In order to encourage improvements, especially in the working environment, as regards the protection of the safety and health of workers as provided for in the Treaty and successive action programmes concerning health and safety at the workplace, the aim of the Agency shall be to provide the Community bodies, the Member States and those involved in the field with the technical, scientific and economic information of use in the field of safety and health at work.

European Agency for Safety and Health at Work

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Turn your back on musculoskeletal disorders (MSDs)

PREVENTING MSDs IN PRACTICE

European Week for Safety and Health at Work

2000

European Agency
for Safety and Health
at Work

Turn your back on musculoskeletal disorders (MSDs)

PREVENTING MSDs IN PRACTICE

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A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://europa.eu.int).

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1.

INTRODUCTION

Background

Musculoskeletal disorders (MSD) are one of the most common work-related ailments affecting millions of European workers across all employment sectors at a cost of billions of euros to Europe's economy. The disorders cover a broad range of health problems. The main groups are back pain/injuries and work-related upper limb disorders, commonly known as 'repetitive strain injuries'. Lower limbs can also be affected. They are common across all employment sectors and industries in all the Member States in the European Union. Once they have occurred they can be difficult to treat and can result in permanent pain and disability for the worker. However, much of the problem could be prevented or reduced by following existing health and safety regulations and guidance on good practice. Unless effective steps are taken the toll of workers suffering will increase along with the costs to industry. Therefore many employers want to know how to introduce effective measures in practice.

Unless effective steps are taken the toll of workers suffering will increase along with the costs to industry

Sharing good practice

Across the European Union Member States a common set of directives aimed at preventing health and safety risks in the workplace apply. An important role of the European Agency for Safety and Health at Work is to gather and make available information that will support and promote the prevention of work-related ill health. This includes assisting and stimulating the sharing of information to solve common problems.

This publication and the Agency's web site aim to show that work-related musculoskeletal problems can be solved in many ways. They provide real examples of how companies and organisations have made interventions and sought to reduce musculoskeletal disorders at work. Each type of industry and workplace has its own conditions, that can also vary between Member States. Therefore work practices and solutions to problems must be matched to the particular situation by carrying out an assessment of the risks at the actual workplace concerned (see box 1). Nevertheless, many musculoskeletal problems are not unique and solutions can be relevant and transferable across various sectors, types and sizes of enterprises.

Box 1.

Risk assessment

Before Good Practice information is applied, an assessment of the hazards and risks present in the workplace should be carried out and reference made to relevant national legislation.

A risk assessment is a careful examination of what could cause harm to people, so that you can decide whether you have taken enough precautions or need to do more to prevent harm. The aim is to make sure that no one gets hurt or becomes ill. If a risk assessment is not carried out before implementing good practice information, there is a danger not only that risks may not be controlled but also that there may be wastage caused by misapplied resources.

Source: Agency website Good Practice area where more information about risk assessment and good practice is available (see references at end of this publication)

The practical examples

The 16 examples of good practice MSD prevention presented here are all award winners in a European competition run as part of the European Week for Safety and Health at Work 2000. The aim behind this European Agency initiative has been to support the dissemination of good practice information about MSDs and to increase the exchange of information about effective ways of prevention and 'practical solutions' in Member States and at European level.

The winners come from 13 EU Member States and include small and medium-sized enterprises, large companies, a trades union and a specialist safety and health institute, operating in very different sectors.

Each example describes the nature of the problem, the solution applied and the results. It is hoped the cases will give those in the workplace an idea of what is achievable. It is not meant to be definitive or provide detailed technical guidance. Not all elements of all cases were successful and these short summaries present the best features to demonstrate what can work in practice and the process to achieve it. Some of the enterprises developed their own solutions using their own expertise. Others found it useful and cost-effective to use consultants with expert knowledge and practical experience in investigating MSD problems. The majority included the involvement of employees and their representatives to determine the problems and try out solutions. This is crucial to success as they have first hand experience of the work situation. Some initiatives were initiated by trade union organisations. A table at the end lists the title of the example, source of problem, industry and intervention.

Each example describes the nature of the problem, the solution applied and the results

Risk prevention

It is hoped that these examples will be of practical use to others. Good practice is about taking effective action to tackle the root cause of the problem. Every organisation is different so for an existing solution to be used by another organisation, it has to be adapted to their particular circumstances. The European directives on safety and health at work and national legislation to implement them and supporting guidelines set out the approach to take (see box 2). The Agency website provides links to information about these directives and to national sites providing information about their legislation, guidelines and also national good practice solutions. Various reports and factsheets giving further information about MSD risks and their prevention are available from the Agency website, as well as more examples of Good Practice and advice about how to use them. See 'references and sources of further information' section.

European prevention approach

- Avoid MSD risks;
- evaluate MSD risks that can not be avoided;
- combat the MSD risks at source;
- adapt the work to the individual, especially the design of workplaces, the choice of work equipment and the choice of working and production methods, with a view, in particular, to alleviating monotonous work and work at a predetermined work-rate and to reduce their effect on health;
- adapt to technical progress;
- replace the dangerous by the non-dangerous or less dangerous;
- develop a coherent overall prevention policy which covers technology, organisation of work, working conditions, social relationships and the influence of factors related to the working environment;
- give collective protective measures priority over individual protective measures
- give appropriate instructions to workers.

Based on "Framework" Directive 89/391 article 6.2 (5)

Acknowledgements

The Agency relied upon its network of 'Focal Points' in the Member States (competent authorities, or bodies nominated by them, responsible for occupational safety and health) to nominate good practice examples for the Agency award scheme. We would like to thank them and the winning organisations for their help in the production of this publication.

European Agency for Safety and Health at Work,

November 2000

2.

PRACTICAL SOLUTIONS

2.1 ADAPTING A FORKLIFT TRUCK

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Task

Unloading lorries and storage of packages on pallets in a warehouse

Problem

A forklift truck is used to unload lorries. Standard packages of bags of polyethylene and polypropylene granules are stacked on pallets. The pallets are then transported and stacked in a large warehouse.

Forklift truck drivers had reported various work-related neck and back problems to the company medical physician. A survey of mental and physical stress in the materials handling department, supplemented by data from conversations between individual employees and the physician, showed that full-time forklift truck driving was the most stressful job in this department. An ergonomic analysis was made of the work and the driver's cab. The ground was uneven, consisting of 'Stelcon' elements, with the result that drivers were continuously exposed to major shocks and jerks. For safety reasons the loaded forklift trucks were driven in reverse. Thus, the shocks were absorbed with the body turned. The driver's seat was not provided with springs. This resulted in further back strain. The forklift used turned out to have an especially low cabin structure to enable the containers to be loaded. Increased pressure of work in this department also needed to be resolved by organisational measures. Technical and safety aspects were also regarded as important objectives that needed improving

Solution

IDEWE, an external authority for prevention and protection, implemented this project at Borealis Beringen.

A multidisciplinary project group was set up. The engineer from the Materials Handling department directed the project. Various operators from the Materials Handling department ensured participative input.

In addition to the participation of Borealis's in-house prevention department, the company doctor and the ergonomist from IDEWE – the external prevention authority – and an employee of Barlow Handling (a company that sells, hires out and adapts forklift trucks) also took part in it.

Determining the ergonomics solution also involved the use of anthropometric data of the drivers and recommendations to propose changes to the cab

The subjective views and experiences of the Materials Handling workers were already known from the survey and the conversations with the company physician. The ergonomists used this data and ergonomic analysis of the existing situation and forklift truck, (based on the "NOVA" checklist) to assess the situation. The project group then formulated ergonomic recommendations. Determining the ergonomics solution also involved the use of anthropometric data of the drivers and recommendations to propose changes to the cab.

First the ground surface in the warehouse was replaced by a soft asphalt covering.

Since no forklift truck could be found on the market that fulfilled all the ergonomic safety and technical specifications, it was decided to adapt an existing forklift truck. A prototype forklift was built and carefully evaluated during trial phases, with adjustments to the design being made throughout this process:

- visibility when driving forwards was ensured by raising the entire cabin structure. This also enabled tall drivers to sit upright;

- the driving seat has been set lower in relation to the base-plate;
- a shorter seat base prevents circulation to the thighs from being cut off. The driving seat is equipped with new springs, cushioning vibrations and acting as shock absorbers;
- the levers are within easy reach and can now be operated while maintaining good posture;
- the switch controlling driving direction has been moved so that it can now be operated from the steering wheel;
- improved lumbar support and the amended design of the seat back makes sitting more comfortable;
- the seat and controls can be adjusted to suit the driver;
- in order to increase productivity, it was decided to implement the design with a double pallet fork, so two pallets can be lifted at the same time.

The ergonomist provided instructions to project group members on their use and driver training for these new forklifts, for example individually adjusting the driver's cab, in order to make the working position as ergonomically effective as possible and in order to be able to work efficiently. The instructions and working procedures were incorporated into work guidelines or standard operating procedures. Comments from drivers resulted in some changes being made.

Results

Reduction in work-related health problems in forklift truck drivers:

- it is now very rare for there to be a need to drive backwards, as forward visibility has been greatly improved;

- exposure to vibrations and shocks have been reduced by the new ground covering;
- increase in operator participation as a result of participative approach.

Reduction of costs:

- the eight adapted forklift trucks are hired at an increased rental cost, but the increased productivity has resulted in savings (Hire costs BEF 1 600 000 a year; an annual profit of BEF 7 200 000 as a result of increased productivity and a BEF 5 600 000 net annual profit).
- 80% gain in storage and order picking.

2.2 IMPROVED ORGANISATION OF WORKSTATION FOR SEWING OF MATTRESSES

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Task

Sewing mattresses.

Problem

The working position was fixed and employees had to make numerous twisting back movements when handling large mattresses during sewing. Foot pedal controls were also causing problems. There were a high number of complaints of health problems regarding MSD like pains in back, neck and shoulders. Sickness absence was between 7 and 10%.

Solution

A comprehensive action plan was developed to combat monotonous repetitive work in the company

A comprehensive action plan was developed to combat monotonous repetitive work in the company. The Danish Regional Preventive Services took part in the process, contributing advice on the development of technical solutions for example.

Initially a new platform for workstations which could be lowered or raised to allow employees to sit or stand up while working was introduced. The control pedal system was altered and careful attention given to working space requirements. Employees may now alternate between standing up for half the day and sitting down the other half while sewing the large mattresses. This also provides some variety.

Despite the changes the problems with the control pedals continued, causing some operators to rest on one hip. Therefore further technical changes were

introduced including the use of automatic sewing machines. Initially one machine was tested in the factory and 16 have been bought since then. The new machines allow operators to move more freely while sewing large items. and this has created considerable satisfaction among employees.

Results

- Effect with regard to absence due to illness: a drop from 7-10% to 1%;
- efficiency has increased by 30-35%;
- employees more satisfied for example with greater freedom of movement when carrying out the work;
- work is continuing on improving the workstations. Plans include the testing of height-adjustable platforms from where the mattresses may be taken for sewing without the operator having to bend her back;
- the process and solution chosen is also suitable for other companies.

2.3 AVOIDING MANUAL HANDLING USING A VACUUM DEVICE TO LIFT MEAT

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Task

Manual handling of heavy loads of meat at high frequency in a meat processing and preparation factory.

Problem

Back disorders are particularly common among Danish meat workers. 64% of men and 56% of women throughout the industry have back symptoms at least twice a year (compared to an average of 45% men suffering pains in the lower part of the back at least once a year-according to figures from a major Danish study, DIKE 1989).

Heavy slabs of meat had to be manually lifted at high frequency. Several workplaces required the lifting of approximately 10 tons an hour per employee using inappropriate movements.

Solution

A specially designed vacuum lifting device or 'meat magnet' was developed for lifting slabs of meat. It consists of a horizontal vacuum lifting unit, a vacuum

suction device and a pneumatic control unit. The operator places the suction device on the meat slab and a vacuum is created between the device and the item, so it can be lifted and held automatically for transport. By activating an open/close valve on the right hand side, the meat item may be raised and lowered without any heavy physical effort on the part of the operator.

Several other lifting relief measures have also been introduced. The work process is also part of a job rotation scheme and work is in progress to develop better scope for job rotation, 'knife-free days' and other technical and job organisational initiatives.

To help in the training in the use of the 'meat magnet' and to help share the idea across the meat industry a professional video was developed. It has been shown at divisional meetings in several companies within the meat processing industry and used for teaching at meat processing and technical colleges.

The involvement of employee prevention representatives and the participation of all employees played a crucial part in developing a successful solution

The involvement of employee prevention representatives and the participation of all employees played a crucial part in developing a successful solution. The project was carried out with the assistance of the external Occupational Health Service, who made regular visits, working with a special project group from within the company and with the involvement of the company's joint prevention committee. Care was taken to keep employees in the division informed of progress throughout the project. Employee prevention

representatives were involved in early testing of the meat magnetic lifting aid. All staff had the opportunity to discuss the project and test the 'meat magnet'.

Results

The effects have been many and varied:

- the 'meat magnet' has eliminated the need for heavy lifting without increasing the speed;
- nearly all the employees report that the equipment is suited to the task and 60% find that using the equipment reduces work stresses on the lower back, upper back, shoulders, elbows, left wrist, hand and fingers;
- no employees have experienced an increase in repetitiveness and about half experience less repetitiveness;
- fewer employees are seeking physiotherapeutic treatment for lower back pains;
- more older employees, men and women, and those with symptoms of premature physical wear, can manage the work;
- training and retaining new employees has become easier;
- many good ideas put forward by employees for technical innovations and work organisation have been implemented;
- the interest in participating in activities aimed at improving the working environment has increased;
- daily interaction between staff has improved. Working with others including on new initiatives to improve the working environment has improved, for example in relation to both attitudes and practical issues such as setting budgets;
- the idea has spread across the sector and now various different 'magnets' have been developed for lifting other meat items.

2.4 AN INTELLIGENT LIFTING DEVICE FOR LOADING A HIGH-FREQUENCY PRESS

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Task

Table manufacture in the furniture industry: gluing solid wood bandings onto table tops using a high-frequency press.

Problem

Manual lifting of heavy, unmanageable loads requiring physical strength and with corresponding bad posture was causing health problems especially regarding MSD.

The worker's tasks include laying the solid wood bandings and table tops in the high-frequency press, supervising the pressing process and removing the complete table top. On average 80 table tops are completed each shift. The workers had to load the high-frequency press manually. This involved them lifting the table tops weighing approximately 40 kg from the freight lorry, carrying them, placing them in the press and removing them. Manual loading was only possible with two workers because of the size of the panels, so another worker had to be deployed solely for the loading process.

The manual loading was causing strain on the spine, due to the weight of the table top, the detrimental body-posture (e.g. bending with the weight) whilst placing the panel in the press or removing it and the frequency of the lifting and

carrying process. The repeated lifting, carrying and setting down tasks took place approximately 200 times per shift.

Solution

A mechanical lifting device uses a vacuum system and intelligent control device to hold the tabletop in a suspended position

A mechanical lifting device was introduced so it is no longer necessary to move heavy loads manually. It uses a vacuum system and intelligent control device to hold the tabletop in a suspended position. The use of the vacuum to hold the tabletop means it can be easily moved. An electronic measuring gauge records the weight of the panel and the electronic controls enable the panel to be suspended. The worker can move the suspended panel in any direction without expending energy. Workers were actively involved in decisions the implementation of this solution

Results

- Reduction of time lost due to sickness;
- improved efficiency of work processes;
- cost savings as the direct result of innovation approx. € 16,000 p.a.

2.5 IMPROVED SEATING AND REDUCED LIFTING IN GARMENT MANUFACTURE

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Task

Textile industry - sportswear manufacture. Production work and transportation of goods within the factory in the tailoring division and printing and dyeing division.

Problem

The work in the tailoring division, printing and dyeing division involved prolonged periods sitting in a static position and constantly lifting or pulling loads. An increase in health problems and absenteeism had been noted, especially related to MSD. Some machines were operated by pedals that were uncomfortable to use. Very large and heavy metal trolleys were being used to transport goods in the factory, which required intense muscular effort and strain on the part of the employee.

The work involved prolonged periods sitting in a static position and constantly lifting or pulling loads

Solution

The company has taken the following steps to help tackle these problems:

- use of new adjustable seating which provides the worker with much better support and also allows them to adjust their body position when working;
- adjusting the pedals of the machines to suit the employee;
- replacing the heavy trolleys by installing a mechanical system of rolling, raised shelves (Schonenberger system) for the purpose of placing, transporting and storing items to be tailored;

- increasing the use of other lifting devices such as fork-lifts, hand-operated pallet-bearing machinery;
- training employees in the correct lifting methods and the use of the lifting devices;
- training employees in other work tasks so a rotation system can be used to move them between different tasks. The aim of this is to reduce both physical and mental strain and allow employees to move from one work area and atmosphere to another.
- moving older and more susceptible employees to lighter work posts;
- carrying out regular health surveillance to help check for problems and that solutions are working;
- creating a pleasant and spacious room for rest and recreation with a canteen.

Results

- Decrease of musculoskeletal problems;
- decrease in average of days off;
- improvement of productivity.

2.6 AUTOMATIC REMOVAL OF PROTECTIVE PLASTIC FROM STAINLESS STEEL PARTS

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Task

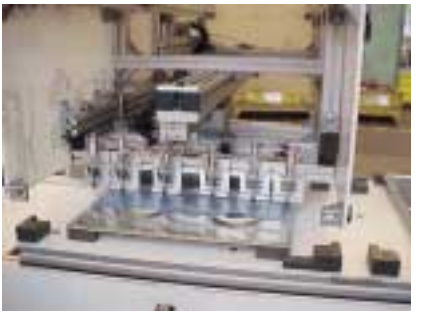
Removal of plastic protective covering from stainless steel parts in dishwasher production and 'stamping'.

Problem

Plastic covering is used to protect the stainless steel used in the production and assembly of household appliances from getting scratched, marked etc. The operation to remove the plastic from the stainless steel part has until now been performed manually. The worker begins from one point and pulls it back, so that by performing circular movements all the plastic is removed. There is a risk of MSD such as tendinitis in the forearm from the repetitive effort involved in the movement required to do this task.

There is a risk of MSD such as tendinitis in the forearm from the repetitive effort involved in the movement required to do this task

Solution



The Department of Stamping Engineering, the section in which stainless steel is worked, had for some time been examining how to avoid the manual performance of this operation. As a machine or tool for this purpose could not be found in use elsewhere, so it was decided to design one, which removes the plastic semi-automatically.

In the new design of the workstation, the operator will feed the machine with parts which are still in their plastic covering, raising the edge of the plastic slightly, the machine will then remove the plastic leaving the machine to do the rest.

The machine's functioning mechanism is basic and consists of pincers closing on the raised edge of the plastic and pulling it back in a regular way. Feeding the part into the machine is not done directly but on a bedplate which allows one to be fed in and the finished one to be removed. The removed plastic is then collected in a container located in the lower part of the machine, which is easily extractable.

Results

- Elimination of an established risk from a repetitive manual task;
- the evaluation of the outcome and benefits is ongoing.

2.7 REDUCING MANUAL EFFORT IN FACTORY LOADING TASKS

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Task

Loading industrial detergent sacks of finished goods on pallets, loading solid raw materials for industrial detergents into mixers, loading raw materials for industrial adhesives into mixers.

Problem

This company produces a variety of chemical products including cleaning agents and adhesives. MSD risks from various tasks involving the manual handling of heavy loads such as barrels, sacks, etc. were identified, including the adoption of forced postures, creating problems of absenteeism and possible poor industrial relations. The worst problems were in the industrial detergents and industrial adhesives production area involving tasks such as putting heavy sacks of industrial detergent onto pallets, loading solid industrial detergents into mixers, loading industrial adhesives into mixers and into crushers.

Solution

Specialised assistance was engaged in order to make a joint ergonomic study of the workstations affected. Based on this study, the main initiatives taken were:

- comprehensive analysis of each of the workstations (including use of the "NIOSH lifting equation" and the limits proposed by ISO/CD 11226) and introduction of prevention measures based on this analysis;
- mechanisation to avoid manual handling of loads (Vacuum-action bag manipulators);
- redesign of the workstation to avoid forced postures;
- specific training for employees involved in each of the workstations;
- education and awareness raising e.g. display of information posters at the workstations involved etc.

50% decrease in worker absenteeism caused by musculoskeletal disorders, following introduction of the corrective and preventive measures

Results

- 50% decrease in worker absenteeism caused by musculoskeletal disorders, following introduction of the corrective and preventive measures;
- improvement in work relations, due to decrease in absenteeism;
- benefits due to the improvement of working conditions include the increase in employee satisfaction and the improvement in working atmosphere.

2.8 REMOVING REPETITIVE RISKS FROM THE ASSEMBLY OF SMALL COMPONENTS

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Task

Small component assembly line work during production of electrical domestic goods

Problem

Esswein is an industrial branch of the BRANDT Group, specialising in the production of dishwashers, washing machines and tumble dryers. Production line operators carry out a whole range of operations to assemble and install small components and sub-assemblies: frame and motor components, internal components, electrical circuits, etc. All these operations entail a large number of very precise positioning, assembly, screwing and clipping operations. It was found that the upper limbs of operators were under constant stress as a result of time constraints, precise and repetitive movements and different levels of exertion at different workstations. The number of work-related MSD was on the increase and new cases had increased by a factor of nine over five years.

The different activities concerned were giving rise to a range of MSD problems on all the production and assembly lines.

Risks arising from the movements performed

- stresses on the wrists and elbows in the case of clipping, insertion of wiring and screwing;
- stresses on the shoulders due to the height at which operations had to be performed at some workstations.

Risks connected with the forces exerted

- weight of tools;
- weight and bulk of the components to be handled.

Risks arising from the repetitive nature of movement sequences

- work on assembly lines, with tasks divided into repetitive sequences always requiring the same movements.

Organisational and relational problems

- little rotation between workstations;
- working areas not geared towards co-operation;
- overloading of supervisors and workshop methods.

Solution

The solutions involved a whole range of changes to improve work and workstations and to improve the whole process of ensuring good ergonomics by integrating it into management activities

The project arose from discussions over a number of years about MSD prevention in the enterprise. These discussions paved the way for the introduction of a range of measures in the appliance production and assembly departments.

The solutions were developed through discussion and participation of the workers and their union representatives.

They involved a whole range of changes to improve work and workstations and to improve the whole process of ensuring good ergonomics by integrating it into management activities:

- mechanised assistance with screwing: changes in the positioning of tools in many screwing stations and changes to their conditions of use in order to reduce levels of exertion;
- assistance with component handling;
- introduction of variable height workstations;
- training in new skills and tasks and incentives for task rotation, following ergonomic studies of the respective constraints of the various individual stations;
- organisational work changes to tackle psychosocial risk factors that can exacerbate the probability of the onset of MSDs (e.g. poor work relations and tensions) including improved communication with operators and reacting to their complaints;
- training for technicians in methods of analysing and finding solutions for MSD risks;
- integration of the use of ergonomic and biomechanical criteria into the design of new workstations from the outset. The complete redevelopment of a production line provided an opportunity to take account of MSD issues right from the design stage;
- involvement and steering of schemes by the unit directors, including enabling ergonomic aspects to be taken into account in management decisions. Supervisory staff have been trained on how to take account of working conditions in their decisions;
- creation of a range of working parties, with employee participation, in order to analyse and redevelop workstations.

Results

- All these measures, introduced over a number of years and still in progress, have curbed the rise in MSDs and substantially improved working conditions;
- many bio-mechanical risk factors have been eliminated: repetitive movements reduced, improved working postures, lower levels of exertion;
- there is now systematic inclusion of ergonomic criteria in the design of new workstations. Increased attention is paid to ergonomics, MSD prevention and working conditions in all management decisions;
- there has also been a marked improvement in the social climate.

2.9 TECHNICAL DEVICES TO REDUCE MANUAL HANDLING AND REPETITIVE WORK IN MEAT PACKING

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Task

Various tasks related to meatpacking including moving, cutting, cleaning and collecting of animal parts in pork meat production.

Problem

Studies show that workers in the meat sector suffer from a high rate of back disorders and the company had noticed a high rate of various MSD problems. The main problem involved manual handling of heavy loads of meat, including whole pig carcasses, at high frequency. Several workplaces required the lifting of heavy loads by the employee using awkward movements. For example twisting and turning whilst holding the load; manoeuvring loads at a height with the arms fully stretched above the head; carrying and supporting heavy carcasses and meat joints across one shoulder. Other tasks involved very forceful and awkward movements to cut the carcasses, often whilst supporting the load manually at the same time. Identified risks included: carrying, pulling, pushing and holding heavy loads, often in static positions; repetitive movements; poor indoor climate; the danger of injury from using sharp instruments and devices for cutting; high physical workload.

Solution

Manual handling of loads and repetitive movements were reduced by using semiautomatic and automatic machines and systems for the high risk tasks and

also making changes to working procedures and by doing so avoiding the need for the workers to carry out these high risk tasks.

For example the following changes were introduced:

- a machine operated meat joint cutter with integral protective gauntlet, with the load of the meat supported by a ceiling hung support;
- automated movement of carcasses through the factory, suspended from the ceiling, to eliminate manual carrying over the shoulder. Carcasses now move automatically between process areas and are suspended at the correct working height;
- automated cutting open of ceiling suspended carcasses, eliminating a forceful cutting task and manual support of the load;
- automatic removal of intestines weighing 25 Kg, before done manually involving an awkward twisting movement whilst holding the heavy intestines;

Carcasses now move automatically between process areas and are suspended at the correct working height

- automated 'unhooking' the carcasses from the ceiling to place on a horizontal conveyer;
- in shoulder jointing section further automation to support the load and to open and cut the meat;
- mechanical lowering of pieces of meat to be processed;
- the suspension of the carcasses from the ceiling has also improved the working postures of those carrying out inspections of the meat.

Results

An evaluation has shown:

- reduced manual handling of loads;
- reduced accident rate;
- elimination of risks especially regarding MSD.

2.10 MECHANICAL AIDS FOR HANDLING GLASS PANES

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Glazing industry: transport and positioning of glass window panes.

Problem

Manual handling problems were occurring in the horizontal and vertical transport of window panes and in the positioning of window panes. This was giving rise to serious back, neck and arm disorders. Examining the accident and sickness absence records confirmed the extent of the problem: the sick leave at the start of the project was 16.7 % and the disability rate (one year sick leave) was 5.5 % which is very high.

Most window panes weigh well in excess of 50 kg and panes weighing between 100 and 200 kg are quite common. (While typical lifting recommendations quote maximum weights for manual handling of 25 kg). Besides heavy loads there were problems of transporting the large, unwieldy panes across difficult and uneven surfaces, including outdoors on building site terrain. The existing transport cart weighed 45 kg, far too much for easy working. Besides the weight they were also difficult to handle and manoeuvre and the wheels often unsuitable, especially on construction sites where transport ways can be muddy or sandy for example.

Surveying and health surveillance of employees revealed more about the nature of complaints. More than 75% of the glaziers had complaints about the

physically demanding aspects of their work. The rate of associated ill health problems was well above the norms in the construction sector, a sector that has high rates of manual handling related ill health problems. The problems were greatest for the back, but significant for other parts of the body as well. For example, prevalent complaints were: to the back 28% (compared to construction industry rate of 23%); neck complaints 23%; shoulders 27%; elbow 14 %; wrist 9%; hand/fingers 10%; hip 11%; knee 22%.

Solution

The companies involved worked with the ARBOUW Institute to develop the solutions. New working methods and mechanical aids were developed to avoid as far as possible the need for the glaziers to carry out any manual handling in the pane transportation and mounting process altogether.

A mechanical hoist mounted on a truck means that a glass pane can be loaded and unloaded without physical strain. The hoist can be easily folded out. The hoisting lasts almost one minute longer than manual loading and unloading. However one worker can now do the job, while previously for most window panes at least two workers were necessary.

A new lightweight cart, weighing 25 kg, can stand loads of 200 kg and can easily be handled by one person

Two tools for horizontal transport were developed: a new lightweight cart, weighing 25 kg, can stand loads of 200 kg and can easily be handled by one person. The wheels can be changed for different situations. For transport over even floors, a mini-cart in the shape of a roller skate was designed.

An easy to use vertical transport aid can lift a pane up to the third floor of a building. The lifting device can be used in combination with a transportable scaffold to provide a stable platform. The physical strain is low, since there is no manual lifting. A special device prevents the hazard of the grip of the vacuum lifting device slipping through leakage of the vacuum.

Results

- Elimination of manual handling is possible and practically feasible;
- 13% to 59% of the glaziers are now using one or more of these mechanical aids;
- improved working between and within companies: the exercise involved three different companies and the participatory process led to real collaboration between all involved in the three companies as well as in their branch organisations;
- economic costs/benefits: qualitative assessments showed a break-even or productivity gain with the new working methods.

2.11 REDESIGNING TRAM DRIVER'S WORKING POSITION

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Task

Driving public transport trams

Problem

Wiener Linien GmbH & Co KG, the Vienna Transport Authority, is Austria's largest local transport company, carrying more than 700 million subway, tram and bus passengers each year. The tram division operates 570 eight- and twelve-wheel low-floor tramcars and trailer trucks, and employs 1,400 drivers.

The company was concerned about the possible high health risks to drivers of operating old trams, resulting in time off work due to illness and early retirement on health grounds. The reasons identified included strain on the musculoskeletal and motor system, stress, irregular hours and poor climatic conditions inside the vehicle.

The design of the driving positions in the old vehicles (529 units) required the driver to adopt constricted postures and perform repetitive activities such as button operation to open and close doors, etc., resulting in extreme strain on the musculoskeletal and motor system.

In order to be ready to brake at any time, the driver of a moving tram had to have his right hand on the 'gritting' lever and his thumb on the 'rail brake' lever. The length of the two levers meant that the right arm usually has to be held fully extended or slightly bent. At the same time, the left hand was being used

to operate the stop/start lever. The driver had to use additional pressure to operate the 'dead man's handle'. These requirements meant that the driver was forced to work in constricted postures with twisting of the torso. The drivers also had to use their feet to operate three pedals (dip switch, bell and solenoid brake).

In addition, at the start of their work shift many drivers found that they did not have time to adjust their seats, leaving them in the position used by the previous driver, as they were difficult and complicated to alter. This created additional adverse affects on the posture of drivers seated in incorrectly adjusted seats.

Solution

Wiener Linien decided to introduce ergonomic improvements to the driver's position when constructing new low-floor trams. To decide what measures were required they questioned drivers and set up a working group that included representatives of drivers, occupational physicians and safety experts, and also used expert support from the Ergonomics Department of Vienna Technical University's Institute of Industrial Engineering, Ergonomics and Business Economics.

To decide what measures were required they questioned drivers and set up a working group that included representatives of drivers, occupational physicians and safety experts

The new trams incorporated the following design features for the drivers:

- new seat with controls for the most frequent operations incorporated in the armrests;
- height-adjustable pedals;
- rapid and simple individual seat adjustment;
- special breathable seat cover material for greater comfort;
- air-conditioned cab.

Specific features of the new seating position included:

- centrally oriented seating position for the driver and possibility of performing the most frequent operations (opening and closing of doors) and the longest-lasting or continuous operations (setting of reference values for driving and braking commands) without twisting of the torso, and therefore without constricted posture, by transferring these functions to the armrests;
- adjustment facilities to adapt the seating position (height of seat and level of foot support) and the appropriate adjustment controls (reference value setter and door function buttons) to the physical size of the current driver;
- contour of the backrest adjustable by the driver.

Results

To date, 41 vehicles incorporating this new driving position and the other safety and health features have been built leading to the following results:

- improved driver posture and reduced strain on the musculoskeletal and motor system;
- reduced perspiration as a result of breathable seat cover and air conditioning of the cab;
- significantly improved driver acceptance of the driving position and enhanced job satisfaction.

In the medium-term further improvements are expected including:

- reduction of occupational illnesses;
- less time off due to illness;
- fewer early retirements on health grounds.

2.12 IMPROVING SEATING AND ERGONOMICS IN FACTORY QUALITY CONTROL WORK

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Task

Quality control checks during the manufacture of plastic articles.

Problem

Checking for defaults in the manufacture of plastic articles is a repetitive task. The operator's tasks in the quality control section basically consist of:

- picking up parts from an incoming runner to inspect them by touch and vision;
- putting the part back on an outgoing runner;
- if it has a defect, placing it on the runner on the operator's left;
- if it does not have a defect, re-routing the part on an upper runner;
- noting the results on a special form.

The problems were mainly:

- health complaints by workers, particularly musculoskeletal disorders;
- operators had to stand to do the job;
- excessive reaching to distances to the runners, which were outside the comfort reach and visual zones of operators;
- for example, a bench was restricting operator access to one of the runners, causing back pains;

- high rate of undetected defective parts, jeopardising customer relations and leading to the return of complete loads in supply contracts where the deadline had only just been met.

Solution

An ergonomic intervention was carried out under the occupational safety, health and hygiene services. It involved a team consisting of the factory medical inspector, an ergonomist and an occupational psychologist.

After an initial identification of health and safety risks in the workplace and dysfunctions in the production system, a detailed analysis of the task, and the analysis of the work activity and dysfunctions in the production system was carried out. The postural demands on the operator in the real working situation were recorded and analysed and those tasks involving greatest risk of musculoskeletal changes identified.

Methods used included free and systematic observation, video recording of the work activity, surveying and interviewing workers and the preparation and completion of analysis tables geared towards the situations under study.

Video recordings were analysed to quantify the frequency, duration and sequence of postures in the real work situation to give a dynamic postural profile of operators as they carried out their work. This was done using the PASEA computer programme (Posture Analysis System for Ergonomic Applications) and with the support of the Ergonomics Laboratory in the School of Human Motoricity, UTL (Lisbon Technical University).

Based on the results of these analyses proposals to minimise the identified health risks were made. This was done with the aid CAD techniques (computer assisted design) and graphic modelling (3D Studio Max) to simulate the real working situation. It included three stages:

– modelling the actual situation;
– preparing potential proposals, with brainstorming and value analysis;
– preparing suggested action with simulations of the work activity.

To enable operators to work seated one of the major problems of the existing layout, the excessive distance for reaching for parts on the lower runner, the upper runner and the rejected parts side runner had to be solved. The runners were brought closer to the operator so that they were positioned in the comfort reach and visual zones of the operators (an analysis of the operators' comfort zones was made). The variables of reach and free space were taken into account in redesigning the workstation.

Frequency of tasks and therefore movements such as reaching was also an important consideration in deciding where to position elements in the redesigned workstation, particularly the runners. In principle the elements of the workstation used most frequently needed to be closest to the operator. One of the restrictions affecting the operator in reaching towards the runner was the bench sited between the operator and the runner. This was replaced with a smaller one.

On-the-job training was provided to facilitate adaptation to the new working situation and to overcome resistance to change on the part of operators

The design of a system based on ergonomics alone does not eliminate harmful risks to the health of operators associated with postural problems. Problems may arise in the implementation stage if it is not monitored and if operators are not trained. On-the-job training was therefore provided to facilitate adaptation to the new working situation and to overcome resistance to change on the part of operators.

Results

A survey was carried out with operators to validate the action:

- output increased by over 30%;
- errors fell from 17% to 2%.

The operators referred to the following aspects of the new work situation:

- greater comfort;
- the chairs are comfortable, leading to a reduction in postural discomfort of the lower limbs at the end of the working day;
- reduction in tiredness;
- due to the technical changes carried out to increase output rates, the rate of the runner carrying parts to be inspected increased and the work rate increased as a result.
- improved motivation because management showed concern not only with increasing production but also with the safety, comfort and health of the operators.

2.13 ERGONOMICS PROGRAMME FOR SMES

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Task

Developing an ergonomic small workplace programme with 24 SMEs to assist them in the prevention of musculoskeletal disorders

Problem

Twenty-four small businesses had previously taken part in a Small Workplace Programme on maintaining and promoting working ability, organised by the Finnish Institute of Occupational Health. A follow-up survey indicated that three out of four employees in the companies had suffered from musculoskeletal symptoms during the past 12 months. The MSD problem was further confirmed by examinations of some employees sent by their companies to a physician at the Finnish Institute of Occupational Health. In addition, the management and staff in the companies and the occupational health services felt that there was a need for improved ergonomics in their workplaces.

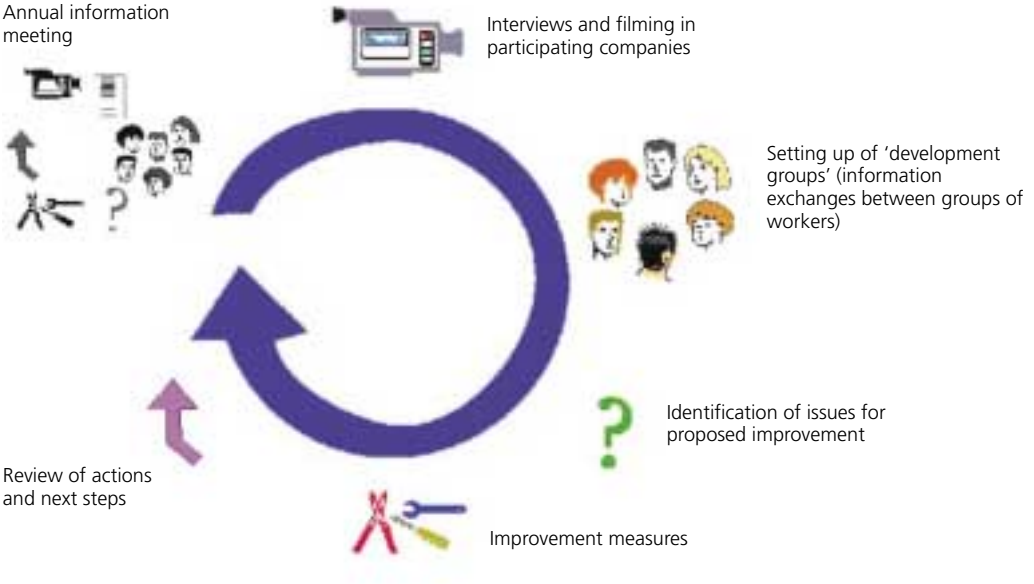
The small companies with MSD problems came from a wide variety of sectors:

Industry	Companies with less than 10	Companies with 10-49 Employees	companies with ≥ 50 employees	total number of employees
Metal	1	5	5	823
Electronics	1	3		92
Printing		1	1	173
Hotel/restaurant		3		75
Commerce	1	3		94
In total	3	15	6	1,257

Solution

A multidisciplinary consultant group from the Uusimaa Regional Institute of Occupational Health developed ergonomics programmes in co-operation with the staff of the 24 companies. The process used to develop the programme with the small workplaces is given in the box.

Process to develop an ergonomics programme to prevent MSD at small workplaces



At a launch meeting with the companies goals were set concerning the development of ergonomics interventions in their workplaces. The precise measures to be taken by the companies were agreed with them during the development phase. Towards the end of the development phase an assessment meeting was held to review progress on the initial goals, whether the agreed measures had been implemented, for example whether the company had made new procurements or if there was anything that required further processing and discussion at the company level. An important element was to review what was considered to have been a success and what could have been done differently. Also effectiveness of co-operation with and between the Occupational Safety and Health Services was reviewed at this stage. A final evaluation meeting was held to discuss whether the measures taken had had any effect on ergonomics. Evaluation forms were also used to obtain feed back on experiences.

Ergonomics interventions were developed on the basis of the needs and goals of the individual companies

Ergonomics interventions were developed on the basis of the needs and goals of the individual companies. A wide variety of methods were used and examples are given in the box below:

Ergonomic measures taken by companies: Some companies used several ergonomic intervention methods.

Ergonomics intervention methods	companies with < 10 employees	companies with 10-49 employees	companies with ≥ 50 employees
Developing workplace ergonomics together	1	8	4
Guidance on ergonomic working methods	2	9	3
Ergonomics training or briefings to employees		1	
Designing the layout of the Workplace/workstation		3	2
Teaching and using the method of mapping workplace ergonomics		4	
Using the method of developing working Conditions and the work community (questionnaire)			1
Consulting ergonomics experts	1	4	3
Assessing the strain on the musculoskeletal system		1	
Finding solutions in problem areas		1	1
Creating an ergonomics library	3	15	6
Training to relieve neck and shoulder Symptoms			
Workstation ergonomics campaign		3	2

Thirteen companies chose to develop ergonomics together. The employees of companies were always involved in developing the ergonomic interventions, using 'participatory ergonomic methods'. Through the project companies made concrete improvements in working conditions and workstations. Some of these measures were 'small-scale' and 'immediate'. Some target areas required more substantial investments and the companies made further plans to implement them in the longer term.

Results

The 'developing ergonomics' programme was successfully implemented in the companies based on the initial goals set:

- concrete improvements in working conditions and workstations were successfully implemented;
- company planning on health and safety was developed e.g. by budgeting and planning for longer term interventions;
- the project promoted employee participation in health and safety and developing ergonomics solutions;
- there was an increased awareness of ergonomics among staff and managers;
- it encouraged co-operative working between some companies on health and safety.

2.14 ERGONOMICS FOR JUNIOR SCHOOLS

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Task

Sitting still for long periods of time in junior school classrooms (pupils aged six to nine years).

Problem

There was concern that prolonged periods of sitting still on ill suited and poorly designed school furniture puts strain on the musculoskeletal systems of young, growing children, and may favour the use of one side of the body. It also means that the pupils are not made aware, by example, of the importance of suitably designed tools and equipment (e.g. furniture) and variations in posture and activity.

Solution

The prevention of strain-related problems in school children solution consists of at least three parts in a coherent programme: provision of suitable furniture of the correct size; exercise; education, training and awareness raising. To help achieve this ergonomics programmes for junior schools have been developed and introduced.

Physiotherapists are now promoting ergonomics knowledge and application

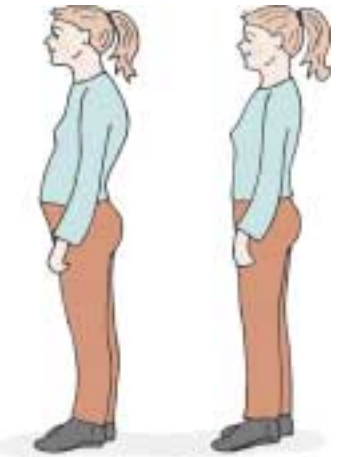
Physiotherapists are now promoting ergonomics knowledge and application in this area through the provision of:

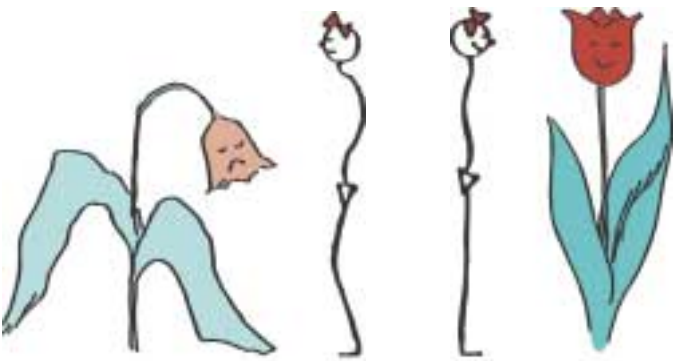
- detailed information to pupils, teachers, other members of staff and parents;
- assistance in the purchasing and testing of school furniture;
- instruction in lifting techniques etc.
- exercise during breaks, etc.,

Results

Preventing a child from gaining serious strain injuries and providing education and training on the issue saves society vast sums of money now and in the future:

- school furniture of the correct size is reducing the direct danger of uneven strain and problems;
- sufficient and correct exercise is increasing ability of the child's body to cope with strain later in life;
- the programme increases the pupils' understanding of ergonomics and allows them to be in a position, in the future, to demand a good working environment.





2.15 INTRODUCING ADJUSTABLE WORKSTATIONS ON A PACKING PRODUCTION LINE

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Task

Packing tea on a production line

Problem

The workstation was not adjustable which proved to be a real problem for the workers, whose heights and body sizes vary considerably. It was also unsuitable for left-handed workers. Worker heights ranged from five feet to six feet three inches. The workstation was too low for tall operators causing them to adopt stooped back postures. It was too high for small operators, but if they raised the height of their chairs (if they were able to) this resulted in their legs dangling without support.

- Operators with larger thighs had difficulty in squashing their legs under the fixed width of the workstation. The limited space caused pressure to be exerted on the upper thigh;
- two out of three of the chairs were unsuitable in that they were not adjustable. At least one of the chairs was fitted with a ring, which was designed to act as a footrest. Operators who rested their feet on the ring were forced into positions, which restricted blood circulation.

- waste bins (for damaged tea bags) were situated at a distance from operators and in some cases placed behind them. This resulted in twisting and stretching;
- boxes piled high around operators interfered with human contact. Operators reported experiencing feelings of being hemmed in;
- left-handed workers had to spend a significant amount of time at the start of their shift rearranging workstation furniture in order that they could carry out their job.

Solution

The project was carried out by a team from the company with expert advice provided by an ergonomist, a health and safety expert and a psychologist from the local University (Sunderland University). The workplace team comprised: four shopfloor operatives (including representatives from all three shifts), the Occupational Health Nurse, the Administration & Training Manager and the Line Manager.

The team met over a number of weeks to brainstorm possible solutions and potential solutions were taken back to the workplace and tried out

Part of the solution including training a small team of shopfloor workers in ergonomic risk factors and to enable them to participate fully in risk assessment and solution generation.

The starting point was for the team to carry out an assessment of health and safety risks (with a particular focus on MSD) as required by national legislation (Management of Health & Safety at Work Regulations) on the production line where the problems were occurring.

Facilitated by the University experts the team met over a number of weeks to brainstorm possible solutions to the problems they had identified. Potential solutions were taken back to the workplace and tried out. A logbook was used by the operators to record ideas as they occurred. All those working on the production line were encouraged to become involved in putting forward ideas and testing them. As a result:

- a new fully adjustable workstation was designed according to ergonomic principles;
- fully adjustable chairs were ordered and all operators were educated in the importance of adjusting their chair and workstation at the beginning of the shift;
- waste bins were placed close to and to the side of workers;
- the high stacks of boxes were eliminated as a result of a change in work practices.

Results

- Each operator on the production line now has a fully adjustable workstation which fits his or her needs no matter how small or large he or she is;
- the working environment is also far more pleasant as a result of the high stacks of boxes having been removed. This has had the effect of enabling operators to look around the room. A number of them have said that this had made them feel 'less bored'.

2.16 WORKER REHABILITATION USING VOICE RECOGNITION COMPUTER SOFTWARE: 'TALK YOURSELF INTO A JOB' TRAINING PROGRAMME

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Task

Use of display screen equipment or other computer operated equipment by workers with or who have had a work-related musculoskeletal disorder.

Problem

Continuing the employment of workers, such as experienced display screen equipment operators, once they have developed a work-related upper limb disorder.

The GMB is a trade union whose members work in both office and factory workplaces. The union was concerned that workers who had developed long-term musculoskeletal disorders, from manual operation of keyboards or the mouse, other repetitive office work, or factory tasks e.g. on factory production lines, were unable to continue in employment. The following may have contributed to the development of the disorder in the first place: very repetitive tasks, insufficient breaks, poor posture, stress, fast pace of work e.g. to meet production targets and bonus targets, insufficient or poorly designed workplace equipment, lack of job rotation etc, insufficient / no training on the safe use of the equipment, VDUs and the mouse may also have exacerbated the MSD. Once the worker had developed such a condition it was impossible for them to

continue in the same or similar work involving repetitive movements etc. Those with the MSD can therefore find themselves unemployed and also unable to carry out other everyday basic tasks. For the organisation it means the loss of an experienced, trained and skilled member of staff.

Solution

To continue in the same or similar employment the way the computerised equipment is operated by the worker needs to be changed. Voice-operated equipment exists but workers need training in its use if they are to remain employable. A special course 'Talk your way into a job' was set-up to help meet this challenge.

The course also covers workplace health and safety information, coping strategies for MSD sufferers and advice on how other workplace aids can help minimise the effects of MSDs

In the UK some Government projects have been set up to assist and provide public funding for initiatives to re-skill workers for future employment. The union worked with a regional programme (Essex TEC Skills 2000 Challenge Project) to obtain the funding and set-up the special training course. The custom built course was designed and developed to provide tuition to MSD sufferers on the use of voice recognition software, predominantly for word-processing activities, as an alternative to standard typing and mouse use; thereby enabling employment re-integration / retention. Eligible people from the local area, with upper limb MSD, can take advantage of this free course that is held one-day per week for six weeks, with tuition being provided on a one to one basis.

It was recognised that rehabilitation support should go beyond just training in the use of equipment. The course also covers workplace health and safety information, coping strategies for MSD sufferers and advice on how other workplace aids can help minimise the effects of MSDs. Assistance is also provided on career re-direction, when necessary. The newly acquired and effective communication technology skill (voice recognition) can provide the client with new and further employment opportunities.

Similar training programmes can also be provided for workers in employment or their employers to enable their retention at work, by the provision of voice recognition training and advice. A charge has to be made for this service.

As a general support and promotion of worker rehabilitation the union has also been involved in providing advice and information to a variety of organisations. This includes: demonstrations and advice on voice recognition software and its benefits; how to obtain Government financial assistance for employing MSD sufferers; how to retain people with MSDs in the workplace is also disseminated to a variety of organisations.

Results

- Workers have been retained in employment by switching to the use of voice recognition software to carry out their work, who would otherwise have become unemployed;
- unemployed individuals with MSDs have returned to the workplace, utilising their new voice recognition skills and MSD coping strategies, where appropriate;
- to date, approximately 1/3 of the clients who have completed the course, since its start in September 1999, are in, or about to enter, paid employment. This would probably not have been possible if they had not attended the 'Talk Yourself into a Job' course.

3.

ANNEXES

3.1 SOURCES OF FURTHER INFORMATION

More information about preventing musculoskeletal disorders is available from the Agency website **http://osha.eu.int** where the full text of all Agency publications can be downloaded free of charge.

Further examples of solutions to MSD risks can be found at **http://europe.osha.eu.int/good_practice/.**

The Agency website also provides links to EU legislation, **http://europe.osha.eu.int/legislation/,** and to Member State sites where national legislation and guidelines may be found.

AGENCY REPORTS

The European Agency has recently published a range of reports, fact sheets and campaign material relevant to the MSD debate. All of these are available on line at the Agency's web site http://agency.osha.eu.int/ publications/ and in a limited number of printed copies from the EC's Publications Office EUR-OP in Luxembourg (http://eur-op.eu.int), or from its sales agents (http://eur-op.eu.int/general/en/s-ad.htm).

Information reports

- **Repetitive Strain Injuries in the Member States of the European Union**
  This short report is is based on the results of a survey questionnaire distributed in 1999. It was carried out at the request of the Dutch Ministry for Social Affairs and Employment who wanted to know how different European countries define and measure the RSI problem and the types of policies and actions they have in place to tackle it. 32 pages, A4, (available in English). Cat. N° AS-24-99-704-EN-C
- **Work-related Neck and Upper Limb Musculoskeletal Disorders**
  In response to a request from the European Commission, this report has drawn together knowledge from an extensive set of sources. These include the contemporary scientific literature, the views of an expert international scientific panel, current practice, employer and employee representatives and a number of official authorities from Member States. 114 pages, A5, (available in English). Cat. N° AS-24-99-712-EN-C
- **Work-related Low Back Disorders**
  Work-related low back disorders, covering both low back pain and low back injuries, are a significant and increasing problem in Europe. This report examines the prevalence, origins, work-related risk factors and effective prevention strategies for low back disorders, A5 (available in English). Cat TE-32-00-273-EN-C
- **The State of Occupational Health in the European Union – a pilot study**
  This wide-ranging pilot study provides a snap shot of the current state of occupational safety and health in the European Union. It combines statistical evidence on OSH with the qualitative knowledge and experience of all the key actors involved. 478 pages, A4 (available in English). Cat TE-29-00-125-EN-C (Summary reports in all languages will be published in December 2000)
- **Future Occupational Safety and Health Research Needs and Priorities in the Member States of the European Union**
  Based on data collected in the Member States this report summarises views and policies on the most important future European research topics for Occupational Safety and Health. Psychosocial issues (particularly stress), ergonomics (particularly manual handling) and chemical risk factors (particularly carcinogens and substitution) emerge overall as the top priorities for future research. 56 pages, A5, (available in English). Cat. N° TE-27-00-952-EN-C

Agency facts

Fact sheets provide concise information on a range of OSH issues and are usually available in all 11 official Community languages.

- **Facts 3** – Work-related Musculoskeletal disorders in Europe
- **Facts 4** – Preventing Work-related Musculoskeletal Disorders
- **Facts 5** – Work-related Neck and Upper Limb Musculoskeletal Disorders: summary of Agency report
- **Facts 6** – Repetitive Strain Injuries in the Member States of the European Union – summary of Agency report
- **Facts 7** – Future Occupational Safety and Health Research Needs and Priorities in the Member States of the European Union – summary of Agency report
- **Facts 9** – Inventory of Socio-economic Information about Work-related Musculoskeletal Disorders in the Member States of the European Union (DE, EN, ES, FR)
- **Facts 10** – Work-related Low Back Disorders – summary of Agency report

Campaign materials

- European Week for Safety and Health at Work 2000

The Agency has produced an information pack consisting of posters, leaflets, factsheets and postcards to promote the European Week 2000 and its theme of the prevention of work-related musculoskeletal disorders.

Additional information on other Agency publications is available at the Agency's web site http://agency.osha. eu.int/publications/

3.2 OVERVIEW OF PRACTICAL EXAMPLES

Country	Title	Industry/ Workplace	Main source of problem	Main intervention
B	Adapting a fork lift truck	Warehouse	Driving	Redesign
DK	Improved organisation of workstation for sewing of mattresses	Textile/furniture manufacture	Workstation layout/foot pedals	Changes to workstation and equipment
DK	Avoiding manual lifting using a "vacuum" device to lift meat	Food	Heavy lifting – carcasses	Lifting aid
D	An intelligent lifting device for loading a high frequency press	Furniture manufacture/ table tops	Heavy, unwieldy loads	Mechanical aid
EL	Improved seating and reduced lifting in garment manufacture	Textile manufacture	Seating, pedal operation, pushing heavy loads	Improved workstation, equipment, transport methods
E	Automating removal of protective plastic from stainless steel parts	Electro-domestic goods manufacture/ dishwashers	Repetitive, forceful task	Automation
E	Reducing manual effort in factory loading tasks	Manufacturing/ chemical products	Heavy loads, awkward postures/sacks, barrels	Lifting aid, redesign of workplace layout
F	Removing repetitive risks from assembly of small components	Electro-domestic goods manufacture	Highly repetitive work	Mechanisation, changes to workstation and organistaion
I	Technical devices to reduce manual handling and repetitive work in meat packing	Food	Frequent manual handling of heavy loads	Automation
NL	Mechanical aids for handling glass panes	Glazing/ construction	Heavy, dangerous, awkward loads	Mechanical hoists, carts
A	Redesigning tram driver's position	Public transport	Poor driving position	Redesign of tram cab
P	Improving seating and ergonomics in factory quality control work	Manufacturing/ plastic goods	Repetitive work, stretching and reaching	Seating, workstation redesign
FIN	Ergonomics programme for SMEs	Small businesses/ various sectors	MSD from various types of work	External service programme with SMEs to introduce ergonomic changes
S	Ergonomics for junior schools	Schools	Poor furniture design	External service programme to introduce ergonomic equipment, training, information
UK	Introducing adjustable workstations on a packing production line	Food	Repetitive work, seating and workplace layout	Changes to seating, workplace layout
UK	Worker rehabilitation using voice recognition computer software: "talk yourself into a job" training programme	Office	MSD from display screen equipment use (mouse, keyboard)	Rehabilitation: Training in voice operated equipment and advice

European Agency for Safety and Health at Work

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