

Safety and Health at Work European Good Practice Awards

2007

Prevention of work-related MSDs in practice



European Agency
for Safety and Health
at Work



Safety and Health at Work

European Good Practice Awards 2007

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LIGHTEN THE LOAD

A EUROPEAN CAMPAIGN
ON MUSCULOSKELETAL DISORDERS





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Introduction

Musculoskeletal disorders (MSDs) are the most common work-related health problem in Europe, affecting millions of workers. Across the 27 Member States, 25% of workers complain of backache and 23% report muscular pains.

MSDs can affect the body's muscles, joints, tendons, ligaments, bones and nerves. Most work-related MSDs develop over time and are caused either by the work itself or by the working environment. They can also result from accidents; for example, fractures and dislocations. Typically, MSDs affect the back, neck, shoulders and upper limbs; less often they affect the lower limbs.

Health problems range from discomfort and minor aches and pains, to more serious medical conditions requiring time off work and even medical treatment. In more chronic cases, treatment and recovery are often unsatisfactory - the result could be permanent disability and loss of employment.

Risk factors

Many factors can contribute, either individually or in combination, to the development of MSDs:

- *physical*, including using force, repetition of movements, awkward and static posture, vibration and cold working environments;
- *organisational*, including high work demand, lack of control over work, low job satisfaction, repetitive work, high pace of work, time pressure and lack of support from colleagues and managers;
- *individual*, including prior medical history, physical capacity and age.

According to European statistics, 62% of workers in the EU27 are exposed a quarter of the time or more to repetitive hand and arm movements, 46% to painful or tiring positions and 35% to carrying or moving heavy loads.

In general, women are less exposed to physical risk factors, although hand or arm movements and work involving painful or tiring positions are experienced equally by both women and men. However, in certain jobs - such as those involving moving people - and sectors - such as healthcare and manufacturing - women are significantly more at risk.

Risk factors in some typically female new employment sectors, such as home care, may be underestimated because awareness is still low and these workers are difficult to contact.

Workers in precarious employment, such as those on fixed-length contracts, are also significantly more exposed to repetitive work and working in painful or tiring positions.

MSDs exact a high toll on companies, workers and their families, and on society at large. The cost of MSDs to business is reflected in medical and social security expenses, compensation payments and lost productivity. But MSDs also cause personal suffering to many workers and their families.

Lighten the load

The European campaign for 2007, 'Lighten the Load', promoted an integrated management approach to tackling MSDs, embracing both prevention and the retention, rehabilitation and reintegration of workers who already have MSDs. Run by the European Agency for Safety and Health at Work, the campaign involved employers, workers, workers' safety representatives, safety and health practitioners, preventive services and policy-makers in improving MSD prevention in workplaces.

Recognising good practice

The campaign featured the Good Practice Awards, which recognise organisations that have made outstanding and innovative contributions to tackling MSDs.

The awards promote and encourage practical solutions in workplaces and share this good practice around Europe. This publication contains 20 working examples of how companies and organisations from across the EU have taken action against MSDs. They were all entries in the 8th annual Good Practice Awards run by the Agency.

What the judges were looking for

Good practice examples are implemented - not theoretical or hypothetical - solutions that help to prevent or reduce MSDs, or support those who have suffered MSDs. They might include identifying and implementing an action programme that, say, modifies tasks to reduce prolonged periods of standing or the manual handling of heavy loads.





The good practice examples, which had to be recent or not widely publicised, had to:

- demonstrate relevance to MSDs;
- be aimed at the workplace;
- tackle risks at source through good management practice, particularly the effective use of risk assessment;
- show efforts to retain, rehabilitate and reintegrate workers who already had MSDs;
- be implemented successfully and show real improvements over time;
- involve the effective participation of the workforce or their representatives;
- involve consultation between management and the workforce or their representatives;
- go beyond simple compliance with relevant legislative requirements;
- be potentially transferable to other workplaces, including to other Member States and small and medium size enterprises (SMEs);
- demonstrate innovation.

Good practice examples could not be developed solely for commercial profit. This particularly related to products, tools or services that are or could be marketed. Examples that were focused on the individual, such as training, had to show they were a part of a wider risk-management approach.

The winning and commended entries

The good practice examples are not intended to be definitive or provide detailed technical guidance. The short summaries in this booklet present the best features, showing what works well in practice and how it was achieved. Some organisations developed their own solutions using in-house expertise; others brought in safety and health consultants. Most invited employees or their representatives to identify problems and develop solutions. Remember, workers have first-hand experience of the work situation.

Every workplace is different, which means employers must carry out an assessment of the risks at the workplace concerned so that solutions are developed for specific problems. However, some solutions can work across industry sectors in organisations of different size.

The entries came from a wide variety of organisations. Examples ranged from measures to reduce the risks of manual handling in a tomato greenhouse to developing a solution to the musculoskeletal problems suffered by guide dog trainers. In total, nine award-winning and 11 commended entries are summarised here. These summaries are available in all Community languages and linked to full-length descriptions on the Agency website.

More information

The Agency's website - <http://osha.europa.eu> - contains much information on workplace safety and health in all European Community languages.

Information on MSDs can be found at: <http://osha.europa.eu/topics/msds> and details of 'Lighten the Load' at <http://ew2007.osha.europa.eu/>. All Agency publications can be downloaded free of charge from the website.

Acknowledgements

The Agency would like to thank its network of focal points in Member States (competent authorities, or bodies nominated by them, responsible for occupational health and safety) for assessing and nominating examples for the Good Practice Awards. The competition would not have been possible without their assistance.

The Agency also thanks the experts who made up the judging panel for their input: Peter Buckle, Károly György, Daniela Kubičková and André Pelegrin.

The panel included representatives from the government, employers' and employees' organisations and an independent expert. Various Agency staff contributed to making the project a success, including Emmanuelle Brun, Berta Lejarza, Birgit Müller, Terry N Taylor, Tim Tregenza and Estibaliz Vidart.

Last but not least, many thanks to the organisations that feature in this publication.

Zinta Podniece
Project Manager
European Agency for Safety and Health at Work
February 2008



Overview of examples

AWARD WINNERS

Title	Country	Sector/ education level	Issue
Let's have a look at loads	Czech Republic	Manufacture of machinery and equipment	An ergonomics programme to identify and introduce measures to prevent MSDs
The ergonomic design of workplaces and work organisation in a small to medium size enterprise	Germany	Manufacture of machinery and equipment	A programme to improve working postures and reduce the manual handling of heavy loads
Systematic ergonomic workplace design in sewing work	Germany	Manufacture of textiles	Developing an ergonomically designed sewing workstation and accompanying operational instructions
A running rail to cut the risks of manual handling in a tomato greenhouse	Cyprus	Agriculture	Introducing a load moving system - the running rail - to ease the production process and cut manual handling risks
Reduction of lifting through smart design	Netherlands	Road construction	Reducing the high levels of physical stress, back and knee complaints suffered by road workers
Replacement of wooden pallets by incorporating a recessed component into the product	Netherlands	Manufacture of non-metallic mineral products	Tackling MSDs arising out of the manual handling of heavy wooden pallets
A comprehensive approach to reduce the risk of MSDs	Slovenia	Manufacture of rubber and plastic products	Workplace measures to prevent MSDs, including technical improvements to reduce manual handling, bending and repetitive movements.
Dealing with the musculoskeletal problems of guide dog trainers and mobility instructors	United Kingdom	Health and social work/ Activities of membership organisations NEC	Tackling the high prevalence of MSDs and absenteeism among trainers
Use of participatory ergonomics to identify and solve high-risk tasks	United Kingdom	Manufacture of chemicals and chemical products	Forming an Ergonomic Improvement Team to tackle MSDs affecting workers at a pharmaceutical plant





COMMENDED ENTRIES

Title	Country	Sector/ education level	Issue
Innovative work organisation for moving supplies	Belgium	Health and social work	Installing new equipment and reorganising work to avoid workers having to do unnecessary lifting, carrying and repetitive work
A comprehensive lifting policy for the prevention of back complaints among home helpers	Belgium	Health and social work	Developing a lifting policy to cut back complaints and spinal lesions, reduce absenteeism and improve patient care
Integrated operator fatigue reduction programme	Greece	Electricity, gas, steam and hot water supply	Addressing problems that included continuous handling of loads, prolonged standing, repetitive movements and awkward postures
Prevention of musculoskeletal disorders among nursing and care staff	Estonia	Health and social work	Preventing MSDs and providing a safe working environment through the use of correct patient lifting techniques
Management of equipment/aids for the manual movement of patients	Italy	Health and social work	Using a database to ensure staff use the correct lifting equipment and are trained in its use
Assistance in the cleavage and grading of stone material	Italy	Mining and quarrying	Improving working positions and introducing extra lifting equipment to reduce the handling of large loads
Modernisation of a ceramics factory to prevent manual lifting	Lithuania	Manufacture of non-metallic mineral products	Automating the removal of tiles from the production line to pallets to cut the risks of back trauma
Using targeted analysis to achieve an "ErgoPlus" industrial workplace	Austria	Manufacture of machinery and equipment	Setting up an ergonomics group to produce an ergonomically optimum workplace, covering all aspects of work from lighting to posture
Preventing manual handling of residents in a care home	Slovakia	Health and social work	Eliminating or at least reducing the manual handling of people and preventing MSDs. Measures included the introduction of lifts, bathing beds and handrails in the corridors
Automation of visual inspection	Slovakia	Manufacture of basic metals	Installing cameras and an automatic checking system to tackle MSDs related to long periods of standing, frequent bending and cold working conditions
Participative development of work methods (SATKE, Taske)	Finland	Construction	Tackling MSDs, including awkward work postures and physical strain that affects the neck and upper limbs, lumbar region and lower limbs of construction workers





1 LET'S HAVE A LOOK AT LOADS

CZECH REPUBLIC MANUFACTURE OF MACHINERY AND EQUIPMENT NEC

Alcoa Fujikura Czech s.r.o.
Plzeňská 387
CZ-349 01 Stribřo
www.alcoa.com/czech_republic/en/home.asp

The issue under discussion

The company's manufacturing - production of cable harnesses for the automobile industry - is largely based on manual work, which increases the risks of workers developing MSDs. Typical tasks include the hand-contacting of conductors, completion of sheaths and cable harness wrapping.

Action taken

An ergonomics programme was set up to identify, evaluate and cut workplace risks, optimise work procedures and standardise work methods. The ultimate aim was to prevent MSDs.

Two teams addressed the problem: a strategic ergonomics team, composed of management representatives and occupational safety and health experts, was responsible for strategic decisions; the operational ergonomics team, composed of departmental representatives, focused on searching for and evaluating ergonomic risks in the workplace. It examined potential solutions to reduce the risk of MSDs and monitored the implementation of both administrative and technical measures. It also functioned as a consulting body for individual workplaces with regard to ergonomics issues.

The company assigned one employee to be responsible for ergonomics. His tasks included coordination of solutions to ergonomics problems, assistance with the investigation of work-related illnesses and work with the company doctor and an external expert. The employee also carried out field investigations, helped the ergonomics teams work together and communicated relevant information to management.

The ergonomics programme, which was based on risk assessment, put in place a range of actions:

- technical measures, mainly focusing on the design of equipment in the workplace;
- work reorganisation;
- increased training and information.

Workers with MSDs received medical treatment and occupational rehabilitation.

Results achieved

The number of work-related illnesses has been cut. Compared to 2003, there were 28 fewer cases of established work-related illnesses in the following year. Complaints related to the excessive loads on employees' upper limbs also decreased.





2 THE ERGONOMIC DESIGN OF WORKPLACES AND WORK ORGANISATION IN A SMALL TO MEDIUM SIZE ENTERPRISE

GERMANY

MANUFACTURE OF MACHINERY AND EQUIPMENT NEC

Keulahütte GmbH
Geschwister-Scholl-Str.15
D-02957 Krauschwitz
www.keulahuettekrauschwitz.de

Maschinenbau- und Metall-Berufsgenossenschaft
Elsterstr. 8a. D-04709 Leipzig
www.mmbg.de

The issue under discussion

An analysis of the company's workplace showed that:

- fettlers have to bend forwards to perform many of their tasks;
- they have to handle heavy loads (18-20 kg);
- awkward positions are taken when seizing cast parts that are far apart and sometimes below trunk level;
- the height of the workbench and grinding machines is not adapted to workers;
- climate, lighting and noise conditions are poor;
- there is no policy for breaks and job rotation.

Action taken

Complementary methods were used to assess the strains, including:

- a worker survey;
- a workers' workshop to analyse the work process, complemented by analyses based on photographs and video;
- an evaluation of risk factors such as noise and climate;
- checklists to identify psychosocial and physical - such as standing and sitting or poor posture - risk factors and health problems;
- the "controlling features" (Leitmerkmalmethode) method to identify carrying, lifting, pushing and pulling tasks;
- ergonomics measurements with the CUELA system (computer-assisted recording and long-term analysis of musculoskeletal loads).

The following measures were developed by an interdisciplinary team made up of safety representatives, members of the staff committee, workers, an occupational physician, representatives from the statutory accident insurance and social security body, and occupational and safety experts:

- use of lifting/tipping containers;
- introduction of height-adjustable workbenches and grinding machines;
- use of easier-to-handle iron-barred boxes;
- introduction of job rotation and short breaks;
- improvement of the lighting and ventilation system.

Workers were given time to familiarise themselves with their new working conditions and were offered support from the team. Further analyses and measurements were performed to ensure that the measures had improved the working conditions without introducing new strains.



Lifting cast parts before and after the introduction of lifting/tipping containers.

Results achieved

The costs of implementing these technical measures amounted to about €16,000 which is a reasonable investment for a small to medium size enterprise (SME). Clear benefits for the company will only become apparent in the longer term. Nevertheless, bending postures at an angle of more than 20° and the manual handling of heavy loads have been almost eliminated. This model workplace could be introduced in similar SMEs, such as those involved in welding or metalworking.





3 SYSTEMATIC ERGONOMIC WORKPLACE DESIGN IN SEWING WORK

GERMANY MANUFACTURE OF TEXTILES

MEWA Textil-Service AG & Co. Management OHG
John-F.-Kennedy-Straße 4 . D-65189 Wiesbaden
www.mewa.de

Ingenieurbüro Schwan Frankfurt
Inckusstrasse 5
D-60320 Frankfurt am Main

The issue under discussion

The number of work-related diseases and lost working hours has increased in the German sewing industry, mainly due to spine and shoulder/arm disorders. These account for more than 34% of all working days lost in this sector, which is considerably higher than elsewhere.

- Sewing involves highly repetitive movements of the shoulder and arm.
- Static postures of the spine and lower extremities - leaning a long way forwards while sitting - are involved for much of the work.
- The height of many sewing tables is still the same as the foot-operated machines common at the end of the 19th century.
- There is not enough room for the legs between the workbench and foot pedal.



A workplace before new measures were introduced: the worker is strongly bent forwards at a workbench that is too low, with too little room for her legs.

Action taken

The leather industry and textile and clothing professional associations initiated a project aimed at developing an ergonomically designed model sewing workstation and accompanying operational instructions (BGI 804 2). The project, supported by the HVBG, was carried out by the Schwan engineering company in eight sewing companies.

At MEWA, 40 sewing workstations were redesigned according to the BGI 804 2 standard:

- the spatial arrangement of the workspace under the workbench and the foot pedal were altered to encourage an upright working posture and relieve the strain on the spinal column;
- a redesigned foot space with a pedal release enabled the unhindered movement of feet and legs;
- a work table of adjustable height was introduced that can switch easily between sitting and standing;
- adjustable support areas for the hands and arms to reduce the static strain on the shoulders and neck were introduced.



Example of a redesigned workstation with arm supports and adjustable height. An electromechanical system is used to incline the table.

Results achieved

The workers' acceptance of the intervention was high. A clear reduction in strains and stress and increased job satisfaction were reported to MEWA's management. The cost of these measures came to €1,500 per workstation. The overall investment of about €60,000 proved profitable in just a few months: the number of working days lost fell by 16%, the needle operating time for the redesigned machines increased by up to 50% and productivity rose by some 15%.

This approach can be applied directly to other sewing workstations and is transferable to workplaces in other sectors, such as those using assembly workstations.





4 A RUNNING RAIL TO CUT THE RISKS OF MANUAL HANDLING IN A TOMATO GREENHOUSE

CYPRUS AGRICULTURE

Alexandros A. Christou
11 Ethnomartyra Kyprianou
CY-4520 Parekklesia Limassol

The issue under discussion

Workers in an agricultural enterprise were being put at risk of developing MSDs through the constant carrying of heavy loads.

Action taken

A Cypriot fruit growing company identified manual handling risks to workers in its greenhouses from the movement of boxes of tomatoes. Female employees, in particular, were identified as being at risk.

The solution was to devise a “running rail” throughout the greenhouse in the form of an overhead pipe supporting a hanging platform onto which can be placed up to 20 boxes of fruit. This hanging platform can then be easily pushed by the worker through the greenhouse and into the adjoining packing area.

Results achieved

This simple load moving system has eased the production process and substantially decreased the manual handling risks to workers. Since its installation, no complaints of back pain have been received from the employees.



The tomato transport system.



5 REDUCTION OF LIFTING THROUGH SMART DESIGN

THE NETHERLANDS ROAD CONSTRUCTION

City of Delft
Martinus Nijhofflaan 2
NL-2624 ES Delft
www.delft.nl

Gardien bedrijfsfysiotherapie bv
Delftechpark 26
NL-2628 XH Delft
www.gardienbv.nl

The issue under discussion

The City of Delft employs about 40 road workers and service employees in its maintenance department. Workers were known to be exposed to high levels of physical stress, with back and knee complaints particularly prevalent.

Action taken

The physical stresses were analysed by a physiotherapist using visual aids to document the problem. A working group was set up comprising affected workers and supervisors and given training on physical stress. The group was able to use the visual aids in its search for solutions.

A plan of attack was prepared on three levels:

- ergonomics - tools were provided to prevent physical stress such as custom-fitted kerb grippers;
- the content and organisation of tasks - the logistics of the work were examined, particularly during the project preparation phase, to prevent the need to handle materials over long distances;
- behaviour and working techniques - workers were trained in techniques by the company physiotherapist; working agreements were formulated with the employees and documented in the form of a "working techniques protocol".

There was also an agreement made with planners and engineering enterprises over the use of materials to ensure that heavy materials were used only when absolutely necessary. For example, where cars do not cross paved areas, smaller, 4.5cm paving tiles are now used instead of heavier tiles. Such changes are being incorporated into a new public spaces manual that sets out standard models for the design of the city's infrastructure.

Results achieved

The City of Delft has more than earned back its investment, thanks to a reduction of 3.9% in absence due to illness. A survey on physical stress carried out before and after the measures were introduced revealed a drop in exposure to physical stress. More importantly, the status and motivation of the workers were enhanced because they felt a sense of "ownership" over the measures.



The measures sought to remove risks such as handling heavy tiles.



6 REPLACEMENT OF WOODEN PALLETS BY INCORPORATING A RECESSED COMPONENT INTO THE PRODUCT

THE NETHERLANDS MANUFACTURE OF NON-METALLIC MINERAL PRODUCTS

Dycore BV, Lelystad Branch
Steenstraat 2
NL-8211 AG Lelystad
www.dycore.nl

Dycore BV, Head Office
Ambachtsweg 16
NL-4906 CH Oosterhout

The issue under discussion

The company manufactures ribbed floor components. It uses a wooden pallet system to transport these products, in which workers have to handle awkwardly shaped pallet blocks weighing around 25kg when dry.

Action taken

The risk of MSDs arising out of the manual handling of these heavy pallet blocks was recognised during an assessment based on the "NIOSH method" (<http://www.cdc.gov/niosh/topics/ergonomics/>). A traffic light system was used to indicate risk levels: red for a major risk requiring action, amber for a risk where action is desirable and green for a situation where no action is required.

Potential solutions included changing the design or materials of the pallets and using mechanical lifting aids. However, the company concluded that the best solution was to get rid of the pallets altogether.

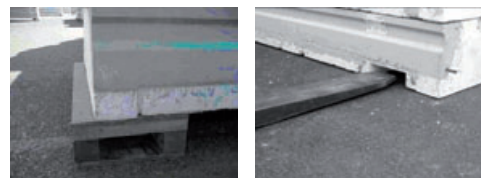
A brainstorming session with the employees identified the solution: incorporating a recessed element into the ribbed floor components themselves, rendering the wooden pallets redundant. The feasibility of this solution was tested, in particular, whether the redesigned components maintained the required quality and construction standards.

The result is that neither Dycore employees nor other workers, such as sub-contracted drivers, have to expend physical effort handling pallets and risk injury.

Results achieved

At an annual cost of €137,000, the redesign saved €91,000 a year in other component use and €22,000 in the purchase of pallets. Improved handling capabilities also meant that three fewer workers were required in this process, saving €120,000. In total, there is a net benefit of €96,000 a year.

It is more difficult to attribute directly the fall in absence due to ill-health over the past three years to the redesign, but there must be a link. Other benefits include a cut in noise as nail guns are no longer needed to repair pallets and quicker deliveries on site because there is no need to load pallets onto trucks.



The components before modification sitting on a pallet block and after with the recess.





7 A COMPREHENSIVE APPROACH TO REDUCE THE RISK OF MSDs

SLOVENIA MANUFACTURE OF RUBBER AND PLASTIC PRODUCTS

Savatech d.o.o.
Škofjeloška cesta 6
SI-4000 Kranj
www.sava.si

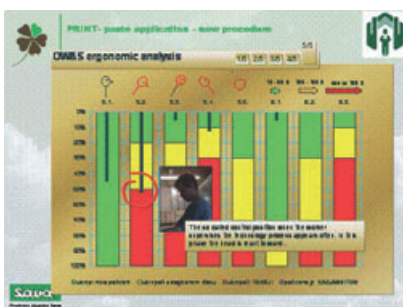
Sava Medical in Storitve d.o.o.
CC Safety
Technical, Fire and Environmental Safety
Škofjeloška cesta 6
SI-4000 Kranj

The issue under discussion

Rubber manufacturing is a heavy industry characterised by high levels of physical strain and repetitive movement. The load on a worker's musculoskeletal system is high.

Action taken

An in-depth ergonomic analysis of workplaces is part of the annual risk assessment audit carried out by Savatech. To manage occupational safety and health (OSH), the company produced and certified a standardised procedure in line with the international standard OHSAS 18001 (<http://www.ohsas-18001-occupational-health-and-safety.com>) in 2004.



Ergonomic analysis of the workplace risks.



Before and after adjustments were made to a workstation.

A multidisciplinary team involving management, workers, OSH experts, occupational health doctors, construction designers and other specialists assessed the ergonomic problems, proposed solutions and monitored their implementation.

A comprehensive set of workplace measures was implemented to prevent work-related MSDs developing. These included technical improvements aimed at reducing manual handling, bending and repetitive movements. Guidelines for the "load relocation code" were provided to the heads and planners of production processes, along with practical information on preventing risks when moving a load.

A prevention campaign included training courses, the dissemination of relevant information in a bulletin and newspaper, and a drawing competition. A manual, 'With physical activity to better health', offering advice on healthy and balanced nutrition and physical exercises, was issued to all workers. A professional fitness trainer provided practical demonstrations of these exercises.

Results achieved

This initiative cut sick leave by 28.8% from 2004 to 2007 and improved workers' satisfaction. Despite operating in the heavy industry sector, sickness absence is below the average for Slovenia.

Owing to the size of the company and the complexity of the measures introduced, the cost was high at €4 million. However, direct benefits such as the cut in sickness absence have already saved €1.5 million. In the longer term, it is expected that the benefits will outweigh the costs.





8 DEALING WITH THE MUSCULOSKELETAL PROBLEMS OF GUIDE DOG TRAINERS AND MOBILITY INSTRUCTORS

UNITED KINGDOM
HEALTH AND SOCIAL WORK
Activities of membership organisations NEC

The Guide Dog for the Blind Association - Health and Safety Team
 Tollgate House, Banbury Road
 Leamington Spa
 UK-CV 33 9QJ
www.guidedogs.org.uk

The issue under discussion

Training dogs for blind and partially sighted persons is a left-handed job, creating one-sided loads on dog trainers/clients' mobility instructors:

- left wrist, forearm and elbow: maintenance of grip, application of force, forearm rotation;
- left shoulder (at socket): transverse extensions and medial rotations to limit the dog's movement; abduction at shoulder particularly with a "crabbing dog";
- left shoulder (scapula and clavicle): all movements, especially adduction, inferior rotation and elevation of the shoulder, when both giving signals to the dog and controlling its movements;
- low back: with handles of inappropriate length, particularly with a "crabbing dog";
- left knee, potentially hip and ankle: asymmetrical weight bearing.

A high prevalence of MSDs and absenteeism was noticed, yet trainers/instructors were rarely aware of the risks. They enjoyed their jobs and considered "aches and pains" a part of it, which led to a high level of under-reporting of illness.



Asymmetric strains on guide dog trainers by left-handed dog training.

Action taken

Alternating between left and right handed training is not possible because this could lead to more "left" or "right" trained dogs and provoke dangerous situations if, for example, the client mistakenly handled a "right" dog as a "left" one.

Together with dog trainers/instructors, risks were assessed and the following measures developed:

- providing different types and lengths of leads and handles to allow workers to match their stature to the dog's height and demeanour;
- rejecting, as early as possible, boisterous dogs which do not respond to training;
- monitoring workers' health;
- providing training targeted at the manual handling issues specific to dog training;
- producing three self-help leaflets;
- stressing the importance of reporting incidents and MSDs to allow better risk identification and prevention.

Results achieved

The feedback from the staff was positive. They felt that "someone" who understood their work and knew about MSDs was listening to them. Their awareness of MSD risks and how to tackle them has increased. As a consequence, more incidents are now reported. The benefits in terms of costs saved are not yet known but a review of the efficiency of the measures is planned for 2008.





9 USE OF PARTICIPATORY ERGONOMICS TO IDENTIFY AND SOLVE HIGH-RISK TASKS

UNITED KINGDOM MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS

*GlaxoSmithKline - Employee Health Management
Harmire Road, Barnard Castle
County Durham
UK-DL12 8DT
www.gsk.com*

The issue under discussion

MSDs were affecting workers at a pharmaceutical plant.

Action taken

A dozen experienced manual handling assessors were trained and formed into an Ergonomic Improvement Team (EIT) to lead the initiative. They were assisted by an ergonomics expert. The team met regularly and sub-groups were formed to investigate improvements and share best practice, with site management providing support.

The EIT investigated ergonomic problems in a variety of work settings, including pallet lifting, repetitive work using poor hand tools in laboratories, cylinder lifting, loading and unloading storing plugs, packaging boxes, working in isolators, hand tool redesign and operating high rise trucks.

A variety of risk analysis techniques were used, including video observation analysis. Measures were launched with the full participation of the workers concerned. The company also ran a communication programme to raise awareness of the issue. About 90% of the ergonomic challenges identified were solved "in-house" without the use of an external expert.

Results achieved

Within a year of initiating the project, 31 work system improvements had been achieved. Of these, one measure involved the automation of a task and three were administrative. Twenty-five reduced workers' exposure to multiple risk factors through the introduction of new work equipment and ways of working or modifications to the existing equipment or work layout. A 40% reduction in the number of MSDs attended to on site by the company physician was achieved.

Within three years, 65 ergonomic improvements were implemented and evaluated. There was a 160% increase in the number of reported ergonomic hazards recorded

(illustrating the greater awareness among workers) and a record-breaking health and safety performance in terms of absence of "lost-time" illnesses.

The cost of the EIT was about £20,000 (c €26,900), dwarfed by savings of £1.5 million (c €2 million) over three years. Overtime pay was cut from £60,000 (c €80,600) a year to £5,000 (c €6,700) through the redesign of the production lines.



Before and after adjustments were made to a workstation.





10 INNOVATIVE WORK ORGANISATION FOR MOVING SUPPLIES

BELGIUM HEALTH AND SOCIAL WORK

De Oesterbank vzw
Vaartblekersstraat 15
B-8400 Oostende
www.deoesterbank.be

The issue under discussion

Workers had to repeatedly fetch and carry large quantities of supplies within a very limited time. As a result, workers were subjected to serious physical strain, leading to high levels of absenteeism and lower productivity.

Action taken

To avoid unnecessary lifting, carrying and repetitive work, the flow of goods was limited to the bare necessities. Roller conveyors and conveyor belts were installed and incoming orders picked up automatically. All conveyance trays now move via roller conveyors to eliminate the risk of falling over. The company introduced ergonomic chairs, tables, workstation design and lighting, and a warning colour policy.

At the request of workers, standing workplaces were replaced by sitting units, which will help to reduce back strain. To cut occupational accidents, production was reorganised to anticipate bottlenecks, allow better planning of the workforce and avoid time pressures. Quality control is now integrated into the production stream to avoid extra manipulation. Only one trained person is now responsible for the system supply and in possession of a break knife, instead of all workers as was previously the case. A fixed, slower tempo guarantees production capacity without putting the workers under stress.



A conveyor belt brings a warehouse crate to the counting area automatically.

Results achieved

Working conditions have improved and no new strains have developed. Lifting has been reduced to 5% as compared to the old method. The new work process has enabled the company to hire new staff with physical or learning disabilities. As a result, extra subsidy was received from the Flemish government for the employment of a special needs group.

The space required for the new work process is about 50% less than before. The production costs have been reduced by 10%. The new measures have also brought in new clients, attracted by this innovative work organisation.

The investment amounts to €450,000, which should be recouped within 10 years. The introduction of a second such installation would reduce costs by about 20%. A €50,000 subsidy was also awarded by the European Social Fund, which recognised the pilot project as an innovative measure. The method could also be applied to other movement of supplies and companies.





11 A COMPREHENSIVE LIFTING POLICY FOR THE PREVENTION OF BACK COMPLAINTS AMONG HOME HELPERS

BELGIUM HEALTH AND SOCIAL WORK

Familiezorg West-Vlaanderen vzw
Biskajersplein 3. B-8000 Brugge
www.familiezorg-wvl.be

The issue under discussion

A survey of 918 home helpers, which included visits to patients' homes, revealed that a high proportion of work consisted of heavy lifting and standing:

- almost three-quarters of home helpers suffered lower back pains at least once;
- in one year, 4,725 working days (involving 150 workers) were lost due to lower back problems;
- neck, shoulder, wrist, middle back, hip and thigh pains were common;
- equipment was rarely used for the lifting of people;
- home helpers and other informal caregivers, such as family and friends, are very creative in finding ways to reduce the strain on their backs;
- patients often resented the use of lifting elevators;
- little information is provided on the use of lifting equipment.

Action taken

A comprehensive lifting policy was developed, including:

- education and training;
- the appointment of an ergotherapist or lifting coach to reduce back problems;
- new methods and working instruments - four forms to record and assess lifting risks, request advice from the lifting coach and evaluate the intervention;
- help for patients to buy and use lifting aids;
- stimulating multidisciplinary cooperation - paramedics, physicians, physical therapists and family members were included in the development of the prevention measures;
- a lifting protocol to guarantee a better acceptance of the measures by informal caregivers - a flowchart shows the step-by-step measures to be followed;
- a multidisciplinary rehabilitation programme for home helpers with back complaints.

The lifting policy is reviewed regularly by the executive board, external prevention services, the lifting coach and home helpers.



A little lift in the back ...!
A comprehensive lifting policy for the prevention of back complaints among home helpers in homecare

Results achieved

The total annual cost of the measure is estimated to be €44,190. The benefits have not yet been confirmed by a cut in sickness or a new survey. However, it has been observed that home helpers are paying increased attention to back-friendly working practices, which, in the longer term, should reduce back complaints and spinal lesions. The result will be a cut in absenteeism and attendant costs for the organisation, and an improvement in the quality and continuity of patient care.





12 INTEGRATED OPERATOR FATIGUE REDUCTION PROGRAMME

GREECE

ELECTRICITY, GAS, STEAM AND HOT WATER SUPPLY

Schneider Electric S.A. 14th km Motor Way Athens - Lamia

GR-14564 Kifissia, Attiki

www.schneider-electric.com.gr

Ergonomia S.A. El. Benizelou 63-71. GR-14231 N Ionia, Attiki

www.ergonomia.gr

The issue under discussion

The assembly lines for transformers involve work that can be monotonous and lead to increased operator fatigue. This is due to:

- continuous handling of loads;
- prolonged standing;
- repetitive movements of both hands and wrists;
- awkward postures.

Action taken

An integrated programme of ergonomic improvements was introduced to reduce operator fatigue and the risk of MSDs and accidents. Sufficient money for investing in production equipment and redesigning work posts was available. The programme included an in-depth risk assessment, which documented the tasks that needed organisational and technical improvements.

Based on the results of the ergonomic analysis, the following changes were implemented:

- by rearranging the placement of tools and assembly parts inside or nearer to the operator's upper extremities envelope while standing in front of the winding axis, it was possible to eliminate awkward turning and flexing of the spine;
- by providing the opportunity to use a sit/stand stool, as well as an anti-vibration mat, it was possible to reduce the fatigue caused by a permanent standing working posture;
- the repositioning of the fixing tape dispenser towards the operators' sagittal plane and the replacement of scissors with appropriate crimp paper cutters to reduce wrist strain.

Other improvements included the installation of an automated conveyor of adjustable height in the assembly department and an adjustable angle table for the easy and safe turning of the transformer's armature. Training for operators complemented the improvements in equipment and the redesign of the assembly line.



Before - working with raised arm and elevated shoulder.



After - automated conveyor of adjustable height.

Results achieved

Data are not yet available on the cost/benefit analysis of the programme because it has been implemented too recently. However, some benefits such as lower worker fatigue, reduced risks of MSDs and accidents, and improved work content and product quality are evident. The programme has also proved valuable to the company as guidance prior to purchase of new machinery and to improve current assembly methods.





13 PREVENTION OF MUSCULOSKELETAL DISORDERS AMONG NURSING AND CARE STAFF

ESTONIA HEALTH AND SOCIAL WORK

Ida - Tallinna Keskaigla AS
Ravi tn 18
EE-10138 Tallinn
www.itk.ee

Estonian Association of Occupational Health Physicians
Hiiu 39
EE-11619 Tallinn

The issue under discussion

One of the main tasks of nurses and carers in hospitals is handling patients. Nearly two-thirds of staff are involved in this task, which can lead to MSDs, in particular, back pain and long-term incapacity.

Action taken

The aim was to prevent MSDs and provide a safe working environment through the use of correct patient handling techniques. The hospital put in place, through the agency of a multidisciplinary team, an integrated approach to the prevention of MSDs. Its main emphasis was on the efficient exchange of information between departments and services, and on increasing workers' awareness of health and safety issues.

Following a risk analysis, the hospital introduced a number of measures to reduce the physical load on the workers. The technical measures included installing handrails in corridors to enable patients to move around without help from staff.



A patient lifter and shower stretcher.

Bathrooms have been replaced with shower rooms. Patients are washed on shower stretchers or special chairs. It is now possible to transport and lift patients ergonomically and to avoid bending forward while washing them. Staff no longer have to handle loads at too low a level.

The introduction of these technical measures was supported by training programmes. All newcomers, as well as current staff, were systematically trained to understand MSD risk factors and proper patient handling techniques. The programme was adapted to the specific needs of particular departments and tasks, and included both theoretical and practical training.

Results achieved

Costs:

- training costs: trainer's salary and visual aids - EEK 100,000 (c €6,400)
- equipment costs: c EEK 15 million (c €960,000)
- cost of general improvement of working conditions, including ergonomic work posts - EEK 2 million (c €128,000).

Benefits (indirect):

- employees applying correct working techniques do not suffer ill-health, resulting in savings on work incapacity benefit and replacement costs
- correct working techniques save time and lead to better planning
- correct techniques help patients; patient satisfaction reduces work tensions among staff.





14 MANAGEMENT OF EQUIPMENT/AIDS FOR THE MANUAL MOVEMENT OF PATIENTS

ITALY HEALTH AND SOCIAL WORK

*Risk Prevention and Protection Service
Arcispedale S. Maria Nuova Azienda Ospedaliera di Reggio Emilia
Viale Risorgimento 80
I-42100 Reggio Emilia
www.asmn.re.it*

The issue under discussion

Equipment for the manual moving of patients is vital for the prevention of MSDs in hospital workers. However, inadequate management of such equipment has been identified as a risk factor.

Action taken

The risk prevention and protection service (RPPS) assessed the manual moving of patients, looking at, among other factors, the number of trained staff and conditions in the wards.

This assessment revealed the lack of any systematic collection of data on the manual moving of patients, making it difficult to examine the risk factors for manual handling in the hospital.

It was found that the control of lifting equipment was shared between various parties and appeared on different inventories, depending on the nature of the appliance. This lack of overall control meant incomplete information was available, leading to difficulties in tracing equipment when it left the ward.

A database was put in place to allow the use of training data relating to staff and the manual moving of patients, which made it easier to quantify and document any improvements

made. This addressed the challenge of managing personnel who may have had restrictions set on the loads they could lift.

An information system was also put in place by the RPPS that allocated beds, aids and useful equipment for moving patients to individual operational units, identified by building, floor and type of service. This database is linked to the hospital's general inventory database and allows for equipment to be tracked from purchase, even during maintenance.

Results achieved

Wards now know what lifting aids are available and where, and the RPPS knows which employees need training on specific equipment. Time was saved in some data collection activities and better communication channels were developed between the service and the wards.

The cost of the system is relatively low as the programme uses commonly available software and data codes for locations, and equipment already existed. There was a significant fall in the number of accidents caused by the manual movement of patients in 2006.

IGHTTEN
THE LOAD





15 ASSISTANCE IN THE CLEAVAGE AND GRADING OF STONE MATERIAL

ITALY MINING AND QUARRYING

*The Joint Health and Environment Committee
c/o E. S. Po V. S. Antonio 36
I-38041 Albiano
www.commissioneporfido.it*

The issue under discussion

Porphyry is a stone material of volcanic origin that is split into parallel planes for use as a semi-finished product. It is extremely hard wearing and, as a result, is frequently used for street furniture and in the home.

In the porphyry working process, stone is extracted using explosives before the material is split and graded. These latter two operations put workers at risk from MSDs; from having to work with the trunk bent and handling stone that typically weighs from 7-30kg. Throughout the working day, a worker may have to handle 200 hundredweight (200 x 50kg) of stone. The risks are higher because the work is carried out on uneven quarry ground and workers are exposed to the elements.

Action taken

An analysis using the NIOSH method (<http://www.cdc.gov/niosh/topics/ergonomics/>) highlighted the risks facing some 400 workers. Taking a participative, tripartite approach involving workers' representatives, employers, and experts, a system for material processing was designed to improve the working positions of the workers. Extra lifting equipment was put in place to facilitate the movement of stones. Currently, there are more than 20 models of this system in place, with more due to be installed.

Results achieved

The results of the measures introduced in this difficult industry sector are clear: workers' exposure to MSDs has been cut by almost half. This in turn has led to less absenteeism. The system also allows the employment of workers with disabilities.



Improved workstation following the introduction of the new measures.



16 MODERNISATION OF A CERAMICS FACTORY TO PREVENT MANUAL LIFTING

LITHUANIA MANUFACTURE OF NON-METALLIC MINERAL PRODUCTS

AB Dvarčionių keramika
Keramiku g. 2
LT-10233 Vilnius
www.keramika.lt

The issue under discussion

Tile packages from the tile-sorting line needed to be hoisted by a manual hydraulic mechanism. A risk assessment in 1998 revealed that a sorting assembly line operator needed to bend down nearly 1,700 times during a shift. Sometimes, packages weighing from 15-30kg would need to be lifted manually. Workers were exposed to the risk of back trauma and it was estimated that high physical loads led to frequent illness and staff turnover of up to 50%.

Action taken

As a result of the risk assessment, it was decided to modernise the unit that put tiles on pallets. Two robot manipulators were installed to replace eight of the 16 workers. Following automation, the workers were trained to manage the computer-controlled mechanism.



Automation of the tile-sorting line.

Of the eight workers not now required to work in the unit, one retired and seven were offered alternative work, which they accepted. The mechanism takes and puts the empty pallets into the relevant place automatically. It includes an automatic assembly line, control box and automatic intake mechanism, allowing the maintenance of eight pallets simultaneously. The operator of the mechanism monitors its control and, in the event of any process failure, resets the operation in automatic mode. Full pallets are taken away by the worker on an electric hoisting cart.

Photo sensors protect the area maintained by the mechanism. If anyone steps into the yellow safety zone, the mechanism is stopped automatically. Electricians or metalworkers are called to deal with more complicated breakdowns.

Results achieved

The cost of modernising the workshop was LTL 140,000 (c. €40,600). With the installation of the new facility, bending was almost eliminated, cutting the risk of back trauma to a minimum. The productivity in the sorting workshop increased by around 22% and the number of days lost to sickness fell.





17 USING TARGETED ANALYSIS TO ACHIEVE AN "ERGOPLUS" INDUSTRIAL WORKPLACE

AUSTRIA MANUFACTURE OF MACHINERY AND EQUIPMENT NEC

Alois Pöttinger Maschinenfabrik Ges.m.b.H
Industriegelände 1
A-4710 Grieskirchen
www.poettinger.at

Haslinger, Ergonomics in the workplace
Prunnerstr. 14
A-4600 Wels

The issue under discussion

The plant produces agricultural machinery. A need to increase output and manufacture machinery in a variety of versions meant Pöttinger had to modernise the assembly of its loading trailers. The company places great emphasis on designing new workplaces ergonomically and improving the ergonomics of existing workplaces.

Action taken

Pöttinger established an "Ergogroup" to ensure high ergonomic standards were met. This was composed of an equipment design engineer, engineering technical expert, industrial engineering technical expert, safety specialist, occupational health practitioner and external consultant. This group developed criteria for an "ErgoPlus" recognised workplace.

The Ergogroup used an in-house analysis sheet and verbal assessment to reveal ergonomic problems, drawing up a series of measures for managers and workers to implement. The analysis sheet takes into account both European standards and other recognised methods such as the key indicator system and the Finnish workplace clarification. It is based on a points system enabling it to rate workplaces as:

- level 1: ErgoPlus workplace;
- level 2: ergonomic workplace;
- level 3: workplace causing strain.

The scores are displayed in traffic-light colours.

The solutions proposed took into account the specific needs of each workplace and aimed to produce an ergonomically optimum situation, covering all aspects from lighting to posture. The measures implemented were then reviewed with the works council, relevant managers, foremen and workers.

At all stages, it was important to raise apprentices' awareness of ergonomics.



Problem (left): working in a low squat position for long periods with arms above shoulder-level - Solution (right): using a rolling stool side-boxes to hold working material.

Results achieved

Positive feedback was received from workers with regard to their physical and psychological wellbeing, and from managers looking at profitability. The new assembly line allows Pöttinger to offer order-based production, different types of loading trailers and to increase both unit numbers and product quality.

Carrying out the ergonomic analysis enabled Pöttinger:

- to increase management's interest and acceptance of ergonomics;
- to show workers that the company values them highly;
- to relieve physical strain on workers without reducing productivity;
- to raise workers' awareness of health and safety issues at work;
- to build a bridge between the planning and production departments.





18 PREVENTING MANUAL HANDLING OF RESIDENTS IN A CARE HOME

SLOVAKIA HEALTH AND SOCIAL WORK

Refugium, n.o.
Súvoz 739
SK-91101 Trenčín
www.refugium.sk

The issue under discussion

Taking care of elderly or seriously ill people in a care home involves manual handling of patients several times a day, whether it is lifting, carrying, placing, supporting or pushing and pulling a wheelchair. This places a considerable load on workers' musculoskeletal systems and may lead to MSDs. To cut health risks, ergonomic factors should be taken into account when planning and building care homes.

Action taken

Occupational safety and health issues were taken into account in the planning, design and furnishing of the care home. A detailed analysis of the risks involved in the manual handling of loads was drawn up, noting the need to provide comprehensive nursing and medical care for patients with the most severe health problems and the handling of immobile patients.



Sanitary rooms.

The aim was to eliminate or at least reduce the manual handling of people and prevent MSDs developing. Measures included the introduction of lifts, bathing beds and handrails in the corridors.

These measures were complemented by training on occupational health and safety issues and in the use of the new devices. On-the-job training and medical examinations were also carried out regularly.

Results achieved

The care home was a new facility with state-of-the-art equipment and barrier-free access. The cost of the equipment for manual handling of loads was part of this primary investment.

The evidence shows that a facility equipped with supportive devices significantly increases work effectiveness and improves the working atmosphere. It also enhances the safety of workers handling patients and residents, and reduces the occurrence of MSDs.





19 AUTOMATION OF VISUAL INSPECTION

SLOVAKIA MANUFACTURE OF BASIC METALS

Slovalco, a.s.
Priemysel'na 14
SK-965 48 Ziar nad Hronom
www.slovalco.sk

The issue under discussion

Visual inspection in the plant consisted of three operations. Workers had to stand by the conveyor during the entire eight-hour shift and inspect each raw anode block. Operators inspected the surfaces of the blocks. The production of anodes blocks was 20 pieces an hour. To identify the blocks, workers had to squat down and use a piece of chalk to mark each block with a six-digit number. If the worker discovered a faulty block, he pressed a button to reject it.

The visual inspection tasks increased the risks of workers developing MSDs from long periods of standing, frequent bending over to mark blocks and the cold working conditions. Workers reported tiredness, back pain and other musculoskeletal problems.

Action taken

To eliminate both the physical and environmental risks, cameras and an automatic block marking system were installed to allow checking from a control room.

- Camera monitoring - anode blocks are monitored by an industrial camera. The pictures from the camera are sent to a monitor in the control room.
- Marking and painting of background layer - the blocks are marked by the automated spraying of a background colour using high-pressure nozzles.
- Painting of an identification number - a printing device prints a block identification number on the white (background) strip, using two printing heads and two nozzles.
- Visual inspection - the operator checks blocks on the screen in the control room. Every hour, he checks the equipment in person.



Visual inspection of blocks before and after automation.

Results achieved

Investment costs on the high-pressure painting device, printer and camera system totalled 1,485,721 Sk (c €44,200). Automation improved the working environment and cut the risk of MSDs by eliminating back and joint-wear-related problems.





20 PARTICIPATIVE DEVELOPMENT OF WORK METHODS (SATKE, TASKE)

FINLAND CONSTRUCTION

Enerke Oy (LTD) et al.
 BOX 177 80101 Joensuu, Finland
www.enerke.fi

Finnish Institute of Occupational Health
 Topeliuksenkatu 41 a A
 FI-00250 Helsinki
www.ttl.fi

The issue under discussion

Electricians, heating engineers, plumbers, air-conditioning mechanics and other similar workers have to operate in many workplaces and during different construction phases, often together with workers from other enterprises. These technicians are exposed to MSD risks, including awkward work postures and physical strain that affects the neck and upper limbs, lumbar region and lower limbs.

Action taken

Bringing together many different actors in the power network construction industry, along with those in technical building services, and including trades unions and employers' organisations, information on risks was gathered through risk assessment and analysis of past accidents. Workers were also asked about their working conditions. The work methods were videoed and photographed so they could be assessed at a later date.



A special device was introduced to protect knees. The device also functions as a stool.

Development groups then discussed their challenges at work, selecting some for closer examination. Potential solutions included the development of new work methods, using existing products and tools and thorough training. The best ideas were taken forward for further development. Participants in the project then built and tested prototypes of new equipment.

The solutions identified included the use of a drawstring bag for hoisting tools up a pole, which removed the need for workers to carry them while climbing, and a device to protect the knees when working. It can also work as a stool, reducing strain in the legs.

Results achieved

Bringing together so many participants, each with the common goal of reducing work-related injuries, was crucially important to the success of the project. This sharing of knowledge and cooperation allowed the development of creative responses to MSDs in a challenging work environment.

No formal evaluation of the measures has yet been made. The programme projects lasted between 18 months and two years, involving between three and 10 people in each. In total, more than 45 potential solutions were identified. Reduced sickness absence and hence lower costs and improved work quality are anticipated.



European Agency for Safety and Health at Work

A European Campaign on Musculoskeletal Disorders

Luxembourg: Office for Official Publications of the European Communities

2008 - 28 pp. - 21 x 29,7 cm

ISBN: 978-92-9191-217-9



In order to improve the working environment, as regards the protection of the safety and health of workers as provided for in the Treaty and successive Community strategies and action programmes concerning health and safety at the workplace, the aim of the Agency shall be to provide the Community bodies, the Member States, the social partners 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
<http://ew2007.osha.europa.eu>



European Agency
for Safety and Health
at Work

Gran Vía, 33. E-48009 Bilbao-Spain
Tel. (+34) 94 479 43 60
Fax (+34) 94 479 43 83
E-mail: information@osha.europa.eu



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