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Magazine of the European Agency for Safety and Health at Work

magazine

Preventing work-related musculoskeletal disorders

WHAT WE KNOW

GOOD PRACTICES

EUROPEAN WEEK 2000

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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>).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 2000

ISBN 92-95007-15-8

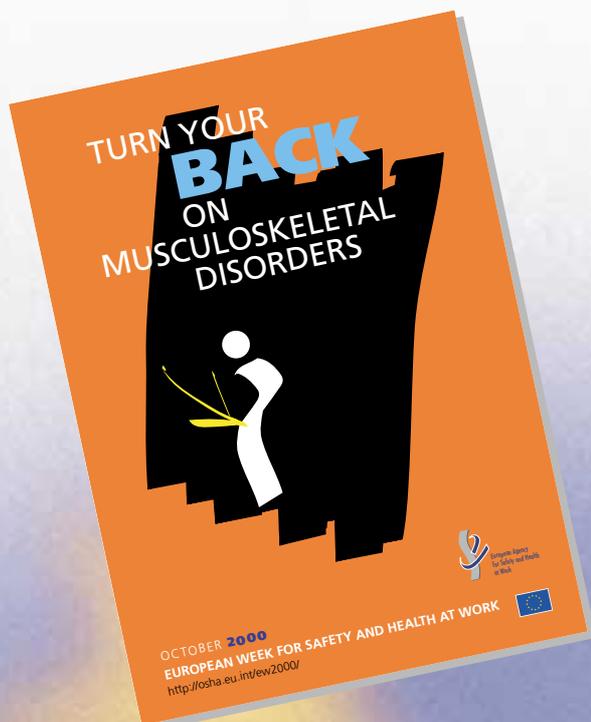
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Printed in Belgium

PRINTED ON WHITE CHLORINE-FREE PAPER

HANS-HORST KONKOLEWSKY

Director, European Agency for Safety and Health at Work



Editorial

The European Week for Safety and Health at Work 2000, which has taken place in Member States during the month of October, has provided a unique opportunity to focus widespread attention on the problem of work-related musculoskeletal disorders (MSDs). These are one of most prevalent of occupational ailments, affecting millions of European workers in all types of jobs and employment sectors every year. However, much of the problem could be prevented or reduced by following existing health and safety regulations and guidance on good practice. Getting this message across has been the key aim of the Week's campaign.

The European Agency was very pleased to have been asked to take over the coordination and organisation of this year's Week by the European Commission. It fits very well with our mission to provide Europe's workplaces with the information they need to make them healthier, safer and more productive. And our network of active Focal Points in each Member State and strong links with the social partners makes us uniquely well placed to deliver an effective pan-European communications campaign.

The European Week has been very much a collective and cooperative endeavour. The Agency's principal role has been one of coordination, support and encouragement. We have provided information, publicity and promotional material in all Community languages, set up a multilingual website dedicated to the Week, and with additional funds voted to us by the European Parliament been able to co-fund 37 European Week projects, a selection of which are reported on in this publication. The real work, however, has taken place in the Member States and beyond, in organisations, companies and trades unions.

Moreover, we have been delighted with the success of the Agency's first-ever European award scheme for good practices in identifying a significant number of high quality practical solutions to MSD prevention. Solutions that the Agency will make accessible to others via its web site.

The campaign has also benefited considerably from the support of the Portuguese and French Presidencies of the European Union. The successful launch of the European Week by Commissioner Diamantopoulou in Lisbon in February helped create the momentum that has resulted in the high levels of participation in the Week reported right across Europe. In addition, the support of the French Presidency, both in the preparation of this publication and in the preparation of the Week's closing event in November, has also been extremely valuable.

The European Week has focused on communication, awareness raising and effective solutions, this third edition of the Agency's Magazine aims to build on these experiences and take them a stage further by beginning a discussion on what should be the next steps in the fight against work-related MSDs. A debate that is set to be explored in even greater detail at the closing event's colloquium on European Perspectives on MSD Prevention.

MARC BOISNEL

French Government Representative on the European Agency's Administrative Board on behalf of the French Presidency of the European Union



Foreword

Musculoskeletal disorders (MSDs) are one of the main causes of occupational illness throughout the Member States of the European Union. The social and economic costs to which they give rise are particularly heavy. The subject selected for the European week, embodied in the slogan 'TURN YOUR BACK ON MUSCULOSKELETAL DISORDERS' is therefore a wise one. The impact of this campaign, organised by the European Agency for Safety and Health at Work, in the Member States bears witness to this.

The mechanisms engendering the risk of MSDs would now appear to have been properly identified, as have the principal risk factors, which include in particular repetitive work, physical effort and posture. Nonetheless, acting effectively and sustainably to counter MSDs remains a

challenge for those involved in prevention work, for the social partners and for the public authorities.

Indeed, tackling MSDs often results in the discovery that work is not organised well. People are still afraid of looking into this issue, which can be interpreted either as an unwanted interference in the operations of a company or as an opportunity to be seized. It is the latter that we must clearly promote and opt for, so as to resolve problems, prevent risks and increase productivity, while improving the living and working conditions of employees.

Each Member State, and the Community as such, faces formidable challenges from the point of view of the economy, employment and social protection. The Lisbon European Council provided the impetus for moves to meet these challenges, linking together the volume and quality of jobs and the current Presidency is seeking actively to advance this cause.

The quality of jobs depends on the proactive management of human resources as an integral part of general corporate policy. Working conditions – primarily the protection of the health and safety of workers – are an essential element. The adjustment of companies to new market conditions involves the selection of technologies and profound changes in the way in which work is organised. It is important that these changes take place through a process of dialogue which helps to reinforce the quality of social relations and improve the motivation of workers.

The technological and, above all, the organisational choices allow greater freedom to manoeuvre, a key factor for competitiveness and dynamism; and help to prevent occupational risks, in particular those associated with MSDs. Work organisation is, after all, an important area for social dialogue at all levels.

An important statutory base has been established by Europe. The adoption of the framework directive (89/391) to improve the safety and health of workers was a decisive step forward in this field.

After ten years' experience with the application of these principles, and faced as we are with changes in the world of work, economic development and advances in scientific knowledge, it is appropriate today to adapt the existing regulations in a positive manner.

'In a positive manner' because no change may be allowed to lead to a reduction in the level of protection currently enjoyed at Community level or fail to combat emerging risks. Public opinion is today rightly concerned about the latter and much is at stake as regards their prevention.

In both areas, the spirit of the framework directive – *work should be adapted to the worker* – must be upheld.

This strategy of adapting Community action must involve all relevant parties, in different but appropriate ways: open convergence, social dialogue and legal measures. It will benefit from being reinforced by exchanges of good practice, the launching of programmes specially designed for SMEs, better coordination of research and the development of a monitoring function at European level.

It is this that the successive Presidencies of the Union want to see.

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PHILIPPE DOUILLET AND MICHEL APTEL

French National Agency for the Improvement of Working Conditions (ANACT, Lyons, France),

French National Institute for Research and Safety (INRS, Nancy, France) – Lead Organisation European Agency Topic Centre on Research: Work and Health

Preventing MSDs: towards a global approach

Designing more effective strategies to deal with MSDs means looking beyond the workstation and taking a broader approach.

Musculoskeletal disorders (MSDs) are now a priority area in the prevention of work-related risks in Europe. Despite the difficulties of international comparison, all the data tend to confirm a very substantial and regular increase in these disorders throughout the countries of Europe. The social impact is obviously heavy, but so too is the economic impact, with problems of workforce management arising at the very time when companies are seeking ways to improve their flexibility in order to remain competitive. The general ageing of the working population is another factor that makes the issue of MSDs a worrying one.

FROM SOCIAL RECOGNITION TO PREVENTION

“*Prevention is making slow progress.*”

However, prevention is making slow progress. Problems still sometimes arise even in the area of recognition of these illnesses: not only in the slow pace of

‘legal recognition’, which has slowed the process of identification, but also problems with ‘social recognition’: employees afraid to report their illness in case it adversely affects their prospects of employment; employers reluctant to address issues relating to MSDs. Some even still dispute whether the problem is really work-related, while others find it difficult to come to terms with a “new” work-related health problem with such a wide range of contributory factors. Furthermore, companies which have introduced preventive strategies have not always seen a significant fall in the number of cases, which has resulted in demotivation on their part.

A QUESTIONMARK OVER PREVENTION

These problems with taking effective and sustainable action against MSDs are a challenge both to the preventers and to the social partners. Knowledge of the MSD risk mechanisms seems well established, and the main risk factors have been catalogued, concerning in particular repetitive working, physical effort and posture. The sectors of industry most affected (such as the agri-food, construction, textiles, electronics and car manufacturing industries, etc.) and working environments likely to contribute to the development of MSDs (cold, vibration, etc.) have also been clearly identified. The analysis of the biomechanical factors thus remains an essential basis for prevention, enabling the physical constraints on movement to be reduced.

However, the past experiences of companies in a variety of industry sectors have produced findings that pose a number of questions:

- in many cases, companies have introduced measures that relate exclusively to work station organisation (such as, in particular, adjustments of scale). But in most of these cases, after a few months, there has been a new “outbreak” of MSDs, possibly at workstations adjacent to those that have been reorganised, possibly involving the same people but with the pain now transferred from hand to shoulder, etc.;
- frequently, too, companies have developed their own ways of solving their problems: training in the right way to perform movements, job rotation, etc. The results achieved have been poor or even the reverse of what was expected, creating new working constraints for employees forced to confront and master a more complex situation;
- prevention also faces a particular challenge when MSDs are found to occur in sectors of work or workplaces where the currently accepted risk factors (repetitive movement, in particular) play an insignificant part: administrative jobs in the tertiary sector, service industries, skilled maintenance work, etc. What explanation can there be for the occurrence of MSDs in situations like these, so different from those of production line operators working under time pressure?
- finally, questions are posed by the development of MSDs in activities which have always been subject to heavy time pressures: how do we explain the fact that, at one particular moment in time, what seemed to be tolerable before ceases to be so, giving rise to complaints?

In addition, and at the same time, increasingly numerous studies, especially in Europe, are highlighting the importance of psychosocial factors at work, and their links with physical and mental disorders. These studies need to be continued, partly in order to clarify the concepts of psychosocial and organisational factors and partly in order to confirm the strong assumptions linking those factors to MSD risks. Already, however, these studies and many on-site programmes are calling for a re-examination of the way in which MSDs are understood: they suggest that broader attention should be paid to the physical activities, which cannot be reduced to a series of individual movements but form part of the psychosocial and mental aspects of the activities of people at work.

“*Studies and many on-site programmes are calling for a re-examination of the way in which MSDs are understood.*”

TOWARDS A GLOBAL APPROACH TO WORK

Studies and practical measures, in France especially, have demonstrated the links between the occurrence of MSDs and forms of work organisation in which the freedom of action left to employees is very narrow. The term ‘organisational dependence’

was coined to describe a situation in which the employee is entirely constrained by the rhythm of production line working and is not free, for example, to decide when to take breaks or to arrange a brief respite from his work. These tightly constrained forms of work organisation have become very widespread in modern economies, in both the industrial and service sectors. The concepts of 'lean production' and other similar forms of production management have often been reflected by greater time constraints directly affecting the work station and greater density of movements required by eliminating work in progress and opportunities for local adjustment of activity. Thus, specific forms of work organisation become essential keys to the understanding of the occurrence of MSDs and constitute a source of possible solutions to be explored. (See Fabrice Bourgeois' article later in this magazine).

As regards links with psychosocial factors relating to the working environment, the studies referred to above demonstrate the importance of analysing the following criteria and the way in which employees perceive them: the monotony of the tasks to be performed; the possibility of identifying one's own contribution to the end product; the quality of relations within the working groups and relations with the hierarchy; freedom of independent action and responsibility; the opportunity to produce high-quality work; problems with reconciling the simultaneous requirements of speed and quality; anxiety about the future, etc.. There are also stronger and stronger assumptions of endocrine links between stress and MSDs. At the very least, work situations that are perceived negatively from the standpoint of psychosocial factors would be capable of triggering both physical and mental disorders. (See Jason Devereux's article)

These various elements highlight the subjective aspect of the individual's commitment to work and open up new avenues for investigation. Thus, hyperstress could be an avenue for the release of psychological pain, the somatisation of the unhappiness experienced in doing work that has lost its meaning. In this case, MSDs would reveal a conflict between the individual and the work organisation which no longer recognises the creative and social capabilities of the workers. The explanation for many MSD situations could thus lie in a new balance between biomechanical and psychosocial factors.

The explanation for many MSD situations could lie in a new balance between biomechanical and psychosocial factors.

BROADENING THE FIELD OF PREVENTION

Despite these problems with understanding MSDs, their prevention is possible. On condition, however, that this global aspect of movement is taken into account and the appropriate conclusions drawn by broadening the range of areas in which changes are made: measures affecting the work station, certainly, but also measures affecting work organisation and the working environment. Hence there is a need for technical solutions involving workstation reorganisation to reestablish biomechanically acceptable limits (reduction of physical effort, correct scaling of workstations, reorganisation of working spaces, etc.) but also measures targeted at work organisation and taking account of the psychosocial factors (job rotation with learning and allowing

DEFINING THE PROBLEM

The World Health Organisation has defined a work related-disorder as one that results from a number of factors, and where the work environment and the performance of the work contribute significantly, but in varying magnitude, to the causation of the disease.

Some of the disorders classified as work-related musculoskeletal disorders (WMSDs) exhibit well defined signs and symptoms, for example, rotator cuff tendinitis, carpal tunnel syndrome and acute prolapsed inter-vertebral disc. Many others are less well defined such as myalgic conditions involving pain, discomfort, numbness and tingling sensations throughout the neck shoulders, upper limbs and lower back. These types of disorder, that are sometimes called non-specific WMSDs, often cannot be diagnosed with respect to a clinical pathology but they may still result in physical impairment and disability.

WMSDs therefore, cover a wide range of inflammatory and degenerative diseases of the locomotor system. They include:

- inflammations of tendons (tendinitis and tenosynovitis), especially in the forearm-wrist, elbow and shoulder, evident in

occupations involving prolonged periods of repetitive and static work;

- myalgias, i.e. pain and functional impairments of muscles, occurring predominantly in the shoulder-neck region, that occur in occupations with large static-work demands;
- compression of nerves – entrapment syndromes – occurring especially in the wrist and forearm;
- degenerative disorders occurring in the spine, usually in the neck or lower back, especially in those performing manual handling or heavy physical work. However, they may also occur in the hip or knee joints.

These disorders are chronic, and symptoms usually occur only after exposure to work-related risk factors for a period of time.

There is little evidence of the use of standardised diagnostic criteria for WMSDs across Member States of the European Union, and a range of terms have been used in different countries to describe these disorders.

For example, when they affect the upper limbs, the terms include Repetitive Strain Injuries (RSI), Work-Related Upper Limb

Disorders (WRULDs), Trouble Musculo-Squelettiques (TMS) and Cumulative Trauma Disorders (CTD). This variation is reflected in the nationally reported data as well as the research literature and makes comparisons between Member States difficult.

Attempts have been made to reach acceptable levels of agreement between healthcare professionals on definitions for some WMSDs (Harrington *et al.*, 1998, Sluiter *et al.*, 2000) and these should be considered as a basis for establishing a consensus that may be used more widely for primary prevention and in workplace surveillance.

Peter Buckle and Geoff David

REFERENCES:

- 1 Harrington, JM, Carter JT, Birrell, L and Gompertz D (1998) 'Surveillance case definitions for work-related upper limb pain syndromes' Occupational and Environmental Medicine, v55, 4, p264 271
- 2 Sluiter, J.K., Visser, B. & Frings-Dresen, M.H.W. (2000) Concept guidelines for diagnosing work-related musculoskeletal disorders: the upper extremity. Coronal Institute of Occupational and Environmental Health, Amsterdam Medical Center, University of Amsterdam, The Netherlands.



effective variation of biomechanical stresses, training, increased freedom of action for employees, a review of products and processes to take account of the ergonomic aspect, support for working groups and opportunities for mutual assistance, etc.).

As with other issues of occupational health today in which a part is played by a variety of personal and group factors, both physical and psychological, all closely associated with the organisation of work, the links between those factors and occupational disorders are probabilistic in nature. Standards may be useful on the biomechanical side, and standards for working speeds might be contemplated; but that is not to say that there would be an immediate reduction in the occurrence of MSDs, bearing in mind the complex interplay of factors. Technical solutions are important; but the way in which measures are adopted seems to be just as much of

a criterion for success: arrangements for giving employees a hearing (especially a preventive hearing in connection with complaints, pains, etc.), their involvement in the processes of change, the updating of the actual work done by the operators: all these elements are essential to the success of any programme of action.

PREVENTION OF MSDS: A CORPORATE PROJECT

Bearing in mind the approach to MSDs set out above, these disorders seem to have singular features: they involve every aspect of working life and ask the company questions about the place of work in its development. Their prevention thus calls for a project approach based on a genuine dialogue between all sections of the company.

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 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/>

EUROPEAN AGENCY FOR SAFETY AND HEALTH AT WORK

MSDs - the European picture

The European Agency's recently published pilot study on the State of Occupational Safety and Health in the European Union sheds new light on the extent of Europe's MSD problem



The pilot study provides a snap shot of the current state of occupational safety and health (OSH) in the European Union. The study is based on national reports from Agency Focal Points (national safety and health administrations or institutions) in the 15 EU Member States backed up by statistics from existing European surveys on accidents at work and working conditions. It succeeds in bringing together statistical evidence on occupational safety and health with the qualitative experiences and knowledge of all of the key actors involved including national authorities, trades unions and employers' representatives, and OSH experts. As well as identifying the most risky occupations, the study also provides the first European-level information on the sectors which are most at risk and those areas where Member States believe more preventive action is needed.

Included in a wide range of specific exposure indicators are a number related to MSDs as an occupational safety and health outcome: posture and movement exposures; lifting/ moving heavy loads, repetitive movements, and strenuous working postures.

Here four tables present the key findings of the pilot study on MSD-related issues.



Exposure indicator: lifting/moving heavy loads

Potential health effects	Musculoskeletal disorders can occur as described below, in particular damage to the muscles and ligaments of the back and arms/hands.
European picture¹	34% of all workers interviewed were exposed to lifting/moving heavy loads.
Sector categories most at risk from the national reports using NACE code² Figures in brackets represent the number of Focal Point responses	45 Construction (14); 01 Agriculture, hunting and related service activities (9); 85 Health and social work (8); 28 Manufacture of fabricated metal products, except machinery and equipment (6); 20 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials (4); 14 Other mining and quarrying (3).
Occupation categories most at risk from the national reports using ISCO code³ Figures in brackets represent the number of Focal Point responses	93 Labourers in mining, construction, manufacturing and transport (11); 72 Metal, machinery and related trades workers (7); 32 Life science and health associate professionals (6); 71 Extraction and building trades workers (5); 91 Sales and services elementary occupations (5); 82 Machine operators and assemblers (5).
Other risk categories	Gender: Several Focal Points in their national reports commented on the high risk exposure to lifting/moving heavy in the "Health and Social work" sector, particularly to female workers. Age: Comments made in the national reports identify the younger individuals as being more exposed to carrying out lifting of heavy loads. However, older individuals may be at a greater risk from injury because of the interaction between frequency of exposure and degenerative conditions in the musculoskeletal system.
Trends	Although a limited response, four Focal Points reported a stable trend in the exposure of lifting/moving heavy loads in the workplace. Six Focal Points reported a decreased trend and two Focal Points reported an increased exposure to the risk from lifting/moving heavy loads in the workplace.
Focal Points identifying the need for additional preventive action	Austria, Belgium, Denmark, Finland, Italy, Portugal, Spain, Sweden and United Kingdom.
Description of indicated action⁴	No common description could be given.
Other relevant information	Exposure to lifting or moving of heavy loads continues to be a severe health and safety problem at work. Number of workers exposed is considerable and heavy lifts are an important factor contributing to the risk of musculoskeletal disorders. Increased demands on production throughput can result in increasing the speed at which individuals work. In cases where there is a high demand for variety and flexibility concerning the manipulation of goods (e.g. with packing/wrapping) the work remains mainly manual. In general, it was commented that the manufacturing sector has experienced a decline of handling heavy loads through the implementation of automation, which has included the use of automated equipment. Automation of work activities is expected to decrease the burden caused by lifting heavy loads in many jobs. However, in many female occupations this trend is not likely, because some lifting and moving tasks in the Health and Social work sector are not easily mechanised.

Exposure indicator: repetitive movements

Potential health effects	Repetitive arm movements can lead to work related upper limb disorders such as tenosynovitis and carpal tunnel syndrome. Tenosynovitis is an inflammation of the thin synovial lining of a tendon sheath usually caused by a mechanical irritation. Carpal tunnel syndrome is a numbness and tingling in the area of distribution of the median nerve in the hand.
European picture⁵	58% of all workers interviewed were exposed to repetitive movements.
Sector categories most at risk from the national reports using NACE code⁶ Figures in brackets represent the number of Focal Point responses	15 Manufacture of food products and beverages (9); 18 Manufacture of wearing apparel; dressing and dyeing of fur (5); 17 Manufacture of textiles (5); 60 Land transport; transport via pipelines (5); 28 Manufacture of fabricated metal products, except machinery and equipment (3); 19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear (3).
Occupation categories most at risk from the national reports using ISCO code⁷ Figures in brackets represent the number of Focal Point responses	82 Machine operators and assemblers (11); 93 Labourers in mining, construction, manufacturing and transport (8); 42 Customer services clerks (7); 91 Sales and services elementary occupations (7); 74 Other craft and related trades workers (5).
Other risk categories	Gender: From their national reports seven Focal Points identified females and one Focal Point identified males as being most exposed to repetitive movements at work. Typical female risk activities include assembly of electronic equipment, cashiers in super markets, textile and sewing workers and typists and computer operators. Age: It was reported in several national reports that the younger worker (less than 30 years old) was frequently more exposed to repetitive tasks, particularly young female employees.
Trends	There was no clear indication with respect to the trend in the exposure of repetitive movements in the workplace over the last 3 – 5 years. Three Focal Points reported a stable trend whereas two reported a decreased trend and five reported an increased exposure to repetitive movements in the workplace. Five Focal Points could not establish a particular trend.
Focal Points identifying the need for additional preventive action	Austria, Belgium, Finland, Italy, Portugal, Spain and Sweden.
Description of indicated action⁸	No common description could be given.
Other relevant information	Repetitive movements are carried out in many sectors such as agriculture in industry using work equipment, in the service sector and financial sector. Repetitive Strain Injuries (RSI) has attracted a great deal of media attention. Repetitive movements combined with a rapid workspace are viewed as important risk factors in RSI. Several Focal Points commented on the rising category of computer related work (key board/mouse operations) requiring special attention.

¹ ESWC-data, 2nd Survey Dublin 1996.

² The most frequently identified sectors which the Focal Points considered to be most at risk.

³ The most frequently identified occupations which the Focal Points considered to be most at risk.

⁴ The descriptions of further actions can be found in the individual chapters dealing with the exposure or OSH outcome.

⁵ ESWC-data, 2nd Survey Dublin 1996.

⁶ The most frequently identified sectors which the Focal Points considered to be most at risk.

⁷ The most frequently identified occupations which the Focal Points considered to be most at risk.

⁸ The descriptions of further actions can be found in the individual chapters dealing with the exposure or OSH outcome.

Exposure indicator: strenuous working postures

Potential health effects	Potentially can result in many health disorders affecting the bones, muscles and ligaments particularly vulnerable is the back. Potential for increased stress levels during work activities involving strenuous postures.
European picture⁹	45% of all workers interviewed were exposed to strenuous working postures.
Sector categories most at risk from the national reports using NACE code¹⁰ Figures in brackets represent the number of Focal Point responses	45 Construction (12); 01 Agriculture, hunting and related service activities (7); 85 Health and social work (5); 93 Other service activities (4); 17 Manufacture of textiles (4); 15 Manufacture of food products and beverages (4).
Occupation categories most at risk from the national reports using ISCO code¹¹ Figures in brackets represent the number of Focal Point responses	93 Labourers in mining, construction, manufacturing and transport (9); 71 Extraction and building trades workers (6); 72 Metal, machinery and related trades workers (6); 92 Agricultural, fishery and related labourers (4); 74 Other craft and related trades workers (4); 61 Skilled agricultural and fishery workers (4).
Other risk categories	No common description could be given.
Trends	Although a limited response, five Focal Points reported a decreased trend in exposure to strenuous working postures. Two Focal Points reported a stable trend and a further two reported an increased trend in exposure to strenuous working postures in the workplace. Six Focal Points were unable to establish a particular trend.
Focal Points identifying the need for additional preventive action	Austria, Belgium, Finland, Italy, Spain and Sweden.
Description of indicated action¹²	No common description could be given.
Other relevant information	Strenuous working postures are of significant importance, especially when combined with lifting of heavy loads and repetitive work tasks. Inadequate working posture is a well-known aggravating factor causing disorders of the lower spine. Difficult working positions contribute to the potential risk of work induced musculoskeletal disorders. Musculoskeletal disorders are a common cause of early retirement. Difficult working positions are important factors contributing to the potential risk of musculoskeletal disorders in the workplace. Musculoskeletal disorders are a common cause of early retirement. The prevention of strenuous postures in the working environment is related to an appropriate ergonomic design of the workplace, workstation, machinery and work organisation. Assessment of tasks and job rotation is fundamental to reducing the exposure to the risk. The implementation of new provisions on ergonomics for the protection against musculoskeletal disorders calls for more distinct supervisory activities. There is a need for improvement of the technical and organisational measures and of information and training.

OSH outcome: musculoskeletal disorders

Potential health effects	Injury to the muscular and skeletal systems of the body. Significant work induced musculoskeletal disorders commonly affect the lower back and the hands (tenosynovitis).
European picture¹³	30% of all workers interviewed were exposed to musculoskeletal disorders
Sector categories most at risk from the national reports using NACE code¹⁴ Figures in brackets represent the number of Focal Point responses	45 Construction (7); 01 Agriculture, hunting and related service activities (6); 55 Hotels and restaurants (4); 85 Health and social work (3); 28 Manufacture of fabricated metal products, except machinery and equipment (3); 27 Manufacture of basic metals (3).
Occupation categories most at risk from the national reports using ISCO code¹⁵ Figures in brackets represent the number of Focal Point responses	93 Labourers in mining, construction, manufacturing and transport (9); 71 Extraction and building trades workers (6); 91 Sales and services elementary occupations (5); 72 Metal, machinery and related trades workers (5); 92 Agricultural, fishery and related labourers (4); 61 Skilled agricultural and fishery workers (4).
Other risk categories	No common description could be given
Trends	Six Focal Points reported a stable trend in the exposure to musculoskeletal disorders whereas, five reported an increase and one a decrease. Only three Focal Points were unable to establish a particular trend.
Focal Points identifying the need for additional preventive action	Austria, Belgium, Denmark, Finland, Luxembourg, Portugal, Spain and Sweden.
Description of indicated action¹⁶	Two Focal Points reported a lack of national data and the need to conduct surveys to collect such information.
Other relevant information	Musculoskeletal disorders are a major source of occupational injuries in the working environment. Occupational exposure to musculoskeletal disorders is one potential source that can result in an injury. Current lifestyles including healthy living, recreational and sporting activities also have a much more important causal connection, thereby contributing to the difficulty in establishing those that are solely attributable to workplace conditions. Repetition and monotony combined with working conditions such as low individual control of the work and high workpace can also lead to an increase in the risk of musculoskeletal disorders. It is expected that still more and better mechanical lifting aids will be developed in the future. The prevalence of musculoskeletal disorders among the active and younger age categories does not reflect the impact of work related symptoms in the oldest age group.

The European Agency's report on The State of Occupational and Health in the European Union is available on line at <http://agency.osha.eu.int/publications/reports/stateofosh>

⁹ ESWC-data, 2nd Survey Dublin 1996.

¹⁰ The most frequently identified sectors which the Focal Points considered to be most at risk.

¹¹ The most frequently identified occupations which the Focal Points considered to be most at risk.

¹² The descriptions of further actions can be found in the individual chapters dealing with the exposure or OSH outcome.

¹³ ESWC-data, 2nd Survey Dublin 1996.

¹⁴ The most frequently identified sectors which the Focal Points considered to be most at risk.

¹⁵ The most frequently identified occupations which the Focal Points considered to be most at risk.

¹⁶ The descriptions of further actions can be found in the individual chapters dealing with the exposure or OSH outcome.

SOCIAL AND ECONOMIC COSTS OF MSDs IN THE EU...

A new Agency fact sheet* sheds light on the social and economic costs of musculoskeletal disorders for EU Member States. Presented here are a few selected extracts to illustrate the heavy burden that MSDs represent.

In Germany, MSDs account for almost 30 per cent (28.7 per cent or as many as 135 million days) of all workdays lost due to sickness. Sickness leave due to work-related MSDs is estimated to cost as much as 24 billion DM.

In the Netherlands, where MSDs account for some 46 per cent of all work-related sickness leave, the total cost of sickness leave due to work-related MSDs, for leave lasting less than one year, was estimated in 1995 at 2,019 million Dutch guilders.

In Britain, almost 10 million working days are lost each year due to work-related musculoskeletal disorders (9,862,000). Of these, almost 5 million are due to back complaints (4,820,000), more than 4 million relate to the neck and arms (4,162,000), while

over 2 million lost days are caused by leg disorders (2,204,000).

The British estimate medical costs for work-related MSDs at between £84 million and £254 million sterling. Work-related back problems are estimated to cost between £43 million and £127 million, disorders to the arms and neck cost from £32 million to £104 million, while £17 million to £55 million is spent on work-related lower limb disorders.

Britain estimates that the direct and indirect costs to enterprises of WRULDs are £5,251 sterling per injured worker, while each person forced to stop working due to work-related illness loses an average £51,000 sterling before retirement age.

In Finland the medical costs of work-related MSDs were estimated at about 2 per cent of expenditure on publicly financed health services, excluding dental care, transportation and investments in 1996.

A "Return to Work" study of workers absent for over three months with low back pain in Sweden, Germany, Denmark and the Netherlands found that between 37 per cent (in Denmark) and 73 per cent (in the Netherlands) had returned to work after 12 months. Most workers who returned to work after 12 months were employed by their old employer.

Between 19 per cent (in Germany) and 38 per cent (in Denmark) of people who resumed work after two years' absence were offered workplace adaptations, whether with their old or new employer.

The majority of workers who returned to work after 12 months were still at work two years later. Most who returned to the workplace after two years had similar or even higher incomes compared to when their sickness leave began.

* Article based on Inventory of socio-economic information about work-related musculoskeletal disorders in the Member States of the European Union, European Agency for Safety and Health at Work, October 2000.

...AND IN THE USA

MSDs of the upper extremities in the United States of America cost more than \$2.1 billion each year in workers' compensation costs, with low-back disorders costing a further \$11 billion in workers' compensation.

The US National Institute for Occupational Safety and Health (NIOSH) has addressed this problem by producing two major documents on MSDs: a primer on suggested components of workplace programmes to prevent job-related MSDs and a comprehensive analysis of the epidemiological evidence for job-related MSDs.

Elements of Ergonomics Programs: A Primer Based on Workplace Evaluations of Musculoskeletal Disorders outlines approaches commonly used for identifying, correcting and preventing work-related MSDs.

The primer shows how specific techniques can be tailored for different workplaces. The methods suggested are practical and cost-effective prevention strategies.

The primer describes seven basic steps for controlling work-related MSDs:

1. Determine if MSDs exist in the workplace
2. Develop roles for managers and workers in an ergonomics programme
3. Recognise and cater for training needs
4. Gather and analyse data to define the scope and characteristics of ergonomic concerns
5. Develop control solutions
6. Establish health care management
7. Create a proactive ergonomics programme

The primer shows ways in which the steps have been put into practice in various workplaces and features a "toolbox" section, which includes checklists, surveys, illustrations and directories.

Musculoskeletal Disorders and Workplace Factors is a major critical review of scientific literature on MSDs. It found that a large body of credible epidemiological research exists that shows a consistent relationship between MSDs and certain work-related physical factors, especially at higher exposure levels.

In compiling the report, NIOSH reviewed more than 2,000 studies and intensively analysed more than 600 which addressed MSDs and workplace factors. The report was extensively reviewed within and outside NIOSH.

It found that MSDs are common, costly and arise in many jobs and sectors. The greatest risk occurs in a small number of industries where high exposure to MSD risks is most common. It recognised that MSDs can develop from or become exacerbated by the workplace.

Having analysed major workplace risk factors for MSDs, the report describes the quality or otherwise of evidence linking such factors to specific disorders, such as carpal tunnel syndrome or low back injury. It concludes that compelling scientific evidence exists between MSDs and certain work-related factors.

For more information visit the joint EU-US web site at <http://europe.osha.eu.int/eu-us/>

VEERLE HERMANS AND RIK OP DE BEECK

European Agency Topic Centre on Research: Work and Health, PREVENT, Belgium

the scientific agenda

While gaps remain in our knowledge of MSDs, considerable advances have been made in recent years.

Recent decades have seen a growing interest amongst scientists in the subject of musculoskeletal disorders (MSDs) related to the workplace, as the number of workers suffering from these disorders has steadily increased. As industry has come to pay greater attention to ergonomics, much effort has been put into improving our knowledge on MSDs. And although some discrepancies are still present in the literature, there's now a broad consensus on priorities based on the available scientific knowledge.

SCIENTIFIC KNOWLEDGE

The relationship between MSDs and work seems to be multi-factorial with risk factors in the physical, personal and psychosocial domain. Rigorous review studies have explored the general importance and occurrence of these risk factors and enabled a number of general conclusions to be drawn.

Several types of study contribute to the augmentation of scientific knowledge. Studies in epidemiology seek to find associations between exposure and disease (cause or risk factor and effect). Both cohort or case-control studies including longitudinal studies, although not often performed, are important sources for information. Exposure measurements used in work-related MSD studies range from very crude measures to more complex analytical techniques. Furthermore, more refined research methods in laboratories are helping to broaden our understanding of the biochemical and biomechanical properties of body structures and their possible role in the development of MSDs. The scientific knowledge from all these studies can be used in the understanding of the aetiology of MSDs, in the development of prevention strategies to prevent or reduce MSDs and also in the development of regulations and guidelines.

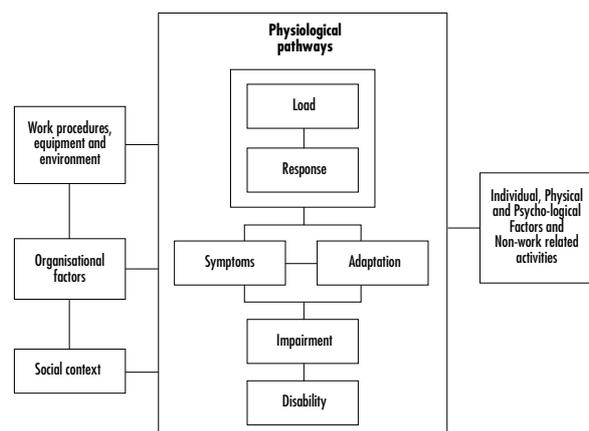
EPIDEMIOLOGICAL EVIDENCE

The epidemiological evidence for work-related MSD, has been reviewed recently by several institutes and committees of researchers. Individual, organisational-social and physical factors were characterised. These factors are presented in the conceptual framework of the National Research Council (Table 1). But what is the general scientific evidence from the epidemiological studies?

Studies of the highest levels of exposure, biomechanical (physical) risk factors (repetition, force, posture, and vibration) have revealed a positive relationship between MSDs and work. Often biomechanical loads are produced on the human body that approach the limits of the

mechanical properties of soft tissues. For low levels of biomechanical stressors, the evidence is less definitive, although some studies suggest causal associations. And this seems to be an important topic for further research.

Table 1: Conceptual framework of physiological pathways and factors that potentially contribute to musculoskeletal disorders (National Research Council, 1999)



It is acknowledged that individual factors may influence the degree of risk from specific exposures. Prior medical history is considered one of the main contributors to the development of MSDs. On the organisational-social level, factors directly associated with stress (low job content, high job demands and low social support) have recently also been identified as being important.

RISK ASSESSMENT METHODS

As a result of the growing interest in ergonomics in industry over the last decades, much effort has been put into improving the usability and effectiveness of assessment techniques in the field using a holistic, participatory and integrated approach. There exists a variety of risk assessment methods to measure exposure to physical risk factors, ranging from very crude measures (e.g., occupational title) to complex analytical techniques. Information on workplace measurements for practitioners is given later in this magazine. Furthermore, more refined research methods in laboratories are performed. Careful characterisation of clinical findings and neurological examinations of sensory changes and muscular weakness can help in the localisation of a possible morphological/anatomical lesion and assist in the differential diagnosis and treatment. New techniques are being used to understand more about the aetiology of MSDs (e.g. near infrared spectroscopy, analysis of endplate fractures in vitro, laser-Doppler flowmetry, ...). It is aimed at obtaining more information as to why some people are at greater risk of developing MSDs than others and

how variability between individuals can be better understood. This is important, since the aetiology of several MSDs is often not clear. For instance, for low back disorders on average 95% of the pain is called 'nonspecific' because the source of the pain is unknown and may have multiple causes.

PREVENTION STRATEGIES

As described in more detail elsewhere in this publication, the scientific knowledge resulting from different research studies can be used in the development of prevention strategies. It can help them to be both acceptable to the company and practical in terms of implementation so that practitioners are able to carry out effective risk assessments.

Reducing physical demands is often the first preventive step to be taken at the workplace. This can mean making adjustments in the workplace, use of mechanical devices or aids with the aim to reduce the stresses imposed on the musculoskeletal system (e.g. wrist supports or mechanical handling devices). It is important to mention that MSDs are also found in jobs where the amount of force is reduced. Therefore, further attention has to be given to duration and frequency of exposure.

Providing education and training is a further important strategy to reduce physical risks. Previous training efforts have generally fallen into three areas:

1. training of specific techniques;
2. teaching biomechanics, thus increasing the understanding and the awareness of the occurrence of MSDs so attitudes towards safe postures and movements can be changed; and
3. training the body via physical fitness so that it is less susceptible to injury.

Paying attention to job design and work organisation can also contribute to prevention. One possible distinguishing feature of successful interventions, compared to those that have failed, is the extent to which intervention ownership is embedded in the company, including company management. It is also important to use measures that actively involve the worker.

An important secondary prevention strategy is the carefully guided return-to-work (RTW) of the patient with a MSD, to stop the further development of a MSD or prevent the onset of chronic pain. A well-planned RTW should incorporate a risk assessment and a control of hazardous job tasks or conditions to prevent re-injury and continued harm. Furthermore, proactive and employee-supportive communications in the workplace should be established. Health care

EUROPEAN CONFERENCE CALLS FOR ACTION

Many workplaces are designed for the physical characteristics of men rather than women, leaving women more prone to RSI-related complaints. Work-related musculoskeletal disorders cost about one per cent of the Gross National Product of Member States of the EU. And despite the number of studies on WRULDs, there remains considerable uncertainty, even controversy, about how to diagnose them.

These are just some of the facts to emerge from an international conference on work-related upper limb disorders organised by the Dutch Ministry of Social Affairs and Employment held in The Hague on 30 May 2000. The conference was part of the Ministry's response to the publication of the European Agency's survey on *Repetitive Strain Injuries in EU Member States* carried out at their request. Conference participants were invited via the European Agency's network of Focal Points.

"It is precisely 10 years since the Directives on the minimum requirements for manual handling and visual display units were agreed but unfortunately the number of workers suffering from work-related upper limb disorders is only rising," said Rob Kuijpers, Director General of the Dutch Ministry of Social Affairs. The increase in WRULDs will have major economic consequences for European society unless it is stopped. If we do nothing, the problem will get worse, given also the enormous increase in the use of information and communication technology and the exposure of workers to risk factors related to WRULDs, he said.

According to Monique Frings, of the Medical Faculty of the University of Amsterdam: "Despite the number of studies on WRULDs, there is considerable uncertainty and even controversy about the criteria used to diagnose them."

An agreed definition would facilitate a more uniform collection, recording and reporting of information about WRULDs in the EU. Such an aim was adopted by a project funded by Saltsa, a joint programme for Working Life Research in Europe, the National Swedish Institute for Working Life and the Swedish Trade Unions in Co-operation, she said.

It established a clinical diagnosis and assessed the work-relatedness of the diagnosis. Case definitions were formulated for 11 specific upper extremity disorders and for non-specific upper extremity disorders. Meanwhile, criteria on two types of work factors were provided: physical factors such as posture, movement and vibration and non-physical factors like work organisation and work characteristics.

The conference heard from Theoni Koukoulaki of the European Trade Union Technical Bureau for Health and Safety (TUTB) that workers too often fail to make the connection between pain felt at work and the work which caused it. Moreover, compensation systems differ significantly between Member States, while official information systems on workplace diseases were reported as inadequate.

Speaking on gender differences, Lena Karlqvist said: "Many workplaces are designed in such a way that they fit best with the physical characteristics of men". Women are more likely

to work in monotonous jobs involving repetitive work. They are less likely to be able to organise and control their work than men, making it more difficult for such women to cope with time pressures, she said (see article on this topic elsewhere in the magazine).

Mr Jason Devereux from the University of Surrey presented information on the epidemiological evidence for WRULDs, noting that scientists have identified a strong relationship between WRULDs and the performance of work, especially where workers are exposed to workplace risk factors.

In summary, the conference concluded that:

- WRULDs are the most pervasive work-related health problem in the EU and they seem set to continue to be so for the next decade
- WRULDs are increasingly prevalent in all sectors and occupations
- WRULDs can be caused by a variety of activities and risk factors
- Given the lack of success of the EU's and member states' policies to reduce the problem, new initiatives need to be undertaken to complement and develop existing strategies
- The prevention of WRULDs should be a top priority in the next European action programme for safety and health at work
- Member states should consider establishing national action plans to combat WRULDs. Such action plans, which need to be properly funded, should focus on preventative measures. Targets related to specific risk factors should be set and monitored for progress.

interventions are another important part of secondary prevention. These interventions may include medication, exercise therapy,...

Regarding the effectiveness of prevention strategies, there are dissenting views in the literature. The discrepancies are often attributed to the different methodological quality of the studies: lack of control groups, lack of randomisation, lack of a placebo group, small number of subjects, no standardisation of the environment, Other negative factors are high costs of interventions, lack of underlying commitment from workers or management.

RESEARCH TOPICS/PRIORITIES

Although we have already amassed valuable information and identified some consistent patterns from current research, additional research is necessary to provide a better understanding of the processes involved. The focus should be on several topics: risk factors, health outcome, exposure measurement, health surveillance and intervention. The National Research Council (1999) mentions five interrelated and fundamental issues that deserve attention:

- develop further models and mechanisms to investigate how tissue responds to repetitive loading, what triggers inflammatory responses and how are these influenced by individual factors?
- clarify the relationships between symptoms, injury reporting, impairment and disability and how are these relationships influenced by social, legal and environmental factors. Multiple factors have to be considered.

- know more about the relationships between incremental changes of the environmental load and incremental responses to define more efficient and better-targeted interventions.
- have more standardisation and greater detail in injury reports, better measurements of contributors and risks, and better measurements of outcomes and other relevant variables.
- have a better understanding of the clinical courses of the disorders to assist strategies for tertiary prevention.

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'HEALTH, SAFETY AND HYGIENE AT WORK'

DG Employment, European Commission

Community action

The European Union has adopted directives to protect workers and to improve safety and health at work. Here, they discuss past progress and future plans in preventing MSDs.

The Treaty establishing the European Coal and Steel Community (ECSC) sought from the beginning to encourage action in the field of ergonomics, with research programmes aimed at improving the health and safety of workers. Six five-year programmes financed 487 projects, at a cost of 96 million euro.

A framework directive was adopted in 1989 (89/391/EEC) which imposed a duty on employers to ensure the safety and health of workers in every aspect related to their work. To this end, employers must, *inter alia*, evaluate the risks to safety and health at work. The framework directive applies to all sectors of the economy (there are a few exceptions) and is the most important directive in this field. Individual directives on specific sectors followed and in 1990 a directive (90/269/EEC) was adopted on the minimum health and safety requirements for the manual handling of loads where there is

a risk particularly of back injury to workers. The aim was to reduce those occupational risks which are statistically most prevalent.

An essential point is that employers must do all they can to avoid the need for the manual handling of loads by workers. They must therefore take appropriate organisational measures or use, for example, mechanical equipment. Where the need for the manual handling of loads cannot be avoided, employers must reduce the risks involved to a minimum.

A Commission Recommendation (90/326/EEC) concerning the adoption of a European schedule of occupational diseases was also adopted in 1990. It recommended, *inter alia*, that Member States should introduce as soon as possible, into their national laws, regulations or administrative provisions concerning scientifically recognised occupational diseases subject to preventive measures, the European schedule contained in Annex 1 to the Recommendation. This includes, among the diseases caused by physical agents, eight different groups of musculoskeletal disorders, including osteoarticular diseases of the hands and wrists caused by mechanical vibration, diseases of the periarticular sacs due to

EU DIRECTIVES IN BRIEF

Several European directives contribute to the prevention of musculoskeletal disorders in the workplace. A short summary of the aims and contents of each follows:

- Seeking to encourage better safety and health for workers, **Directive 89/391** provides a general framework on hazard identification and risk prevention in the workplace. Calls on employers to adapt the work to the individual, especially as regards the design of work places, choice of equipment and the choice of working and production methods.
- Aimed primarily at protecting workers against back injuries, **Directive 90/269** deals with the identification and prevention of manual handling risks.
- **Directive 90/270** addresses the identification and prevention of risks arising from display screen equipment. It details

employers' obligations. For instance, employers' obligation to carry out a health and safety analysis of all workstations, "particularly as regards risks to eyesight, physical problems and problems of mental stress". It includes the minimum requirements for: display screen equipment (no flickering, no reflective glare, tiltable keyboard etc.); work environment (e.g., space, lighting, noise, humidity); and operator/computer interface (e.g., software suitability).

- Designed to improve the working environment through the introduction of minimum health and safety requirements, **Directive 89/654** includes minimum measures for workstation layout, seating, temperature and lighting.
- The minimum safety and health requirements for workers' use of work equipment are decreed in **Directive 89/655**.

- Minimum requirements for the assessment, selection and proper use of personal protective equipment are laid out in **Directive 89/656**.
- **Directive 98/37** aims to harmonise the design and construction of machinery to promote safety for workers who use machines in the workplace. The directive replaces Directives 89/392 and 93/44.
- Seeking to protect workers from the detrimental health and safety effects of overwork, **Directive 93/104** deals with the organisation of working time. Its provisions seek to ensure that workers avoid excessively long working hours, inadequate rest provision or working patterns that could damage workers' safety or health.

For more details visit the 'resources' section at <http://europe.osha.eu.int/topics/#msd>

pressure, and diseases due to overstraining of the tendon sheath and the peritendineum. It should be borne in mind, however, that the Recommendation was not binding.

On this basis, an important document was drawn up by a group of experts convened by the Commission. It was entitled *Information notice on the diagnosis of occupational diseases* and provides information on the causal relations between diseases and their occurrence in the workplace.

The Commission is very concerned to develop its knowledge and understanding of musculoskeletal disorders at work, and uses various sources of information to this end, such as the "Working conditions in the European Union" survey published regularly by the European Foundation for the Improvement of Living and Working Conditions in Dublin, and data collected by the European Communities' Statistical Office.

As part of the Community Programme concerning safety, hygiene and health at work (1996-2000), the Commission made (Action 8) "new proposals for high-risk activities or for certain categories of workers". As a result of its cooperation with the Dublin Foundation and the Bilbao Agency, and its continuing dialogue with the Member States, the social partners and scientific communities, the Commission will be able to identify the areas where workers are not

adequately protected by the existing legislative framework. These may include new high-risk activities, those working in specific sectors of industry with exceptional risks, and categories of workers excluded from the present legislation. Once these high-risk activities have been identified, the Commission will consider the most appropriate ways and means of combating them; this may or may not involve legislation.

Against this background, the Bilbao Agency conducted a study in 1999, at the request of the European Commission, on "work-related neck and upper limb musculoskeletal disorders" (see *previous articles*). Statistically, such disorders constitute most work-related musculoskeletal disorders apart from back problems, the prevention of which is provided for by Directive 90/269/EEC, as mentioned above. This study presents information and results from research already conducted in the Member States of the European Union, analyses specific risk factors and provides some very useful information on the prevention of work-related musculoskeletal disorders.

At present, with the assistance of the Advisory Committee on Safety, Hygiene and Health Protection at Work, the European Commission is examining the options for Community action with a view to the effective prevention of work-related musculoskeletal disorders.

SETTING STANDARDS

Standards could play a key role in preventing musculoskeletal disorders in the workplace, according to Dr J.A. Ringelberg, convenor of the CEN*/TC 122 Working Group on Biomechanics.

She believes that there is a role for standards in preventing work-related musculoskeletal disorders. "There is of course an important role for standards as a preventive process in relation to the design of machinery and other products used in the workplace. And on the other hand also for the development and design of the workplace itself and the design of work tasks."

The aim of standards in this area is to put forward a methodology for risk assessment to prevent MSDs at work. As such, standards are primarily for designers of machinery rather than for employers. However, once standards for MSD risk assessment become available, they could be used in court in cases of MSD injury.

There is a great need for agreed standards. "A lot of people are just at the moment telling us that they need these standards," she says.

However, musculoskeletal disorders and ergonomics are not as highly developed as

other fields in occupational safety and health, such as toxicology. Indeed we're still at the starting point for the prevention of musculoskeletal disorder, she says.

Nevertheless, European musculoskeletal standards are currently being developed, the key aspects of which, together with their state of development, are summarised below.

prEN 1005-1 deals with the safety of machinery and human physical performance and puts forward terms and definitions on matters such as manual handling and posture, while presenting the terminology used in the draft standard. Work is ongoing on it and it has yet to be adopted.

prEN 1005-2 puts forward a risk assessment methodology for manual handling of machinery and component parts of machinery. Not yet adopted, improvements and additions are currently being added to the draft standard. Voting on part 2 is expected to take place before the end of 2000.

prEN 1005-3 puts forward recommended force limits for operating machinery. It would require designers to take into account matters such as

the force required by operators to push a pedal. The pre-standard is on track for acceptance as a harmonised standard.

prEN 1005-4 concerns the evaluation of working postures in relation to machinery. It advises designers on postures that workers can healthily adopt while operating machinery, advising mainly about the trunk and upper limbs. For instance, people should not have to bend forward for a long time or have to stretch to lift or push a button or have to assume an awkward standing posture. A new version of the pre-standard is expected before the end of 2000.

prEN 1005-5 puts forward a risk assessment procedure for the design of machinery requiring repetitive handling at high frequency. It deals with repetitive handling of small items weighing less than 3 kilograms. A first draft of the working group's document was in preparation and was due to be sent to the technical committee in October 2000.

* CEN is the European Committee for Standardisation.

LENA KARLQVIST

Gender and Work, National Institute for Working Life, Stockholm, Sweden

i nvestigating the gender gap

MSDs can affect workers in all sectors, but women appear to be at particular risk.

Are there gender differences in work-related neck and upper limb musculoskeletal disorders? Literature reviews indicate that women in general report more symptoms (Punnett and Bergqvist, 1997). Why is this?

One reason could be that we still have a gender segregated labour market. Men and women work in different sectors – or more precisely, carry out different work tasks.

So far, when looking at occupational risk factors much more attention has been paid to physically demanding exposures such as manual materials handling, dust and noise, environments more usually the preserve of male workers. These types of exposure often place more emphasis on whole-body exertions and energy expenditure than on localised, repetitive stress to the upper extremities.

Jobs requiring high static loading of the neck and shoulders, with repetitive use of small muscle groups, involve a high risk of upper extremity disorders. During dynamic low-load manual work, the higher the speed of motion and/or the higher the demands for accuracy, increases in measured muscle forces relative to their capacity are found (Bernard, 1997; Sjøgaard and Sjøgaard, 1998). The physical demands of these female-intensive jobs are often perceived (by those not performing the jobs) to be less strenuous than the jobs typically performed by men. Furthermore, some studies have shown that women and men working in the same factories, even with the same job titles did not always perform tasks with the same physical requirements or work organisation (Punnett and Herbert, 2000).

Women tended to perform more repetitive work on average, whereas men were less likely to sit for prolonged periods compared to women.

”*Women tended to perform more repetitive work*”

CANNING AND CARVING

One practical example can be seen in a study of the fish industry in Sweden where men and women have the same job title. Cutting operations at the canning bench were studied. In the fish industry traditional sex roles are deeply rooted.

Men delivered and transported the fish and products, while women cleaned, trimmed, sliced and put the treated fish into cans, which moved along the production line. Salaries were based on a piece-work

agreement which increased the pace. Work injury statistics showed that canning bench workers were significantly more exposed to carving injuries and physical stress illnesses than the average active worker in Sweden.

The role of the knives for the hand and arm work load was investigated and together with designers new knife models were designed for special assignments within the preserved fish industry. The new knives fitted the size of the hands as well as the physical performance for treating the different products. The knives reduced the work load and were highly appreciated by the workers. However, work organisation factors were not investigated in this study, which of course would have required a great deal of attention (Karlqvist, 1984).

WORKLOAD AND ORGANISATION

Workplace risk factors relevant to the occurrence of MSD include both the physical workload and the organisation of work in general. Work organisation refers to the way that production or service activities are organised, allocated and supervised. It includes physical job features such as work pace, repetitiveness, duration of exposures and recovery time as well as psychosocial dimensions of the work environment such as decision latitude, psychosocial job demand and social support from supervisors and among coworkers.

It is often difficult to distinguish between “physical” and “psychosocial” ergonomic risk factors. High psychosocial work demands often involve both rapid physical work pace and feelings of time pressure (Punnett and Herbert, 2000).

Gender differences in work-related symptoms are illustrated from Statistics Sweden (Fig. 1). Also sick-leave statistics show a higher rate and longer duration among female workers.

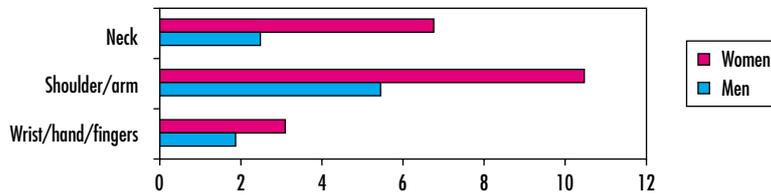
But, what do the statistics for work-related illness hide?

Household work, which for the most part is still the responsibility of women, results in greater overall exposure to physically demanding activities and psychosocial strain, as well as reducing the opportunities to recover after the working day (Lundberg et al, 1994). Little is known about the health impacts of this unequal division of paid/unpaid work because virtually no such research has been conducted.

”*Little is known about the health impacts of this unequal division of paid/unpaid work*”

However, in one recent study in Sweden, the MOA-study: Modern work and living conditions for women and men aimed at developing

Figure 1. Work-related symptoms (%) during the last 12 months in the Swedish working population between 12-64 years of age (Statistics Sweden, 1999)



methods for epidemiological studies, the focus was on paid work, unpaid work as well as recreational actions (Härenstam et al, 1999). It revealed variation in the time spent on different activities by women and men.

The figure shows the average - and there were great variations within the two groups. The groups were matched on gender, type of work and qualification level, but still – they differed. Statistically significant relations between MSDs and physical as well as psychosocial exposures were found. Among the women the exposures were expressed in time pressure, hindrances, VDU-work, repetitive motions, physical demanding work and strenuous working postures at their paid work. In addition, the demands of domestic work must be added.

Among the men the exposures were expressed in terms of monotonous working conditions, little social support, general physical load and strenuous working postures at their paid work. More studies of the whole living situation among the population are needed in order to understand how work is related to health.

BODY SIZE

Many work sites fail to accommodate female anthropometry such as their smaller body sizes in for example shoulder breadth and hand sizes. Since many workplaces have been designed on the basis of anthropometric data for men and therefore are ergonomically inappropriate for women, women may sustain greater exposure to biomechanical stressors even when performing the same tasks as men.

” Many workplaces are ergonomically inappropriate for women

Men and women, on average, differ in many aspects of physical body size and functional capacity, such as stature, body segment lengths, flexibility and muscle strength. These differences lead to a poorer fit, on average, of workstations, tools, equipment, gloves and other personal protective equipment for women workers (Kilbom et al, 1998). One case in point is VDU work. Today most workstations are equipped with a mouse or track-ball. But the size of an average keyboard forces small-shouldered persons (mainly women) to stretch to work with the mouse and track-ball and hold their arms in a strenuous posture (Karlqvist et al, 1999).

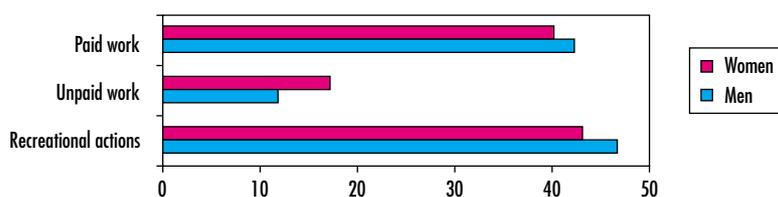
In addition, gender-related biological differences (e.g. muscle strength and distribution) may result in differential vulnerability of women to physical workplace factors. Women’s total body strength is, on average, two-thirds that of men’s. However, it varies depending on the tasks and muscles involved. Women’s average strength is relatively lower in the upper extremities.

Different studies reach different conclusions as to the predicted value of muscle force capacity and protection against MSDs. One possible explanation for the low predictive value, especially in low effort work, relates to the physiological process of muscle fibre recruitment during muscle contractions. There are gender differences in sets of muscle fibres, which can be of value for explanation of gender differences in the occurrence of neck/shoulder disorders in jobs with high static muscle loading (Hägg, 1991; Sjøgaard et al, 1998).

PREVENTING INJURY

Musculoskeletal disorders occur both in men and in women and there is adequate scientific knowledge regarding specific occupational ergonomic stressors to prevent a large proportion of MSDs among working people. The best approach to eliminating

Figure 2. Percentage of working time for different activities among 102 women and 101 men in the MOA study



musculoskeletal injuries from the workplace is the implementation of controls, such as changes in workstation, equipment, job design and product design in the context of a comprehensive ergonomic programme with participation from all levels of the enterprise (Messing, 1999).

More research is needed to elucidate whether MSD risk varies between women and men in jobs with the same occupational exposures and whether work-related MSDs have the same outcomes in women and in men.

CONCLUSION

In conclusion, the associations of musculoskeletal disorders with gender and occupational ergonomic exposures should be assessed separately in order to determine whether women are at increased risk when exposed to the same ergonomic stressors as men. Gender-stratified presentation of data is valuable since it examines differences in the exposure-response relationships.

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Work-related stress and MSDs: is there a link?

Work-related stress and musculoskeletal disorders are the two leading occupational ill-health problems in the European Union and have also become a major medical problem.

The second European survey on working conditions produced some indication of the magnitude of these two health problems. Musculoskeletal complaints were the highest reported ill-health problem followed by health affected by stress at work.

Understanding the factors that lead to the development of these two conditions is important for prevention and rehabilitation. Both stress and musculoskeletal disorders have been scrutinised in recent publications of the European Agency for Safety and Health at Work. The report on work-related stress by Professor Tom Cox et al and the report on work-related neck and upper limb musculoskeletal disorders by Professor Peter Buckle and Dr. Jason Devereux include risk factors for the condition considered in each report.

Both reports make reference to physical and psychosocial workplace risk factors. In particular, similar psychosocial factors in the workplace were mentioned in both reports, for example perceived work demands and job control, which appear to increase risk of both stress and musculoskeletal disorders.

However, what is unclear at present is the role of work-related stress reactions in the development of musculoskeletal disorders.

CAUSE OR EFFECT?

There is evidence to support a relationship between stress reactions and musculoskeletal disorders but it is difficult to conclude whether stress reactions are significantly involved in the development of musculoskeletal disorders or whether those with musculoskeletal disorders simply experience stress reactions due to the experience of pain and functional impairment.

There are plausible mechanisms to support the relationship between work stress and work-related musculoskeletal disorders. Being exposed to physical and psychosocial work risk factors and their potential interaction effects may result in certain biological reactions that can exacerbate the effects of physical strain. These stress reactions may limit the ability of the body's defences and repair systems to deal with musculoskeletal damage, therefore, it can take longer to recover from work.

Behavioural and emotional stress reactions may increase exposure to workplace risk factors for musculoskeletal disorders. For example, a delivery driver may handle boxes very rapidly because of a stress reaction to time pressure, thus, placing excessive physical strain on

the body because of the excessive speed of movement and the excess tension brought about by the stress reaction. Finally stress reactions may increase the psychological and physical sensitivity to pain.

STRESS STUDY

The Robens Centre for Health Ergonomics, University of Surrey, U.K. is currently conducting a large scale study of 7000 workers to investigate the role of work stress reactions upon the development of work-related musculoskeletal disorders. The three-year study commenced on the 1st April 2000 and is funded by the Health and Safety Executive in the U.K.

The study will follow a cohort of workers without musculoskeletal disorders over 14 months. It will determine whether those with severe work stress reactions at the beginning of the 14-month follow-up period are more at risk of developing musculoskeletal disorder symptoms compared to those with no significant indicators of work stress reactions at the start of the follow-up period.

Potential interaction effects between physical and psychosocial work risk factors will also be measured as such an effect has been shown to increase the risk of musculoskeletal disorders.

It is important in this study to make a distinction between what researchers believe to be the cause-effect relationships of stress and what 'lay people' believe regarding the role of stress. People's beliefs about the causes, manifestations, consequences and alleviation of work stress may affect behaviours such as vocational choice and reporting work stress. For example, if an individual believes that their stress is because of their weak nerves then that person may not seek the appropriate support from managers, colleagues etc. in order to help overcome the stressors. Therefore, elucidating how people react to situations that they regard as stressful or what their expectations may be of work stress may play an important role in the development of musculoskeletal disorders.

The research project is the first longitudinal study to investigate beliefs of work stress in the context of musculoskeletal disorders and also interactions between physical and psychosocial workplace risk factors. The objective of the study is to produce results that are of vital importance for the management of both work stress and work-related musculoskeletal disorders.

For further information visit
<http://www.eihms.surrey.ac.uk/robens/erg/stress.htm>



1 social partner perspectives

What should be the European Union's next steps in tackling musculoskeletal disorders in Europe's workforce? Here, the social partners set out their points of view.

DOCTOR PATRICK LEVY*

Medical advisor to the RHODIA group

1 the employers' viewpoint

MSDs are becoming more common in most of the Member States affecting the health of workers and giving rise to major direct and indirect costs to companies and society in general. All sectors of the economy are affected to a greater or lesser extent, particularly those involving 'manual' labour.

It should be borne in mind that MSDs include pathologies which may affect very different areas of the body and give rise to very different symptoms (tendonitis, tendinosynovitis, carpal tunnel syndrome, hygroma, etc.). Without wishing to deny the role of work



in the genesis of these disorders, it should be stressed that the pathologies involved are often multifactorial, with non work-related factors (age, sex, state of health, other problems in life, etc.) combining with work-related factors. Among the latter, ergonomic problems are not the only culprit. Organisational factors may also play a role.

The prevention of MSDs, more than any other disorder, must therefore be based on an all-encompassing, multidisciplinary approach, involving technical disciplines (ergonomics, work organisation, industrial health and safety, the design of workstations, etc.) as well as medical ones (taking account of individual factors, training/information, intervention as soon as symptoms emerge, medical treatment of established disorders, etc.). Prevention thus depends on consideration being given to the situation as a whole within companies, including an analysis of inherent processes (design, organisation of work, ergonomic aspects of workstations, medical suitability, etc.). Companies must understand what is at stake, institute preventive measures, and make them an integral part of the enterprise.

Companies must understand what is at stake and institute preventive measures

A QUESTION OF LEGISLATION

Before a response can be given to the question of whether more regulation is needed, there are two others that must be answered:

Is there a significant gap in the current regulations?

Directive 89/391 introduced the duty to evaluate all risks in a company: chemical, biological, physical, ergonomic, etc. This general framework thus covers the prevention of MSDs; moreover, the forthcoming Commission directive on vibrations will complete the regulatory framework. Before dreaming up a new piece of legislation, implementation of the current legislation should be ensured; it would therefore appear to be useful for the Commission to evaluate application of the framework directive in this area in particular.

What might new legislation contain?

If all the risks of MSDs are to be covered, and the very processes of companies involved, as well as individual and collective factors, which take many forms and may vary enormously from one sector to another, any new legislation would have to be more than either a set of general reminders with no real impact on the dynamics of

prevention or specific provisions for one type of trade in a particular sector of the economy with its own methods of organisation. Little value added would appear likely to be generated by a new regulation, and in any event it would be limited to a relatively restricted aspect of the problem; more than is the case with other risks, there is unfortunately no 'miracle cure', applicable in all sectors of the economy and in all companies; to be effective, a case-by-case approach is required. It is therefore difficult to imagine legislation which could tackle the whole of the problem. I do not therefore believe that it would be useful to adopt a new regulation to ensure the prevention of MSDs.

Moreover, employers in Europe are responsible for health and safety in their companies. Consequently, if there is to be effective prevention of MSDs, a flexible, non-binding framework is required which will allow companies to choose from among different options those that are the most relevant and innovative; a rigid regulatory approach would not permit this.

The most important thing is how those involved at the heart of companies respond: in other words, if there are complaints of intermittent pain this must be seen as an initial warning which should lead to an analysis of the situation and the institution of corrective measures where necessary. At the same time, the prevention of MSDs must be taken into account as an integral part of the process from the moment new workstations or equipment are to be designed or existing ones modified. It is thus essential that employers, those involved in prevention, and all members of staff are sufficiently trained and have sufficient information at their disposal to participate in such a process.

OTHER INITIATIVES

It should be stressed that we have some very useful information at our disposal, collected by the European Agency in Bilbao, including in particular the report by Professor Buckle. I do not believe in a Community tool for evaluating and overcoming the risks which exist in all companies. However, the drafting of guidelines containing a series of recommendations to be differentiated by sector and company, could be of considerable benefit. Moreover, greater training and more information for those affected could boost awareness of the problem, particularly among small and medium-sized enterprises. The organisation of a European seminar devoted to the subject would be a first step.

The prevention of MSDs requires measures to be taken on the ground, often specific to the economic activity concerned. I believe that the Commission could do more to promote exchanges of experience by encouraging a dynamic, sectoral approach.

My role as Chair of the ad hoc working party on MSDs of the Advisory Committee on Safety, Hygiene and Health Protection at Work will be to seek a consensual and pragmatic position for the working party, on which the Advisory Committee can base its opinion; on this basis, the Commission will be able to define the best approach to the effective prevention of MSDs at European level.

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the employees' viewpoint

MSDs are a major occupational health problem in Europe creating a consequent social and economic burden. The Eurostat study launched by the Commission to achieve comparability of data on recognised occupational diseases in Member States in 1995 (EODS) indicates that MSDs were among the 10 more frequent diseases in the EU.

Specifically Upper Limb Disorder cases were in 6th and 7th position. The very recent third European Survey on Working Conditions (2000) -in press- has revealed that 33% of European workers have backache complaints and 23% neck and shoulder pains, 13% upper limb pains and 12% lower limb pains. These results present a sharp increase in the self-reported complaints comparing to the statistics of the second European survey of 1997. In addition, there is a significant increase in risks exposure (e.g. the percentage of part time workers carrying heavy loads has increased by 4%;

intensification of work - 15% workers have work cycles of less than 5 seconds).

The problem of MSDs is now visible even though underreported in the Member States. What we are facing here is the tip of the iceberg of an epidemic.

European employees expect European Union Institutions and Members States' authorities to draw the necessary attention to MSDs and take political action. MSDs should be tackled by prevention through risk control in the working environment and early diagnosis, rehabilitation and compensation for those affected.

Above all, our prime expectation from European Union institutions is to achieve an equivalent level of protection from the different types of MSDs for all European workers. Improvement of the current legislation in order to provide sufficient prevention for all the types of MSD is required.

Secondly those disorders should be included in the national schedules of occupational diseases in order to be able to get compensation and to give accurate data on the MSD situation in the European Union. Thirdly CEN should develop without any delays ergonomic standards in order to improve work equipment design.

Our prime expectation from European Union institutions is to achieve an equal level of protection from MSDs for all European workers

A QUESTION OF LEGISLATION

In considering whether more legislation is needed, we should first examine if the existing legislation provides sufficient prevention from all MSDs. The sole directive that refers directly to a musculoskeletal problem is the Manual Handling Directive and potential result of a back injury. However WRMSDs are numerous. Upper Limb Disorders (ULD) such as carpal tunnel syndrome or tendinitis are not covered in the Manual Handling Directive or in Visual Display Units Directive. In the latter, the focus is more on eyestrain when working with a computer. Only in the Framework Directive is there a general obligation of the employer to adapt the work to the individual in order to alleviate monotonous work with no clarification on these provisions. Nevertheless, the European legislative approach to tackling occupational health problems has so far focused on controlling risk factors in the workplace. In the case of ULD not all factors are dealt with in the Framework Directive. Synergetic factors like awkward postures and force, for instance, are not mentioned.

Furthermore, there is no reference on the specific health implication of ULD or explicit reference on risk assessment. Specific minimum requirements are needed.

Finally the Framework Directive was launched 11 years ago when epidemiological data on prevalence rates as well as scientific evidence that most WRMSD are preventable through actions taken at work were scarce. The recent report of the European Agency on Neck and Upper Limb Disorders states that there is substantial evidence within the EU member states that these disorders are a significant problem and its size is likely to increase because workers are becoming more exposed to the subsequent workplace risk factors.

We should not wait for comprehensive and comparable epidemiological data on MSDs work relatedness to draw prevention policies. If we could use the existing knowledge on MSDs with its limitations the effects on European workers' health would be enormous. To give an illustrative example, it is estimated that millions of European workers already have or will develop cancer over the next 30 years before the effects of the ban on asbestos use in Europe are felt.

It is obvious that upper limb disorders are a growing problem that is not covered sufficiently in the existing legislation. So regulatory provisions covering all MSD risks are required. This does not call necessarily for a new directive. An amendment of the Manual Handling directive to broaden its scope and improve it can be an alternative.

Legislation is not the final goal to reach prevention but it is always the first step. If sufficient legislation is enforced then the complementary measures that are needed will act more efficiently.

OTHER INITIATIVES

There is certainly a lack of harmonised scientific tools to assess the MSD risks and criteria to diagnose the diseases. Guidelines should be published by the Commission to harmonise risk assessment methodologies to apply across the Europe to obtain comparable data for the MSD risk factors.

Also a scientific consensus document for MSD evaluation criteria is needed. Even if one country has MSDs in its national list this may not be diagnosable because of the lack of diagnostic knowledge.

Still we must bear in mind that all these are supporting measures that facilitate legislation implementation. The first objective is to achieve sufficient legislation in the field.

UNION ACTION ON MSDs



The European Trade Union Confederation* (ETUC) decided to start a European-wide campaign on musculoskeletal disorders in 1997.

An awareness-raising campaign, its focus is on the prevention of work-related MSDs and is directed at workers, union representatives, employers, labour inspectors, occupational physicians, ergonomists, public authorities, designers of machinery and equipment, and EU institutions.

The key campaign objectives are to:

- improve European legislation to cover all types of MSDs
- amend the European schedule of occupational diseases to include all types of MSDs
- get a greater say for workers and their representatives in how work is organised
- attain recognition of work-related injury and fair compensation for, and rehabilitation of, all MSD victims
- develop ergonomic standards to improve the design of work equipment

Campaign activities at European level include:

- publications, such as *Europe under Strain* and a special report in the TUTB Newsletter
- survey of trade unions on MSDs throughout Europe, seeking information on legislation, statistics, current problems, compensation and trade union activities
- poster presenting TUTB material, activities and objectives
- regional seminars in Vienna, Madrid, Amsterdam and Bilbao.

Campaign activities at national level include training, publications, innovative tool development, risk assessment tools and sector oriented activities.

The MSD campaign is on going. After the European Week a survey will be carried out to follow up on its impact at national level, with a view to defining future initiatives.

The ETUC aims to influence the European Union by making direct representations to EU institutions, such as the Commission, Parliament, and Council. It also ensures trade union participation in various advisory bodies.

* The European Trade Union Confederation (ETUC), established in 1973, comprises 68 national trade union confederations from 33 countries and 12 European industry federations, with a combined total of 60 million members.

The European Trade Union Technical Bureau for Health and Safety (TUTB) was founded in 1989 by the ETUC to promote high standards of health and safety in European workplaces.

The TUTB monitors the framing, national incorporation and implementation of European legislation and provides expertise to European institutions dealing with the working environment.

For more information see:
TUTB special report on MSD, TUTB Newsletter n° 11-12, June 1999, 56 pages
Europe under strain, a report on trade union initiatives to combat workplace MSD, Rory O'Neill, TUTB: Brussels 1999, 128 pages
Integrating gender in ergonomic analysis: strategies for transforming women's work, Karen Messing, TUTB: Brussels, 1999, 192 pages
 Details available at
<http://www.etuc.org/tutb/uk/msd.html>



Further research is also needed to investigate intervention effectiveness in workplaces and the impact of new organisation forms to workers' health.

In addition, the Commission has published a European schedule of occupational diseases where among the diseases caused by physical agents under general categories some MSDs are covered. Yet this is a recommendation to the Member States and not all have incorporated these diseases in their prescribed list. In fact the majority of countries recognises very few MSDs to have occupational origin and in some cases none where the injured worker and Trade Unions have to prove the causal link. We must stress here that the procedures and requirements of entitlement compensation vary significantly among Member States.

We believe that access to rehabilitation, recognition and compensation of MSDs should be an ensured and harmonised right across Europe.

In this context, the Commission should follow the suggestions of the Eurostat pilot study on occupational diseases in Europe for data comparability which were to code MSDs in a different way, create separate categories namely for carpal tunnel syndrome and define clear inclusion criteria in the general categories.

Also the Commission, in the light of new epidemiological evidence, should revise the occupational diseases schedule and include more MSD types on the list.

In recent years the scientific evidence for work-relatedness of MSD has been growing. The number of people affected is enormous. If MSDs are not diagnosed early then European workers are subject to deterioration of their condition. That makes secondary prevention difficult and in some cases rehabilitation impossible. It is consequently of great importance that all types of MSD are recognised as occupational in all Member States.

Furthermore, the prevention policies in Europe nowadays are more and more evidence-based (according to occupational health data or accidents) although this is a reactive approach.

Nevertheless it is important that MSDs are diagnosed and recognised to give a clear and close to the truth figure of MSD morbidity among European workers.

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a question of organisation

Strategies to combat MSDs in the workplace often uncover dysfunctional areas within an organisation. But far from being a threat to the company, such approaches in fact offer an opportunity to improve the definition of the resources needed to bring about greater flexibility.

Preventive action makes it necessary to be able to identify correctly the links between MSDs and organisational factors. This, in turn, means acquiring an even more detailed knowledge of how such disorders come about.

ORGANISATIONAL OBSTACLES

The part played by force, articular angles and repetitive movements is crucial to the aetiological explanation of these disorders. In many cases, however, installing mechanical aids at the work station or confining movements within biomechanically acceptable limits has proved inadequate: the MSDs may disappear here, but only to reappear

” *MSDs may disappear, but only to reappear elsewhere*

elsewhere. This kind of result cannot fail to cause concern, and prompts us to learn more about the ways in which such work-related disorders arise.



For example, we have come to realise that time factors in the working environment have not been sufficiently taken into account in preventive strategies. The targeted objectives have often been invalidated by other objectives pursued by the company, especially the desire to increase productivity by reducing costs. But reducing the time needed for each individual movement by bringing the target area closer puts the operator under a new set of constraints, characterised by greater density of movements and reduced room for manoeuvre in terms of time.

The fact is that an analysis of the hyperstress of a movement cannot be reduced to its biomechanical components. A movement is far from being a simple muscular event. When an operator makes a movement, that movement is always integrated into an action, directed towards an end. It is a vector of action strategies conceived by the individual and intended to improve effectiveness.

MSDs are thus symptomatic of the operator's inability to contribute to that effectiveness. In seeking the cause of that inability, we should certainly examine equipment design but also, necessarily, the organisational resources available to the operator.

RISK FACTORS IN ORGANISATIONAL CHANGE

In France, about 10 years ago, occupational physicians began to find a correlation between employees' perception of symptoms of periarticular injury and the introduction of qualitative and/or quantitative changes in their working activities. Some of these changes (the adoption of lean production, greater flexibility, etc.) have gradually deprived employees of the freedom to choose when to take breaks, the freedom to vary their working speed or amount of work done, and the freedom to work independently of the speed of the machine or the workrate of one or more colleagues, etc., resulting in what is known as 'organisational dependence'.

A French epidemiological study found that people who considered themselves highly dependent were (1.43 times) more likely to suffer from carpal tunnel syndrome than those who considered themselves less organisationally dependent. This increased probability is even greater (3.56 times) when compared with people who have a low level of organisational dependence and are not involved in just-in-time working or lean production.

The link between organisational changes, such as lean production, and the occurrence of MSDs has thus been verified. In actual fact, the cause is not lean production as such but the organisational option selected by the company in introducing it.

For example, in changing from production line working to independent teams, management is hoping to make work less monotonous and increase flexibility. Yet we find that such changes



are no guarantee of the absence of MSDs and may indeed be a signal for their appearance. Why?

Because they have been unable to preserve the room for manoeuvre that the operators enjoyed even on the production line. We can illustrate this argument by the example of an assembly line.

PRICE OF PROGRESS

Engineers are required to meet more stringent market requirements, to enable new product lines to be launched and productivity gains achieved. One of the solutions to these problems offered by organisational technology is the U-line, which allows the number of workers to be adjusted to the level of demand. If the number of positions open is unchanged, on the other hand, the size of the workforce is geared to the volume of orders. Each operator may therefore be required to move between two or more jobs. This tactic requires operators to be more versatile, and to work standing up. It also enables the areas in which articles are reached to be brought closer, and allows a saving of space by bringing the workstations closer together. The holding of buffer stocks between two workstations thus becomes impossible.

From the management's standpoint, this makes for more efficient working and provides greater flexibility in the achievement of objectives because the presence of work in progress between workstations is often a fault that incurs penalties. After such situations have existed for a while, as everyone knows, seats tend to reappear. Their presence violates a management ban, resulting in a conflict situation, generally a suppressed one: deterioration of labour relations, lack of job satisfaction, turnover, absenteeism, etc., all in addition to

the complaints and reports of MSDs, which are no less frequent than before. The efficiency of the production line has been lost.

Gradually, everyone agrees that working standing up is not an improvement. An attempt is then made to reach a compromise on the number of permitted seating positions in the line. But other events can also frustrate the aims of the reorganisation. The presence of a few articles put down in the gaps between workstations becomes more and more common. Talks prove difficult, because this is a key principle in the quest for flexibility.

But what kind of flexibility is this? Work analysis shows that these few articles play a part in helping to control the rhythm and alleviate the tedium of the work. A few units assembled in advance enable an operator to vary his speed of working and enjoy a few moments' rest. They form a buffer stock that creates some space for attending to activities within the group, such as, for example, being available to help out a colleague, exchanging information, etc.

MSDs arise where this kind of organisational dependence exists. Operators are less and less able to use their own resources (their skills, know-how, creativity, etc.) in deciding their movements.

MSDs arise where organisational dependence exists.

Identifying the factors that make individuals more dependent on organisational constraints is one approach to prevention. More accurately, the organisational risk factor lies in the application principle adopted (for example, the elimination of buffer stocks) rather than in the production concept (lean manufacturing) itself. In this way we can identify where action is needed (the possibility of sitting down to work, establishing mini-stocks, etc.) and whom it should involve (designers, instructors, operators, etc.).

MSD PREVENTION AND ORGANISATIONAL EFFICIENCY

There is also a fear on the part of management that attempts to prevent MSDs will result in a slowing of performance, as if MSDs were, in some way and despite everything, the price to be paid for "holding one's ground" in an increasingly commercial market. The very reverse is true.

MSDs reveal sources of non-productivity which the company has been unable to identify or associate with the conditions under which the work is done. A particular focus of the preventive approach is identification of these links.

MSDs reveal sources of non-productivity which the company has been unable to identify.

For example, the person in charge of a meat-boning unit denied that there was any connection between the speed of the line and the occurrence of MSDs. Work analysis showed very high density of movement, forcing operators to reduce the frequency with which they sharpened their knives, in order to save time. But, as the knives cut less efficiently, so the cutting effort required was greater and accuracy worsened. The person in charge of the line suddenly understood the link between working movement conditions and efficiency, and it was only at that point that he recalled the high wastage rate. This result of non-productivity had been kept confidential up to that time.

These examples clearly show the risk involved in dissociating prevention from the achievement of production objectives. Preventive solutions, then, involve the promotion of organisational alternatives which maximise the economic value obtained from the workers' skills, know-how and movement strategies.

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t turning knowledge into know-how

Transferring research into good practice.

An immense amount of research into the causes of work-related musculoskeletal disorders (WMSDs) has taken place in recent decades and an extensive international literature resource now exists on this subject. Although our knowledge of the biological mechanisms involved in these disorders is not complete, a strong positive relationship between their occurrence and workplace risk factors has been established.

Consistently reported risk factors are fatiguing postures, high force exertions, direct mechanical pressure on body tissues, exposure to vibration, cold working environments, the work organisation and the worker perceptions of the work organisation (psychosocial work factors). However, our understanding of the interactions between these variables is limited and the relationships describing the level of risk for varying amounts of exposure to workplace risk factors (i.e.

“ *Workers at higher risk can be identified using current knowledge* exposure-response relationships) are still difficult to deduce. Nevertheless, those workers at higher risk can be identified using current knowledge.

PREVENTION FRAMEWORKS

Based upon the scientific research that has been undertaken, a number of authorities have proposed frameworks for the assessment and prevention of WMSDs. These frameworks incorporate the application of ergonomics principles to the solution of workplace problems, and include:

- establishing employers' and employee's responsibilities and management commitment to addressing potential WMSDs in the workplace;
- initial surveys to identify potential problem areas, such as frequent reports of pain from specific occupational groups;
- training to increase the ability of key staff within the organisation to evaluate and prevent WMSDs;
- undertaking Risk Assessments based upon the requirements of relevant national and European legislation;
- identifying appropriate measures to either eliminate or reduce the risks, and then implementing them by making changes in the workplace in co-operation with the workers concerned and other stakeholders in the organisation;

- establishing Health Care Surveillance to ensure early detection and treatment of musculoskeletal disorders;
- establishing Health Care Management programmes to encourage the return of affected employees to active participation in working life;
- monitoring the prevalence of WMSDs and the effectiveness of the measures that have been introduced to prevent them;
- developing job design methods that identify potential problems and eliminate them before new working methods and equipment are introduced to the workplace.

RISK ASSESSMENT

A key stage in the above framework is the systematic approach to Risk Assessment. Risk Assessment should be based upon the application of ergonomics principles and this approach is implicit in many of the existing European Union Health and Safety Directives (e.g. Manual Handling of Loads, Display Screen Equipment). It recognises the need to consider the work system as a set of interacting elements, with a strong focus on the needs and capacities of the workers (or equipment users) in relation to the demands that are placed upon them by the performance of work activities.

A variety of methods have been developed to assess the exposure of workers to risk factors for musculoskeletal disorders, some of which have been specifically developed for use by practitioners in the workplace (such as the Quick Exposure Check, Li and Buckle, 1998). The Risk Factors associated with specific activities and tasks that make up the job must be identified, and increased exposure to risk factors can be used as a basis for establishing priorities for action. Although the need to consider the interactions between potential risk factors is desirable, their separate assessment in the workplace may well provide important pointers to potential areas for risk elimination or reduction. Those workers in extreme exposure groups should be specifically targeted in the first instance for risk removal/reduction. It has been shown that ergonomics interventions to reduce the occurrence of WMSDs are likely to be particularly effective for occupations that are highly exposed to work risk factors (Hagberg and Wegman, 1987).



GOOD PRACTICE

The application of this approach to assessing or reducing the risks of musculoskeletal disorders in specific working situations has been illustrated on the following pages by a series of case studies. They provide an insight into the methods and solutions that have been used across a variety of workplaces and provide encouragement to those who wish to initiate prevention programmes. However, it is important to recognise that the solutions that have been advocated may not necessarily be effective in other situations where a different combination of working conditions, tasks, environments and



Action must only be undertaken following a systematic risk assessment.

equipment are found (i.e. different work systems). Action must only be undertaken following a systematic risk assessment at the workplace concerned.

A number of studies on the effectiveness of ergonomics interventions have been reviewed by Westgaard and Winkel (1997). They conclude that “the following intervention strategies have the best chance of success:

- organisational culture interventions with a high commitment from stakeholders, utilizing multiple interventions to reduce the identified risk factors;
- modifier interventions, especially those that focus on workers at risk, using measures that actively involve the worker.”

Both strategies incorporate the identification and the removal/reduction of the relevant risk factors for the exposed individual. “Accordingly, the active support and involvement of the individual at risk and other stakeholders in the organisation should be ensured.”

There is a need for more information on the effectiveness of the measures taken in reducing the level of disorders within the working population. Organisations who undertake prevention programmes should be prepared to document a number of measures with respect to changes in the prevalence of disorders and variations in productivity both prior to and following the changes that are made. However, it must be recognised that staff within organisations often find such data difficult to collect and analyse for a number of practical reasons.

The European Agency has established an information resource for practitioners, and especially those from SMEs, who wish to prevent WMSDs. It is the Topic Centre Good Practice on Musculoskeletal Disorders and provides detailed information on risk assessment and additional case studies. It may be found from the European Agency web pages at http://europe.osha.eu.int/good_practice/risks/msdl.

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CAR PLANT'S ROAD MAP TO PREVENTION

A European Week co-funded project is helping to drive down MSDs in the car industry.

Autoeuropa, Automóveis Lda., a Volkswagen plant in Portugal, sought ergonomic expertise so that the company could prevent musculoskeletal problems affecting its workforce.

The company wanted to be able to monitor all risk factors on its production line and also to prevent the possibility of work-related MSDs from arising in the first place when tasks were being planned by its manufacturing planning department.

The company knew that some tasks more than others had a greater potential of contributing to or causing musculoskeletal disorders, such as activities that required forceful exertion, repetitiveness, awkward postures or exposure to vibration.

According to Mr Carlos Fujão, an ergonomist at Autoeuropa, the company took a proactive approach and wanted "to have an accurate tool not only to identify ergonomic hazards, but also to reduce them in order to have healthier workplaces".

In 1998, Autoeuropa carried out a risk assessment for its activities, involving the ergonomics department at the Faculdade de Motricidade Humana, Lisbon. Two senior ergonomists, a junior ergonomist and a student ergonomist worked on the project.



The most hazardous factors in the car industry are work location and the frequency of movements, says Mr Fujão, who worked on the project. "Awkward postures assumed while performing certain tasks, together with forceful exertions to complete the same tasks tend to leave workers vulnerable to musculoskeletal disorders. Undoubtedly the upper limbs are our major concern," he says.

Solutions devised and already implemented at the factory include organisational measures such as task rotation. Handling devices were also designed so the equipment would be more user-friendly on the production line. Anti-fatigue mats and anti-impact gloves were also employed.

And the on-going pro-active management of the prevention of MSDs at the facility continues, with the company recently embarking on an ergonomic initiative to improve power hand tools. The European Agency as part of the European Week activities is co-funding the development of prevention guidelines based on Autoeuropa's experience.

For further information contact: Carlos Fujao, email: carlos.fujao@autoeuropa.pt

CUTTING EDGE SOLUTIONS

A European Week co-funded project is getting to grips with MSDs in the meat industry

The meat industry has a very high accident rate, with a large number of workers taking legal action following work-related accidents each year. Indeed, there has been an alarming increase in occupational illnesses, especially MSDs, in the industry.

In France, the *Mutualité sociale agricole* (MSA) is playing a key role in an initiative being run by the *Caisse nationale de l'assurance maladie* (CNAM) - the national health insurance fund. The initiative targets sectors within the meat industry using a participatory, preventative approach to MSDs, involving employers' organisations, trade unions and institutional organisations.

"The Knife that Cuts" initiative recognises that the knife is the most frequently used instrument in the industry, often wielded in repetitive and rhythmical tasks in cold, humid and noisy conditions. Such conditions increase the incidents of MSDs, while the risk of MSDs further increases when the knife does not cut well.

Time spent sharpening and grinding instruments is often not thought of as part of the working process or even part of working hours. Moreover, sometimes workers do not know how to sharpen their instruments correctly, resulting in excessive strain on, and fatigue for, the worker. As it becomes more difficult to cut with the knife, it takes the worker longer to complete the work, resulting in even less time to sharpen the instrument. The vicious circle can result in musculoskeletal disorders.

The new initiative to prevent MSDs involves the help of prevention experts and trainers. It involves a project team being set up in a company, which surveys the premises,

especially areas for maintaining knives, hygiene, storage, transport and working conditions. In light of the survey, a plan is drawn up.

The implementation of the plan includes the provision of a training course on how to sharpen instruments. Specially selected workers in the company undergo a three-day training course, who, in turn, train their colleagues. The training includes the worker being shown photographs taken with an electronic microscope of different injuries that can occur - usually invisible to the eye - by using a knife. It reveals the detrimental effects a badly maintained knife can have on the body.

The initiative also opens up different areas relating to work organisation, management, production, product quality and working conditions. The plan enables discussions to take place within the framework of working groups, facilitating companies to develop practical ideas to eliminate working conditions that give rise to MSDs.

For further information contact: Daniel Lavalée, Caisse Centrale de Mutualité Sociale Agricole, email: lavalée.daniel@ccmsa.msa.fr

RETAIL THERAPY

Musculoskeletal problems can readily arise in the food retailing industry, whether in warehouses, during transportation of goods or in shops.

For instance, MSDs can be caused due to the weight and size of boxes, the type of packaging used or the height of pallets especially in warehouses and distribution, while in shops poor ergonomic design of cashiers' workstations can lead to MSDs.

According to Mr Joachim Larisch (BIPS), one of the authors of a research study* on occupational safety and health in food retailing funded and scientifically accompanied by, among others, the German Federal Institute of Occupational Safety and Health and REWE, organisational and technical changes can reduce the risk of MSDs.

The REWE-Group, described by Mr Larisch as "one of the most important retail companies in the world" employs about 230,000 people worldwide, of whom some 180,000 are based in Germany. There, some 30 central warehouses deliver goods to some 9,500 shops.

REWE established a workplace health promotion plan in the beginning of 1990. In co-operation with the company's health insurance company, health circles and workplace-oriented interventions were established to reduce MSDs, says Mr Larisch.

"Employees participating in the health circles developed more than 470 proposals to improve workplace safety and working conditions. Nearly 50 per cent of these proposals have been adopted. More than 100 proposals concentrated on the working conditions in the warehouses, where manual work still is predominant."

Health insurance company data show that intervention programmes have helped to reduce MSD-related absenteeism.

"Workplace oriented programmes to improve manual handling of commodities took place in 1995 until 1999. These initiatives led to organisational and technical changes in the warehouses," he says.

"Additionally, the REWE-Group ordered new technical equipment in order to facilitate the collection of goods in warehouses."

In Germany, more than 20,000 cashiers' workstations in some 6,000 workplaces were equipped with new chairs to reduce MSDs. Moreover, cashiers' workstations were re-designed to provide a healthier work environment.

Employees' representatives, Berufsgenossenschaften (German statutory accident insurance institutions) and state institutions co-operated in this process. Absenteeism due to sickness leave has been reduced from 4.9 to 3.7 per cent between 1994 and 1997 in the REWE-Group, while data provided by the health insurance company show a decline in MSDs after workplace health interventions. It seems reasonable to assume that health promotion at the workplace significantly contributed to a reduction in absenteeism and workers' ill-health.

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SHOPPING FOR ANSWERS

A European Week co-funded project is focusing on cutting the risks for supermarket workers.

An analysis of work-related accidents occurring at Eroski supermarket in Bilbao showed that the main type of accidents were musculoskeletal injuries.



According to Mr Iñaki Gallastegui Zuazua of Eroski supermarket, safety specialists from the company's prevention service who carried out a risk assessment identified the fish and fruit sections as the riskiest places for workers to develop MSDs.

"During risk evaluation, we identified that in both sections the handling of heavy objects, forced postures and the environment were contributing factors to the risk of musculoskeletal injuries," he says.

While back injuries in the supermarket were the most prevalent, workers also reported upper limb disorders such as carpal tunnel syndrome.

From the company's point of view, the activities that generated most risk of musculoskeletal injuries were those associated with weight overload, the handling of heavy objects, working in awkward postures such as twisting the spine, and problems posed by working in a cold and wet environment, says Mr Gallastegui Zuazua.

Other problems identified included a misfit between the design of workstations and the size of the workers, inappropriate positioning of machinery and the discomfort of workers becoming wet while handling loads in a cold and damp work environment.

Eroski set about solving these problems firstly by determining that MSD prevention would be an explicit core value when designing new centres. Secondly, it decided that centres already operational needed to be adapted in accordance with MSD principles. Everything from work plans to counters, show cases and machinery needed to be fitted to the physiques of its workers.

Moreover, Eroski performed medical examinations of its employees and set up an innovative training and fitness course on back care which involved workers strengthening the muscle groups most at risk from their work activities. The course presented theoretical training on muscle and bone physiology and offered specific exercises for strengthening those muscle groups that suffer most from work activities. Individual workers who required it were personally taught how to strengthen specific muscle groups. Finally, Eroski have provided printed and audio-visual support for its MSD initiatives.

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TAKING THE RISK OUT OF ROOM CLEANING

A Swedish trade union has focused attention on the MSD risks of hotel room cleaning.

Hotel room cleaning poses particular challenges for workers. As well as having to work to tight deadlines, fully furnished hotel rooms can leave very limited workspace for cleaning. As a result, cleaners can find themselves having to adopt awkward and unhealthy postures, while the use of labour-saving devices can be restricted or made impossible by space constraints or delicate furnishings.



Work-related injuries and repetitive strain injuries are increasing due to frequent, unbalanced lifting of heavy furnishings and equipment in confined rooms.

In 1999 the Swedish Hotel and Restaurant Trade Union (HRF) formed a working party comprising more than 20 hotel cleaners to research a possible solution to their problems. Their report has now been published and distributed to workplaces in order to provide a basis of discussion in negotiating MSD solutions.

A specific aim of the working party was to highlight the fact that such problems exist in the first place. In the majority of cases the industry's management structure is hierarchical and because that management model controls cleaners' terms and conditions of employment, the management model itself, the working party argued, should be a focus of change.

The working party was keen on having MSDs recognised. It proposed that:

- Unaccompanied cleaning should be minimised, to reduce heavy lifting and lessen the risk of assault or threat of assault.
- Cleaning duties should be integrated with other work tasks such as reception duties, conference and breakfast duties, purchasing, and planning of work schedules.
- On-going education and training needed to be provided to enhance the wellbeing of workers. Areas suggested for training included cleaning methods, quality of cleaning, languages, ergonomics, working environment, accounts, IT and technology.
- Locally negotiated working agreements should be established with every hotel concerning the maximum number of hotel rooms that any one worker should be expected to clean. The basis for negotiation should be the particulars of each hotel and the non-cleaning duties expected of workers. When the job has been completed satisfactorily, the work shift should be considered completed. Overtime or extra duties should be compensated with time off rather than extra pay.
- A specialist sanitation company should be hired when an exceptionally dirty or unsanitary hotel room needed to be cleaned.

The working party has set itself the objective of bringing about change during the 2001 annual contractual negotiations between HRF and employers, with working party delegates included in the negotiations.

For further information contact: Gerry Andersson, Hotel and Restaurant Workers' Union, email: gerry.andersson@hrf.se

BACK IN WORK

The Healthy Workplace Initiative, launched in March 1999, is a joint initiative between the British Health and Safety Executive and the Department of Health for England and Wales. Conceived as a good way to achieve common aims shared by both organisations, it aims to put health, including health and safety, into the mainstream of business and organisational life. It recognises that the health of people at work is a core issue for management and aims to get across the message that 'improving health is everybody's business'.

Thousands of workplaces were contacted inviting them to register their interest in the programme, to improve productivity, lower sickness absence rates, prevent accidents and reduce illness. Some 35,000 businesses that replied are sent regular newsletters updating them on the latest initiatives to create healthier workplaces.

One such initiative is the Back in Work initiative, a joint HSE/Department of Health collaboration launched in March 1999 under the Healthy Workplace Initiative umbrella. The Back in Work initiative is supporting a series of pilot projects on healthy backs in the workplace.

It is estimated that the annual cost of back pain to Britain's National Health Service is £481 million sterling, with over 12 million GP consultations, 7 million physical therapy sessions and 800,000 in-patient bed days. The back is the leading cause of sickness absence from work, with some 11 million working days lost in 1995 from MSDs, including back pain.

Under the Back in Work initiative, some 19 pilot projects have been approved and funded. The pilot projects identify and promote good practice, incorporating prevention, assessment, treatment and rehabilitation. They also exhibit a review mechanism, sustainability and compliance with legislation. The pilot projects demonstrate examples of good practice, exhibit creativity in tackling back pain related issues, encourage partnership and local solutions, provide models for others and raise awareness about the causes of back pain.

For instance, one project involves staff with musculoskeletal problems at St Helen's Metropolitan Borough Council being offered a combination of education, pain management and an exercise package, including being taught relaxation, posture and exercise techniques.

A second project involves developing a comprehensive back injury management programme, which can be used by organisations and companies, big and small, while another project aims to raise awareness and develop training and risk assessment programmes to tackle back problems in the clothing industry.

For further information visit the HSE's web site at <http://www.hse.gov.uk/>

FOUR STEP APPROACH TO RISK ASSESSMENT

Germany has produced a simple, user-friendly guide and checklist for workers and employers to help determine MSD risks at work.

Dr. Joerg Windberg (BAuA), scientific director at the Federal Institute for Occupational Safety and Health, says of the 1997 publication *Leitfaden Sicherheit und Gesundheitsschutz bei der manuellen Handhabung von Lasten*, A guide for safety and health for manual handling: "I think almost everyone can use it in their firms very easily".

Included in the 46-page guidelines is a four-page four-step checklist.

The first of the four steps assesses frequency of lifting and the time spent lifting loads. It asks if the load is lifted less than 10 times, up to 40 times, 40 to 200 times, 200 to 500 times, or more than 500 times per shift and ascribes points accordingly. This step also assesses for how long the worker has to carry the weight: less than 30 minutes, 30 minutes to one hour, one to three hours, three to five hours, or more than five hours.

The second step assesses the weight lifted. The categories for men are less than 10 kilos, 10 to 20, 20 to 30, 30 to 40, or more than 40 kilos. Categories for women are less than 5 kilos, 5 to 10, 10 to 15, 15 to 25, or more than 25 kilos. Points are ascribed according to the weight carried.

The third step presents body positions. Workers choose the column which best describes their own work. The first column is work done standing upright with the weight near the body or walking only a few steps. The second column is work involving a little bending of the upper body or carrying loads a longer distance. The third describes deep bending and having the weight far from the body or over shoulder height. The fourth column describes very deep bending and turning the body, with the load very far from the body or work which involves kneeling. Points are ascribed in accordance with the body positions which best describe the job.

The fourth step assesses ergonomic conditions of the workplace. The floor conditions, handling procedures and the grip may be good or, alternatively, there may be restricted working space or the floors may be in poor condition.

Total points indicate whether the work presents high or low risks for workers developing MSDs and, accordingly, whether the workplace needs to be redesigned.

Copies of the guide are available from BauA (Federal Institute for Occupational Safety and Health), Friedrich Henkel Weg 1-25, D-44149, Dortmund (price: 6,- DM/ 3,07 EUR).



“Musculoskeletal disorders are a very serious problem for Europe’s 150 million workers. But it is not all bad news. Across Europe, there are numerous examples of organisations and companies, big and small, that have found ways to reduce the risk of their workers developing MSDs. A key aim of this year’s European Week for Safety and Health at Work is to help promote practical preventive solutions to the problem of MSDs in workplaces across Europe” Anna Diamantopoulou European Commissioner for Employment and Social Affairs.



“In spite of the alarmingly high and increasing number of cases, work-related musculoskeletal disorders are in large part preventable if employers and workers follow existing health and safety regulations and guidance on good practice. That’s an important message for the European Week to get across,” Stephen Hughes Member of the European Parliament.

EUROPE IS TURNING ITS BACK ON WORK-RELATED MSDS

Encouraged by the success of three previous European Weeks for Safety and Health at Work, the idea of asking the European Agency to take over the organisation of a fourth Week in October 2000 received widespread backing from the European Commission, the European Parliament and the 15 Member States.

The Agency’s tri-partite Board, which includes representatives of the social partners as well as national authorities and the European Commission, took the decision to focus the campaign on the biggest single cause of absence from work - musculoskeletal disorders. And the European Parliament allocated an additional budget to the Agency to co-fund information and communication activities in the Member States.

This Community money has supported a variety of initiatives, from adverts on busses in Ireland to an interactive TV programme in Finland. Thirty-seven projects in all (see box) and all focused on getting the message across that MSDs can and must be prevented. To give you a flavour of what has been happening in EW2000, details of a few of these co-funded projects and other national activities are presented in this magazine. But they are just the tip of the European Week iceberg.

Each Member State has run its own campaign geared to its own national priorities, with emphasis on promotional aspects such as

conferences and information campaigns on the prevention of work related MSDs in general or on specific projects designed to provide solutions.

To support these campaigns, the Agency produced promotional material in all Community languages (posters, leaflets, postcards and factsheets) and launched a *European Week 2000 website* at <http://osha.eu.int/ew2000/>. It has also run information projects on specific aspects of the MSD problem including work-related neck and upper limb disorders, low back pain disorders and ‘repetitive strain injuries’, and carried out data collection of good practice examples.

High levels of participation in the Week have been reported right across the EU and beyond. And the Agency hopes that the awareness raised during the Week about musculoskeletal disorders and back pain together with the promotion of preventive actions have played a part in helping to lighten the burden of MSDs in Europe’s workforce.

Looking beyond EW2000, the information collected through the campaign will ‘live on’ on the Agency’s web site and serve as a valuable source of reference material for those looking for information on this work-related risk and in particular for good practice examples.



THE EUROPEAN WEEK HAS SEEN A WIDE VARIETY OF ACTIVITIES TAKING PLACE RIGHT ACROSS THE EUROPEAN UNION AND BEYOND. BY REPORTING ON SOME OF WHAT'S BEEN HAPPENING IN SEVEN OF THESE COUNTRIES WE AIM TO GIVE YOU A TASTE OF WHAT THE WEEK HAS BEEN ALL ABOUT.

FRANCE

A practical training course on MSDs for managers was one of four projects that received Agency funding in France.

Mr Jean Pierre Carrière, an engineer specialising in health and safety with the Caisse Régionale d'Assurance Maladie des Pays de la Loire (CRAM), says that the number of MSDs in the Pays de la Loire has been sharply increasing for the past four or five years. "We have now to put on the market a solution to stop the diseases, to improve prevention of musculoskeletal disorders."

CRAM now offers training to managers with authority to effect changes in factories and other workplaces so that people can deal with MSDs in their workplace. The training course of six days is spread over four months. For three consecutive days participants are presented with information about MSDs and the project in hand is explained. Participants return to their workplaces with a view to putting into effect what they have learned.

The fourth day of the course takes place several weeks later, which involves an update on progress to date; while the last two days some weeks later finalise the project. "They do a draft project and they come back and discuss the project with us. We follow up the draft project until it's ended," he says.

Moreover, the participants' projects will be followed up next year in 2001 to evaluate further progress, whether developments are unfolding or if targets have been met.

Mr Carrière says the course is a new idea, "doing training courses for people in factories who are able to improve the prevention on the factory work floor".

Asked if a lot of managers in France would not be trained about MSDs, he says: "No, not in France. They are not informed of the problem of musculoskeletal disorders. We have to speak to the managers and tell them of the importance of these kind of diseases."

The first course, which involved participants from the metalwork, electricity and telecommunication industries, took place from March to May 2000, while a second course was planned from October to December 2000. A further three courses are planned for 2001.

For further information contact: Frédéric Leonzi, Ministère de l'Emploi et de la Solidarité -Direction des Relations du Travail Bureau CT 1-2, email: frederic.leonzi@drt.travail.gouv.fr, websites: <http://www.travail.gouv.fr> or <http://fr.osha.eu.int>

ITALY

Italy held a conference in Modena on 20 September 2000 on work-related upper limb disorders. Invited speakers came mainly from companies with experience in risk assessment, in the re-design of workplaces and the re-employment of workers with WRULDs, such as Whirlpool, Electrolux, Embraco, and Emerson.

A book *La Valutazione E La Gestione Del Rischio Da Movimenti E Sforzi Ripetuti Degli Arti Superiori* (Evaluation and Management of Risk by Repetitive Movements of the Upper Limbs) which presents new guidelines was launched and distributed. Written by Daniela Colombini *et al*, the guidelines offer easy-to-use risk assessment methods to industrial technicians in designing or re-designing workplaces to prevent MSDs.

Writing the foreword to the guidelines, Prof. Antonio Grieco says the book was chiefly written for the men and women "who design, implement, inspect, assess and modify the times and methods with which certain jobs are performed in a manufacturing environment, based on their own professional expertise and experience".

A leaflet presenting health information to workers exposed to repetitive tasks was also distributed.

In October, a two-day meeting in Rome covered the prevention of musculoskeletal disorders for repetitive movements, manual handling and when handling hospital patients. Speakers shared their practical experiences in risk assessment, prevention and health education. The book and leaflet were distributed here too.

This winter and in spring 2001, the EPM (Ergonomia della Postura e del Movimento) research unit is organising nine two-day courses for company technicians in different Italian regions, north and south. Courses look at the prevention of WRULDs, risk assessment of manual handling tasks and the prevention of low back pain.

For further information: ISPESL, Dipartimento Documentazione, Informazione e Formazione, website: <http://www.ispesl.it> or URL: <http://it.osha.eu.int>

AUSTRIA

Austria has two projects cofunded by the Agency for European Week 2000.

"Be clever with going back", under the auspices of the Allgemeine Unfallversicherungsanstalt, the Austrian workers' compensation board, aims to raise awareness of MSD risks and to encourage measures to deal with the problem. The information campaign is directed at small and medium sized enterprises through brochures, posters and videos.

The project deals with topics like manual handling of heavy loads, repetitive strain injuries, healthy behaviour, work organisation, work processes, how to design healthy workplaces, and includes practical help and tips.

The second project is called InForm: *What supports me! What moves me! Impulses to posture and movement*, being run by LIFE, Institut für Gesundheitsentwicklung and Human-ware, Institut für Gesundheit, Sicherheit und Ergonomie im Betrieb It aims to educate a wide range of people, especially employed people and students, about musculoskeletal stress factors and potential complaints.

The campaign includes a workbook and a poster. A checklist enables employees to evaluate their own workplace for MSD risks. It includes

samples of good practice in preventing MSDs through the design of work and work processes and procedures.

Austria also organised a conference "Mausarm & Katzenbuckel" (Mouse Arm and Cat's Arched Back), October 18 - 19, during the European Week. It included three workshops that took a creative approach in words, drawings and movements to the theme: "What gives me support and keeps me in motion". The first evening was set to close with a "thematic cabaret" on health promotion and MSDs, with the scientific programme the following day hearing a presentation of the Austrian projects described above as well as contributions of speakers from Germany, Sweden, the Netherlands and Austria.

Further information: Gabriele Kaida, email: gabriele.kaida@bmv.gv.at, websites: <http://www.bmv.gv.at/vk/9schutz/arbeitsmain.htm> or <http://at.osha.eu.int>

UNITED KINGDOM

The new millennium's first European Week for Safety and Health was set to take place in the UK from 16 to 22 October to coincide with Back Care Week.

The Week aimed to reduce the problems of backpain and musculoskeletal disorders by increasing awareness, identifying solutions and supporting practical projects in the workplace. Musculoskeletal disorders and backpain cost the UK economy some £5 billion a year with over 11 million days lost from work each year and they cause misery and suffering to tens of thousands of workers in Britain.

The Health and Safety Executive (HSE) teamed up with the National Back Pain Association, the TUC, CBI, the Departments of Health, Education and Employment, and Social Security, NHS Trusts, large and small firms, and trades unions sign up as active supporters of the Week," he said.

HSE's Director of Information, Peter Rimmer saw the European Week as an opportunity for people to sign up and take action to eliminate health and safety problems in their workplace. "Each year, more and more local authorities, government departments, NHS Trusts, large and small firms, and trades unions sign up as active supporters of the Week," he said.

HSE publicity and promotion materials for the Week included:

- four-page advertorials in the main health and safety journals in May 2000;
- a newsletter of 500,000 copies published in mid-May 2000;
- an 'Action Pack';
- advertising in national, regional, trade and technical press.

Other HSE activities included: launching the Week with a press conference in London on 16 October with BackCare, the TUC and athletes Roger Black and Sally Gunnell; organising a conference on occupational health in construction on 17 and 18 October linked to the 'Working Well Together' campaign; and managing a series of workshops, seminars and events all over the UK.

The Back Care campaign included an Information Pack, posters, booklets, ideas and fact sheets and local alliances with professional institutions. Meanwhile, the British Safety Council planned five roadshows from Aberdeen to Bristol with HSE and other speakers, while BSC circulated 12,500 Action Packs to their members.

The Department for Education and Employment developed a New Deal for Disabled People and planned to publish a Good Practice guide in October, while a conference was planned for the Week with the Department for Health to review and report progress on the Back in Work funded projects.

The Health Education Board for Scotland was set to launch Backs in Scotland on 16 October, while HSE Northern Ireland planned a Back Pain conference for the same week. Meanwhile in Wales, the Agency leaflet and poster was translated into Welsh for local distribution.

For further information contact: Janice Martin, Health & Safety Executive, email: janice.martin@hse.gsi.gov.uk, website <http://uk.osha.eu.int>

LUXEMBOURG

Mr Paul Weber, director of the Inspection du Travail et de Mines in Luxembourg says that, in association with and sponsored by the European Agency for Safety and Health at Work, Luxembourg has produced a CD Rom on safety and health at work in the construction sector. An Internet version for this sector and for small and medium sized enterprises has also been produced, focused on self-control assessments. It not only facilitates self-assessments but shows solutions that work in models of good practice.

Similar CD Roms for the finance sector and for other sectors are under preparation and will be ready in Spring 2001.

The CD Roms and Internet versions enable safety managers in companies to do a self-evaluation of their company, looking at workplace risks and formulating good solutions to prevent those risks, said Mr Weber.

Moreover, during European Week from October 22nd to 29th in Luxembourg, interesting public relations events took place, including high-profile items on television, highlighting workplace health and safety. For instance, every evening that Week, a different small or medium sized company, each finalists in an awards competition representing different industries and each of which had taken initiatives to address workplace MSDs, was presented in a three-minute TV spot.

The TV items were broadcast at prime time viewing during the evening news on RTL, a one-hour programme repeats of which are shown every hour, which is seen by some 75 per cent of the population of Luxembourg every evening. On the Thursday of European Week Luxembourg staged a public relations event whereby these six award-winning enterprises were presented to the media.

Meanwhile, on the Impulse television programme on the Sunday of European Week, representatives of the employers, unions and the Luxembourg government took part in a half-hour round table discussion on workplace health and safety promotion. The purpose was to place health and safety as a core business objective, no less important than profits or productivity.

At the national autumn fair in Luxembourg, a big stand was set to highlight workplace health and safety. It was a joint stand with an insurance company, which has to pay out for work accidents, and the administration of customs, with which the Inspection du Travail et des Mines have worked closely together.

The joint venture between the three administrations would see stunt men perform every 20 minutes on the big stand, re-enacting work accidents, showing how accidents arise where safety is not properly managed and, in contrast, how safe workplaces operate.

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IRELAND

Relatively few back injuries occur due to a single event. The conventional wisdom that workers should always bend the knees and not the back when lifting may not be right. And those responsible for designing work should ensure that the most demanding bending loads on the low back are not undertaken shortly after rising from bed.

These are just some of the provocative and challenging propositions which participants at a major Irish national conference on work-related MSDs heard in June, as part of Ireland's participation in the European programme on MSDs. The conference was organised by Ireland's Health and Safety Authority and the Irish Ergonomics Society.

Prof Stuart McGill of the University of Waterloo in Canada challenged conventional wisdom that it is always better to bend the knees and not the back - that is squat, not stoop - when lifting. Many workers prefer to stoop, perhaps because there is "an increased physiological cost in squatting". Citing recent research comparing stooping and squatting when lifting, he said it concluded that "at least in terms of low back compression", neither technique can be justified over the other.

"The case could be made that the important issue is not whether it is better to stoop lift or to squat lift but rather the emphasis could be placed on placing the load close to the body." This is to "reduce the reaction moment" and "avoid a fully flexed spine to minimise shear loading", he said.

"In fact, sometimes it may be better to squat to achieve this, or in cases where the object is too large to fit between the knees, it may be better to stoop, flexing at the hip but always avoiding full flexion to minimise posterior ligamentous involvement."

Commenting on the diurnal change in spine length, he said there could be an increased risk of back injury early in the morning. Managers and people responsible for the design of work should "design jobs so that the most demanding bending loads on the low back are not conducted early in the morning or shortly after rising from bed," he said.

The current practice which tends to require workers and medical personnel to identify "the single cause of injury", that is a specific



event accounting for an injury, is not attuned to recent advances in the scientific understanding that "much injury is the result of cumulative trauma". Accordingly, an "overhaul of the current injury reporting system needs to be considered," he said.

Ireland also participated in the European Week's focus on MSDs through a series of talks around the country in September and October on preventing work-related MSDs organised by the Health and Safety Authority. The Authority produced a free guidance booklet on manual handling *Handling With Care - Safe Manual Handling*. Meanwhile, the HSA used billboards in train stations, trains and on buses in Dublin with the message: "The Straw that Broke the Camel's Back: Lifting at Work Shouldn't Break Yours!"

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GERMANY

European Week generated a lot of interest in Germany where MSDs account for some 29 per cent of all sickness absence days from work and are the greatest cause of disability. There was great interest in participating in the Week, with a lot of applications received for the European Week good practice award.

Two conferences were set to take place during the Week. The first was organised by an association of professional insurance companies for 25 October in Stuttgart.

Conference themes included how to prevent MSDs, work-balance perspectives for successful MSD prevention and how different jobs give rise to MSDs. Practical examples were given from small and medium sized enterprises in different sectors, including the textile industry, construction, wholesale and storage, the meat industry, health care and metal industries. Directed at employers, employees, physicians and OSHA-institutions, the conference had a particular focus on working conditions in SMEs.

The conference, which combined reports and workshops, was held under the patronage of the Prime Minister of the Federal State Baden-Württemberg, Mr. Erwin Teufel.

The second conference, the Multiplikatoren-Kolloquium (the multiplier colloquium) was planned for 24 October in Potsdam organised by the institute of occupational health and safety in the federal state of Brandenburg, which the German Labour Minister, Mr. Walter Riester was due to attend.

It aimed to address the epidemiological problems of MSDs, methods for analysing and assessing MSDs and prevention strategies, results and experiences in various workplaces. It set out to present an outlook for what to do in the future.

The conference was organised for employers and employer associations, employees, trade unions, staff associations and workers' councils. Occupational physicians, regional OSHA services, national and federal states OSHA institutions, insurance companies and politicians were also targeted.

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eW 2000 co-funded projects

Thirty-seven projects have been co-funded by the European Agency as a key part of its organisation of the European Week 2000. They were selected following a call for proposals published in the Official Journal of the European Community in October 1999. The evaluation for funding was carried out by the Agency in partnership with its national Focal Points and social partners.



Organisation

Main activity

Austria

Allgemeine Unfallversicherungsanstalt	The development of a video, folders and posters.
LIFE Institute für Gesundheitsentwicklung GmbH	Posters and a "Working Book" intended for training in schools and in the private sector.
Ppm forschung und beratung	A questionnaire – to be used by the social partners and by preventive services to improve current procedures of risk-evaluation.

Belgium

Algemeen Christelijk Vakverbond – Dienst Onderneming	Campaign to inform employers and workers.
Internationaal Syndicaal Vormingsinstituut	Campaign to instruct workers in risk analysis
PREVENT	Training video and brochure

Denmark

Arbejdstilsynet	Promotion activities in connection to the EW2000, including local initiatives co-ordinated by the Labour Inspectorate.
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Finland

Työturvallisuuskeskuksen kannatusyhdistys ry	A Healthy Back 2000 – a campaign carried out in co-operation with experts from different unions and social partners.
Wellmedia WM Oy	Interactive TV-programme, internet and teaching package delivered to SMEs and larger scale enterprises.
Invalidiiliitto ry	Regional events in Finland during the Week organised by this association for the disabled.

France

Agence Nationale pour l'Amélioration des Conditions de Travail	10 seminars for SMEs to be aware and trained in using preventive MSD tools
D.R.T.E.F.P. du Centre	Sector project (metallurgy) targeted at SMEs, focused on exchange and dissemination of good practice.
Caisse Centrale de Mutualité Sociale Agricole	Sector project (meat industry, slaughterhouses). Information campaign and training. Targeted at SMEs.
Caisse Régionale d'Assurance Maladie des Pays de la Loire (CRAM)	Regional innovative project. Training at company level for managers responsible for preventing actions.

Germany

Hauptverband der gewerblichen Berufsgenossenschaften	Identification of impact at workplaces. Exchange of good practice. Workshops. A conference during the Week.
Landesinstitut für Arbeitsschutz und Arbeitsmedizin	A conference in October where experts looked to identify solutions. Results published in Internet.

Greece

Ministry of Labour & Social Affairs	Information campaign against MSD targeted at employers and employees. Conferences and TV spots.
Ministry of Labour & Social Affairs	Production and edition of information leaflets on the prevention of MSDs.

Ireland

Health & Safety Authority	Advertising campaigns on public transport vehicles in Irelands major cities.
Irish Congress of Trade Unions	Questionnaire to be distributed to those involved in the construction industry. Information leaflet and conference.

Italy

Local Health Administration A.U.S.L. 5 Pisa Department of Prevention	Videos, brochures, posters, and other information material. Seminars during Week.
Unità di ricerca Ergonomia della postura e del movimento EPM-Fondazione Don Carlo Gnocchi	Transformation of scientific findings into information and training materials to be used in SMEs.

Luxembourg

Inspection du travail et des mines	Production of a CD for "self control" tool on risks concerning MSD - construction sector
Inspection du travail et des mines	Production of a CD for "self control" tool on risks concerning MSD - finance sector

Netherlands

Stichting Projecten MKB – Nederland	Information centre of the central organisation representing SMEs in Holland will collect and disseminate information concerning prevention.
TNO Arbeid	The enhancement of the awareness of the risks related to lifting heavy loads. Use of the 10 best practice projects in the SME assembling sector.

Portugal

Pioneer Electrónica Portugal Produção S.A.	To develop an information programme incorporating several variables and ergonomic constraints.
AUTOEUROPA - Automóveis, Lda.	Analysis of the influence of the physical factors of MSD in the cars industry and to develop guidelines for its prevention.

Spain

Instituto Nacional de Seguridad e Higiene en el Trabajo	Publication of new and existing material related MSD and backpain.
Instituto Nacional de Seguridad e Higiene en el Trabajo	To train main actors in the prevention of MSD and backpain, especially in SMEs.
EROSKI S.COOP.	Improvement of the workers health of the fruit and fish sections in the Hypermarket "Eroski" and Supermarket "Consum" due to the suitable design of their worksites. Establishment and consolidation of a "School of the back".

Sweden

Arbetskyddsstyrelsen	A campaign to improve the conditions at the loading bays. All labour inspectors in Sweden will take part.
Arbetskyddsnaändnen	A leaflet "Ergonomics Thermometer" will be printed and distributed to workers safety representatives, small enterprises, and health centres.
Landsorganisationen i Sverige	Regional seminars with focus on MSDs. Participation at the major Work Environment Fair. Translation and printing of TUTB information.

United Kingdom

Taunton Deane Borough Council	Enhancing the development of risk evaluation and preventive practices.
Trades Union Congress	To raise awareness of preventive approaches in small firms.
Health & Safety Laboratory	Produce a video to illustrate practical solutions to manual handling in agriculture.

Good Practice Awards



Sixteen examples of good practice in the prevention of MSDs are set to be recognised at an award ceremony in Bilbao on 27 November, 2000.

Launched earlier in the year, the aim behind the European Agency's competition 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.

For more details visit the EW website at <http://osha.eu.int/lew2000/>

Innovative design

IDEWE, 3001 Leuven, Belgium

Adaptation of a forklift truck based on ergonomic analysis

Slagteriselskabet DANISH CROWN a.m.b.a., 8210 AarhusV, Denmark

Specially designed vacuum lifting equipment for lifting slabs of meat – 'Meat Magnet'.

Fagor Electrodomesticos, S. Coop, 20500 Arrasate, Spain

Design of a machine to remove semi-automatically protective plastic from stainless steel.

Economic effectiveness

Carl Thøgersen A/S, (Huma) 7760 Hurup Thy, Denmark

Improved organisation of work sites for sewing of mattresses

Henkel Iberica, S.A., 08170, Montornes de Valles, Spain

Mechanisation and redesign of workstations in order to prevent musculoskeletal disorders

R. Twining and Company Ltd., United Kingdom

Improving the work stations of packers on a production line.

Small and medium-sized enterprises

Uusimaa Regional Institute of Occupational Health, 00370 Helsinki, Finland

Developing ergonomics for small workplaces.

Wilkhahn Wilkening und Hahne GmbH.Co, 31848 Bad Münder, Germany

An intelligent lifting device for loading a high-frequency press

Arbouw, 1005 AC Amsterdam, the Netherlands

Glaziers' mechanical aid

Reintegration of workers

GMB (Britain's General Union) London Region, Chelmsford, UK

Talk yourself into a job – training courses in the use of voice recognition software

Special awards for good ergonomic solutions

Wiener Linien GesmbH & Co KG, 1030 Vienna, Austria

Redesign of a tram driver's position

Esswein, 85002 La Roche sur Yon, France

Incorporating MSD prevention into production management on assembly lines for domestic electrical goods

Cosat, 1050-099 Lisbon, Portugal

Analysis of muscular disorders in the manufacture of plastic products

Aziende USL Modena e ASL Mantova, 41012 Carpi, Italy

Semiautomatic and automatic handling of pigs in meat production

FANCO S.A., 69100 Komotini, Greece

Interventions aimed at preventing and dealing with MSD problems in a sportswear factory

Lundborgs sjukgymnastik, 80255Gävle, Sweden

Ergonomics for junior schools

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European Agency for Safety and Health at Work

Magazine of the European Agency for Safety and Health at Work n° 3, 2000

Luxembourg: Office for Official Publications of the European Communities

2000 — 37 pp. — 21 x 29.7 cm

ISBN 92-95007-15-8

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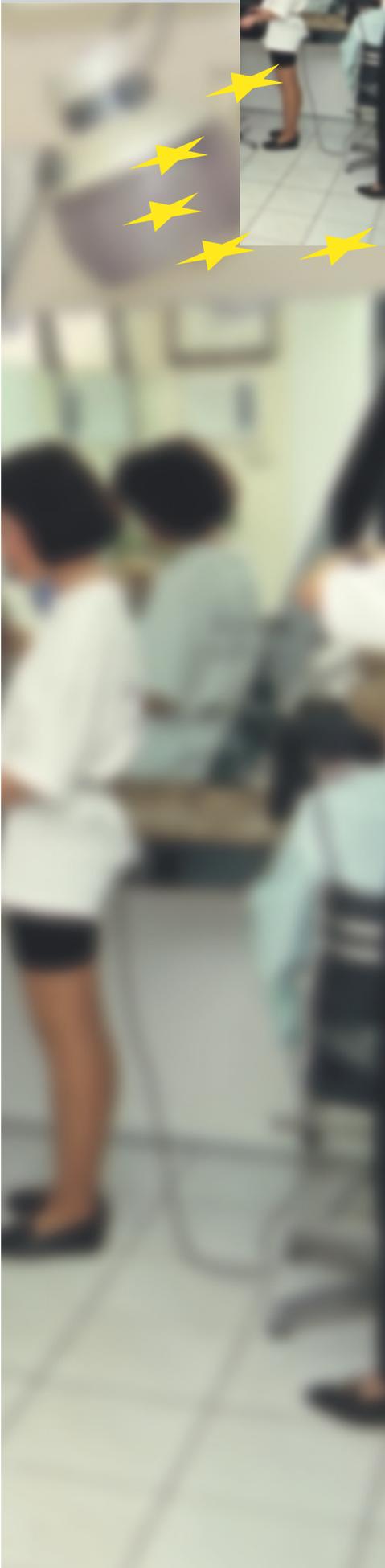
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ISBN 92-95007-15-8



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