



## **ERGONOMIC ADAPTATION OF OFFICE AND INDUSTRIAL WORKSTATIONS FOR DISABLED WORKERS**

### **1. Organisations involved**

Instituto de Biomecánica de Valencia (IBV)

### **2. Description of the case**

#### **2.1. Introduction**

In order to integrate or reintegrate disabled people into employment, whether sheltered or otherwise, the working environment must be suited to the capabilities and characteristics of the workers.

In this context, the Instituto de Biomecánica de Valencia (IBV) carried out two different projects on the analysis and adaptation of workplaces: ADAPTOFI, which included four case studies relating to the office environment, and ADAPREC, comprising five case studies on the industrial work environment.

The ErgoDis/IBV method was used to carry out the assessments. This method was designed to identify areas of mismatching between work demands and the functional abilities of workers, and to evaluate job risk levels arising from physical and environmental workload. The results of the project have been incorporated in free multimedia material to provide methodological as well as practical information about real cases to professionals in the field.

Ergonomics applied to the integration or reintegration of disabled people into sheltered and ordinary employment implies the selection and/or the accommodation of workstations suited to the characteristics of the workers. In order to do this, it is necessary to analyse work demands and worker capacities, to compare them with one another and to propose adaptive measures to overcome mismatches between them.

On the other hand, the risk to which the worker is exposed must be taken into account because, in many cases, it may represent an even wider problem than that caused by a mismatch between demands and capacities.

#### **2.2. Aims**

The two projects had the same goals: the development of a database with recommendations concerning workplace adaptations, and the analysis of several workstations occupied by disabled people to enable relevant adaptations to be made.

#### **2.3. What was done, and how?**

The Instituto de Biomecánica de Valencia (IBV) developed two different projects for the analysis and adaptation of workstations: ADAPTOFI, which included four case studies on the office work environment, and ADAPREC, comprising five case studies on the industrial work environment.

In both projects, similar steps were accomplished:

- Field study at selected workplaces, using several techniques to gather information (standardised questionnaires, observation, video recording of tasks, compilation of dimensional data, etc.).
- Data analysis, using ErgoDis/IBV method.

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- Proposal for the adaptation of the workplace, based on the worker needs, on the possibilities of implementation and on the opinions of all the people involved in the specific case.
- Implementation of the adaptations. Some adaptations (equipment, furniture, software, etc.) were obtained from conventional or specialised stores and adjusted or modified if necessary, while other adaptations were specifically designed and made up for these projects.
- Follow-up of the effectiveness of the adaptations, in order to detect undesirable effects.
- Project dissemination.

The method used in these two projects is called ErgoDis/IBV, a software tool specially designed for adapting workstations to suit people with physical, sensory, and/or mental impairments.

The method involves three different steps.

First, work and worker information is gathered by means of standardised forms. This requires direct observation of workers performing their jobs and also interviews with workers, supervisors, and other people involved in the process. A set of forms has been developed to analyse the workplace, the tasks, the working conditions and risks of the workplace. A worker analysis evaluates the worker's abilities and gathers data on his disability and the technical aids he normally uses. A form evaluates the worker's tolerance to the workplace: his ability to cope with environmental and psychosocial aspects and workplace dimensions.

Finally a test is included where the worker may express his opinion about postures, movements, forces and other working conditions, as well as make suggestions to solve possible problems. A video recording is made of the work tasks in order to determine risks related to physical workload.

Once the information has been gathered, the software tool will carry out the data processing. Finally, a decision can be made about the suitability of a disabled worker for a specific job considering the situation as a whole. The database has been designed to enable a search of solutions according to different criteria.

### **Case study example from ADAPTOFI project:**

**Workplace:** the job title is 'accounts clerk'. It is an administrative post, involving a lot of computer work and handling of documents. The most important demands are related to activity of the upper limbs, vision and cognitive aspects.

**Worker:** The worker is a man of 23. His principal limitations are related to shorter reach and reduced mobility at the upper limb and trunk due to his short stature. The main problems detected at this workplace were as follows:

- mismatches: difficulties when sitting, accessing the work surface, and reaching the elements needed at the workplace (documents at the table, folders in shelves, computer controls);
- physical workload risk: bad postures and movements of arms and trunk in the main working situations: seated, writing/reading documents, typing, reaching objects, etc.

To eliminate these problems, some recommendations were put forward. Once they had been discussed and approved by the worker and other relevant people, the following adaptations were implemented:

- special office chair: this was a commercial chair intended for children, so it has appropriate dimensions for the user. This chair was also adjustable, allowing the user to alter seat height easily;
- portable steps, to make it easier to reach shelves and cabinets;
- accessories to facilitate document handling at the desk: rotary trays, articulated copyholder, etc.;

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- organisational measures, for example: changes in the location of elements in shelves according to their size, weight and frequency of use, reduction in monitor height, relieving the worker of the task of making copies, etc.

## **Case study example from ADAPREC project:**

**Workplace:** The job involves the assembly of halogen kits. The worker, who is seated, takes parts from one box on his right, does the assembly on the work table, places a sticker on the kit and puts the final product in another box at his left. When the box is full, the worker puts it on a conveyor belt and takes another empty box. This work requires intensive use of the upper limbs (mobility of the arms and accuracy of the hands). The posture of trunk and neck is mostly static. There is also a need for good close vision. Concentration is the main mental requirement.

**Worker:** The worker is a 30-year-old man with a mental impairment secondary to cerebral palsy. His main limitations are related to reduced mobility in arms, hands and legs, and difficulties in processing information.

The main problems detected at this workplace were:

- mismatches: related to difficulty in reaching the elements in the boxes, removing the stickers and carrying the boxes to the conveyor belt. Other relevant mismatches were related to cognitive problems: insufficient attention to complete the task and low initiative to take his own decisions;
- physical workload risks: bad postures and movements of arms, trunk and neck in the main working situations: seated, reaching objects, etc.
- to remove these problems, some recommendations were provided. Once they had been discussed and approved by the worker and his manager, the following adaptations were implemented:
- ergonomic chair, in order to improve the general working posture, increase comfort and make reaching easier;
- new work surface, with the following features: enough space to fit all the working elements comfortably, height adjustment, L-type legs to facilitate access and adjustable footrest;
- two work stands, adjustable in height and tilt, to place the boxes on and enable the material to be reached easily;
- adhesive label dispenser for inside roll winding (this tool allows stickers to be removed easily);
- measures to improve the worker's cognitive performance, for example drawing marks on the table showing the best way to complete the task, displaying photos of what is considered a good product and/or showing the main mistakes, etc.;
- help other workers when carrying the boxes to the conveyor belt.

## **2.4. What was achieved?**

This tool has been applied to more than 400 workers with physical, sensory and/or mental disabilities. More than 300 relevant professionals have been trained to use the method. The project has produced free multimedia material to provide methodological as well as practical information about real cases to professionals and others involved in the occupational integration of people with disabilities. A new application has been developed and implemented in the form of the Ergo/IBV method, which consists of a tool for ergonomic risk assessment for pregnant workers. The assessment is made by means of a simple checklist, taking into account risk factors related to physical demands of the task and working environment and organisational conditions which may involve problems for maternal and/or foetal health.

## **2.5. Success factors**

The success of this method is guaranteed because it is based on the gathering of very detailed information about the worker himself and the workplace.

## **2.6. Further information**

Contact information:

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## **2.7. Transferability**

This method of assessing and adapting workstations for disabled people can be used in other countries. It can also be adapted to other sectors of activity.

## **3. References, resources:**

- <http://osha.europa.eu/en/publications/reports/TE7809894ENC>