OCRA] module to assess the repetitive movements of the upper limb.

Ergo/BV - Module selection wizard

This utility helps you select the most appropriate module/s to assess the risk of the task to be analyzed. It is possible to use more than one module to analyze the same task, because not all the assessment procedures are mutually exclusive. Specify the conditions of the analysis by marking only the relevant boxes.

Conditions **Recommended modules**

Initial assessment
You want to perform a qualitative initial assessment of the potential ergonomic problems existing in a company, workstation or task.

There are workers over 50 in the company

Pregnant worker
performing activities with potential ergonomic risks (related to the manual handling of loads, postures, movements, etc.).

Manual handling of patients are performed (lifting, moving, transferring, etc.)

Manual lifting of loads > 3 kg **Multiple MMH**

The person who performs the lifting task has returned to work after suffering a lower back injury (such as musculoskeletal overexertion, strains or non-specific lower back pain).

Different manual load lifting tasks are performed in a determined sequence or rotation throughout the workday.

The lifting tasks are always the same: the conditions do not change significantly during the task (for example, loads of equal mass are lifted, always in the same way, from and to the same places, etc.).

The lifting tasks are different, some conditions change significantly (load mass, position of the load at the point of origin or destination, etc.).

Handling conditions when lifting vary greatly (for example, when preparing orders in a warehouse where many objects with different weights are lifted, at very different heights and/or depths, with or without trunk rotation, etc.).

Lifting and carrying loads of > 3 kg are combined.

Manual pushing or pulling with carts, pallet jacks or any tools used to move loads

Load pushing/pulling is always the same: the conditions do not change significantly during the task.

Load pushing/pulling is different: some conditions change significantly during the task (initial or sustained force, distance traveled, grip height, etc.).

Pushing and pulling is combined.

Repetitive movements of the upper limbs, in tasks with clearly defined work cycles **OCRA**

You want to obtain the specific risk for the neck-shoulder area and for the hand-wrist area, separately.

You want to obtain the overall risk for the upper limbs, and to know the influence of the distribution of the working hours (exact sequence of events and their length in minutes).

Poor posture of different body areas

You want to analyze work postures sampled at regular time interval.

You want to analyze work postures chosen because they are the most frequent and/or most arduous a priori.

Force application
for operating/using the controls/pedals, as well as pushing/pulling objects without wheels, guides or rollers, both in the standing and the sitting position.

More than 2 daily hours of effective work with display screens

Figure 17. Wizard main screen showing the selected modules

Conditions. It is possible to use more than one module to analyze the same task, because not all assessment procedures are mutually exclusive.

There are, however, a number of conditions that are indeed exclusive, that is, selecting some conditions of the analysis disables the selection of others. For example, if the user specifies that the worker is pregnant, none of the assessment modules concerning physical load will be recommended (*Manual load handling*, *Repetitive movements* and *Poor posture*), and the user will be sent to the *ErgoMater assessment module*.

ISO ANALYSIS MODE

Ergo/IBV allows you to assess workstations following the technical criteria set out in the ISO 11228 series of standards for the analysis of manual load handling tasks and repetitive tasks.

The analysis of office tasks considers the criteria set out in the ISO standards, 9241, 8995 and 7730 series.

The program includes the criteria set out in the following standards:

- [ISO 11228-1 \(2003\)](#). *Ergonomics-Manual handling. Part 1: Lifting and carrying*. International Organization for Standardization (ISO).
- [ISO 11228-2 \(2007\)](#). *Ergonomics-Manual handling. Part 2: Pushing and Pulling*. International Organization for Standardization (ISO).
- [ISO 11228-3 \(2007\)](#). *Ergonomics-Manual handling. Part 3: Handling of low loads at high frequency*. International Organization for Standardization (ISO).
- [ISO 9241-303 \(2011\)](#) Ergonomics of human-system interaction -- Part 303: Requirements for electronic visual displays.
- [ISO 9241-4 \(1998\)](#) Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 4: Keyboard requirements.
- [ISO 9241-400 \(2007\)](#) Ergonomics of human--system interaction -- Part 400: Principles and requirements for physical input devices.
- [ISO 9241-5 \(1998\)](#) Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 5: Workstation layout and postural requirements.
- [ISO 9241-6 \(1999\)](#) Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 6: Guidance on the work environment.
- [ISO 9241-9 \(2000\)](#) Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 9: Requirements for non-keyboard input devices.
- [ISO 8995 \(2012\)](#) Lighting of work places -- Part 1: Indoor.
- [ISO 7730 \(2005\)](#) Ergonomics of the thermal environment -- Analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices and local thermal comfort criteria.

To activate the ISO assessment mode you must access the Configuration window (Utilities menu | Configure). The user should activate the *ISO Mode* by clicking the activation box (Figure 18).

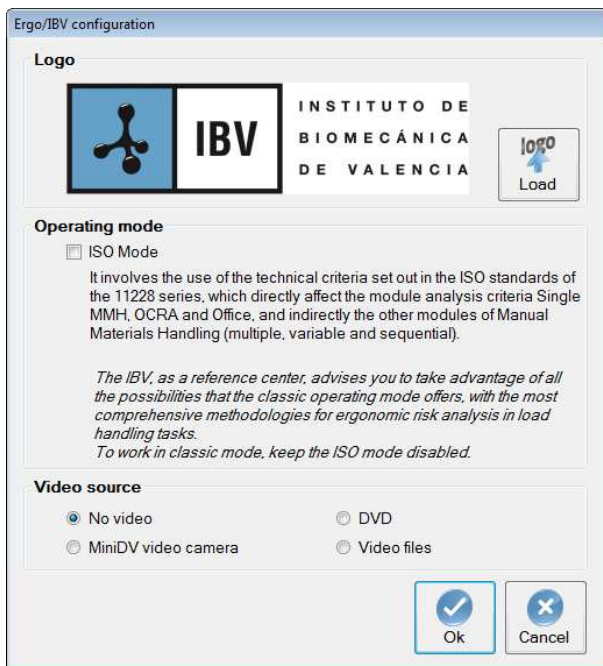


Figure 18. ISO Mode activation

Once this mode is activated, the user will **ONLY** be able to open the files that have been created in the *ISO mode*, as the program warns.

The *ISO Mode* involves the use of the criteria established in the ISO 11228, 9241, 8995 and 7730 series, which directly affect the following assessment modules (Figure 19):

- Single MMH: ISO 11228-1
- Pushing and pulling: ISO 11228-2
- OCRA: ISO 11228-3
- Office: 9241 series , ISO 8995 and ISO 7730



Figure 19. ISO assessment modules

The main features and aspects to be considered in the analysis when a user activates the *ISO Mode* are summarized below.

ISO 11228-1. Lifting

If the *ISO Mode* is configured, it should be noted that the ISO standard does not include the following risk factors:

- Additional task
- Operation performed with one hand
- Operation performed by 2 people

The ISO mode shows these risk factors crossed out (Figure 20). The evaluator should take into account the fact that if any of these factors is present in the workstation under analysis, such factor cannot be considered, which will affect the task risk index as well as the task **redesign screens**.

In regard to the **various factors included in the equation** (population, duration, frequency, horizontal position, vertical position, displacement, angle of asymmetry, and grip type), both the values and their calculation method are those referred to in the Ergo methodology (see *chapter 4*).

Task:

Company: Date: 23/03/2017

Observations:

Population:

Variables

Duration: Load mass (kg): Frequency (lifts/min):

Horizontal location (cm): *Origin* *Destin.*

Vertical location (cm):

Angle of asymmetry (°):

Coupling:

Control at destination

One-handed-operation

Two-person-operation

Additional task

Index:

Recommended Mass Limit (kg)

	M ref	HM	VM	DM	AM	FM	CM	OM	PM	AT	RML
Origin											
Destin.											

Video Report Redesign Ok Cancel

Figure 20. Variables not considered in the ISO standard (crossed out)

There is only *variation in the grip type factor*, for which the ISO standard considers a value of 1.00 when the grip is regular and the height is greater than or equal to 75 cm (0.95 in ERGO).

In relation to the risk index of the task, the ISO standard only considers whether the lifting is acceptable or unacceptable (by comparing between the weight handled and the reference mass). However, the following values are obtained in order to help the evaluator interpret the results:

- *Acceptable* risk (Index ≤ 1)
- *Unacceptable* risk (Index > 1)

The report provided by the program consists of the same sections (identification, variables and calculations) as the Ergo methodology. The report header shows that the lifting has been analyzed according to the ISO 11228-1 criteria.

The "variables" section of the report does not include those variables not considered in the ISO methodology (additional task, operation performed with one hand, and operation performed by two people); obviously, the risk index of the task is limited to the 2 levels considered in the ISO (acceptable and unacceptable).

Variable manual load handling tasks follow the same criterion as single MMH, and thus the additional task, operation performed with one hand, and operation performed by two people variables are not considered in the assessments performed in the ISO Mode.

Sequential manual load handling tasks do not consider the *Additional task* factor because the ISO standard does not include it.

However, it should be noted that the ISO standard does not cover the analysis of multiple, variable or sequential tasks, which means that the risk level calculated follows the ERGO criteria and, therefore, there are three levels:

- *Acceptable* risk (Index ≤ 1)
- *Moderate* risk ($1 < \text{Index} < 1,6$)
- *Unacceptable* risk (Index $\geq 1,6$)

ISO 11228-2. Pushing and pulling

With regard to the assessment of single and multiple pushing/pulling tasks, the criteria considered in the ISO standards and the Ergo methodology have points in common.

In multiple lifting tasks that involve pushing/pulling, the additional task factor cannot be considered since this factor is not included in the ISO standard.

The main difference is based on the results interpretation, as the ISO standard compares the forces measured with those established in the tables and also sets a color code:

If the forces measured, initial or sustained, are greater than the recommended forces, the risk level is RED.

Otherwise, the risk level is GREEN.

Although the ISO standard does not establish any risk index, the following values are obtained so as to help the analyst:

- *Acceptable* risk (Index ≤ 1)
- *Unacceptable* risk (Index > 1)

The report provided by the program consists of the same sections (identification, variables and calculations) as the Ergo methodology, except the additional task factor (in the case of multiple tasks). The report header shows that the pushing/pulling has been analyzed according to the ISO 11228-1 criteria.

ISO 11228-3. OCRA

The assessment procedure set out in the ISO 11228-3 standard has similarities with the procedure included in ERGO, specifically with "Method 2 - Detailed risk assessment" of UNE EN 1005-5 (2007) concerning the assessment of risk due to high-frequency repetitive handling. In turn, this standard is based on the OCRA method (*Occupational Repetitive Actions*) originally developed by the EPM research center in Milán [Colombini, Occhipinti y Grieco, 2002].

With regard to the operating mode and use of the program, since both methodologies are similar, it is advisable to read the manual of the OCRA Multitask module.

However, there are some differences between the Ergo and the ISO operating mode which are important to point out:

1. The nomenclatures used by ISO 11228-3 and the ERGO method differ in some multipliers of the equation. The equivalence table of nomenclatures between the Ergo and the ISO methodology (ISO 11228-3) is shown below.

ERGO	ISO
CF	K_i
D_j	t_j
F_{Mj}	F_{Mj}
P_{Mj}	P_{Mj}
A_{Mj}	A_{Mj}
D_{UM}	t_M

2. The method to calculate the OCRA index differs in both procedures. The ERGO mode incorporates the criteria of the UNE EN 1005-5 (2007) standard, as well as the procedure set out in the article "Ocrá method: a new procedure for analyzing multiple repetitive tasks [E. Occhipinti, D. Colombini, 2009] *Research Unit Ergonomics of Posture and Movement (EPM), Foundation Don Gnocchi Onlus Milan -Italy*", presented at the 17th IEA Conference of the International Ergonomics Association on August 9 - 14, 2009 Beijing, China, to

calculate the OCRA index in multiple repetitive tasks. In the OCRA method used in the ISO standard, the criterion to calculate the OCRA index is the one set out in the UNE EN 1005-5 (2007) standard. The **calculation of the OCRA index used in the ISO 11228-3 standard** is shown below.

In the main window (Figure 21) for each upper limb, both right and left:

- **ATA – Number of actual technical actions, total.** It is the total number of actual technical actions during the working hours, that is, those that are really performed by the worker including all the repetitive subtasks analyzed. It is obtained by the following equation:

$$ATA = \sum_{j=1}^n F_j \times D_j$$

where:

n	Number of repetitive subtasks performed during the working hours
j	Generic repetitive subtask
F_j	Frequency (technical actions/min) of subtask j
D_j	Duration (minutes) of subtask j

- **RTA – Number of reference technical actions, total.** It is the total number of reference technical actions during the working hours, that is, those recommended taking into account the conditions under which they are performed. For all the repetitive subtasks analyzed, it is obtained by the following equation:

$$RTA = \sum_{j=1}^n [CF \times D_j \times (F_{O_{Mj}} \times P_{O_{Mj}} \times R_{e_{Mj}} \times A_{d_{Mj}})] \times (D_{u_M} \times R_{c_M})$$

where:

n	Number of repetitive subtasks performed during the working hours
j	Generic repetitive subtask
CF	Constant of frequency = 30
D_j	Duration (minutes) of subtask j
F_{O_{Mj}}, P_{O_{Mj}}, R_{e_{Mj}}, A_{d_{Mj}}	Force, posture, repetitiveness, and additional multipliers for subtask j
D_{u_M}	Duration multiplier
R_{c_M}	Recovery multiplier

- **OCRA index.** It is a representative value of the risk level of musculoskeletal disorders in the upper limb. It is calculated as

the ratio of the two previous values [ATA/RTA]. The risk grows as the index increases, with three levels and their associated color codes, which are interpreted as follows:

- ≤ 2,2 *No risk* (green). Acceptable condition.
- 2,3 – 3,5 *Very low risk* (yellow). Improvements are recommended.
- > 3,5 *Risk* (red). Not acceptable. It is necessary to redesign the subtask and/or the workstation.

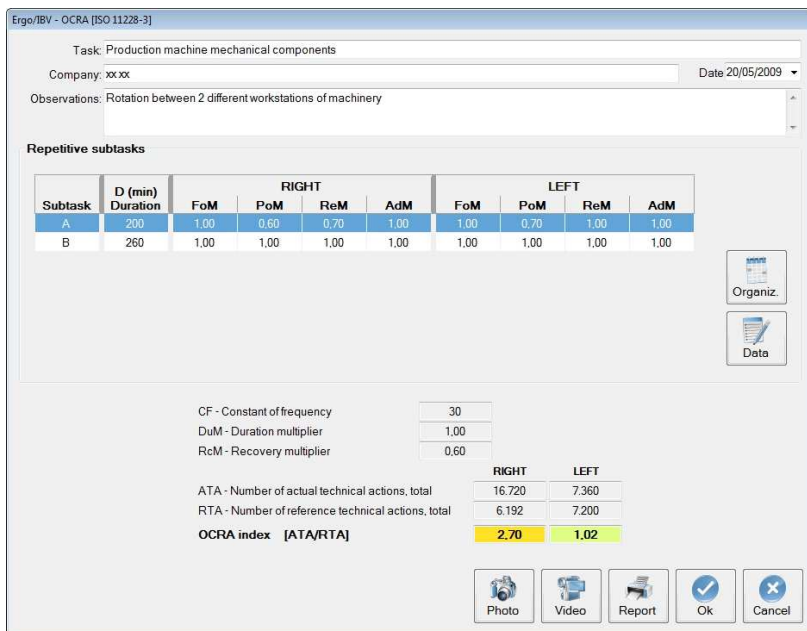
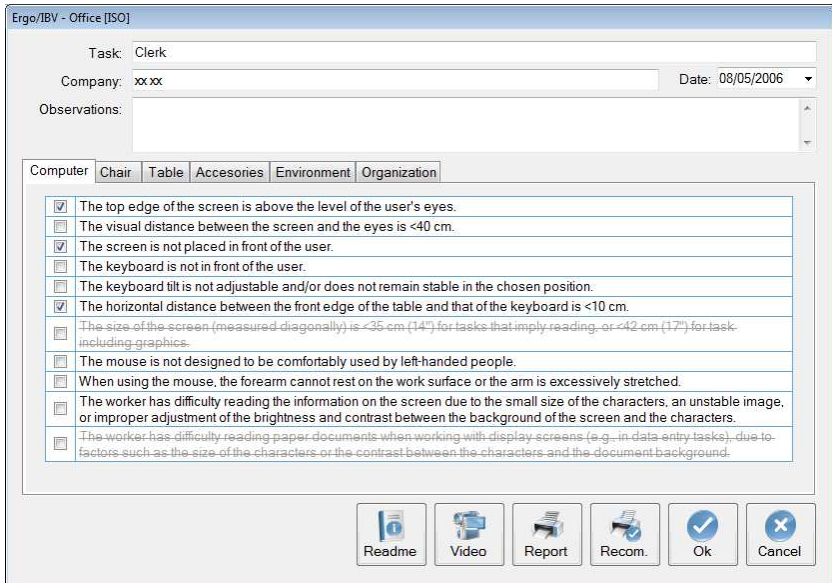


Figure 21. OCRA [ISO 11228-3] – Main window

In addition to these results, other values are displayed in the main window (Figure 21). Each row of a repetitive subtask includes the name, duration, and the force, posture, repetitiveness and additional multipliers obtained for each side. The constant of frequency (which always takes the value 30) and the calculated duration and recovery multipliers are shown below.

ISO 9241 series, ISO 8995 and ISO 7730. OFFICE

If the ISO mode is configured, this module does not consider some of the criteria from the European and Spanish legislation. These criteria will be shown disabled (crossed out), Figure 21.



Task: Clerk

Company: xxx Date: 08/05/2006

Observations:

Computer | Chair | Table | Accessories | Environment | Organization

- The top edge of the screen is above the level of the user's eyes.
- The visual distance between the screen and the eyes is <40 cm.
- The screen is not placed in front of the user.
- The keyboard is not in front of the user.
- The keyboard tilt is not adjustable and/or does not remain stable in the chosen position.
- The horizontal distance between the front edge of the table and that of the keyboard is <10 cm.
- The size of the screen (measured diagonally) is <35 cm (14") for tasks that imply reading, or <42 cm (17") for task including graphics.
- The mouse is not designed to be comfortably used by left-handed people.
- When using the mouse, the forearm cannot rest on the work surface or the arm is excessively stretched.
- The worker has difficulty reading the information on the screen due to the small size of the characters, an unstable image, or improper adjustment of the brightness and contrast between the background of the screen and the characters.
- The worker has difficulty reading paper documents when working with display screens (e.g. in data entry tasks), due to factors such as the size of the characters or the contrast between the characters and the document background.

Readme Video Report Recom. Ok Cancel

Figure 21. Variables not considered by the ISO standards in office tasks (crossed out)

The evaluator should note that if any of the criteria that appear crossed out are present in the workstation under analysis, it will not be considered and, therefore, the recommendations for improvement cannot be obtained. The criteria not covered by the ISO standards are as follows:

- **Computer:**
 - The screen size (measured diagonally) is <35 cm (14") for reading tasks, or <42 cm (17") for tasks including graphics.
 - The worker has difficulty reading documents (in paper) when working with display screens (for instance, in data entry tasks), due to factors such as the size of the characters or the contrast between the characters.

- **Chair**
 - Some accessible parts of the chair may have rough edges, protrusions or coatings which might cause injuries to the user.
 - The chair is not stable and may fall over when leaning on the edge of the seat, the back, or one of the armrests.
- **Table**
 - There are drawers or cross planks below the central part of the board.
 - In the space that surrounds the table where the chair of the worker is the minimum free surface is $<2 \text{ m}^2$, or the distance between the frontal edge of the table and the closest obstacle behind the worker is $<115 \text{ cm}$.
- The worker has not been informed about the risks involved in the job and the preventive measures associated with them.

The report provided by the program consists of the same sections as the Ergo methodology. The report header shows that the task has been analyzed according to the ISO criteria.

ADDING PHOTOGRAPHS

All the risk analysis tasks allow you to include a photograph that will be stored along with the data of the task and which will appear in its report.



By pressing the *Photo* button in the main screen of all the modules, you access the photograph window (Figure 22), which allows you to manage the photograph of the task.

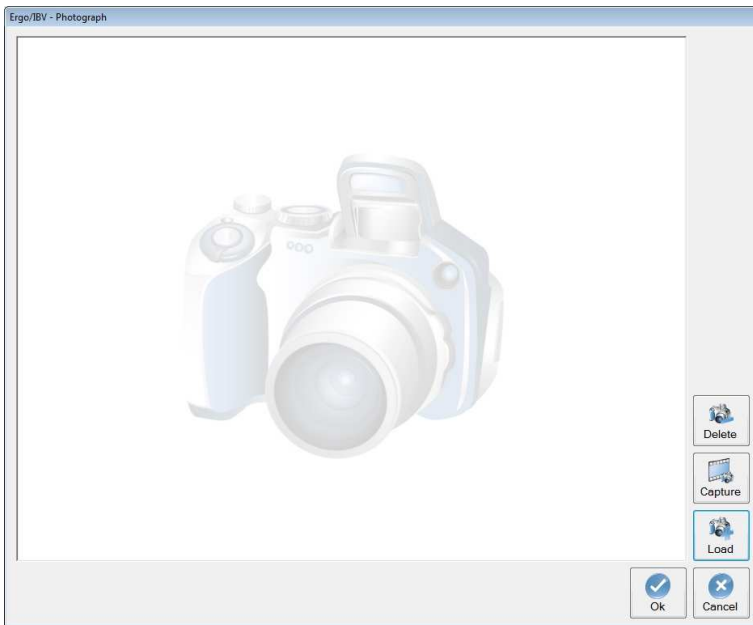


Figure 22. Photograph management window

The function of the various buttons in the photograph window is as follows:



The *Load* button selects a picture to attach it to the task.



The *Capture* button takes a screenshot of the current frame of the video player.



The *Delete* button removes the photograph of the task.

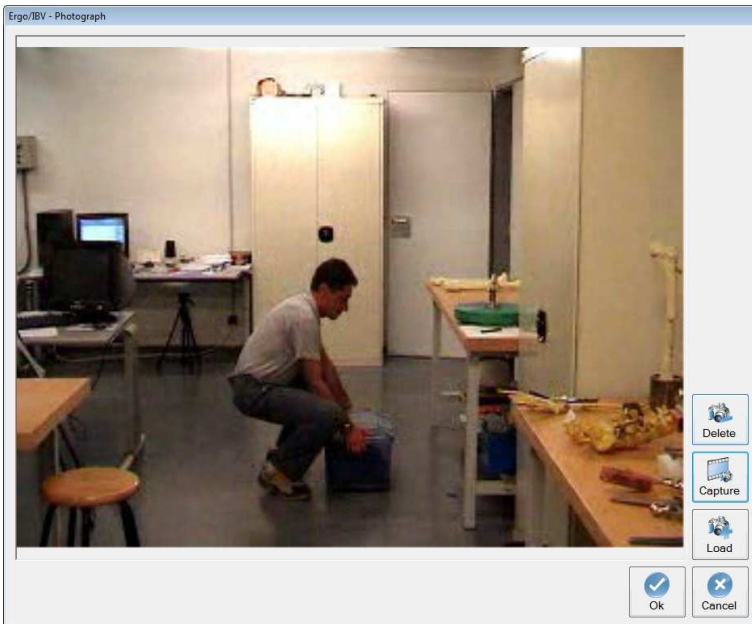


Figure 23. Photograph of the task

HOW TO USE THE VIDEO

The Ergo/IBV program allows you to view the worker task that has been recorded on video. This is a considerable advantage as it avoids the need to use an additional monitor for this function. The video player is accessible from all the application modules. The basic instructions for its operation are described below.

Video source. You must specify the video source in the *Configuration* window of the *Utilities* menu, and select one of the four options:

- *No video*, when this function is not available. This is the option configured by default.
- *MiniDV video camera* to view images from the camera connected to the computer via IEEE 1394 port (FireWire or i.LINK).
- *DVD* to watch images recorded in DVD format.
- *Video file* to view images in other video files (avi, wmv, mpeg, mpg, vro, etc.).










Video player. Pressing the “Video” button from any task opens the Video Player window (Figure 24), which is resizable and can be located anywhere on the screen.



Figure 24. Video player

If the source specified is a video file, the program displays a window where you have to select the file.

The video player includes the following commands:

-  Go backward 1' (in a video file) / Go to previous
-  Go backward 10'' (in a video file) / Rewind
-  Play
-  Pause
-  Stop
-  Go forward 10'' (in a video file) / Forward
-  Go forward 1' (in a video file) / Go to next
-  Audio (if DVD)
-  Menu (if DVD)

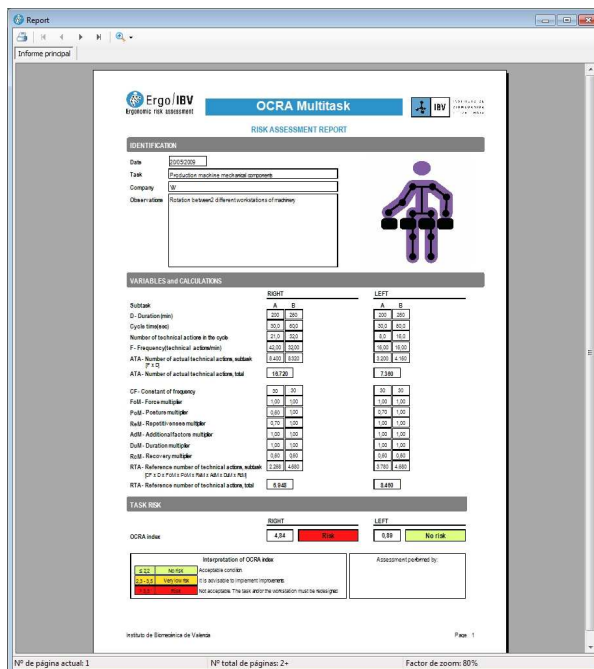
Next to these buttons there is an indicator that shows the number of both the title and the current scene (if there is a DVD source), and a timer (hours, minutes and seconds).

HOW TO USE THE REPORTS

The program generates different types of reports, according to the module applied, the contents of which will be detailed in the relevant chapters of this manual. Their common features are explained below.

Report window. The window where the reports are displayed includes the following (Figure 25):

- Button to print the report.
- Drop-down menu to select the zoom.
- Buttons to move through the pages (first, previous, next and last).



Report
Informe principal

Ergo/IBV Ergonomic risk assessment **OCRA Multitask**

RISK ASSESSMENT REPORT

IDENTIFICATION

Date: 2023/2024
 Task: Ergonomic machine maintenance
 Company: W
 Observation: Relation between different convolutions of machinery

VARIABLES and CALCULATIONS

	RIGHT		LEFT	
	A	B	A	B
Subtask				
D - Duration (min)	200	200	200	200
Cycle (times)	800	800	800	800
Number of technical actions in the cycle	2100	2100	810	1110
F - Frequency (technical actions/min)	10.50	10.50	4.05	5.55
ATA - Number of actual technical actions, subtask DP x D	1.680	1.680	1.296	1.422
ATA - Number of actual technical actions, task DP x D	10.200		7.290	
CP - Constant of frequency	0.20	0.20	0.20	0.20
PAF - Posture multiplier	2.00	2.00	1.00	1.00
PAF - Posture multiplier	0.00	0.00	0.00	0.00
RA - Repetition action multiplier	1.50	1.50	1.00	1.00
AD - Additional actions multiplier	1.00	1.00	1.00	1.00
DA - Duration multiplier	1.00	1.00	1.00	1.00
RA - Recovery multiplier	0.00	0.00	0.00	0.00
RTA - Reference number of technical actions, subtask DP x D PAF x F PAF x AD x DA x RA	2.268	2.268	1.701	2.421
RTA - Reference number of technical actions, task DP x D PAF x F PAF x AD x DA x RA	1.420		1.080	

TASK RISK

	RIGHT	LEFT
OCRA Index	4.84	0.89
	Risk	No risk

Interpretation of OCRA Index


OCRA Index	Interpretation
5.01 - 6.00	No risk
4.01 - 5.00	No risk
3.01 - 4.00	No risk
2.01 - 3.00	No risk
1.01 - 2.00	No risk
0.01 - 1.00	No risk

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Nº de página actual: 1 Nº total de páginas: 2 Factor de zoom: 80%

Figure 25. Report display window

Company logo. The top right corner of the pages of any report can include the logo of the company that purchased the application. This logo is loaded as follows:

- Press the button  in the *Configuration* window of the *Utilities* menu.
- Select the logo from the window opened for this purpose. The format of the selected image must be JPG.

Evaluator identification. All the *task reports* generated by the application have a space for evaluators to enter their name and signature. This box is usually located on the first page, except in certain types of report where it is located at the end.

Task image. In the header of each report, the software includes by default the image associated with the module used for the analysis, together with the identification data of the case. If a photograph was added to the task, the default image will be replaced by the photograph. It is also possible to replace the module image with a recorded image of the real task without having to add it to the task. To do this, the *Video Player* window must be open. The program will load the image that is being displayed when the **report** button is pressed and, therefore, the evaluator must find and freeze the desired image before launching the report from any task.

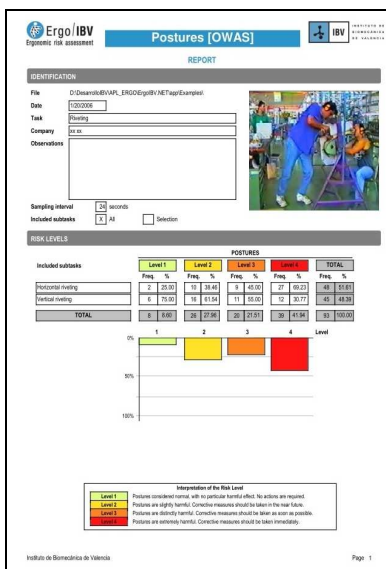



Figure 26. Report including the task image


Report of the case study. Ergo/IBV can also generate a report that includes all the tasks or workplaces that belong to the same case study.

This study also provides a list with the name of the task analyzed or the workstation designed, the company to which it belongs, completion date, module used, and a summary of the results obtained.



Ergonomic risk assessment

Ergo/IBV



INSTITUTO DE BIOMECANICA DE VALENCIA

CASE STUDY REPORT

IDENTIFICATION

Date:

Name:

Description:

Ergonomic interventions:

Observations:


SUMMARY OF THE TASKS

TASK	COMPANY	DATE	MODULE	RESULTS
Example company NNN NNN	NNN NNN	15/03/18	ErgoCheck.	<input type="checkbox"/> 11 potential risk factors detected.
Pulling a cart	NNN NNN	11/01/05	Single MMH - Pulling	■ Index: 1,32; Moderate risk
V - Orders puller	NNN NNN	19/01/13	Variable MMH	■ Index: 1,80; Unacceptable risk
A - Container lifting	NNN NNN	16/01/13	Single MMH: Lifting	■ Index: 1,64; Unacceptable risk
Boxes lifting	NNN NNN	03/04/09	Injured MMH	■ Medium risk
Packaging of products	NNN NNN	10/01/05	Single MMH: Lifting	■ Index: 1,12; Moderate risk
Rotation 1	NNN NNN	01/02/13	Sequential MMH	■ Index: 4,18; Unacceptable risk
Orders puller in a warehouse	NNN NNN	03/12/10	Variable MMH	■ Index: 1,88; Unacceptable risk
Shelving boxes	NNN NNN	16/09/05	Multiple MMH	■ Index: 1,49; Moderate risk
B - Piece lifting	NNN NNN	17/01/13	Single MMH: Lifting	■ Index: 1,01; Moderate risk

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Figure 27. Report of the case study. Example 1



Ergo/IBV
Ergonomic risk assessment

Ergo/IBV



IBV
INSTITUTO DE BIOMECÁNICA DE VALENCIA

CASE STUDY REPORT

IDENTIFICATION


Date

Name

Description

Ergonomic interventions

Observations



SUMMARY OF THE TASKS

TASK	COMPANY	DATE	MODULE	RESULTS
Other Workstations company	VV	15/03/18	ErgoCheck	<input type="checkbox"/> 14 potential risk factors detected.
Workstations company	VV	15/03/18	ErgoCheck	<input type="checkbox"/> 17 potential risk factors detected.
Employee engine plant automotive sector	VV	28/03/14	EN [FORCES]	Subtask Actuating lever: ■ Index: 0,82; Risk unacceptable Subtask Pushing boxes: ■ Index: 2,30; Risk unacceptable Subtask Driving machine: ■ Index: 0,39; Risk acceptable Subtask Pushing actuator: ■ Index: 0,56; Risk moderate
Laundry	VV	30/03/10	Postures[REBA]	Subtask Sorting clothes: ■ - Posture 1: REBA: 9; Risk High ■ - Posture 2: REBA: 3; Risk Low ■ - Posture 3: REBA: 3; Risk Low Subtask Washing machine: ■ - Posture 1: REBA: 5; Risk Medium ■ - Posture 2: REBA: 7; Risk Medium Subtask Ironed: ■ - Posture 1: REBA: 3; Risk Low ■ - Posture 2: REBA: 5; Risk Medium ■ - Posture 3: REBA: 10; Risk High
Field collection	VV	27/03/14	Repetit. Tasks	■ ST Neck Risk: IV ■ MT Neck Risk: IV ■ LT Neck Risk: IV

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Figure 28. Report of the case study. Example 2

QUESTIONNAIRE MANAGER

If the evaluator wishes, the *questionnaire manager* can be used. It is an optional tool that makes it possible to collect risk assessment questionnaires through the web to automatically incorporate their data into the Ergo/IBV application. It is a useful alternative to conventional paper forms to collect and enter the data manually in the program.

Currently, this tool is only enabled for the questionnaires associated with the *Ergo+50* module. Such questionnaires, the specific content of which is explained in detail in the appropriate chapter of this manual, must be filled out by the workers themselves.

The evaluator accesses the tool using the menu '*Utilities | questionnaire manager*', whose main purposes are:

- To create *studies* to collect the opinion of a group of workers to whom the questionnaire is sent (such group is defined by their email addresses). At the beginning of the study, each worker will receive an email with the link to the questionnaire, so that they can answer it through the web.
- To specify particular opening and closing dates for each study. It is also possible to make changes in this regard such as closing the study manually at any time, extending its closing date or bringing it forward automatically after receiving a certain percentage of questionnaires answered. The questionnaires can only be answered while the study is open.
- To perform a statistical follow-up of the answers received.
- To send a reminder message at any time to those workers who have not answered the questionnaire.
- To download the results of each study in a file in **xml** format, which will be subsequently *imported* from the risk assessment module to analyze the data.

It is important to note that the evaluator does not have the ability to relate the received answers with the emails of the workers to whom the questionnaire was sent; therefore, the **anonymity** and **confidentiality** required to apply the Ergo+50 module is fully guaranteed, as later explained when describing that module.