European Agency for Safety and Health at Work

R E S E A R C H

Research on
changing world of work

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Luxembourg: Office for Official Publications of the European Communities, 2002

ISBN 92-95007-65-4

Printed in Luxembourg

PRINTED ON WHITE CHLORINE-FREE PAPER

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FOREWORD

Working life in Europe is changing at an ever-increasing speed. There are on-going discussions on international, European and Member State level how to cope with these changes and the challenges for health and safety at work. Changing World of Work has been a priority topic of the European Agency, and a number of various activities has been carried out on this topic during last years.

The work to facilitate this report on 'Research on Changing World of Work - Implications on Occupational Safety and Health in some Member States of the European Union' was carried out by the Topic Centre on Research - Work and Health. The Topic Centre consists of a consortium of ten major OSH research institutes in Europe. TNO Arbeid from the Netherlands and NIWL from Sweden have been project co-ordinators for this task. A workshop of experts was used to provide input into the report and comment on an early draft. A consultation process was carried out by sending the manuscript to members and observers of the Agency's Thematic Network Group on Research - Work and Health. After the consultation process the final report was prepared and published.

The Agency wishes to thank all those who contributed to the report and especially the authors for drafting the report.

Bilbao, december 2001

EUROPEAN AGENCY FOR SAFETY AND HEALTH AT WORK

EXECUTIVE SUMMARY

Introduction

Working life in Europe is changing at an ever-increasing speed. This includes changes in contractual arrangements, working hours, use of technology, increased ability to work away from a fixed workplace or from home etc. European Union Member States need to manage the occupational safety and health (OSH) implications of these developments. There have been on-going discussions on international, European and Member State level as to how to cope with these changes and the challenges they present for health and safety at work, especially given that the occupational health situation in European is not showing improvements (Merllié & Paoli, 2001).

Changing World of Work (CWW) issues can be summarised as new work organisational forms, new contractual relationships and use of working time, new technologies, changes in the workforce, and changes in OSH systems. All these issues can clearly have an effect on occupational safety and health. Increased labour market flexibility means more part-time, temporary, precarious employment, including temporary agency work. Working time patterns have changed. Not only does technology increase the possibilities to run factory production etc. around the clock but also the 24 hour society is emerging. Information technology has had a profound effect on the nature of some tasks and on the work organisation although effects have been little studied. There is reduced unemployment, but the workforce is ageing, and there is an increased participation by women and immigrant groups. The changed world of work means higher job demands, and challenges of flexibility and knowledge. The European OSH approach is based on a broad framework of prevention action based upon risk assessment that can be applied to any type of risk or workplace. It incorporates the need to respond to changes in technology and consider the implications of work organisation. However it is unclear to what degree Member State OSH-systems are dealing in practice with these new OSH implications.

On behalf of the European Agency, its Topic Centre Research has produced a report looking into this complex situation. It covers research in seven EU countries, analysing new work organisational forms, new contractual relationships and use of working time, new technologies, changes in the workforce, and changes in OSH systems. The report also considers teamwork, decentralisation of supportive tasks, job enlargement, knowledge management, teleworking and virtual networks.

1. Changes in work organisations and OSH implications

Companies experiment in several ways with their work organisation. These experiments are called 'new' because they deviate from what used to be considered the 'optimal' way to organise production and services. In the past, maximal division of tasks was seen as the most efficient way of organising tasks. This meant that organisations opted for a centralised control and a strong division of tasks. New forms of work organisation are intended to reduce this division of labour, and decentralise all kinds of responsibilities.

Several solutions are on the agenda:

- Teamwork;
- Decentralisation of supportive tasks, such as quality and maintenance;
- Job enlargement, job rotation and interdepartmental job rotation;
- Knowledge management;
- Teleworking;
- Virtual networks.

All of these changes have not always been accompanied with positive outcomes for workers. The main risks and possible problems in prevention are:

- Most of these changes had lead to higher productivity. Job demands on workers are rising and bring higher psychosocial demands on workers. The time to take care of possible occupational health risks has been reduced.
- Telework systems and virtual networks have brought work to the home situation. New risks arise as a consequence of the small fit between work and the home situation. Monitoring of risks is a problem.
- Some of the changes have also reduced the possibilities of workers to control their working situations. In these situations, workers can be confronted with new psychosocial risks.

2. Changes in employment relations and OSH implications

Over the past 30 years, labour market flexibility has been viewed as a solution to rising unemployment. As unemployment rates are becoming more diverse in the European Union, there is a common trend in the European Union towards a growing proportion of part-time and non permanent jobs. This trend goes hand in hand with the growth of services within the overall employment structure. In the last few years, the growth of non permanent jobs seems to have become less steep, and the proportion of part time jobs has become even greater (Goudswaard and Andries, 2001). International comparison in the field of contractual relationships is difficult, due to the difference in concepts, rules and regulations.

One of the forms of precarious employment is Temporary Agency Work (TAW). TAW has increased rapidly in almost all European countries, as part of the general movement towards increased flexibility in employment. However, this type of work still comprises quite a small proportion of total employment in Europe, rarely exceeding 2% (Merllié & Paoli, 2000).

The trend towards flexible contractual relationships has an impact on working conditions and health. There is some research information available on this relationship between employment status and OSH. At a European level, working conditions, in particular physical constraints and conditions of employment, of precarious workers are worse than those of permanent workers: more work in painful positions, with more exposure to noise, more repetitive tasks and movements and less skill development, less access to training,

less autonomy over their work and time and less access to participation (Letourneux, 1998). As a result of this, more musculoskeletal problems and fatigue are found among precarious workers. Workers with a permanent contract, on the other hand, are more exposed to high-speed work and show more stress and mental health problems. Some of these differences can be explained by differences in sectors and occupations (Goudswaard and Andries, 2001).

There has been little research into the question how workers adapt to the new situation of flexibility and insecurity. Some research indicates that the feeling of insecurity can also be experienced by permanent employees as a result of the process of outsourcing and subcontracting.

New working time patterns arise because of the entrance of 'new' groups of workers on the labour market and as a result of company strategies responding to the demands of the 24 hours economy. It has become more and more an 'art' to plan the workforce around tight schedules and peaks in production or services. Not all authors agree on the widespread emergence of the 24 hours society. There may be large differences between countries in the impact of the 24 hours society on working time. Working around the clock will mean more people exposed to the ill-health effects of sift work and night work. Research on the impacts of working in shifts and at night is well established, but there has been little research into the OSH impacts of new working time patterns. This research includes evidence that older workers have more difficulties adjusting to shift work.

When looking at different types of working time arrangements, the use of part-time work catches the eye. Next to non-permanent jobs, part-time labour has been the engine of employment growth in some countries. The OSH impacts of part time employment are divergent: many part-timers work in less skilled jobs then full time employees and may miss out on OSH training.

An important factor, related to the increase in the diversity of working time patterns, is the increase of work intensity in all countries in Europe. Some effects of this increased work intensity are the extended practice of weekend work, the increase of working time schedules with irregular and less predictable working hours, and the use of excessively short (involuntary) part-time work or excessively long working hours (involuntary over-time). Development towards more work intensity and time unpredictability does not seem to go in hand with an increase in workers autonomy over work. There is still little research on the exact link between new working time patterns and OSH-issues at the European level.

3. ICT and OSH implications

New technologies have long been investigated by numerous researchers. The focus of this technology research has somewhat shifted through time. In the eighties, microelectronics was seen as the new technology. Researchers looked into the effects of mainframe computers, new production and stock control programs and the diffusion of 'hard automation' (robots, NC- and CNC-control) on the levels of employment and on quality of work. Currently, research has studied the rise of information and communication technologies (ICT) in employment and work. The mainframe computer has been replaced by computer networks, electronic data interchange and the internet. These new technologies make it possible to develop permanent contact between the worker and his work situation. The internet has also given rise to e-business, with a whole new set of business and work practices. An unexpected outcome of these new technologies is that they have organising capabilities. ICT is not solely oriented at automating all sorts of operations, but helps to organise processes and operations. E-business raises new challenges for

occupational health and safety. For example, supply management relations between companies raise the issue of occupational health and safety responsibilities. Lack of data makes it difficult to assess possible negative effects of ICT on the functioning of organisations.

4. Changes in the workforce and OSH implications

Europe has seen a dramatic drop in unemployment. This is seen as a blessing for national economies. The optimism, which followed this development, must not obscure the fact that the European workforce has changed in composition, and will continue to change in the next fifty years. It is important that the different economies find ways to account for these changes. Three major shifts can be seen.

The first is the ageing of the workforce. In all European countries, the average age of the workforce is rising. The category of workers in the category above fifty years will continue to grow. The number of younger workers will shrink so there will be an imbalance between the age groups. The policies from the last decade, aimed at early retirement of older workers, will have to be reversed, so that the traditional pension age of 65 years may have to be altered. The ageing of the workforce will mean that policies for upgrading the workforce will be rendered more difficult. Older (skilled) workers need more time to learn to acquire and keep new knowledge, time which is not always made available. The OSH-implications of having large groups of very old workers (+60 years) in the workforce are unclear. It is also unclear if the ageing workforce will be able to cope with the rising job demands because of new organisational practices and new technologies. Older workers have more difficulty in adapting to ever changing job demands.

A second trend is the feminisation of the workforce. In most countries, participation rates of women have risen quite steadily. Societal changes have brought these changes about. Classical gender divisions will change, but it is not clear to what degree. Differences will remain between jobs for men and women, in the use of different contract forms, and in opportunities to climb organisational hierarchies. Still quite a few jobs have not been adapted to the needs of female workers. Such jobs can have OSH-implications for female workers such as for example musculoskeletal problems. Tools and equipment have often been designed for male rather than female workers and traditional working hours may be difficult for women with their family responsibilities.

A third trend is immigration of new groups to the European economies. This immigration will be responsible for rejuvenating the workforces to some degree. At the same time, this immigration will mainly consist of very poorly trained and educated workers. These workers are mostly endangered by changes in the economies to more knowledge intensity. Such workers also experience language problems for instruction and training. Knowledge intensity of production and services make it difficult for poorly educated workers to find lasting job situations.

5. Problems and needs in the OSH system

There is a growing use of information and communication technology in all sectors.
As an ever-higher proportion of workers is now employed in the service sector, new burdens arise, such as ergonomic problems in information-intensive work. Increasing part of work in the service sector is about personal contact with people - clients, customers, patients etc. which can lead to increased stress and violence at work.

There is a shift away from the traditional concepts of work towards new forms, such as telework, self-employment, subcontracting and outsourcing work, temporary employment, small firms etc. There is also a general trend towards more flexible and irregular working hours, increasing work pace and workload. This may have an effect on accident rate and stress at work.

The development of new technologies resulted amongst others in increased integration and globalization of work. Therefore, national solutions become increasingly dependent on European and international conditions. Demographic changes mean that in 2005, more employees will be in their fifties than in their thirties and the number of women entering the labour market will be increasing.
With the changes in the job market, employees' work possibilities and expectations are also changing. There is an increasing interest in autonomous work, self-realization, staying healthy etc.
The OSH framework in Europe of risk assessment and prevention can be applied to any risk or workplace. However practical support to apply it is needed as well as research into its application to the various CWW issues.

There are challenges for the OSH structures and authorities in Member States to reach small businesses, mobile work forces etc. and to provide practical support on work organisational issues.
The introduction of new working conditions should mean the opportunity to improve working life. This is clearly not always the case. A more inclusive OSH approach is needed to bring business management and management of change and work organisations issues together with OSH considerations.
There is need to develop new OSH research approaches and methods to cope better with rapid changes in the working life, e.g. action research, intervention studies and learning networks.

6. Summary about changes in work and their OSH implications

The changing world of work leads to new OSH-implications. According to some research, new organisational forms and contractual situations lead to higher job demands. New possibilities for job control are not sufficient to dampen the effect of these higher demands. Other research has shown what steps can be taken to address risks of new forms of work organisations and contract situations.

Table A summarises these changes in work.

OSH impacts,	Changing work organisations	Changing employment relations	ICT developments
new increased risks Problems in the OSH-system, risk management	- stress and work overload - skill demands - higher accident rates	- job insecurity - higher accident rates - skill development - ageing workforce	- information overload - musculoskeletal problems - skill demands
Initiatives/ Interventions to prevent risks		- gender segmentation - information problems - representation	- monitoring of risks is a problem
Initiatives/ Interventions to prevent risks	- partnership employers - employee organisations - OSH-reform - employer responsibility stimulated by means of insurances - independent OH-services - workplace health promotion - new approaches to research		

Research overview on Occupational Safety and Health Impacts of the Changing World of Work in some EU Countries

Below are summarised trends in change and their implications from seven EU Member States. A summary table of these trends is given in table B.

Countries	TRENDS	EMERGING RISK
The Netherlands	- technological and economic changes - increased labour market participation - OSH services are independent organisations - new organisational forms have developed: functional flexibility a more important item - more attention to work family life balance and individualisation of working hours	- greater psycho-social demands - issues of participation in decision-making - changed skill demands
Belgium	- reformed OSH legislation - employers primarily responsible for OSH - labour market is increasingly female, ageing, and working part-time, and service sector dominated - subcontracting and outsourcing have increased	- risks to women, and problems of ageing, including pension age - insecure work - outsourcing raises issues of training and OSH, with higher accident rates
Germany	- preventive OSH policy enhances productivity - demographic change means - new forms of work organisation - shiftworking and use of new technologies have increased	- new skills required - job security
Sweden	- companies restructuring - productivity increasing - outsourcing, virtual companies - companies are responsible for OSH for employees	- less secure working conditions - issues of participation - stress and other psycho-social factors are significant - lack of sufficient safety representatives - women dominate part-time work

Countries	TRENDS	EMERGING RISK
Sweden		- short-term contracts can be monotonous,physically demanding, will little control over work - restrictive jobs through new technologies - information overload - tailored employment contracts - hard to monitor OSH using current OSH services
Finland	- improved working conditions, varied tasks, and increased participation in in-house training - pace of work, uncertainty, competition and non-permanent employment have increased - OSH supports preventive approaches - feminization of the workforce - labour shortage, and pressure on young workers - workplace health promotion - fragmentation of companies	- issues of skill, social contact, work community, trust and co-operation - gender segregation in work content and wages - monitoring OSH and follow-up are difficult - stress, workload and fatigue have increased, with violence at work
Spain	- encouraging employee partici pation - teamwork and job rotation are increasing - repetitive work and physical problems - temporarily employed workers	- greater physical demands, less autonomy, less participa tion and poorer health, and more accidents linked to tem porary work - new forms of flexibility in Spanish companies conflict with the legal basis of regula tions, collective bargaining and prevention - more mental demands
France	- shift to an industrial and service society - increased technology and organisational change - social partners have roles in the prevention system - reductions in working hours	- pace of work can be constrai ned

The Netherlands has undergone technological and economic changes, with increased labour market participation. OSH services are based on independent organisations, helping and advising companies. New organisational forms have developed, with teamwork, quality certification, Just-In-Time, work organisation and knowledge intensity. The socio-technical tradition is strong, assisting organisational renewal. Change has implications for training and OSH systems. Non-permanent jobs have increased in the past decennia, but permanent jobs dominate; many companies have no non-permanent staff. Functional flexibility seems to become a more important item in company policy making. Also more attention to work family life balance. OSH implications are complex, with greater psychosocial demands on permanent staff. Part-time work and flexible working time measures have expanded, with the return of women to the labour market. Divergent OSH implications with regard to part time work: less physical demands, and less skill development. New technology raises issues of participation in decision-making, and changed skill demands.

Belgium has reformed OSH legislation, covering wellbeing, prevention, protection, and an increased emphasis on psychosocial factors. Legal structures are in place, with employers primarily responsible. The labour market is increasingly female, ageing, and working part-time, and service sector dominated. There has been concern for risks to women, and problems of ageing, including pension age. Insecure work, subcontracting and outsourcing have increased, raising issues of training and OSH, with higher accident rates. Flexible and teleworking are expanding, presenting new OSH challenges.

Germany is undergoing structural change; there is little data on work organisation. Preventive OSH policy is the basis for sustainable employment, and flexibility is required for SMEs. OSH helps the health of employees and the management of companies, while prevention enhances productivity. Demographic change means adapting jobs, developing qualifications and protecting health. Companies are decentralising, and emphasising learning. Business transformation requires new skills, new forms of work organisation, involving continuous improvement and teamworking, with innovation as a conscious goal, and employer commitment to job security. Contracts varied between West and East Germany, with SMEs and the service sector vital in both. Shiftworking and use of new technologies have increased, changing focal tasks and fields of work.

Sweden has changed, with companies restructuring, and productivity increasing, placing pressure on remaining staff, with less secure working conditions. Traditional exposures need to be monitored, also dealing with new patterns of work. Companies are responsible for OSH for employees. Downsizing changed relations between employees and employers, increasing instability and uncertainty, especially for those with least training. Workers became silent, prone to sickness and accidents; stress and other psychosocial factors are significant. Outsourcing has encouraged virtual companies and temporary partners. Such organisations lack sufficient safety representatives. Women are most liable to on-call roles. Such jobs are more prone to back and neck pain,. Work life balance is vital; women dominate part-time work. Project workers are often highly educated, with high demand and control. Short-term contracts can be monotonous, physically demanding, with little control over work. New technologies can lead to restrictive jobs, such as in call centres, placing new demands on workers. OSH impacts of network organisations are little understood, with stress and information overload, but the possibility of tailored employment contracts. Employment agencies are important in both public and private sectors. Quality of work and work environment is hard to monitor using current OSH services.

Finland has improved working conditions, varied tasks, and increased participation in in-house training. Pace of work, uncertainty, competition and non-permanent employment have increased. OSH supports

preventive approaches, in large enterprises; problems remain with SMEs, agency work, mobile teleworkers, and the self-employed. There is a labour shortage, and pressure on young workers. Maintenance of work ability and workplace health promotion have been introduced to deal with workload and stress, maintain competitiveness, emphasise flexibility and retain motivation. OHS integrates work environment, tasks, health and competence; there are national programmes. Fragmentation of companies raises issues of skill, social contact, work community, trust and co-operation. Women are more likely to have temporary jobs, with gender segregation in work content and wages. It is important to retain older workers, and to address related safety risks. Monitoring and follow-up are difficult. Boundaries between work, home and leisure activities are blurred. Research on OHS implications of new technologies is important, as in telework. Overall, stress, workload and fatigue have increased, with violence at work.

Spain has addressed work organisation, standardising work procedures and encouraging employee participation. Quality is important, linked to employee autonomy, in smaller enterprises. Employee representatives adopt roles beyond health and safety, such as planning, new technologies and choice of equipment. Teamwork and job rotation are increasing, linked to mental demands. Teamworking can reduce autonomy, while increasing shift work and training, with associated psychosomatic problems, insomnia and irritability. Repetitive work in old forms of work organisation can lead to physical problems. Temporarily employed workers are increasing, with greater physical demands, less autonomy, less participation and poorer health, and more accidents. New forms of flexibility in Spanish companies conflict with the legal basis of regulations, collective bargaining and prevention.

France has moved from an agricultural, to an industrial, and now a service society; with increased technology and organisational change. These changes require evaluation, if safety is to be improved. Research programmes and the social partners have roles in the prevention system, and occupational medicine develops to meet new needs. France has pioneered reductions in working hours. Employees face irregular working hours, including shifts and night work. Pace of work can be constrained, with impacts for OSH. Prevention of occupational accidents and diseases involves the social partners at national and European level.

Future trends and challenges to Occupational Safety and Health

Participating EU countries have faced similar pressures; national conditions and trends vary, with different frameworks for OSH, and varying roles of trade unions.
Social and labour market policy, including occupational health and safety policy, must keep pace with the changes in the world of work and be adapted accordingly.

All stakeholders within the occupational health and safety system (employers, employees, regulators, inspection authorities, insurance funds, etc) have to discuss and if necessary, adapt their role and tasks.
There is a growing number of microfirms and small and medium enterprises. In such businesses health and safety knowledge is insufficient and often missing. In addition, traditional accident or ill health risks remain on the agenda.

There is an increase in so-called atypical workers such as part-time, temporary or contract workers and self-employed persons. Many of them fall outside the present health and safety prevention system and/or internal safety organization of the company.

1. INTRODUCTION

1.1 Background to the report

The European Agency's survey of National Priorities and Strategies in 1998 had identified the need of the Member States to manage the safety and health implications of the changing structures of employment following the development of the Information Society. (European Agency for Safety and Health at Work, 1998)The European Commission had addressed the subject in two Green Papers: on the Information Society, and on New Organisation of Work (European Commission, 1998).

In 1998 the European Agency together with the Austrian Presidency of the European Union organized a Conference dealing with the "Changing World of Work" (European Agency for Safety and Health at Work 1998; 2000). The participants of this conference identified the major trends, which characterize the "Changing World of Work":

- There is a growing use of information and communication technology in all sectors.
- As an ever-higher proportion of workers is now employed in the service sector, new burdens arise, such as ergonomic problems in information-intensive work. Increasing part of work in the service sector is about personal contact with people - clients, customers, patients etc. which can lead to increased stress and violence at work.
- There is a shift away from the traditional concepts of work towards new forms, such as telework, self-employment, subcontracting and outsourcing work, temporary employment, small firms etc.
- There is a general trend towards more flexible and irregular working hours, increasing work pace and workload. This has an effect on accident rate and stress at work.
- The development of new technologies resulted amongst others in increased integration and globalization of work. Therefore, national solutions become increasingly dependent on European and international conditions.
- Demographic changes mean that in 2005, more employees will be in their fifties than in their thirties and the number of women entering the labour market will be increasing.
- With the changes in the job market, employees' work possibilities and expectations are also changing. There is an increasing interest in autonomous work, self-realization, staying healthy etc.

The resulting main key challenges of these trends for the health and safety at work systems were listed as follows:

- Social and labour market policy, including occupational health and safety policy, must keep pace with the changes in the world of work and be adapted accordingly.
- All stakeholders within the occupational health and safety system (employers, employees, regulators, inspection authorities, insurance funds, etc) have to discuss and if necessary, adapt their role and tasks.
- There is a growing number of microfirms and small and medium enterprises. In such businesses health and safety knowledge is insufficient and often missing. In addition, traditional accident or ill health risks remain on the agenda.
- There is an increase in so-called atypical workers such as part-time, temporary or contract workers and self-employed persons. Many of them fall outside the present health and safety prevention system and/or internal safety organization of the company.

- New information technologies are producing new types of work and work organization such as telework. This work also tends to be more "precarious".
- Management and structural changes in organizations, such as leaner management affects the health and safety management too. For example, it delegates responsibilities in such a way that it becomes unclear who is responsible for decisions that affect health and safety at work. Organizations may no longer employ specialists on health and safety neither internally nor through external preventive services.
- Health and safety experts, working in in-house or external preventive services, need to alter their previous way of working, for example to respond to managing and co-ordinating health and safety among contractors.
- Enterprises, especially small and medium enterprises, often do not realize that health and safety at work is not only a legal requirement but also a "strategic tool for companies".

To cope with these challenges, it was indicated that it is necessary to collect and distribute the available national and international information, to develop the availability, sharing and utilization of information, especially for small and medium enterprises, and to identify any knowledge gaps. In doing so, all aspect of work have to be addressed. In addition, the continuation of tripartitism was identified as a crucial factor in ensuring health and safety at work. Collaborative actions and a multidisciplinary approach between occupational health and occupational safety experts need to be developed and tested. Regulators as well as inspection authorities have to use new tools and other organizations, for example social partners' organizations, head organizations of small and medium enterprises, to reach companies, especially small and medium enterprises.

In June 1999 another European Conference "The Future of Working Conditions" continued the discussion launched during the first conference "The Changing World of Work". The German Presidency of the European Union organized this Conference with the support of the European Agency for Safety and Health at Work. (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin 2000).

In September 1999 more than 300 experts and policy makers from 31 countries came to Bilbao to examine the link between safety and health and employability. The European Conference, hosted jointly by the European Agency for Safety and Health at Work and the Finnish Presidency of the European Union, demonstrated that the conference theme was a current, high profile subject at both European level and in the Member States and also linked to the changing world of work.

The changing world of work is requiring worker's skills to be adapted more and more quickly to ensure employability. Employability concerns a person's ability to be employed. It has become self-evident that health, coping at work and well being in general is essential to an individual's employability. Healthy and safe working conditions prevent exclusion of workers from the labour market. Such working conditions facilitate that ageing workers stay active in the working life and they increase possibilities to employ disabled people. (European Agency for Safety and Health at Work 1999; 2001)

Shortly, the key findings of the expert sessions were as follows:

- The exclusion of workers from the labour market due to occupational safety and health-related causes undoubtedly had a major impact in human and financial terms at European, national, enterprise, and individual level. For example: In 1996, between 100 and 200 million work days were lost in the European Union because of accidents at work. 600 million working days per year are lost in the European Union for occupational health reasons.

- While the link between safety and health and employability is clear, a new multidisciplinary approach to the provision of qualitative and quantitative information is required. The provision of information is vital to support planning and show the successes of policy implementation.
- Means of prevention can be carried out at State, sector, and enterprise levels. There has to be an exchange of information in Europe on successful prevention strategies.
- A holistic approach to occupational safety and health should be taken at both the strategic planning and local implementation stages of preventive activities. At the strategic planning stage both occupational safety and health and employment policy bodies should be involved and the implementation requires action with social partners and all stakeholders.
- Reintegration and workplace redesign are the keys to unlocking the potential of those who have experienced exclusion from the workplace. Programmes at enterprise, sector, or State level show that reintegration is practical, even in a high-risk sector like construction.
- There is a need to change the perception of those excluded from the workforce; by viewing workers as "differently abled" rather than "disabled", most people become employable.
- Health and safety and rehabilitation have to be integrated into the mainstream of employment policy.

The European Agency has collected and published information about the state of occupational safety and health in the European Member States (European Agency for Safety and Health at Work 2000). The Focal Points of each EU Member State were asked amongst other issues to indicate specific topics, which are considered as emerging risks in several areas of concern. Emerging risks are understood as new issues that can have a negative impact on health and safety of employees that are expected to be in focus in the individual Member State. The areas of concern for which the Focal Points identified specific topics and indicated their considerations are shown in the table 1.

Table 1. The most frequently identified topics related to changing world of work in the EU Member States (European Agency for Safety and Health at Work 2000)

AREA OF CONCERN	TOPIC	NUMBER OF RESPONSES
Changing Work Patterns Changes in Labour Force	Changed work organization	8
	- Increase in number of tempo rary workers	5
	- Increase in female employees	
	- Ageing workforce	4
Particularly Sensitive Risk Groups	- Young workers	4
	- Older workers	8
	- Disabled workforce and age management	6
Clean and Safe Production and Products	Cleaner technology may introduce new risks	5
Safety and Health Management	Implementation of safety and health management	2

AREA OF CONCERN	TOPIC	NUMBER OF RESPONSES
Psychosocial Aspects	- Stress - Violence	8 6
Ergonomics	- Manual handling - Repetitive strain	8 6
Safety Risks	New technology	3
Chemical Risk Factors Physical Risk Factors	New chemicals being used - Noise - Electromagnetic radiation	 7 5
Biological Risk Factors	New biological and genetic engineering procedures	5
Sector Research	- Health and social work - Construction	6 5

Based on this study, some common consolidated considerations can be made:

- Workforce needs training to keep skills up to date.
- Preventive occupational health and safety system has to tackle special needs of particularly sensitive risk groups.
- Occupational health and safety personnel need methods to survey and handle psychosocial risks, e.g. burnout.
- More monitoring and publicity campaigns are required.
- Regarding chemical risk factors health risks are unknown in many cases.
- Concerning biological risk factors greater awareness and more safety courses are necessary.

In 2000, the European Foundation for the Improvement of Working and Living Conditions (Dublin) conducted it's third European Survey on Working Conditions. In this survey, working conditions in general were surveyed for a representative sample of the workers of the 15 European Union member states. The general conclusion by the European Foundation was that working conditions are not improving over the years (Merllié & Paoli, 2001). As part of the Swedish Presidency of the European Union, the Swedish National Institute for Working Life organized the conference on Work Life 2000 - Quality of Work in January 2001. More than 60 expert workshops were organised as preparation phase for this conference during 1997-2000. Changing world of work has been one important topic in these activities. (Ennals 1999-2001, Skiöld L, 2001)

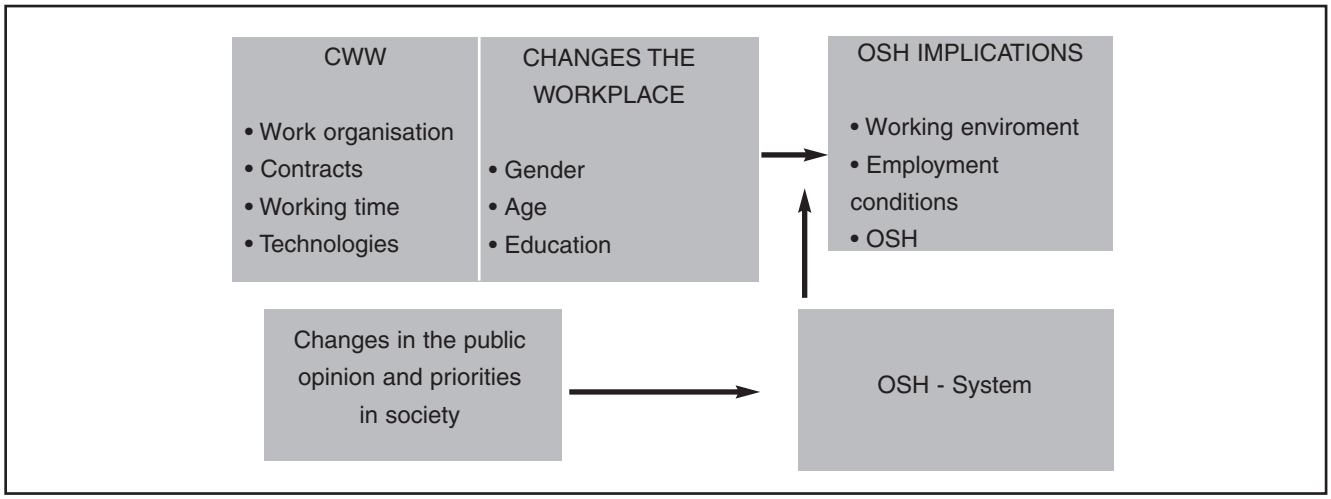
1.2 Interpretation model

The Agency's Topic Centre on Research - Work and Health (TC/WH) conducted a pilot project during 1999 on this subject to develop an interpretation model and to investigate which research results and needs

exist. (Topic Centre on Research - Work and Health 1999) This pilot project was limited to the situations of the Netherlands and Sweden.

A specific interpretation model was developed by the authors of the pilot report. This model gives an insight into how to identify research needs in the different country research programmes and results. (see figure 1.1) The model was presented and discussed during the Swedish Work Life 2000 workshop in January 2000, which was organised in Bilbao, Spain (Skiöld L, 2000).

Figure 1. General framework for the analysis of the changing world of work.



The main conclusion from the pilot report was that productive society is changing profoundly. Concerning the impact on OSH, the following issues were presented:

1. the health situation in our societies is not improving dramatically, on the contrary;
2. the question is whether effective OSH systems have an impact on the health situation;
3. the future of OSH does not seem promising, in the sense that the ageing workforce will be subjected to stronger, and more lasting, negative effects from work;
4. OSH systems have increasing problems in finding (qualified) people prepared to do tasks. Public funding of OSH systems is insufficient.

It was also concluded that the Information Society may have advanced from a technological point of view, but it does not make OSH superfluous. Good working OSH-systems are necessary for a safe and healthy Information Society.

These preliminary results were discussed and commented upon by participants of the Swedish Work Life 2000 workshop. Comments were made on the terminology used, the approach applied, the separate variables, and the dimensions used in the model. These comments can be summarised as follows:

- Terminology: the current model is not sufficiently oriented to healthy work.
- Approach: there is a need for a holistic approach. The current approach is too mono-causal. The participants see the different relationships in the model as more dialectical in nature. A second remarkwas that the descriptive model should change into an explanatory model. The scope of the report should be broadened, and in two directions. In the future, more nations should be included in the analysis. The element of time should come in to the framework.
- Variables, dimensions: some participants wanted to include new dimensions in the current report. The following topics were suggested: environmental issues, SME's, participation. A separate question was asked about the cost effectiveness of OSH systems.

1.3 Goal of the report

This report aims to provide up-to-date research information on OSH implications of the changing world of work in the following EU Member States (The Netherlands, Belgium, Germany, Sweden, Finland, Spain and France). The report deals with the following aspects of the changing world of work and their impacts to occupational safety and health:

- new organisational forms,
- new contractual relationships and patterns of working time,
- new technologies, and
- changes in the workforce.

The goals of this report are twofold:
1. to consider what changes are actually occurring and if these changes are common or divergent for these countries.
2. to consider what are the research findings on the OSH implications of these changes.

1.4 Structure of the report

The report is structured as follows. First (chapter 2), a general overview is given on different aspects of the changing world of work and the implications on occupational safety and health. Second (chapter 3), each of the national reports are presented. In the final chapter (chapter 4) the findings are summarised, and conclusions presented. This last chapter aims to answer two questions:

- what are the gaps in research knowledge, and what research is needed in order to understand OSH implications of the Changing World of Work?
- what can be learned from the state of the art at this moment, for government and social partners, and
- what challenges can be defined?

2. Emerging trends in europe

2.1 Introduction

This chapter looks at major developments in the field of the Changing World of Work and the implications on occupational safety and health. These main developments, as identified in the current literature, are presented. In the next chapter, major developments in different European countries will be presented. The following developments are analysed in this chapter:

- New forms of work organisation;
- New contractual relationships and use of working time;
- New technologies;
- Changes in the workforce;
- Changes in occupational safety and health systems (OSH).

2.2 New forms of work organisation

2.2.1 Introduction

Work research has always had considerable interest in new ways of organising production organisations. Companies experiment in several ways with their production structures, control structures and work organisation. These experiments are called 'new' because they deviate from what used to be considered the 'optimal' way to organise production and services. In the past, maximal division of tasks was seen as the most efficient way of organising tasks. This meant that organisations opted for a centralised control structure, and as divided a work organisation as possible. The consequence of such an organisational solution is that top management is overloaded with all sorts of demands. New forms of work organisation are intended to reduce this division of labour, and decentralise all kinds of responsibilities. Several solutions are on the agenda:

- Teamwork;
- Decentralisation of supportive tasks, such as quality and maintenance;
- Job enlargement, job rotation and interdepartmental job rotation;
- Knowledge management;
- Teleworking;
- Virtual networks.

Organisational renewal is seen as an important means of improving innovation within companies, market flexibility of companies, and quality of work (De Man, 1997; Jacobs, 1998). Governments are advised to focus more on stimulating this kind of organisational renewal (Van Amelsvoort, 1998). Information on diffusion, and the way such new organisational forms operate, is not readily available (Peeters et al, 1998).

This chapter looks more deeply into some of these developments in industry.

2.2.2 Teamwork

In teams, tasks are assigned to groups of workers. Team workers are allowed to take care of planning, division of tasks and checking their own tasks. The advantage of such a model is a reduction in control

demands at top managerial levels of organisations. Since the end of the 1950s, teamwork has been promoted as a measure to improve the capability of organisations to adapt themselves to market demands for flexibility (Emery and Trist, 1960). The main reason for this is that such teams do not require the interference of top management in each decision, which is taken. To be able to take the right actions, it is necessary that such teams are built around clearly defined products or services.

In considering the practice of teams, a distinction is made between teamwork which allows a lot of autonomy for the individual members of such teams, and a second form of teamwork in which a team manager has most of the controlling power. The first form is known as sociotechnical teams; the second form is known as the Japanese or 'lean production' version of teamwork (Womack e.a., 1990; Van Amelsvoort, 1994). The prediction is that these two versions of teamwork will show different consequences for quality of work.

2.2.3 Integrated Management Systems

Another important field, which has shown a lot of renewed interest, is control in companies, much of which is covered by the term 'Integrated Management Systems'.

A first important trend is the important amount of attention given to Quality Management. A lot of companies, mainly those with standardised services or production, have changed their quality procedures, in such a way as to make them conform to the rules of the ISO-9000 quality certification. This International Standard Office norm contains a whole set of rules, setting out the best way to control quality within production. Companies whose internal procedures conform to this norm, and are able to maintain this conformity over time, can receive a ISO 9000 certificate. Such a certificate helps these companies to prove, to their suppliers and customers, that their production and services are quality proven. In several sectors, it is not possible to be a supplier without such an ISO certificate. Implementation of an ISO certificate can be seen as a control support measure. With an ISO certificate, companies reduce their freedom to do as they please in their production. In line with Quality Management, a lot of attention is directed towards Safety Management. The introduction of the Safety Management BS standard is proof of this development.

A second important trend is the introduction of Just-in-time (JIT) delivery procedures. JIT means that a supplier delivers products to its customer only when the customer requires this product. Such a delivery policy helps to prevent stockpiling in the production or service chain. Stock costs can be reduced. JIT-delivery requires a lot of discipline, as well from the supplier as from the customer. The two production systems have to be well synchronised. There are two different kinds of JIT-systems. A first system is confined to the internal operations of one company. Such a JIT-system requires that all production or services processes are well attuned to one another. Each department delivers only what is required by the following department. The Japanese automotive industry developed a system with cards, which helps to co-ordinate such a production system. The card is called a kanban, and the delivery system is also called kanban.

This card system is also used in the second JIT system, which deals with supply relations between companies. The processes in such a delivery system are the same as the company-limited JIT-system, but the system is more complex. Within a company, orders can be given by the management. Between companies, all relations have to be governed by contracts or by trust. In these JIT systems, more and more use is made of electronic means, such as EDI (electronic data interchange) and the internet, to replace the kanbancards. These electronic means make it possible to gear the different planning and ordering systems closely to each other. Companies react to each other in an automatic way. In the same way as quality systems reduce the freedom companies have to do things, JIT-systems reduce the decision latitude of companies.

2.2.4 Decentralisation of responsibilities

Decentralisation of responsibilities to workers is another item of interest in modern companies, and leads to a reduction of control overload in organisations. Lower organisational levels take care of part of the burden of decision making. Such measures are somewhat contrary to the ISO and JIT measures, which have just been discussed. ISO and JIT support control by top management because they help to standardise internal processes in companies, which helps to render all activities in the company much more transparent to management and workers. If such measures are applied, control covers all details of operation in a company. Top management is not satisfied by controlling only the output of production or services. Such control is found necessary, because it is seen as the sole way in which fluctuating demands from the market can be incorporated into production. . Decentralisation renders direct processes less visible to top management. This is not seen as a disadvantage, because these processes were already hard to control by top management. In most cases, such decentralisation coincides with the implementation of teamwork.

2.2.5 Knowledge intensity of production and services

A fourth development in industry and services is the rise in knowledge intensity. Knowledge intensity means two things: the required educational levels of workers are rising, and the complexity of tasks is increasing. Three reasons are put forward to explain this development:

- Technological development leads to more complex work: new technology makes production more capital intensive. More expensive investments require better, and more continuous, production control. Employers need to employ workers who can handle technology with more care, and with more insight in how this technology operates. This is true for traditional industrial sectors, as for services in which expensive information and communication technologies are used.
- The steady supply of better educated workers makes it easier to render work more complex: Allaart and Kunnen (1995) have pointed out that next to these technological developments, there are also labour market changes which lead to more knowledge intensive work. The steady supply of highly educated workers supports increased demand for such workers.
- Services are becoming more knowledge intensive because of more customer orientation, and more use of information technology: the shift in society toward more knowledge intensive services is a final reason for more knowledge intensity. Several services can only be executed with more knowledge and education. Such a shift in services changes the way services are delivered in modern society (De Vroom, 1990).

Development toward more knowledge intensive production and services is also a policy goal for governments (e.g. the Dutch Ministry of Economic Affairs, 1997). Governments expect that their local industries and services can only stay competitive if they orient themselves to more innovative products and knowledge intensive production or services. Only such a reorientation can help industries and services cope with their relative labour cost disadvantage.

2.2.6 Telework and virtual companies

Another development is the rise of teleworking practices. The main concept is that workers can stay at home, and do their work from there. The growth of new technologies (internet, intranet, extranet) also makes teleworking more accessible for many companies, for example through the facility to consult, and process information from home, over the Internet and through dial-up facilities, etc.

Different forms of teleworking are possible:
Telework is now a political issue. Governments are aware that teleworking can provide a solution to congestion problems and unemployment in former industrial regions. The liberalisation of the telecom markets means that more workers have access to (relatively) cheap communications means, such as cell phones and Internet connections. These preconditions have made it possible for telework to spread quickly in different countries.

The rise in telework has also been a precondition for the development of virtual companies. These are companies, mainly in the ICT-sector, which use teleworking, telesales and tele-collaboration

2.2.7 New contractual relationships

Another set of measures which is used to react to rapid changes in the market, growing world wide competition and changes in organisational models, concerns contracts and working time arrangements. Companies feel the need to adapt their personnel levels to constantly changing demands. There are several ways of doing this:

1. working time can be reduced to avoid production loss and to optimise use of the internal labour force.
2. temporary contracts can be used to fill in for jobs of sick employees, to perform work with a short peak or seasonal character, but also, in situations where the future is uncertain, to avoid firing permanent personnel. Companies can look at flexible employment relations on issues such as: access to training, upward or downward mobility, career perspectives, labour market position and skill development.

Cross-national research in this field is often difficult to carry out, because of different meanings of the specific concepts between countries, and strong political debates that go with the issue of flexible labour.

Over the past 30 years, labour market flexibility has been viewed as a solution to rising unemployment, but also as an attack on social standards; policy makers have considered a variety of measures to increase labour market flexibility (Brodsky, 1994). There is no research evidence that flexibilisation of labour markets leads to job creation and lower unemployment. Several authors argue that flexibilisation leads to more segmentation, and that so-called 'atypical' jobs can be seen more as a 'trap' than as a solution to unemployment (Delsen, 1997; ILO, 1997).

As unemployment rates are becoming more diverse in the European Union, there is a common trend in the European Union towards a growing proportion of part-time and non permanent jobs. This trend goes hand in hand with the growth of services within the overall employment structure. In 1996 precarious paid employment (fixed term contracts and temporary work) accounted for 15% of paid employment in the European Union (Letourneux, 1998). In the last few years the growth of non-permanent contracts seems to have been less steep. The growth in part time employment seems to have been greater, partly because of the increasing labour market participation of women (Goudswaard and Andries, 2001).

One of the forms of precarious employment is Temporary Agency Work (TAW). TAW has increased rapidly in almost all European countries, as part of the general movement towards increased flexibility in employment. For some countries, this occurred from the mid-1990s or earlier; in others even more recently. However, this type of work still comprises quite a small proportion of total employment in Europe, rarely exceeding 2% (see Michon, 2000).
Together with this growth of TAW in Europe, the European Commission has acted to regulate this form of employment relationship at European level (see Michon, 2000). In 1982 the European Commission issued a draft Directive on temporary work which covered both TAW and fixed-term contracts. The proposal was never adopted. In 1989 the Commission proposed three Directives on "atypical work", which covered, among other forms of employment, fixed-term contracts and TAW.

In 1995, the Commission launched broad consultations of the EU-level social partners on atypical work issues ("flexibility in working time and security for workers") under the Social Policy Agreement annexed

to the Maastricht Treaty. Negotiations between the social partners so far have led to the following agreements:

- Framework Agreement on Part-Time Work (1997): which aims to eliminate discrimination against part time workers in the area of employment protection, and make this form of employment more attractive to employers and employees alike (see www.eiro.eurofound.ie/1997/06).
- Framework Agreement on Fixed-Term Work (1999): which aims to enshrine the principle of non-discrimination between open-ended and fixed-term contract workers, and to establish a framework to prevent abuse arising from the use of successive fixed-term contracts (see www.eiro.eurofound.ie/1999/01).

The table below show the difference between the different member states in employment status and duration of work, based on the 1996 European Survey on Working Conditions (Source: Goudswaard and de Nanteuil, 2000).

Table 2. Employment status in the EU (static distribution, 1996)

COUNTRIES	PERMANENT CONTRACT (%)	NON PERMANENT (INCL. FIXED TERM AND TEMPORARY AGENCY WORK) (%)	FULL-TIME (%)	PART-TIME (%)
B	87	13	84	16
DK	84	16	78	22
WD	90	10	83	17
EL	82	18	96	4
E	60	40	92	8
FR	78	22	83	17
IRL	86	14	87	13
I	89	11	93	7
L	91	9	92	8
NL	82	18	62	38
A	91	9	86	14
P	84	16	95	5
FIN	83	17	89	11
S	88	12	75	25
UK	91	9	75	25
EU	85	15	83	17

Source : Goudswaard & de Nanteuil, 2000, table 7.

Negotiations over an agreement on Temporary Agency Work were planned for 2000

This trend towards flexible contractual relationships has an impact on working conditions and health. There is some research information available on this relationship between employment status and OSH. At a European level, working conditions, in particular physical constraints and conditions of employment, of

precarious workers are worse than those of permanent workers. More work in painful positions, with more exposure to noise, more repetitive tasks and movements and less skill development, less access to training, less autonomy over their work and time and less access to participation (Letourneux, 1998). As a result of this, more musculoskeletal problems and fatigue are found among precarious workers (Letourneux, 1998; Benach and Benavides, 1999). Workers with a permanent contract, on the other hand, are more exposed to high speed work and show more stress and mental health problems (Letourneux, 1998; Benach and Benavides, 1999).

As the overall working conditions of employees do not seem to have improved in the last years (Merllie and Paoli, 2001), the data of the European Foundation show that differences in physical demands between permanent en non permanent employees can mainly be explained by differences in the sectors they are working in. Non permanent employees still do have less control over their job and their working time and work in less skilled jobs (Goudswaard and Andries, 2001).

There has been little research into the question how workers adapt to the new situation of flexibility and insecurity. Some research indicates that the feeling of insecurity can also be experienced by permanent employees as a result of the process of outsourcing and subcontracting.

2.2.8 New patterns of working time

New working time patterns arise, because of the entrance of 'new' groups of workers on the labour market (women in particular). When looking at different types of working time arrangements, the use of part-time work catches the eye (see the table above). Next to non-permanent jobs, part-time labour has been the engine of employment growth in some countries (see also ILO, 1995).

New working time patterns arise as a result of company strategies responding to the demands of the 24 hours economy. It has become more and more an 'art' to plan the workforce around tight schedules and peaks in production or services (Tijdens, 1998). Not all authors agree on the widespread emergence of the 24 hours society. There may be large differences between countries in the impact of the 24 hours society on working time. Here also cross-national comparisons are difficult, because of different meanings of the concepts.

Time issues have come to the forefront of the political agenda, due to factors such as the increasing use of (voluntary and involuntary) part-time work, the evolution of different working time patterns, and some initiatives aimed at reducing working time (see also ILO, 1995; IIER, 1997). An important factor, related to the increase in the diversity of working time patterns, is the increase of work intensity in all countries in Europe. Some effects of this increased work intensity are the extended practice of weekend work, the increase of working time schedules with irregular and less predictable working hours, and the use of excessively short (involuntary) part-time work or excessively long working hours (involuntary over-time). Development towards more work intensity and time unpredictability does not seem to go in hand with an increase in workers autonomy over work (see for instance European Foundation, 1994 and 1998; Breedveld, 1998; Goudswaard and de Nanteuil, 2000).

There is still little research on the exact link between new working time patterns and OSH-issues at the European level. There is some research on the link between part time work and OSH implications. Even when differences in occupations and sectors are taken into account, part time employees seem to have more favourable ambient working conditions, but they have less control over their working time and work in less skilled jobs (Goudswaard and Andries, 2001).

2.3 New technologies

New technologies have long been investigated by numerous researchers. Frame 1 contains a list of concepts and abbreviations of such new technologies. The focus of this technology research has somewhat shifted through time. In the eighties, micro-electronics were seen as the new technology. Researchers looked into the effects of mainframe computers, new production and stock control programs (e.g. MRP, DRP) and the diffusion of 'hard automation' (robots, NC- and CNC-control) on the levels of employment and on quality of work. Currently, research has studied the rise of information and communication technologies (ICT) in employment and work. The mainframe computer has been replaced by computer networks, electronic data interchange and the internet. These new technologies make it possible to develop permanent contact between the worker and his work situation. An unexpected outcome of these new technologies is that they have organising capabilities. ICT is not solely oriented at automating all sorts of operations, but helps to organise processes and operations. The most important new technologies are:

- Workflow/DIS: workflow software helps to automate the way administrative organisations distribute tasks, execute tasks and control tasks. Document information systems (DIS) help to digitalise the whole administration and correspondence, and make all this information accessible from a computer terminal (Eppenhof, 1996; Poyssick & Hannaford, 1996; Grefen, 2000).
- ERP: ERP stands for Enterprise Resource Planning and is a new development in MRP and DRP systems at the company level. In the past, such systems only supported stock control; ERP has the capability to automate the whole administration and operations of companies. In such new systems, all company operations and product characteristics are parameterised, which leads to a strong standardisation of c ompany practices (Laudon & Laudon, 1996; Koorevaar, 1997).
- Internet, intranet, extranet, EDI: these technologies help to automate contacts and supplier relations in the distribution channel. These technologies have helped to expand the reach of ERP to suppliers. Extended ERP is called X-ERP.
- Mobile IT solutions: these technologies help to bring more communication possibilities closer to the customer or worker. One solution is WAP (wireless application protocol) which makes it possible to browse the internet for certain information.

The technical precondition for such technologies is the existence of computer networks in companies. Companies need to invest in such new technologies.

Frame 1. List of explanation of abbreviations
MRP = material resource planning
DRP = distribution resource planning
NC = numerical control
CNC-control = computer numerical control
ICT = information and communication technologies
EDI = electronic data interchange
DIS = documentary information systems
ERP = enterprise resource planning
WAP = wireless application protocol

These technological developments have been recognised by several authors, and analysed in depth in the literature. It is striking that there is only limited data on the diffusion of such new technologies. Lack of data makes it difficult to assess possible negative effects of ICT on the functioning of organisations. For example, little is known on how ICT influences the performance of organisations. The Dutch Ministry of Economic Affairs has recorded that the costs of implementing ICT are very high, and that productivity improvement, mainly in the service sector, is questionable (Dhondt et al, 2000; see also Brynjolfsson et al, 1996). It seems that ICT can only lead to improvements if organisations give enough attention to organisational improvement, training and schooling, and more co-operation within organisations (p. 22).

Another explanation is that top management are not committed to ICT. Investments in training and education are not high enough. Such investments are required if a company wants to develop a competitive edge with ICT.

2.4 Changes in the workforce

In the last couple of years, most of Europe has seen a dramatic drop in unemployment. This is seen as a blessing for national economies. The optimism, which followed this development, must not obscure the fact that the European workforce has changed in composition, and will continue to change in the next fifty years. It is important that the different economies find ways to account for these changes. Three major shifts can be seen.

The first is the ageing of the workforce. In all European countries, the average age of the workforce is rising. The category of workers in the category above fifty years will continue to grow. The number of younger workers will shrink so there will be an imbalance between the age groups. The policies from the last decade, aimed at early retirement of older workers, will have to be reversed, so that the traditional pension age of 65 years may have to be altered. The ageing of the workforce will mean that policies for upgrading the workforce will be rendered more difficult.
A second trend is the feminisation of the workforce. In most countries, participation rates of women have risen quite steadily. Societal changes have brought these changes about. Classical gender divisions will change, but it is not clear to what degree. Differences will remain between jobs for men and women, in the use of different contract forms, and in opportunities to climb organisational hierarchies.

A third trend is immigration of new groups to the European economies. This immigration will be responsible for rejuvenating the workforces to some degree. At the same time, this immigration will mainly consist of very poorly trained and educated workers. These workers are mostly endangered by changes in the economies to more knowledge intensity.

2.5 Changes in the OSH system

OSH-systems in Europe are built on the principle of prevention. Most of these systems have been adapted to follow EU framework guidelines. It remains unclear to what degree these changes are sufficient to deal with the changing world of work.

The changing world of work leads to new OSH-implications. According to some research, new organisational forms and contractual situations lead to higher job demands (see for overview of literature: Landsbergis e.a., 1998). New possibilities for job control are not sufficient to dampen the effect of these higher demands. Other research is more optimistic about the risks of new organisations and contract situations. It is unclear how workers adapt to the new situations of flexibility and insecurity. The changing world of work leaves new groups of workers at risk. Older workers have more difficulty in adapting to ever changing job demands. Knowledge intensity of production and services make it difficult for poorly educated workers to find lasting job situations.

In the OSH-literature, prevention is seen as an innovative strategy to bring quality of work in line with new working conditions. The key motive behind such a policy is the procurement of jobs and working requirements, which will secure employment for all employees, until the end of their working life. This includes the development of improved integration of those outside working life into the job market. It is unclear how such prevention policies are used in different EU countries. It is not clear to what extent current OSH systems are capable of dealing with changes in the world of work. This report deals with these questions.

3. THE STATE OF THE ART IN RESEARCH ON OSH IMPLICATIONS OF THE CHANGING WORLD OF WORK IN SOME EU COUNTRIES

3.1 The Netherlands

3.1.1 Introduction

This chapter gives an overview of the main elements of the changing world of work in The Netherlands. The Netherlands has shown some major technological and economic changes in the labour market. Recent surveys have given insight into the main areas of change: new organisational forms and measures, new forms of contractual relationship, new patterns of working time and new technologies. Each topic is dealt with in the same way. An overview is given of the general situation of the topic and an assessment is made of the occupational health and safety (OSH) implications. These changes take place in a changing labour market.

3.1.2 Changes in the Dutch workforce

In the nineties, the labour market participation has increased, mainly among women. This increase in labour market participation will continue. For several years the growth in the Dutch employment has been larger than the growth of the workforce (Ministerie van Sociale Zaken en Werkgelegenheid, 2000; Sociaal Cultureel Planbureau, 2000; Sociaal Economische Raad, 2000). This has led to an increasing shortage on the labour market. The ageing workforce has an negative impact on the growth of the Dutch workforce. Even with a continuing increase in the labour market participation of women, the growth in the workforce will decrease (De Beer, 2000). The number of vacancies continues to be high. On the other hand, because of an upgrading of employment in general, there is a number of low educated unemployed, with less opportunities to find work (Ministerie van Sociale Zaken en Werkgelegenheid, 2000; Sociaal Economische Raad, 2000). Government and social partners policy is directed towards increasing labour market participation (or entrance) of immigrant groups, lower educated, unemployed, disabled with financial investments in, for example, education and subsidised work.

Labour market participation of older workers (above 55) is being stimulated with age specific personnel management and flexible pension schemes. Labour market participation of women (and the participation of men in care tasks) is stimulated by government policy in the field of work-life balance, such as the Law Adjustment Working Time, and child care facilities (Min. of Sociale Zaken en Werkgelegenheid, 2000).

3.1.3 Changes in the Dutch OSH system

The Netherlands has been quick in changing its OSH-system to new European rules (1992). Occupational Health Services are now independent organisations, which help and advise companies to implement better occupational health policies. Even with these changes, there is still a high rate of work disability in The Netherlands. After some years, in which a dramatic drop of this disability rate was seen, this rate is on the rise again. With about 8% of the workforce in disability systems, there is continued pressure to change company policies to better working conditions. These changes are quite slow. Current works councils and occupational health services are incapable of containing the high pressures of work exerted on workers. At the sectoral level agreements are being set up between government and social partners to improve

specific OSH risks (arboconvenanten). At the moment six of such agreements have been made and 23 are in the process (Ministerie van Sociale Zaken en Werkgelegenheid, 2000).

3.1.4 New forms of work organisation

The Dutch organisational scene has changed significantly in the last decade. Companies have experimented with teamwork, ISO 9000-quality certification of companies, Just-in-time (JIT) delivery systems, work organisational measures and knowledge intensity of production.

3.1.4.1 Teamwork

Some 21% of Dutch companies use some kind of teamwork. The percentage varies between different sectors. Teamwork appears to be most common in the health care sector (36% of companies). Mainly bigger companies report the presence of teamwork. About 40% of the companies with more than 100 workers have teamwork. In smaller companies, teamwork is a more limited phenomenon. Half of teamwork companies decentralise central production responsibilities to workers. About 36% of companies only decentralise very few responsibilities to workers. 14% of teamworking companies do not transfer any responsibilities to workers. This last group of companies can be seen as companies with 'lean production' teamwork. Most teamworking companies show high levels of decentralisation. Teamwork percentages remain at the same level over the years.

3.1.4.2 ISO-9000 and JIT

Twelve percent of Dutch companies report an ISO-certificate; JIT is applied by about 7% of the companies. Both measures are applied together in 2% of the companies, but are not applied in the same way in the different sectors: the process industry, metal industry and construction are front runners in the use of ISO. More than 40% of companies in the process industry are ISO-certified. Quality of products and processes are of utmost importance in this sector. ISO-certification is almost non-existent in the non-commercial services, restaurants/hotels and the health care sector. JIT is less predominant in the Dutch industry. It is only of importance in sectors in which transport or supply relations with other industries are necessary: the process industry, retailing, wholesale trade and transport-distribution-communication. Both ISO and JIT are practices, which are more common among larger companies (more than 100 workers). Nearly half of the companies with more than 100 workers possess an ISO certificate and about a quarter of these companies have JIT programmes. This makes it clear that these practices have a significant impact on part of Dutch industry and services.

3.1.4.3 Decentralisation of responsibilities

Companies can make the shop floor responsible for pricing policies, for investments in the technology policy, for innovation of products or services, for planning and control of work, and for teamwork. Decentralisation in Dutch companies is more commonly applied to such subjects as the team, planning work. Decentralisation is less common for those elements of company policy, which have to do with financial decisions. These decisions are still the prerogative of top management. Decentralisation of innovation coincides with decentralisation of responsibilities concerning investments and pricing. Decentralisation of work planning is correlated with decentralisation of responsibility for the work team. An explanation for this result is that top management is not eager to delegate any responsibility to do with means of renewing the company. Decentralisation is more common in the service sector. The front-runner is the wholesale trade; next come the commercial services, health care and the non-commercial services. Agriculture, construction and the transport-distribution-communication are accustomed to centralised decision making.

3.1.4.4 Knowledge intensity of production and services

About half of Dutch companies can be identified as knowledge intensive producers or services. Knowledge intensity appears to be quite high in service sectors. More than 70% of companies in commercial services, health care and wholesale trade show more than half of their workers with higher secondary education or university degrees. Industrial sectors do not possess as high a percentage of highly educated workers. The food industry and construction come out as the least knowledge intensive production. In about half

of all companies, regardless of firm size, half or more of the workers have higher secondary education or university degrees.

3.1.4.5 Summary: new production concepts in The Netherlands

These four organisational measures are correlated. When combined, four different production concepts can be identified:

1. lean production: these are the companies which are highly standardised and centralised, the main users of ISO-9000 and JIT;
2. classical Taylorism: these companies are mainly centralised, but use ISO and JIT;
3. sociotechnical production concepts: these companies are highly decentralised and use different new organisational forms;
4. intermediate production concepts: these companies are at the same time concerned with organi sational renewal and standardisation.

Nearly half of the Dutch companies use a sociotechnical production concept. Nearly 40% of the companies are structured according to a classical Tayloristic production concept. The dominance of the sociotechnical production concept makes clear that decentralisation is important for a lot of companies. With such attention to work organisational renewal, there are important chances of good quality of work in these companies. This result makes it clear that organisational renewal has found good ground in The Netherlands. These results also show that Lean Production is an exceptional production concept among Dutch companies. Lean Production is more common in the process industry and less common in the metal and food industry and in the wholesale trade. Sociotechnical concepts are more common in the sectors of paper-wood-furniture, restaurants/hotels, commercial services, health care sector and wholesale trade. Intermediate forms can be found in the process industry. Classical Taylorism is still dominant in industrial sectors, but also in non-commercial services. Lean Production is used in a lot of larger companies (>100 workers). Small companies use more classical Taylorism as their organisational concept. Sociotechnical concepts are used in all sizes of firms. Larger companies use more intermediate concepts. Apparently, larger companies have more need for standardisation.

3.1.4.6 OSH Implications of new forms of work organisation

Different new forms of work organisation and measures have implications for required qualifications and skills of workers. In most studies, these new organisational measures require more qualifications from workers. Teamwork is associated with more skilful work, and more job enlargement and enrichment measures. These measures do not lead to higher educational requirements, or more training than workers in non-teamwork settings. This last result is somewhat strange, because workers in teamwork report more discrepancies between their educational level and the demands from work. Teamwork-workers find that their educational level is too low for the tasks they have to carry out. Such a result should mean that in teamwork-companies, demands for training should be high (Kraan et.al., 2000).

ISO companies are more training-oriented than non-ISO companies. Workers in JIT companies have more short cycled work. The upside is that ISO and JIT companies require some quite skilful work and high qualifications. Neither measure automatically leads to a degradation of work.

Workers in more knowledge intensive companies report higher levels of professional training, but also other forms of training such as computer training and training in different social skills. Work in these companies is more mentally demanding, but at the same time workers experience higher degrees of autonomy than workers in less knowledge intensive companies. Workers in less knowledge intensive companies report more job enrichment measures. It is unclear why this is the case.

In general, we see that workers in companies with new organisational forms report more improved working situations and higher qualification demands. Even in companies, which have ISO programmes, more training is given to workers. Only JIT companies seem to create more short cycled work than other companies.

3.1.5 New forms of contractual relationships

3.1.5.1 Changes in the workforce in relation to new contractual relationships

A large proportion of the growth in jobs in the past decade is due to a growth of non-permanent and part-time contracts (Dunnewijk and Lammertsma, 1999; Baaijens, 1999). Research shows a growth of the percentage of flexible contracts from 12% in 1986 to 15.5% in 1996 (Kunnen et al., 1997). Dunnewijk and Lammertsma (1999) calculate, on the basis of CBS-data (CBS Arbeidsrekeningen) a mean growth of 7.3% in the period 1987-1997, while full-time permanent contracts only show a growth of 0.2%. They calculate that the growth of the employment in the period 1987-1997 is 28%, due to the growth of flexible employment relations. However, due to the labour market situation, the growth of flexible contracts has decreased. Current employment growth mainly contains permanent jobs (both fulltime and part-time) (Van Elshout and Eijkhout, 2000).

Research has been done into characteristics of the flexible and non-flexible workforce (Goudswaard et al, 1999 and 2000b; Baaijens, 1999; Boelens, 2000; Dekker and Dorenbos, 1997). Workers with a flexible contract are more often female, young and have a lower education, than workers with a permanent contract.
While approximately 94% of male employees have a permanent contract, only 85% of women work with a permanent contract (this percentage includes both full-time and part-time contracts on a permanent basis, Goudswaard et al, 2000b). The percentage of employees with a non-permanent contract is highest among employees younger than 24.

The difference between men and women is even more strongly shown in the case of so called zero-hours or min-max contracts, work on demand, while there is not so much difference between men and women with fixed term contracts, or temporary agency workers (Goudswaard et al 1999).

3.1.5.2 The use of new contractual relationships in Dutch companies

Although the percentage of employees in the Netherlands that are employed through non-permanent contracts has grown, there is still a high percentage of companies that do not use any non permanent contracts. Goudswaard et al (2000b) calculate that the majority of the employees in companies have permanent employment status (77,1%), or have a fixed term contract with the intention to become permanent (7,8%). Large companies make relatively more use of temporary agency contracts (6% of the employees in the 100+ companies). Smaller companies make relatively more use of different contracts on demand/call, or the so-called 'zero-hour' or 'min-max' contracts (9.5% of the employees in the 10- companies) (Goudswaard et al, 2000).

There are large differences in the use of flexible employment contracts between different sectors (Goudswaard et al, 2000b; Dunnewijk and Lammertsma, 1999; Dekker and Dorenbos, 1997).
There seem to be three groups of companies: the first group, mostly companies in the hotels/restaurants and the non commercial services, use high proportions of non permanent contracts; the second group, mostly in the construction trade and the wholesale trade, use mainly permanent contracts; the third group of companies, for example the process industry, use non permanent contracts, but not to such an extent.

The gap between companies that employ only permanent employees (40% of the companies), and companies with more than 25% of their workforce with a non permanent contract (32,4% of the companies), seems wide (Goudswaard et al, 2000). Comparison with older research information shows an increase in the amount of companies that work with non permanent contracts over the last few years (Bolhuis, 1996).

Companies can use several strategies for flexibility. Research shows that there are (at least) three different strategies, used separately or in combination with one another by Dutch companies: a short term quantitative strategy of flexibility, based on temporary agency contracts; a longer term quantitative strategy, based on the use of fixed term contracts, work on call and working time arrangements; and a qualitative strategy of flexibility (Goudswaard and Batenburg, 2000).

At the moment, most Dutch companies want to increase their qualitative flexibility, rather than their external quantitative flexibility (Goudswaard, 2000d). Due to the necessity for company innovation, upgrading of employment and the shortages on the labour market, companies seek more structural flexibility with an emphasis on training, functional flexibility and employability (De Lange en Thunnissen, 2000).

3.1.5.3 OSH implications

Some recent research has been done on the OSH implications of flexible contracts (Goudswaard et al, 1999; Goudswaard et al, 2000b and 2000d; Boelens, 2000; Dekker and Dorenbos, 1997; Schippers and Faber, 1997; De Jonge and Geurts, 1997; Klein Hesselink et al, 1997 and 1998; Steijn, 1999; Zant et al, 2000). Flexible workers have less attractive jobs, from several perspectives. Employees with a flexible employment contract are more often subjected to physically demanding work than employees with a permanent contract, and less attractive working environment (higher noise levels) (Goudswaard et al, 1999). Employees with permanent contracts seem to be more at risk than employees with non-permanent contracts when it comes to psychosocial job demands. These employees report higher levels of fatigue than those with a non-permanent contract. However, when other variables are taken into account (like characteristics of employees and the jobs), differences in job demands between different employment contracts are no longer significant. There is a lasting difference in job control: even when we take several other variables into account, workers with a non permanent contract have less autonomy in their work (Goudswaard et al, 1999 and 2000).

Although characteristics of the sector and the job, and of employees (age, gender, education) are important in understanding working conditions and occupational safety and health, there are some impacts of employment status on working conditions and OSH (more physical risks, less autonomy). There are also some risks concerning training, skill development and career development due to employment status (less access to training, lack of job security and more downwards mobility) (Zant et al, 2000; Steijn, 1999; Goudswaard et al, 2000).

3.1.6 New patterns of working time

3.1.6.1 Changes in the type of employment status in the Netherlands

Current patterns of working time in the Netherlands are influenced by different demand and supply side trends. From the side of the companies, operating in a 24 hours economy, it has become more and more an 'art' to plan the workforce around tight schedules and peaks in production or services. Between 1970 and 1990, the gap between the opening hours of the companies and the working hours of the workforce has widened: in 1995 only 20% of the companies use opening hours that are the same as the average working week of their employees (Tijdens, 1999).

From the side of the employees there has been growing demand for part-time jobs, with women entering the labour market. There is also more attention for the work family balance, supported by New Government Legislation and Collective Agreements.

The use of part-time work in Dutch companies catches the eye. Next to non-permanent jobs, part-time labour has been the engine of employment growth in the Netherlands. Dunnewijk and Lammertsma (1999) calculate that growth of permanent part-time labour in the period 1987-1997 is 5.2%, while full-time permanent jobs only grew by 0.2%. Total growth of working hours has not been so steep. The increase of permanent part-time work and flexible contracts almost compensates for the decline in working hours of permanent full-time workers. This decline was not caused by a reduction in the number of workers, but by the fact that the average full-time working week went back from about 42 hours in 1969 to about 36 working hours in 1998 (Klein Hesselink et al, 1999).

3.1.6.2 The use of flexible working time arrangement in Dutch companies

Dutch companies use several flexible working time measures. More than 70% of companies use part-time contracts of some kind, and more than a third use small part-time contracts, of less than 12 hours a week. Almost a quarter of companies use work shifts, 18% of the companies use overtime as a measure, and only

11% make use of compressed working weeks (Goudswaard et al, 2000b).

At the worker level, 33% of all employees in the investigated companies work part-time (Goudswaard et al, 2000b). In particular in health care, non-commercial services, the retail trade and the restaurants/hotels there are many part-timers. Other sectors, like agriculture, construction, metal industry and process industry use little part-time contracts.

Small part-time contracts (less then 12 hours a week) are mainly found in restaurants/hotels and in the retail trade. More than 20% of employees in these sectors work less than 12 hours a week. Smaller companies have higher percentages of part-time workers (Goudswaard et al, 2000b).

About 30% of companies work at weekends. This percentage also includes those employees that work only during weekends. The average percentage of employees that work in the evening is 21%, and that work at night is only 5% (Goudswaard et al, 2000b).

3.1.6.3 Changes in the workforce in relation to working time patterns

The growth of the part-time labour in the Netherlands coincides with the re-entry of Dutch women into the labour market. There are large differences between men and women in the number of working hours they work (Baaijens, 1999). The labour market participation of women has been increased to 51% in 1999. The share of care tasks by men has increased to 27% (Ministerie van Sociale Zaken en Werkgelenheid, 2000). Women still count for most of the work done at home (see also Wieling, 2000). Women work an average of 26 hours a week, men still work 41 hours on average (Smulders et al, 2000, unpublished draft). In particular workers with children want to work less hours a week. There are also differences in working time between different age groups and educational level. Of all employed women, only 40% work more than 34 hours a week. Employees with a small part-time job (less than 20 hours a week) are mainly women, older than 35 years and with a relatively low educational level. Employees with the large part-time jobs (between 20 and 34 hours a week) are relatively more often male and are found in all age groups and educational levels (Goudswaard et al, 1999).

Bloemhoff and Otten describe the trends in irregular working hours in the last ten years (In: Houtman et al, 1999). They base their figures on CBS-data (DLO) of all employees with a contract more than 12 hours a week. The percentage of employees that work at night or in the evening decreased in the period between 1990-1993 from 54% to 43%, and then grew and stabilised at approximately 63%. The percentage of employees that work in the weekends also decreased between 1990 and 1993 from 53% to 50%, and then grew and stabilised at approximately 59%. The percentage of employees at work in work shifts is relatively constant at 10% in the entire period between 1990-1997. Breedveld (1998) argues that working at atypical hours may concern many workers, but the amount of hours worked at atypical hours are still limited in the Netherlands.

3.1.6.4 OSH implications

In the past, research has been done into the impacts of work at irregular hours on the health of workers. The unfavourable effects of time flexibility are mostly related to arrangements with long working days. In arrangements such as permanent overtime, the overall working week, or seasonal changing schedules, negative effects appear (see Klein Hesselink et al, 1997).

There is not much research into the relationship between time flexibility and work pressure, and the relation with control over working time. Breedveld (1998) states that control over working time is more related to levels of education than to working atypical hours. The higher educated report more control over their working time than the lower educated. He does, however, find that employees with the least control over their working time work more of their time at scattered hours. Goudswaard et al (2000) also find that, even when educational level is taken into account, employees that work in the evening or at night endure higher job demands and lower job control (Goudswaard et al, 2000). Further research is being carried out into the backgrounds of these findings. There has been recent Dutch research into the question of working time arrangements, family-work interface and health impacts (Jansen and Kant, 2000). Results are not yet available.

Other research into the relationship between working time and OSH concerns the duration of the working week. Part-time workers report less heavy work than part-timers with larger jobs and full-timers. They also have less demanding jobs. Full-time employees have work with greater job demands. These higher job demands of full-time employees are not compensated by higher job control. Full-time employees endure more work stress risks than part-time employees. This is confirmed by the higher fatigue of full-time employees in comparison to the part-time employees with limited contracts (less than 20 hours). When we take into account other personal and professional variables, there are no differences in fatigue between full-timers and part-timers with larger jobs. Part-time work has negative impacts on access to training and career development and this applies to all types of part-time jobs. (Goudswaard e.a., 2000).

3.1.6.5 Summary: combinations of different types of flexibility for employees

At the level of employees, different forms of flexibility correspond: companies use part-time employees to fill in the work in weekends or in the evening, also a lot of non-permanent contracts are on a part-time basis. Three different forms of flexibility should be distinguished (Goudswaard et al, 2000b):

C. flexible employment status (non permanent contracts and part-time contracts);
W. time flexibility (work in work shifts and/or at unsocial hours);
F. functional flexibility (job enrichment, multi-skilling).

Through a combination of these three types of flexibility eight types of employees came out, with big differences between men and women (see table 3).

Table 3. Percentage of employees in the different types, including comparison between men and women in the Netherlands.

	Total	men	women
non-flexible (cwf)	11%	14%	6%
only functional flexible (cwF)	21%	28%	12%
only flexible working hours (cWf)	9%	11%	5%
flexible working hours and functional flexible (cWF)	19%	27%	10%
only flexible and/or part-time contract (Cwf)	6%	4%	9%
flexible/part-time contract and functional flexible (CwF)	8%	5%	12%
flexible/part-time contract and flexible working hours (CWf)	10%	4%	18%
super flexible (CWF)	16%	7%	28%

(Source: Goudswaard e.a., 2000)

Possible determinants of these types are: gender, age, education, children at home, breadwinner or not.

With these determinants in mind we can describe some types of employees:

- The 'non-flexible' employee (with a permanent, full-time contract, only working at the office hours and not functional flexible) is relatively often older than 45 years of age, breadwinner and with secondary professional education;
- The 'core-worker, type A', who works on the basis of a permanent full-time contract, only during office hours, but is functional flexible, is relatively often male, age between 35 and 45, breadwinner and with a high professional education;

- The 'core-worker, type B', who works on the basis of a permanent full-time contract, in a working shift schedule, and functional flexible, is also relatively often male, age between 25 and 45, breadwinner and with a secondary or high education;
- The 'super-flexworker', working at irregular working hours, functional flexible and working on the basis of a non-permanent and/or part-time contract, is relatively often female, younger than 25 years of age and no breadwinner;
- The 'flexworkers' that work at irregular working hours, on the basis of a non-permanent and part-time contract and are not functional flexible, are relatively often female, either younger than 25 years or older than 55 years, no breadwinner and with a low education.

3.1.7 New technologies

3.1.7.1 Use of new technologies by Dutch companies

About 38% of companies (1998) report the existence of a computer network. Networks are more common among bigger companies. About 63% of the companies with more than ten workers report a computer network. The number of companies using networks has grown. The CBS-data (internet-site) also show that Dutch companies are orienting themselves more and more to networked companies and data communication. The use of computer terminals and stand alone-pc's has declined and the use of central servers and networked computers has risen with about 20% per year at the end the nineties. Also, the use of internet and e-commerce has risen quite dramatically. Sales via e-commerce has risen form 0,1% BNP in 1998 to about 0,8% of BNP in 2000 (IDC, 2000). In different sources, The Netherlands are a frontrunner in the use of new technologies (IDC, 2000; Paoli, 1996).

The proliferation of more complex organisational technologies such as workflow and ERP is rather limited. Only 4% of the companies use workflow systems. These are mainly larger companies (a quarter of the 100+-companies) and companies in the metal industry, process industry and commercial services. ERP is a new phenomenon, found in only 3% of the companies. Mainly larger companies and companies in the metal industry and process industry use ERP. 39% of all Dutch companies have implemented at least one of these new technologies. In 6% of the companies, all three of these technologies are implemented. Mainly companies with more than 100 workers use these technologies. Investment in such technologies helps to improve the technology position of the companies.

Being technologically inclined does not always mean that workers can participate in investment decisions. Companies which have invested in ERP are less inclined to give their workers more responsibilities for technological investments, or for product and service innovation. ERP is more a responsibility for top management. Workflow investments are not correlated with decentralisation of investment responsibilities. Companies which have invested in new technologies report more decentralisation of responsibilities for product and service innovation. Companies which only report investments in computer networks are more inclined to decentralise responsibilities for technology and innovation. Training in the use of computers is correlated with investment in such technologies.

3.1.7.2 OSH Implications

New technologies have an impact on qualification levels of workers, and on physical job demands. Previous research has shown that new technologies lead to higher educational and other skill requirements (more social skills) from workers. Workers in companies which have invested in computer networks, workflow or teleworking, report that work has become more complex than in those companies without these technologies. These workers also report that their jobs are more active and interesting than other workers. This result is not consistent for all new technologies. In companies which have invested in ERP, workers report less job enlargement measures than workers in other companies, and less discrepancies between educational levels and job demands. Both these results make it clear that workers in ERP-companies are better 'fitted' to their jobs. This means that ERP-investments must have been accompanied by better training or selection of workers. Training (oriented at computer use) has been somewhat better than in other companies, but this effect is not very prominent.

Workers who spend most of their time behind computer screens report higher skill demands in their jobs. They also report more job enrichment measures. It seems that these workers are less exposed to stressful working situations than other workers, and that these workers are more trained than other workers. These are all positive results for these workers. These workers also report lesser discrepancies between their educational levels and the job demands.

ICT leads to the use of computer screens, working with a computer mouse, and possibly to a telework situation. Other implications are a connection between workflow systems and short cycled work. Physical demands which are related to computer use are: working with bent wrists, working in static positions and working in seated positions. Such work is related to complaints about pain in the neck, shoulders, elbows and hand/wrists. About 18.9% of the total population reported such complaints. Working with computer screens is a risk factor, mainly when this was done more than four hours a day. The only other factor was working with a bent or twisted neck. Using force on arms and hands, working with trembling or recoiling equipment, and the combination of repetitive movements with force, are also associated with more complaints. Work with a computer mouse, and working with bent wrists, are not at all associated with more complaints. Telework and short cycled tasks are not correlated with more complaints. There are also no complaints concerning more ICT-technology and just-in-time systems in companies. Higher job demands and less decision latitude, on the other hand, remain important risk factors for repetitive strain injuries.

3.2 Belgium

3.2.1 Introduction

In this chapter we give an overview of the changing world of work in Belgium. We first look at recent changes in legislation, and then different trends that we can see in Belgium relating to work organisation, OSH implications and current research topics.

3.2.2 The OSH system

As a result of European (framework) directives, Belgian health and safety at work legislation has been thoroughly reformed over the last 10 years. One of the most important developments has been the intrinsic widening of its scope. In Belgium, we no longer talk of just health and safety, but also of wellbeing, prevention (of accidents) and protection of employees. The field of wellbeing includes: safety at work, health, ergonomics, psychosocial problems (stress), hygiene at work, embellishment of the workplace and the environment. All companies in Belgium must develop a prevention policy around these different areas, so interest is increasing in subjects such as stress, ergonomics, and wellbeing, not only within the law itself, but also within trade and industry.

When we look at OSH implications, it does not just involve the consequences of the number of accidents at work or occupational diseases; attention also has to be directed towards subjects such as overload (physical and mental), health implications, etc.

The overview below outlines Belgian legislation and the most important preventive structures. The central statute on working conditions is the General Regulations for Occupational Safety and Health (ARAB, 1945), which has been subject to several amendments (Royal Decree of 20 June 1975). In addition, there are some specific statutes governing the technical aspects of several OSH issues.

Safety is covered by the 'Wellbeing of Employees at Work Act'. This Act establishes a safety service to replace the current occupational health and safety services. The employer is required to call in the assistance of safety experts for the implementation of safety and preventive measures. These experts can work on two levels, i.e. within or outside the company. Every company is required to establish its own internal safety and prevention department.

In addition to the ARAB and the Wellbeing of Employees at Work Act, OSH regulations are laid down in collective labour agreements. The requirements stipulated in them may involve further specification and extensions to general statutory regulations.

3.2.2.1 Consultative bodies
There are a number of important consultative bodies and compulsory services at various levels.

1. The Higher Council for Safety and Prevention brings employer and employee representatives together on an equal basis. The Council advises the Minister on matters of policy, particularly with regard to legisl ation in preparation.
2. There are sector-based Safety and Prevention Committees in the construction, metal and chemical indus tries, which make comments and recommendations on legislation.
3. At a company level, there are compulsory Safety and Prevention Committees in workplaces with 50 or more employees. Employee representatives are elected every four years. Employer representatives are appointed by the employer from management personnel. The safety officer attends in a consultative capacity. The powers of the committee are set out in the Act on the Wellbeing of Employees at Work and its Orders in implementation of it.

3.2.2.2 Decision-making and executive bodies
1. The primary responsibility for working conditions in a company is borne by the employer, who is assis ted by an interdisciplinary safety and prevention department.
2. The hierarchical line assists the employer in conducting safety projects. The hierarchical line, or mana gers, are people with management responsibility over one or more employees or a department such as foremen, group leaders, departmental heads, supervisors, managers, etc.
3. Employees also have a series of responsibilities, and actively participate in the safety and prevention policy, by providing feedback and support to the employer and the internal department.
4. The employer is required to call on recognised institutions for certain technical operations. These are operations relating to electrical equipment, lifting and goods handling equipment, steam engines, gas containers, personal safety equipment, etc.
5. Within the public authorities, the main executive agencies responsible for health and safety are the Department of Occupational Safety and the Department of Occupational Health. Both Departments come under the Ministry of Employment and Labour. They draw up proposals for legislation, and each has its own inspectorate.

3.2.3 Labour market situation

3.2.3.1 Feminisation of the labour market
In January 1999, the NIS (National Institute of Statistics) surveyed 900 households in Belgium. This Belgian survey forms part of the surveys co-ordinated by Eurostat. The sample data have been extrapolated to the entire Belgian population.

We can conclude from most recent data that employment in Belgium is increasing, especially with regard to part-time, salaried work for women (NIS, 1999).
The "Employment, Labour and Training Centre" regularly analyses the labour market situation in Belgium, and in particular in Flanders. The studies of the Centre show that the labour market population (working and unemployed together) increased in the nineties.
This rise is mainly attributable to the increasing participation of women in the labour market. The working female population grew in this period by around 100,000, while the male population has remained stable. The rate of growth has subsided in comparison to the Eighties but the annual average growth is still 1% .

The causes of this growth are attributable to the highly increased level of activity of young women, almost all of whom enter the labour market after obtaining a qualification. They also stay there longer than with previous generations.

3.2.3.2 The ageing labour market
As a result of combined action of demographic and socio-economic factors, there is now an ageing of the working population. By 2010, 23% of the working population will consist of older employees (compared with 15% now). As a result of longer education, entry to the labour market is coming at a later stage, but exit is also much later, which ensures that longer labour market participation results in continuing high levels of activity, despite the rising age.

The percentage of young people should fall from 10% to 8%. The most important question here is how the large post-war generations, who will mainly withdraw from the labour market between 2010 and 2025, can be replaced by the younger generations, which are becoming steadily smaller and spending more time in education.

Table 4. Projection of the activity level (AL) and the size of the working population for the years 2005 and 2010 and the difference in the size of the working population (D WP) in 1997 (Flemish Region)

	2005 AL (%)	2005 WORKING POPULATION (N X 1000)	D BB 1997-2005 (N X 1 000)	2010 AL (%)	2010 WORKING POPULATION (N X 1 000)	D WP 1997-2010 (N X 1 000)
15-24	29,5 / 31,6	209 / 223	-41 / -27	28,1 / 30,0	199 / 213	-51 / -37-
25-49	85,1 / 87,1	1 832 / 1 875	-45 / -2	85,1 / 87,1	1 752 / 1 794	124 / -83+
50-64	44,1 / 46,1	490 / 512	+127 / +149	46,1 / 48,1	569 / 594	206 / +231
TOTAL	63,7 / 65,7	2 530 / 2 610	+41 / +121	63,0 / 65,0	2 521 / 2 601	+31 / +111

Source: NIS, SEB (Re-analysed by Steunpunt WAV)

3.2.3.3 Rising use of part-time
When the increase in the working population (expressed in number of people) is expressed in labour years (correction for part-time work), and as a labour volume in hours (correction for annual working duration,) we find that growth is mainly attributable to the strong increase of part-time work. There are currently fewer full-time workers than in 1981 but, due to the strong increase in part-time work, growth is still positive .

Table 5. Part-time workers 1995-1999

	1995(A)	1996(A)	1997(A)	1998(A)	1999(B)
MALE	2.8%	3.0%	3.3%	3.5%	5.0%
FEMALE	29.8%	30.5%	31.4%	33.3%	39.1%
TOTAL		14.0%	14.7%		19.5%

Source. NIS Working population survey. www.statbel. fgov.be/figures/society/d231_nl.htm.

(a) number of workers with a part-time job in relation to the total number of workers (wage earners and non-wage earners, i.e. self-employed, helpers and family co-workers)
(b) number of wage earners with a part-time job in relation to the number of wage earners.

In Belgium part-time work has thus increased over the last few years. The figures show that it is mainly women who do this part-time work.

3.2.3.4 More service jobs
Research shows that around 42.3% of the Belgian working population work in the tertiary sector. This is just as much as the EURO3 average (the Netherlands, France, Germany) and somewhat more than the Euro 15 average (41.0%). Employment in the services sector is at its highest in the Brussels region (45.9%). In Wallonia employment is 40% and in Flanders it is 43%.

When the figures are examined for each sector, it can be seen that Belgium does not score so well in the services to companies sector (temping sector, information technology and consultancy). Belgium scores higher than the European average when it comes to transport and communications, public authorities, education, healthcare and trade.

3.2.3.5 OSH implications of the changing labour market
Changes in the composition of the working population will also have an effect on the risks employees are exposed to.

With regard to the increased participation of women in the work process, the protection of women during pregnancy and the breastfeeding period has received more attention over the last few years. In Belgium there is currently a lot of debate on criteria for temporarily removing women from risky places of work. There are now indeed criteria, and there is a list of agents that pregnant and breastfeeding women should not be exposed to, but there is still debate on a number of points. A working group is working on these criteria within the Occupational Diseases Fund (which is responsible for paying women whose contract of employment has been suspended). Additional work is also needed on researching stress in female employees. It is not rare for them to have two forms of daily work (occupational work and family work) where they have responsibilities. This can lead to conflicts between different requirements placed on women, bringing stress problems.

An ageing working population brings specific problems that have to be investigated. One of the problems that older employees can be confronted with concerns the fact that the activities they are responsible for can be so demanding (physical/mental) that they find it difficult to keep up. In Belgium an agreement was recently reached, in which hospital staff (nursing) can gradually wind down their career in relation to age. In practice this means that, as from the age of 45, they have to work fewer hours. It is generally accepted that the work of nursing staff is too physically and mentally demanding to continue full time to pension age. This is confirmed by the fact that many older nurses (40+) are leaving.

In Belgium there is currently a political debate on the pension age. There is a desire is to raise it (to 68 years for example). Nevertheless, we note that today many employees are retiring early (around 50-55 years), for example, because the jobs are too wearing. Hence the proposal to raise the pension age immediately encounters resistance. There are also people saying that career planning should be better organised (inserting breaks and career interruptions of a number of years), accepting quieter jobs at a later age without this influencing the pension, etc.

Increased part-time work can also cause specific problems. For example, to what extent do part-time employees have sufficient access to information on the company, the organisation, instructions, and training? Exposure to certain hazardous situations is reduced because fewer hours are being worked, but it is essential for people to be adequately informed of the different risks they are exposed to, and preventive measures that have to be taken.

Growth of employment in the tertiary sector has meant that fewer people are exposed to traditional serious risks in industry, agriculture, and the construction industry. New risks are coming to light, however, originating from the changed work organisation, the intensive use of new technologies, etc.

3.2.4 New contractual relationships

In this paragraph we will look at a few insecure forms of work: temping, subcontracting and outsourcing, self-employed, flexiworkers.

3.2.4.1 Agency work

Over the last few years temping has become more popular. In 1998, 59,300 agency staff went to work every day. Over the last 10 years the number of agency staff has grown such that there were 146,776 in 1991 and 285,000 in 1999. Temping work is mainly done by male, blue-collar workers (see table 6).

Table 6. Breakdown of agency staff according to sex and occupational category (1998 figures)

	MALE	FEMALE	TOTAL
BLUE COLLAR	46.2%	17.7%	63.9%
WHITE COLLAR	13.1%	23.0%	36.1%
TOTAL	59.3%	40.7%	100%

Source: Safety and Temping Figures, Central Safety Department for the Temping Sector. www.p-i.be/nl/statistieken.htm.

Table 7. Breakdown of agency staff according to age

- 21 YEARS	11%
21 - 25 YEARS	34.9%
26-30 YEARS	21.8%
31-45 YEARS	26.6%
46+ YEARS	5.7%

Source: Safety and Temping Figures, Central Safety Department for the Temping Sector. www.p-i.be/nl/statistieken.htm.

Temping involves a form of atypical work that has recently become more common. The growth of temping is explained by the needs of the business world. The need for flexibility has steadily increased as trade and industry must be able to respond quickly to the ever changing need of customers (just in time, reduced delivery periods, reduced stocks, etc). This has meant that the permanent workforce is no longer sized according to the maximum capacity of a company, but at a lower point. Wage costs play an important role in companies, such that there is a trend to keep the workforce as small as possible. Temping agencies provide an ideal solution in this context. At peak times more people are hired. The competitiveness of the company is assured, or can even improve.

Agency staff are being increasingly used to replace ill employees, victims of industrial accidents, and to absorb temporary and sudden production increases.

Research also confirms this. In the event of a temporary increase in workload, companies will call on flexible options. One third of companies choose to use part-time labour, 30.5% temporary contracts, and

29.5% agency staff. When these figures are examined sector by sector, it turns out that 45% of industrial companies will use agency staff in the event of an increase in the workload. Another observation relates to the size of companies. The larger a company, the more external flexibility it has call on (agency staff or temporary contracts); the smaller the company, the more internal flexibility will be used (part-time work).

3.2.4.2 OSH implications of agency work

In general, too little attention is given to the training, introduction and provision of instructions to such employees. In addition, according to the industrial accident statistics their profile (age and years of service) falls into the category of employees that is most often the victim of industrial accidents.

The Collective Labour Agreement of 9 March 1998, on the induction and accommodation of agency staff, stipulated that the user has to arrange the induction and accommodation of new agency staff in the company.

The Royal Decree of 19 February 1997 on health and safety at work stipulated that measures for agency staff must ensure that agency staff enjoy the same level of protection as other employees in the company. This principle has resulted in a series of obligations for the user and the agencies.

The Royal Decree of 4 December 1997 set up a central safety department for agency staff. The department assists the agencies in observing their obligations towards agency staff. All agencies are required to join.

In 1999 it was found that 285,000 agency staff worked 120 million hours and had 10,372 industrial accidents (at the place of work with at least one day of being unfit for work). Altogether these accidents accounted for 210,000 lost days. There were 3 fatal accidents.

An examination of these statistics shows that agency staff are twice as likely to have an accident as other employees. This is explained mainly by the age of agency staff. Half of them are younger than 25 years. They have more accidents (albeit less serious) than their older colleagues. Most accidents occur in the first few days of a new job. This means that agency staff who regularly change jobs are more likely to have an industrial accident . Statistics show that the trend in the number of industrial accidents among agency staff is falling. This decrease coincides with campaigns on health and safety policy in the temping sector .

3.2.4.3 Subcontracting, outsourcing

Subcontracted labour involves certain workers in companies where the less hazardous work is reserved for the company's own employees, in order to project a positive image. The workers affected carry out work on a subcontracting basis, which may be extremely dangerous to both their health and safety, and for which there is no clear picture, because of the highly varied nature of the work done .

3.2.4.4 OSH Implications

The contracting out of hazardous work to external companies or third parties brings risks with it. Increasing attention has been paid to this over the last few years. Customers no longer bring in just anybody for a certain project. Increasingly, minimum guarantees are often required concerning the safety policy of the contractor. Systems such as the CSC (contractor safety checklist) and BeSaCC (Belgian Safety Criteria for Contractors) are gaining importance.

In both systems the extent to which the contractor has developed and implemented a health and safety policy is examined. Requirements are also placed on the contractor with regard to the training of employees working on the site, industrial accident statistics, documents used and methods employed (risk analysis, toolbox meetings, etc). After a positive evaluation the contractor is given a certificate.

This increasing importance is also encompassed in recent legislation. The law on the wellbeing of employees in the performance of their work requires companies to keep out subcontractors with unsafe practices. In order to be able to assess this, systems such as CSC and BeSaCC can be used, although such systems have no legal basis.

3.2.4.5 Attention to apprentices and independent workers
In the next three to five years, the authorities will pay special attention to apprentices and students who follow a course in which the training programme provides a form of work that is done in the education institution. The same applies to the self-employed who work at temporary and mobile construction sites. Both groups are exposed to the same risks as employees in comparable working conditions.

Industrial accident statistics show that the profile of the victim of an industrial accident corresponds to a young employee (between 21 and 30 years old, with 4 to 5 years of work experience). It is therefore recommended that young employees go through a system of part-time working and part-time training when they first start.

The following measures can be taken: conducting awareness campaigns, training, proposals to improve working conditions further to the case studies of dysfunctional situations, the provision of this information to the bodies that promote the interests of this category of employee, the same legal protection for students and self-employed that employees have.

The Wellbeing Act of 4 August 1996 equates the following categories of people to employees:
- People who perform work under the authority of another person other than by virtue of a contract of employment;
- People following occupational training;
- People on an apprenticeship;
- Student trainees;
- Apprentices and students following a course in which the study programme provides a form of work to be done in an education institution.

3.2.4.6 Flexiworkers
In Belgium the number of people working under "flexible" contracts is growing, for example in the distribution sector. These employees have no set working hours but may be called up by the employer. They must remain available for a certain number of hours, but they do not know beforehand how many hours they will actually have to work.

Flexible working also occurs in other sectors. In some production companies where there are clear peaks, employees work full time for a few months each year, then a period of part time work, and then they are free for a few months. The working hours are then calculated on an annual basis.

In the health sector there are also "flexible" working systems. In these cases people might work in discontinuous services: a few hours in the morning and a few more in the late afternoon.

All these forms of flexible work organisation have advantages and disadvantages for employees. A lot will depend on the way in which it is organised in practice, within the companies and organisations. It is important that people strike a balance, and that employees clearly know where they are. This is not feasible with every flexible working system (certainly with call-out contracts).

3.2.4.7 Telework
Teleworking is in. The growth of new technologies also makes teleworking more accessible for many companies, for example through the possibility to consult and process information from home over the Internet and through dial-up facilities, etc. As Belgium is a small country with an enormous motorway and railway network, and a high concentration of small companies around large cities, the economic need for teleworking is less pressing. Nevertheless, the government is aware that teleworking can provide a solution to congestion problems and unemployment in former industrial regions.
The liberalisation of the telecoms market meant that in 1998 Belgium had the highest increase in GSM's and Internet connections. The preconditions have thus been fulfilled.

It is not expected that Belgium will turn to teleworking from home en masse, but rather to mobile forms of work to increase customer service. More virtual companies will be set up in the ICT sector, which will use teleworking, telesales and tele-collaboration right from the start .

With regard to Belgium, teleworking in figures is as follows. In Belgium and Luxembourg together, in 1998/1999 6.2% of the working population engaged in teleworking . With respect to 1997 this is an increase of 25%.
The percentage of teleworkers in Belgium is thus not tremendously high.
There are nevertheless interesting projects with large companies such as IBM, BACOB, Kind en Gezin, etc.

Different forms of teleworking are possible:

(a) The teleworker at home who works at least one full day a week at home for an employer
(b) The self-employed teleworker at home (in a small office home office (soho));
(c) The mobile teleworker who does at least 10 hours a week teleworking (mobile);
(d) The teleworker who teleworks less than 1 day a week.

Table 8. Types of teleworking in Benelux (1999)

TELEWORKERS % OF WORKFORCE	HOME BASED	SELF EMPLOYED (SOHO)	MOBILE	OVERLAP (% IN 2, 3, 4 – 100%)
BELGIUM	49%	27%	51%	26%

Source: European commission DG XIII, the national coordinators network data. –In: M. Soogen, Teleworking: a contribution to the wellbeing of the employee ?, 2000, KU Leuven, HIVA training (final paper), p. 32

The table below gives a picture of the number of teleworkers working from home in Belgium (absolute figures).

Table 9. Working populations: work at home broken down according to sex (1997)

	MALE	FEMALE	TOTAL	PERCENT
USUALLY	220.458	170.243	390.701	10%
SOMETIMES	160.644	87.596	248.240	7%
NEVER	1.895.899	1.304.220	3.200.119	83%

Source: NIS, 1997.

The difference in percentages can be explained by the fact that working at home is not the same as teleworking at home. This last table concerns working at home. The share of teleworkers working at home cannot be derived from this.

One of the biggest benefits of teleworking lies in the increase in productivity which can be from 3 to 43%. Teleworking also yields savings in office space.

3.2.4.8 OSH implications

3.2.4.8.1 Legal framework

In Belgium there are still a number of legal problems with regard to teleworkers at home, under the application of the law (and the orders in execution of it) on the wellbeing of employees in the

performance of their work. This law inevitably comes into conflict with the legislation on the protection of private life. The law applies to "…any place where work is performed, irrespective of whether it is within or outside the establishment and irrespective of whether it is an open or closed area." , thus also the location of teleworking, even when this is the home of the employee.

Some legal problems can arise here: supervision of the working conditions at the home of the employee (private life). A practical workable solution of this legislation has been set out by companies or entire sectors in collective labour agreements.

3.2.4.8.2 Implications for the wellbeing of the employee
Currently, there is not a lot of information available on the consequences of teleworking on the wellbeing of the employee. But the literature and experience from companies who have already introduced teleworking show that you cannot just introduce teleworking (at home) overnight.

Teleworking requires another way of working, organising work and management. This can cause problems with the psycho-social load of the employees. Are teleworkers under more or less pressure to achieve set objectives? Do they feel sufficiently supported by colleagues, supervisors, management? How is their absence perceived by those who "stay behind" (teleworking is not a holiday)?

Experience from cases shows that solutions to these types of problems are often sought to keep the various parties concerned satisfied:

- Avoiding social isolation (work in the office one day a week);
- No extra costs for the employer;
- Payment for travel to the office;
- Special arrangements for industrial accidents (accidents at home are considered to be industrial accidents);
- No control of the hours worked.

These solutions can quite easily be developed on a company level. The search for structural solutions will probably yield more problems.

The physical load can also create major problems. What is the workstation arrangement in the home or teleoffice? Does the working environment satisfy ergonomic criteria? Does the teleworker take adequate breaks? What are the risks of strain injuries?

These are certainly subjects that will receive a lot of attention in policy and research over the next few years.

A new working pattern like teleworking will initially give rise to an adaptation period in which employees will learn to manage with the discomfort relating to the new work organisation.
The possibility that the health and safety performance of companies will decrease is real. Research is needed to understand how the welfare of the workers who engage in telework is affected.

3.2.5 Changes in management style and the work organisation

Traditional management styles and forms of work organisation (recording timekeeping and attendance, strict control of the work done, strong vertically organised companies) no longer work when the organisations experiment with other forms of work such as teleworking.

In many companies the work is no longer done in this way and other management tools have to be found. Management by objectives, coaching, self-driven teams, etc, are becoming more common. In Belgium, in this respect, we only have a view of a few cases and large-scale research is absent. While this research is lacking, attention has often been focused on the consequences that these substantial changes of the work organisation will have for the wellbeing of employees.

3.2.6 Conclusions

Just as with other (European) countries, we can also notice a changing world of work in Belgium. On the one hand these changes are due to social, economic and demographic factors that substantially influence the supply on the labour market. On the other hand, the world of work is also taking on a new appearance through the increased importance of new information technologies. In this brief overview we have endeavoured to provide a summary picture of the Belgian situation. What is most striking is that the working population is ageing, becoming more female, and is deployed more flexibly (part-time work, short-term contracts, etc).

Important changes are also taking place in work organisation within companies. Through increased professional activity in the service sector, and increased use of information technologies, employees are less bound to a fixed place of work. Working from a distance (whether or not from home) is within everybody's reach.
In addition, we note that companies want to satisfy the ever-changing situations on the economic market. Employees must be able to be deployed flexibly, work in a customer-oriented way, while remaining competitive. The deployment of agency staff, the contracting out of certain operations such as maintenance and logistics, making contracts of employment more flexible, etc, are valuable tools in this respect.

All of these developments can influence the wellbeing of employees. We can thus note, for example, that agency staff constitutes a risk group when it comes to industrial accidents and health effects. Employees who work for contractors on temporary and mobile construction sites, for example, are under pressure, and that is not without consequences for their wellbeing.

With regard to policy and research, the importance of these (and other) new risk groups and risk areas will increase. It will have to be further investigated as to how the positions of agency staff, contractor employees, etc, can be optimised. How the consequences of the changing work organisation, and the use of new technologies and management styles, can be charted. Research is ongoing, but too little general information is available. In the next few years, attention will be given to topics such as measuring labour psychosocial factors, work satisfaction, stress, the measurement of the mental strain, and the impact of flexible forms of working on health and safety .

3.3 Germany

3.3.1 Introduction

Germany is undergoing profound structural change, reflected in technological and economical developments in the labour market, and in the entire social structure. There is however, very little data available on these developments. Data is available on contractual relationships and new working time patterns, but not on new work organisation. These last trends can only be pointed out in a general fashion. These developments, and in so far as data is available on OSH-implications, will be presented in this chapter.

3.3.2 Changes in the German OSH system

The principle of prevention, which is established comprehensively in the EU Framework guidelines, can be used as a innovative strategy to bring the quality of work in line with new working conditions. The key motive behind such a policy is the creation of jobs and working requirements, which will secure employment for all employees until the end of their working life. This includes the development of an improved integration of those outside working life into the job market.

New occupational safety and health legislation in Germany has created an effective and flexible basis for future action. Statutory regulations are no panacea. Law makers have recognised in recent years that no progress is made with ever more complicated statutory regulations. Germany wants to improve occupational safety and health by making it more effective and less bureaucratic. It is only flexible regulations that offer companies the latitude for occupational safety and health activities adapted to suit their situation. In particular, small and medium-sized enterprises, which are gaining ever more importance for the German economy, require support in the form of guidelines, assistance on action, or the sort of tools which are found in occupational health and safety management systems, so that they can apply regulations more effectively.

The new meaning of safety and health regulations is to contribute towards the protection, maintenance and promotion of employees' health while at the same time improving internal company management structures. In addition, successful prevention, which includes health promotion at the workplace, assures uninterrupted production by avoiding or reducing absence and fluctuation, increasing attendance and worker motivation.

3.3.3 Changes in the workforce

The proportion of older people in the overall population will increase sharply. There will therefore be fewer young people on the labour market in the next few years. Demographic change in Germany becomes serious: the proportion of the group of people over 60 year will increase from 21% (1995) to 23.4% (2010) and 26.2% in 2020 of the total population. It thus becomes considerably more important to preserve the full work capacity of all working people up to a relatively high age. This sets new requirements for employers, the education system and the labour market, and for those responsible for funding the social security system. These requirements concern the creation of suitable forms of work and technology in industrial plants so as, on the one hand, to maintain, adapt and develop further the necessary qualifications and, on the other, to preserve the health of working people for many years.

3.3.4 New forms of work organisation

New forms of work organisation are on the increase in Germany, for example, outworking and contract work, teleworking, long-term low paid work and apparent self-employment as a new form of independence. This is shown in new company structures, in changes which have taken place in inner and inter-company work-organisation such as decentralisation of production and customer service, outsourcing of company operations, virtual enterprises, external workshops and establishing of small enterprises. The change can also be seen in new framework conditions for companies such as globalisation, single customers who have individual product, delivery and quality requirements, in the rapid developments in technology, new organisational structures and finally, in increased competition. Hierarchical structures are increasingly being replaced with more flexible organisation; organisation which is based more on teamwork, projects and processes and orientated towards the market and customers. The movement is towards a learning organisational structure, which can cope with the permanent pressure caused by the need for organisational flexibility.

The transformation of business activity, through technological development, the shorter life cycles of business ideas and products, and the need for new skills, require new management strategies and new forms of work organisation. The transition, from stable forms of industrial activity to organisations that are in a process of constant change, requires a shift in leadership and management methods, and in the design and organisation of production. This change makes new demands at all levels of the hierarchy of modern companies and administrations including OHS. One of the major problems is how to renew strategies, so that full use can be made of the advantages offered by new technology, and how best to apply technology to new commercial opportunities. One of the most important means of overcoming these problems, and therefore one of the priorities for change in management practices and work organisation, is to focus on human competence and skills development at all levels.

While experience has shown that there is no unique formula, the most successful of today' s companies and administrations have used a cluster of similar techniques to raise their effectiveness:

- Commitment of workers to productivity, quality and profitability, recognising that these are prerequisites for income growth and employment security;
- Continuous improvement of product quality and work methods based on shop-floor initiatives, including close relations with consumers and suppliers;
- Organisational patterns designed specifically to promote the efficient application of new technologies. In other words, organisation precedes and supports innovation and technology, rather than responding to it;
- Complex organisational and inter-organisational arrangements to ensure continuity of production flows, minimum capital tied up in inventory and rapid adaptation to changes in demand, products or production methods;
- Development of multiple skills. Training is systematic, constant and integrated into the work itself. Work becomes a lifelong learning experience ;
- Use of networks and co-operation (supported by new information technologies) instead of bureaucratic hierarchies to plan, co-ordinate and control work;
- Innovation as a conscious goal, sometimes promoted by teams outside the traditional hierarchy;
- Commitment of the employer to job security. Decisions about lay-offs, plant closings, new technology and other matters reflect the view that long-term economic interests require dedicated workers who are fully confident that their employment will continue.

These developments have consequences for stress and strain of the employees: 3% of all employees in Germany (1998/99) complain of overload of work, 7% of underload of work, 50% of stress and pressure. 29% of all employees had a restructuring of their work during the last two years.

3.3.5 New forms of contractual relationships

In Germany there are almost 35 million workers, with about 90% employees and 10% self-employed. Roughly two thirds of employees worked in normal employment relationships, and roughly one third in atypical employment relationships. Normal employment relationships still account for the majority. However, they are slowly but surely decreasing, whereas atypical employment relationships are increasing at the same rate. This tendency is promoted by structural change:

- Increase in small enterprises with a decline in large companies;
- Growth of employment in service industries with a reduction in the employees in manufacturing industry.

Both small enterprises and service companies tend to have a higher rate of atypical employment relationships.

The development of normal employment relationships varied between western and eastern Germany. In western Germany the percentages of the atypical employment relationships have risen since 1970 from 16 % to 32 % (1995). In eastern Germany there was an increase in 1991 in atypical employment relationships to about 40 % in the wake of reunification. Subsequently, the figure fell to roughly 30 % by 1995 (Commission for Future Issues 1996). The rise in exclusively marginal part-time employees is noticeable in western Germany, doubling from about 6 % (in the early 80s) to about 13 % (1995). In eastern Germany, the proportion of short-time workers and employees on job creation schemes increased dramatically after reunification, whereas the exclusively marginal part-time employees increased much more slowly than in western Germany (1995: approx. 7 %). The atypical employment relationships therefore exhibit structural

differences in eastern and western Germany (Commission for Future Issues 1996). No information is available about the OSH implications of these new developments.

3.3.6 New patterns of working time

Time patterns in Germany are characterised by an increase of shift work (1998/99: 22% of employees) and weekend work, staggered working hours and overtime work (1998/99: regularly and sometimes 71% of all employees), as well as the intensity of their use judged by the proportions of employees affected by each type. All trends are towards a decoupling of individual working hours and operating hours, and are usually associated with unfavourable working time situations and times of strain for the employees.

3.3.7 Growing use of technology

Innovations in information and communication technology have created the conditions for an expansion of information and communication services and applications nobody could imagine a short time ago. The acquisition, processing, conveying, propagation and utilisation of information are playing an increasingly important role in industry and the world of work. For industry, "information" as a raw material has already become a major factor of production.

The effects of the development into the information society on employment – and hence on occupational safety and health – are varied and complex. They range from the change in existing occupations and the development of new fields of occupation, through to a change in forms of co-operation within companies, between companies and between sectors. The dynamic nature of the change to the information society involves a shift in focal tasks and the emergence of new fields of work. In the working population the percentage of those employed with regular contracts of employment will decline further with a simultaneous increase in atypical, flexible employment relationships. At the same time the new communication possibilities will help blur the boundaries between the world of work and the home environment for a section of the working population. Telework –nearly 2% of all workers in Germany - in various forms will spread rapidly in the coming years in the view of the experts, among other things with the result that the number of freelancers and of small and very small companies will increase rapidly.

These developments mean opportunities, as well as risks and new challenges for people who have to cope with the new technologies and requirements under changed conditions regarding work organisation and forms of work. Education policy, employment policy and occupational safety and health policy will have to carry people into the new information society and offer them meaningful work and prospects.

44% of all employees in Germany have reported that in the last two years (1998/99) new technologies, new software, new machinery have been introduced and changed their work situation. New technologies mean for the relevant employees not only the introduction of new tools and equipment it always bring changes in work organisation, design of workplaces and has consequences for the work tasks, work content and qualification. Design of work should be an integrated part of the whole planning process of a company, taking into account the health and safety aspects of the employees in a very early stage. There is however no real data about the OSH-implications of these changes.

3.3.7 OSH implications

In-company health protection is closely linked to these developments. Quality and cost management are today an indispensable part of the service known as "health protection". The starting point for quality philosophy is the assumption that an improved structure will lead to an improved process and hence to an improved result. The task of corporate occupational safety and health here is to become integrated in this chain and to achieve its objectives of prevention, provision and health promotion. It will by judged by the extent to which it attains these objectives.

Possibilities for action in occupational safety and health are modified, for example, by the lack of corporate social structure and infrastructure, or because the action possibilities for occupational safety and health are hampered by being excluded increasingly from the classic domain of prevention; the preventive models given by large companies cannot be applied elsewhere without difficulty. This puts occupational safety and health under pressure to modernise – also in the context of new occupational safety and health law –, and such pressure will continue to grow with the decline in its classic success environment of medium-sized and large companies. One of the major challenges therefore is to implement the preventive notions as embodied in new occupational safety and health law, and to do this by applying a forward-looking occupational safety and health policy.

With the erosion of traditional work structures there is also an erosion of the inherited procedures, strategies and concepts in occupational safety and health. Occupational safety and health must take account of the new patterns of work.

Among the urgent problems of implementation, three particular areas should be highlighted: the large and still growing number of small and medium-sized companies, the recording and analysis of the domain of psycho-social strains with their consequences, the determination of a standard performance level under the changed conditions of new work structures and organisations encompassing ageing workforces.

Occupational health is more than just a presence in the company, and efficiency of employees. Occupational health in the company is both the prerequisite and result of a continuous and productive encounter with the conditions and challenges of work. The promotion of personal, organisational and social health potential is today a major prerequisite for corporate success and further growth in productivity.

3.4 Sweden

3.4.1 Introduction: changes and priorities in Swedish working life today

The present world of work is undergoing changes in many countries in Europe. Companies are reorganising by dropping various peripheral activities to concentrate on what they are really good at, compared with competitors worldwide. This "slimming down" of operations has led to many employees losing their jobs, and the first part of the last decade saw a huge drop in employment in Sweden, as elsewhere. Paradoxically enough, the period also saw a marked rise in productivity; companies managed to produce more, despite a constantly shrinking number of staff. In an increasingly competitive climate, survival depended on getting even more out of those operations, which were already going well. The cuts primarily affected staff and middle management and their duties and authority were decentralised through the organisation. Consequently, as the number of staff fell, those who remained took on increased responsibilities.

The reasons for these changes are several. Ongoing globalisation of the economy plays a key role here, with increasing international competition and greater movement of businesses and capital. Companies' dependence on the stock market and the power balance on the labour market shifting in favour of employers probably also played a part.

Working conditions of employees are changing accordingly. Companies are now using fixed-term contracts, external staff and other temporary arrangements to adapt their business to the demand at any given time. Changes are introduced within the organisation to create greater flexibility and to improve conditions for developing the skills of staff.

3.4.2 Changes in the Swedish OSH system

Certain general working life trends have been identified above. There are, however, also newly identified environmental factors of possible importance for the future, such as multi-factorial chemical and physical combination effects after low-level occupational exposures. Parts of the traditional occupational health services thus should be maintained, at the same time, as efforts must be made to control work life changes and trends. New areas must be covered such as, for instance, work organisation and administration, labour costs and management economy. Company health care should be an integrated part of the company management. In recent years in Sweden there has been an unfortunate trend towards a "side-car" effect, i.e. company health care functionally lived its own life outside the company. When management directors were asked about their opinions on company health care, a very small fraction only stated positive experiences of it. This, at a time of economic depression in the country, resulted in a withdrawal of government subsidies, and many physicians and hygienists had to leave for work elsewhere. A diminishing company health care sector must, in order to survive, realise on-going changes, and adjust itself to current and future work life conditions and demands.

The Swedish Work Environment Act demands that each employer shall arrange for satisfactory company health care for employees. With a service programme adapted to the changed situation of companies and their employees, the occupational health services may regain their position as a support function in the companies' efforts for economically sound, high quality production in a good work environment.

3.4.3 New forms of work organisation

3.4.3.1 Downsizing in every sector

In the early nineties the Swedish labour market (about 4.5 million people) lost half a million jobs. The unemployed were the clear losers. For many of those who remained in work, the change was for the better; they gained greater responsibility and a more varied workload. Companies were forced to undergo major organisational changes introducing more flexible terms of employment and duties for the remaining staff.

The trend also has its downside. Every company has an "internal labour market" which is not primarily controlled by supply and demand for labour. Instead, more long-term ties are forged between employers and employees, with the help of internal training, career structures, performance-related pay, etc. This internal market has constituted a stable centre for many companies. As companies are now increasingly cutting out middle management, and having this work carried out outside the company, some of these conditions on which the internal labour market is based are being removed. Relations between employees and employers are changing. There is greater instability and uncertainty among staff, and it is up to individuals to ensure that they gain new expertise. Experience shows that those with little training suffer the most in this context.

The trend in the private sector, as described above, is also seen to a considerable extent in the public sector. Changes in the surrounding world affect the private sector as well as the public sector, for example, the trend towards large-scale operations seems to have vanished in both sectors, in that both are concentrating on core business, and contracting out work to external bodies.

3.4.3.2 OSH implications

The effects of the instability of the Swedish labour market during the 1990s were not recognisable during the process of downsizing and reorganising of companies. The people who remained in work became reluctant to comment on working conditions or to show signs of fatigue or other health problems. The rate of sick leave in the Swedish work force decreased radically, and so did the number of reported work-related accidents and diseases. During 1998 and 1999 the Swedish labour market has recovered, and the rate of unemployment is steadily dropping. However, the latest statistics of work-related accidents and diseases show a dramatic increase. During 1998, 33,400 work-related accidents were reported; an increase

of 12% compared to 1997. 16,300 work-related diseases were reported during the same period, which constitutes an increase of almost 30%. Among work-related diseases, those indicated as caused by organisational and social factors increased the most, and half of these cases were said to be related to stress.

3.4.4 New forms of contractual relationships

3.4.4.1 Virtual jobs

As companies "slim down", they are forced to buy in services or labour now and then, as the need arises. "Outsourcing" is the main trend, using leasing firms and contract staff to cope with the situation when it occurs. Businesses are broken down into projects. People are increasingly working in networks, and with what are known as "virtual companies". One consequence of this trend is that companies are becoming more and more dependent on other, temporary partners. This in turn means that the number of combinations of potential partners soon becomes vast, with a number of conceivable negative consequences in the form of information problems and increasing transaction costs. It is likely that we will soon hit a ceiling where it is no longer practical or profitable to outsource further.

Some new companies, such as virtual companies, are founded entirely on network structures. Here the key assets are the contacts one has developed and knowing the people most suitable for the activity for which one is recruiting. In Sweden, the example of the Swedish Folk Opera has been described (Hedberg 1994), where a handful of staff gather together appropriate singers, a suitable orchestra, a conductor, backstage staff and so on for performances involving hundreds of people. Once the performance is over, the company again consists only of a handful of staff ready for new projects. The trend affects both large and small companies and it is more likely that the winners are to be seen among the latter.

Around an inner core of permanently employed staff many Swedish companies have created peripheral groups of temporary employed and on-call hired people. These groups have during the last decade grown from 10% to 16% of the whole Swedish workforce and comprise at present about 500,000 people. There is strong gender segregation in the group of on-call hired staff. Women are in vast majority, whereas men dominate in project/object related employment. (SCB, 1998)

3.4.4.2 OSH implications

A recent Swedish study (Aronsson et al, 2000) shows that on-call hired staff report more health problems than other groups of temporary employed like project employed or people in vicarious jobs. Most frequently reported are back and neck pain and fatigue/listlessness. The differences between the employment subgroups are so consistent, and of such amplitude, that there are reasons to rank them in a centre - periphery structure.

It is also obvious that with a large part of the workers employed on various fixed-term or temporary contracts there will be difficulties in finding representatives for the workers, who are willing to take on responsibility for maintaining a good quality work environment within the company. In fact the number of safety representatives of the employees has decreased by almost 8% in the last year (Du and Jobbet, March 2000). In the lean organisations of today, time for the internal control of the work environment is considered difficult to allocate both by the employers and the employees, despite the legal demand on the employers to have a functioning system of internal control of the work environment.

3.4.5 New patterns of working time

3.4.5.1 Shrinking 'normal times'

Changes in the world of work during the 1990s have largely focused on creating a more flexible labour market. The aim was to give opportunity for all enterprises to adapt the labour force to emergency requirements; a flexibility which necessarily also affects the private world of the individual. With fixed-

term contracts and flexible working hours becoming more prevalent, it becomes difficult to make long-term plans for one's private time (leisure time). The boundaries between working hours and leisure time are shifting. The positive and negative aspects of these factors remain to be researched.

In a study based on the Swedish Labour Force Surveys of 1989-1997, it was found that the majority of the working population still had its working hours located to daytime and weekdays. There has, however, been a decrease between 1991 and 1997, from 80% to 75% for women and from 84% to 81 % for men. Women constitute the group with increased flexibility in working hours. In comparison with Swedish men, Swedish women hold also more than six times as many part time jobs. (Gonäs L, Spånt A, 1997)

3.4.5.2 OSH implications

The changed labour market includes various types of fixed-term contracts, such as project work and temporary contracts substituting for an absent permanent employee, as well as employment by the day or by the hour. Studies have shown that these groups have very different working conditions, for example those hired for projects are mainly highly-educated staff, given stimulating tasks and a great degree of control over their own working situation.

The working situation of those employed on very short-term contracts, on the other hand, is the reverse, with monotonous and often physically demanding duties, little control of the working situation and little opportunity to influence it. Although both these groups suffer stress at work, the kinds of stress are different. Project contracts may often be demanding, but they do give the individual a large degree of control, which can mean a stimulating positive kind of stress, while high demands in terms of the work put in, and very little freedom of action for those on very short-term contracts, can lead to negative stress.

3.4.6 Growing use of new technologies

3.4.6.1 ICT-jobs

Information and communication technology has created the fastest-growing industrial sector in the world. This is also the situation in Sweden. It has given many people better, less restricted jobs, but not all. For some people, work is instead becoming more and more routine and controlled.

Call centres, which receive calls from customers and often conduct their own outbound telephone surveys, base their work on new information and communication technology. These centres may operate from any location, quite independent of where the company they belong to, or work for, is based. Call centres are becoming common, and are employing more and more people. Many are employed on a temporary basis or work part-time, and personnel turnover is very high. There are few possibilities for career advancement, and there is extremely little opportunity for skill development at work.

New information and communication technology represents a strongly growing part of the electronics and telecommunication industry, and it is affecting work life in several ways. Some of the effects are:

- Globalisation - companies are operating in global markets;
- Companies and other organisations are operating more via networks, and are increasingly seeing knowledge as their most important resource.

The result is that new demands are being made of employees. Technical skills are important, such as knowledge of foreign languages and project planning. Even more emphasis is placed on skills such as analytical ability, creativity, flexibility and the ability to work as part of a team.

A first report of a larger Swedish study entitled "New Boundaries of Work" (Allvin et al., 1998) presented interviews with some strategically selected individuals working with flexible arrangements with regard to time, space and work organisation. 50% of the interviewed people were employed on a permanent basis by fairly large companies in the communication/media, computer or electronic sector. The other half of the group was working on a freelance basis as consultants in areas of networking, organisation and management development. There was no apparent difference in attitude to work or relationship to

employer/client between the two subgroups. The persons with permanent employment did not express any special ties to the employing enterprises or particular advantages of having permanent employment.

3.4.6.2 OSH implications

There is not yet very much knowledge about what effect network organisations, the new way of working, will have on the individuals. It is known that new information and communication technology brings factors, which create stress. The analysis in the above Swedish study showed that participants were characterised by a very high work pace, sustained activation and difficulties in unwinding and relaxation. They seem to have few safeguards and a limited set of life-roles, which could make them vulnerable when difficulties arise. There was a tendency among the participants to idealise their own working conditions. The action strategies of the participants can be described as both purposeful and creative. At the same time, they reported cognitive problems handling and integrating the large amount of information generated through such creative strategies. People become overloaded with information and contacts, and are required to be constantly available. More and more responsibility is placed on the individual, who increasingly has to accept temporary employment, has to take responsibility for his or her own skills development, and has to market himself or herself.

The possibility of arranging employment contracts adapted to individually chosen working hours and demands of private life is a positive factor for work in the information and communication society. Flexibility in this new sector of work needs to be matched by a flexible OSH system, where every employee is included, regardless of individual conditions like location and hours of work.

3.4.7 Growing proportion of workers in service sector

3.4.7.1 Production and company services

The areas known as production services (from banks and insurance companies) and company services (legal and fiscal services, computer consultants, employment agencies and so on) are expanding. The number of staff in these fields has recently increased, unlike the number of people employed, for example, in the manufacturing sector. A Swedish study (Swedish National Board for Industrial and Technical Development, Nutek 1994) showed that one in two companies hired external staff, in the form of experts and consultants. One in seven used external staff for pure production services.

This trend is also seen in the public sector of Sweden. Public bodies are unable to grow as automatically as before: in fact they are forced to shrink. The "new liberal" wave which swept through the 1980s and 1990s brought in its wake an administrative policy which had as its aims decentralisation and delegation, efficiency and goals which could be monitored. The task of the political leadership became to set goals and ensure that they were met; implementation was left entirely to the administrative bodies themselves. However, difficulties have arisen in controlling areas such as the education, health and care sectors, where the "slimming" of the organisations has now in some cases reached a stage where the former, laid off staff are being rehired via employment agencies.

The number of employment agencies active in Sweden amounts to about 400 with about 25,000 employees. The main areas of activity are administration and accounting engaging about 65% of the employees, with industrial and technical areas as the next largest market for the agencies. The expanding sectors for employment agencies are health and care, which today engage 5.8% of the employees of the agencies (Source: SPUR).

3.4.7.2 OSH implications

Control of the quality of work as well as the quality of the work environment in the new forms of service being offered on the Swedish market is difficult. The companies offering the services are mostly considered to be Small & Medium-size Enterprises (SMEs). It can be recognised, as in the information and communication sector, that personnel turnover is rapid. Under these circumstances possible effects of inadequate working conditions may not be seen until the people exposed have moved to a new workplace. The present system of OSH has very few instruments to cover such development.

3.4.8 Conclusions

Changes in company organisation and terms of employment pervade a large part of the labour market, both in the private and public sectors. The aim of achieving an efficient organisation is shared by businesses and public bodies alike. The initiative of introducing a flatter organisation with decentralised responsibilities has not only come from management but also from employees, trade unions and the political system. However, it has not always been easy to predict the consequences of such changes. Continued work by the National Institute for Working Life is focused on studying health effects of the organisational changes in the world of work set out above.

3.5 Finland

3.5.1 Introduction

Findings of the Finnish Quality of Work Life Surveys 1977-97 show e.g. that working conditions have improved in Finland over the last two decades; tasks of employees have grown more varied, and participation in in-house training has increased; employees feel that they can increasingly influence their work; work is more interesting, and support is received more readily than before

Negative aspects have been especially the increasing pace of work, uncertainty of job contracts, competition between workers and less fixed-term employment. Work has become mentally wearing, and social conflicts have increased at workplaces.

In general, OSH-infrastructure and legislation give a good basis for preventive measures in Finland. The situation is better in big "traditional" industry and service companies. Too little information is still available regarding SMEs, agency work, and mobile teleworkers, especially self-employed workers and their working conditions.

The unemployment rate has reduced by a half since the recession years during the first half of the 90s. Currently, there is a shortage of labour especially in high-tech industry and services in Finland. First signs of negative health impacts can be seen among young labour force in these areas as a result new working culture, e.g. with excessive working hours, often without compensation.

3.5.2 Changes in the Finnish OSH system

In Finland, together with the different social parties, maintenance of work ability (MWA), the Finnish concept of workplace health promotion (WHP) has been introduced to begin the process of reversing the trend of early retirement and the high incidence of disability in an ageing work force. The main challenge for MWA/WHP is to support employees, work groups and organisations in controlling work load and stress, in maintaining efficiency and competitiveness, and in encouraging companies to be innovative and flexible, and to keep ageing workers motivated and productive.

Health and disability issues are not seen to be a function solely of the individual, but are due to the interaction of the work environment, work tasks, the health status and professional competence of the workers. This concept has originated from a collaboration between employers and trade unions, with strong governmental support.

In 1999 a committee made up of the main labour market parties (Confederation of Finnish Industry and Employers and Central Organisation of Finnish Trade Unions with state and local government

representatives) published their report on how MWA/WHP should develop. The report included proposals for on-going training (workplaces, authorities, educational institutes), organisational development (insurance organisations, occupational health service system), improving the monitoring and follow-up process (authorities, occupational health services, workplaces) and specific action on organisation of work (long working hours, shift-work, part-time work, contracted and hired work force and other new forms of work).

The major national policy instruments in responding to new challenges of both working life and labour force in Finland are the National Programme for Ageing Workers 1998-2002; the Finnish Workplace Development Programme, with the 1st phase in 1996-1999, 2nd in 2000-2003; the Well-Being at Work Programme in 2000-2002; and the National Productivity Programme in 2000-2003.

Among other important programmes are the FIOH (Finnish Institute of Occupational Health) Small Workplace Programme operating in SMEs in 10 sectors. This programme launched a new strategy for MWA/WHP action in SMEs. Occupational health services with the support of the FIOH developed a network of services, seminars and training events for local SMEs.

Financial support from the ESF helped the programme to get started. New methods of providing information and helping and supporting SMEs in MWA/WHP activities will be applied to other SMEs and expanded to other sectors of the economy. At the moment, the most pressing problem facing the development of MWA/WHP is how to put it into practice within SMEs.

3.5.3 New forms of work organisation and contractual relationships

Recent trends of fragmentation of the companies into smaller independent decentralised units, of subcontracting, of outsourcing, and of flexible organisations, together with flexible working hours, have both positive and negative impact on health and safety. One of the new questions is the difficulty in developing skills and competence in contingent work, because skills of the workers are only in fragmentary use. The changing nature of social contacts, work community, trust and co-operation in virtual organisations and teams are also interesting new issues from the OSH perspective.

The new models for working life show distinct gender tendencies. Temporary work has become most common among women over 30 years of age with higher education, while, among men, temporary contracts are more common for younger employees entering their first jobs. There is a risk of further segregation of the labour market by gender, especially concerning work content and wages.

Elderly workers' participation in working life has been used to balance the supply and demand of labour, for example, through adjustments in pension rules and statutes and retirement ages. This policy has increased the risk of marginalisation among elderly workers with low education.

Risk of occupational accidents is higher among temporary workers. A stable workforce can participate more easily in safety training. More research data and preventive measures ís needed regarding safety attitudes and context of accidents of young generations, both those entering into work life and those with limited work experience. Safety risks of older workers have specific characteristics also. Zero-accident philosophy is one way to systematic preventive safety activities in companies.

With fragmentary work contracts and unstable work environment, traditional follow-up studies with large samples of workers are not possible. Regular monitoring of the work environment and health becomes discontinuous, if not impossible. Machines, tools and communication technologies are used in changing environments, even in cars.

Company-based data may become less important than individual-based data. International mobility makes follow-up studies even more demanding. New methods must be developed in order to monitor work environment and to follow, register, and assess workers' health and exposure. There might be a growing

need for personal monitoring in addition to environmental monitoring. One problem with databases and statistics is that they are relatively rigid systems, and new types of risks are therefore not easily identified.

Work and non-work exposure is difficult to differentiate, and analysis of combinations of several different types of factors is needed. New exposure factors emerge, e.g. in human-human interaction between service workers and clients. Confounding factors are different in different environments and cultures. The application of research may become more difficult because of the multi-causal character of the problems.

3.5.4 New patterns of working time

Unpaid extra working hours have increased, especially among white-collar workers both in industry and service sector. Research has been conducted in Finland e.g. on the impact of shortened working hours on well being. Experiences have been positive when new working time arrangements have been based on innovative approach: joint negotiations between parties, participation on the voluntary basis, and benefits are gained by both employers and workers.

Normal everyday functioning in society is based on the assumption of full-time and permanent work. If the change in work life is toward increased so-called flexible work, problems with life resources should be solved. The boundary between work, home and leisure time activities is becoming blurred. This has many implications for family life, gender roles, and duties and responsibilities outside work

3.5.5 Growing use of new technologies

Regarding the development and implementation of new information and communication technologies (ICT), and the implications for OSH, not a lot is known in the Finnish situation. OSH-research is needed in 3 main areas:

- The demands on the visual and auditory sensory system in the design of new technologies, cognitive ergonomics, and the organisation and management of information work.
- A specific research and development programme has been started in Finland regarding information-intensive work. The aim of the programme is to plan and allocate resources to projects, which combine research, development and training in knowledge intensive organisations and work processes.
- Business processes, the implementation of new technologies, and organisational development should be developed simultaneously, based on new types of research and development networks.

More attention should be based on flexible forms of work organisations, with telework as one example discussed here in more detail.

Statistics and research data on telework, both at national and European level, are very limited, especially regarding other types than tele-homework. Data are lacking e.g. on different working situations and conditions of mobile teleworkers. More well-planned longitudinal studies are needed on stress, strain, musculoskeletal disorders, and isolation in different types of work. The impact of new technologies and new work organisations on skills, impact of flexible hours on health and productivity in the long run, problems with separating work and family life, and building of new organisational and leadership cultures can be seen only after a long period of time.

Telework provides an opportunity to perform work in one of the most decentralised ways in society. It can be done across the borders while staying at home. In order to remove obstacles from the wider adoption of telework, especially transborder telework, many labour law and social security issues should be solved.

Among these are the sources of labour law, and health and safety regulations, the legal status of teleworkers (employee vs. self-employed), conditions concerning privacy, regulations regarding the contract of employment, and coverage of teleworkers by different social security benefits.

Telework may outdate the traditional concept of subordination, in which work is performed under the command and control of an employer. Working independently from time and place calls for trust between different parties. A successful combination of work and personal life requires a clear separation of the work place and commonly agreed rules upon how to secure undisturbed concentration on work, privacy, and data protection. Also possible risks to third parties should be addressed.

Big companies have created their own telework practices and agreements, where health and safety issues in telework have been regulated. A solution has been sought in systematic control by means of health and safety surveillance directed toward internal rules and routines of the companies. Attention to health and safety risks of the applied material, equipment and work environment should start at the point of sale, consulting the teleworkers.

Especially for small and medium-sized enterprises and for self-employed teleworkers, specific health and safety information dissemination activities with guidance and training on how to proceed with respect to relevant issues (e.g. health surveillance, how to organise work patterns, working times, re-training, risk assessment on home work station) are needed. Guidebooks, newsletters and computer-based instructions for adjusting and checking the work environment and working should be further developed, using both internet and CD-ROM.Another expanding area, where new forms of work organisation and applications of newest information and communication technologies are combined, concerns different types of call centres.

3.5.6 Growing proportion of workers in the service sector

Most of the issues discussed in previous chapters are relevant regarding changes at work and OSH implications in the service sector in Finland. A recently published large survey in the commercial sector in 1998 revealed that during the 90s, the number of stores has decreased but the size of the stores increased. Since the earlier parallel surveys in 1979 and 1989, work pace, extra work without compensation, and violence or threat of violence has increased, violence especially in small grocery stores. Mental stress, physical load, feeling of fatigue and negative mood were more frequent than in earlier studies. Reduction of work pace and overwork, physical load and violence are the key OSH issues to be addressed.

In addition to retail workers, high-risk occupations as regards violence at work are e.g. hotel receptionists, ship's deck crews, police officers, guards and security workers, restaurant workers, social workers, drivers of buses and streetcars, etc., and health care workers.

3.6 Spain

3.6.1 New forms of work organisation

Spanish companies are subject to the same pressures as their European competitors. For this reason, they have started studying the efficiency of their work organisation: firstly with standardisation of their work procedures through ISO quality certification, and by secondly encouraging certain types of direct employee participation with a view to improving their involvement in company objectives.

3.6.1.1 ISO 9000

The number of companies in possession of an ISO quality certificate is growing steadily, and at the beginning of 2000, 3515 certificates had been issued to companies proving their compliance with the ISO 9000 series (1/2/3) quality standards.

According to ENCT 99 data, 12.7% of all work centres had a quality management system and a further 15.7% were considering introducing one. By sectors, the work centres of the chemical (26.2%) and metal (24.3%) industries showed the highest presence of these systems.

In the largest work centres (with over 500 employees), 45.3% had introduced one and a further 25% were considering doing so. It should be pointed out that one quarter of all centres (which reaches 75% in centres with over 500 employees) are part of a company with several work centres and so the company's quality management initiatives are distributed over the majority of its centres.

The intention to improve the quality of products and services comprises the main thrust behind changes in the technical equipping of work centres. Seven out of ten companies had made a significant investment in work equipment (machinery and installations).

The main reason for such investment is improvement of product or service quality for 45.5% of them, and for 33.7% this is the second reason. In industrial companies, the main reason is improvement in productivity (over 50%), while in services companies quality is the primary reason (between 45 and 59% according to sector).

3.6.1.2 Direct participation/representative participation

Quality as an objective also encourages the company to initiate employee participation practices and direct involvement, ranging from traditional methods with little formal structure, to more innovative proposals for giving certain employees autonomy of decision. The following table shows the results of the ENCT 99.

Table 10. Direct participation by sectors. Work centres with participation procedures, in %

	INDUSTRY	SERVICES	CONSTRUCTION	TOTAL
DIRECT CONSULTATION	90.1	87.6	85.2	87.8
SUGGESTIONS BOX OR SIMILAR	14.5	18.9	15.1	17.5
IMPROVEMENT OR QUALITY GROUPS	16.8	19.4	11.3	18
AUTONOMOUS WORK GROUPS	5.6	6.4	8.1	6.4
PARTICIPATION IN OWNERSHIP	9.5	10.1	2.6	9.1

Basis: Total of work centres.
Source: Company questionnaire. ENCT 99.

Improvement groups or quality circles are established in 27.5% of work centres in the "social services" sector, in 26.1% in the chemical sector, and in 24.2% in banking.
Moreover, autonomous work groups are present in 10.7% of work centres in banking and in 10.4% in the chemical sector.
In both cases, the greater presence in these centres could be related to the higher average level of qualification of employees dedicated to these activities .

The larger the company, the weaker, but more structured forms of participation can be found, such as the suggestions box. More stable organisational forms, such as improvement or quality groups, are also found more frequently the larger the company, and in this case are related to the fact that the larger companies have introduced quality systems to a greater degree and these groups comprise part of the system. Besides

this, autonomous work groups, which give their components a greater capacity for decision, are established in 20 to 25% of the larger centres.

Table 11. Direct participation. Company size and different forms of participation, in %

	50 TO 249	250 TO 499	500 +
DIRECT CONSULTATION	83.6	74.9	86.7
SUGGESTIONS BOX OR SIMILAR	43.6	46.7	45.1
IMPROVEMENT OR 1 GROUPS	32	39.4	41.1
AUTONOMOUS WORK GROUPS	12.3	25.7	18.9
PARTICIPATION IN OWNERSHIP	6.9	7.1	6.6

Basis: Total of work centres
Source: Company questionnaire. ENCT 99

The appreciable expansion of these modern forms of work organisation should not make us forget that other indicators reveal an overwhelming survival of other "Fordist" forms of work organisation such as "chain working", which in the same personnel sections is over 10% of the total of employees.

As several studies have demonstrated (Cressey, P., 1988), the relationship between representative and direct participation is mutually beneficial. It is more difficult to extend direct participation practices without the support of formal employee representation (Aragon, A., 1998: 242).

The recently passed Industrial Risk Prevention Act (Act 31/1995) has established some of the widest consultation and participation rights to be found in Spanish labour legislation. It formally grants employee representatives a capacity for influence in spheres that are beyond the traditional concept of safety and hygiene matters, such as the planning and organisation of work, the introduction of new technologies and the choice of productive equipment.

Table 12. Representative participation by payroll size, in %

	50 TO 249	250 TO 499	500 +	500 +
PLANNING AND ORGANISATION OF WORK	50.8	52.9	51.1	40.6
INTRODUCTION OF NEW TECHNOLOGIES	31.2	20.2	38.6	23.4
CHOICE OF EQUIPMENT	34	21.8	44	25

Basis: Total number of centres.
Source: Company questionnaire. ENCT 99

Table 13. Representative participation by industrial sector, in %

	CHEMICAL	METAL	OTHER NON MANUF. IND.	INDUSTRY TOTAL
PLANNING AND ORGANISATION OF WORK	46	40.8	48.4	41
INTRODUCTION OF NEW TECHNOLOGIES	24.7	26.6	33.7	25.3
CHOICE OF EQUIPMENT	27.8	33	37.9	27.7

Basis: All industrial sector centres
Source: Company questionnaire. ENCT 99

Table 14. Representative participation by services sector branch, in %

	BANKING	COMMERCE. CATERING	SOCIAL SERVICES	SERVICES TOTAL
PLANNING AND ORGANISATION OF WORK	41.3	38.8	49.4	40.8
INTRODUCTION OF NEW TECHNOLOGIES	29.9	20	33.3	23.8
CHOICE OF EQUIPMENT	27.9	18	29.1	22.5

Basis: Total of services sector centres.
Source: Company questionnaire. ENCT 99

As the figures demonstrate, compliance with these legal obligations does not occur in the majority of cases, and so we can say that they imply an acceptable degree of penetration of these processes in the fabric of the business world in Spain. The obvious evidence of the benefits obtained, and the level of trust existing between the participants (businessmen and employees and their representatives) implied by the practice of such participation, would probably contribute, to a large extent, to its natural spreading to other centres and companies, rather than through pure compulsory imposition of a legal text.

3.6.1.3 Team work and job rotation

The fact that an increasing number of companies experiment with new forms of organisation does not mean that these experiments are carried out on all company payrolls. The number of employees involved in them is usually small in ratio to the whole. And so, according to ENCT 99, only 3.1% of employees form part of a work team within which different tasks are carried out. Payroll size does not appear to be a conditioning factor of greater or lesser presence in this system of organisation. However, this is clearly related to the type of activity, and in industrial sectors such as the metal industry, this reaches a quota of 5.5%.

Job rotation between different posts and functions is more widespread than teamwork, and affects around 17% of employees, rising in the case of the metal and chemical industrial sectors to 26 and 24% respectively. The smaller the work centre, the greater the flexibility the employee must have in terms of work, and this is calculated at around 20% in companies with fewer than 50 employees. Consistent with this larger presence in industrial activities, 15.6% of the total of this collective group (8% of the total of employees) work using traditional forms of organisation such as "chain working".

The relationship between these two multi-role employee types (whether inside a working group with some degree of relative autonomy, or through the alternating performance of different jobs or functions) and the form of payment is clear. Part of the salary received by 23% of employees who form part of a work team is paid in a variable way, for those occupying alternating posts this is 18.2%, and for those performing one job or function it is 12%. Variable salary is used as an incentive to a greater extent in these organisational forms that involve the employee more in his task.

3.6.1.4 OSH implications

Team work seems to be strongly linked with specific mental demands in the job. The demand for maintaining a high or very high level of concentration or that of maintaining a high work pace for most of the working day affects these employees to a significantly higher degree; 69% per 58.5% in the first situation and 51.5% per 35.3% of those affected by work pace. In addition, it does not always seem to imply for the employees any increase of contents in the tasks they perform in relation to other types of organisation, as complaints concerning repetitiveness and short duration of the work cycle are higher than the average: only one quarter of this collective group is never affected by such work demand.

The level of autonomy in task performance carried out by those working in a team and those alternating between jobs is appreciably lower in relation to those who have to take care of one job or function only.

Table 15. Employees who can never modify .... (In %).

	TASK ORDER	WORK METHOD	WORK PACE	DISTRIBUTION AND DURATION OF BREAKS
ALWAYS PERFORMING ONE JOB ONLY	18.5	29.2	26.8	26.4
ROTATING BETWEEN JOBS	27.5	35.6	29.1	32.1
ALTERNATING JOBS WITHIN ONE ESTABLISHED WORK TEAM	25.2	35	45.2	41.3

Basis: Total of employees in industry and services.
Source: Employee's questionnaire. ENCT 99

It is members of work teams who, generally speaking, enjoy a lesser degree of autonomy, in particular as regards modulation of work pace. Only 9.7% of these are not subjected to an established work pace, meaning that the employee can establish this for himself, while in the other groups 15% state that they do not have a pre-established pace. Moreover, 22% of this collective group does shift work (11% including night shift), which is over double the average for all employees. In addition, 21.4% of the group regularly works on Sundays or public holidays, and a further 22% on an occasional basis, and one employee out of every four in this group holds a temporary contract, while in the total number of the sample this is only 17.5%.
On the other hand, they receive more training than other groups; 57.3% had attended some training process in the last year as against 43.6% of the total. Almost 20% of the group had suffered an accident at work in the previous two years (the average for industry is 14%).
Generally, it is the group showing the greatest proportion of problems in respect of the total number of factors. The symptoms of psychosomatic indisposition are higher in both groups.

Table 16. Psychosomatic problems, in %

	ALWAYS DOES THE SAME JOB	ALTERNATES WITH OTHER JOBS	ALTERNATES THE JOB WITHIN A WORK TEAM
INSOMNIA	10.3	13.3	13.6
CONTINUAL FEELING OF FATIGUE	9.5	14.7	15.5
FREQUENT HEADACHES	12.1	17.5	12.6
IRRITABILITY	7.9	12	9.7

Basis: Total of employees.
Source: Employees questionnaire. ENCT 99.

Table 17. Reasons for going to the doctor, which are work-related according to the way this is organised, in %

	ALWAYS DOES THE SAME JOB	ALTERNATES WITH OTHER JOBS	ALTERNATES THE JOB WITHIN A WORK TEAM
NECK AND BACK PAIN	7.2	11.8	10.7
PAIN IN SHOULDERS, ARMS, WRISTS AND HANDS	2	6.3	14.2
STRESS AND DEPRESSION	1.8	1.4	4.7

Basis: Total of employees.
Source: Employees questionnaire. ENCT 99

According to the employees themselves, one quarter of all visits to the doctor made over the last year were due to their working conditions. The following table summarises the principal underlying reasons for such consultations.

3.6.1.5 Persistence of old forms of work organisation

The growing diffusion of "new" organisational methods must not lead us to forget that even today, the old forms are more widespread among the Spanish wage-earning population. As an organisational formula, chain work is used among 22.7% of employees in industry and 2.5% of those in the services sector. Among them, for those with a temporary contract it is 5.5 points higher (22.5%). The salary paid to 20.5% of them contains a variable item, which in the majority of cases is related to productivity. One third of those doing chain work do so alternating between different jobs. The perception of the existence of safety risks is much higher in this group (92.3%) than among those who are not employed in chain work (69.5%) or among the entire group of industrial workers (84.8%).

3.6.1.6 OSH implications

Constrictions of a physical nature are more frequent in this group, in particular the highly repetitive hand and arm movements used for most of the working day, and which affect 54% of those performing chain work as against 33.7% of the total.

Mental demands are also higher, ranging from the high level of concentration required from the worker for task performance, to his obligation to maintain a high work pace but, obviously, it is the excessive repetitiveness of the task which differentiates these employees from all the others. Consistent with the low regard in which the task is held, two thirds of those comprising this group consider that no special knowledge is required, just plenty of practice, for performing the job satisfactorily. The indicators referring to autonomy level demonstrate the low capacity these employees have for involving or adapting task performance to their level of knowledge and physical and mental states. The following table shows the different restrictions placed on employee autonomy.

Table 18. They can never modify

	CHAIN WORKERS	TOTAL EMPLOYEES
TASK ORDER	47	20.2
WORK METHOD	54.2	30.4
WORK PACE	44.5	27.7
DISTRIBUTION AND/OR DURATION OF REST BREAKS	49.6	27.8

Basis: Total of employees.
Source: Employees questionnaire. ENCT 99.

Work pace determinants are, in the first place, the rhythm of the machine (39%), production limits (19.6%), external causes, public or customers (17.7%) and the pace conditioned by that of other colleagues (13%).

On the other hand, almost 20% occasionally work on night shift (nearly doubling the average for all employees) and 29% do shift work as against 11% of the total.

Insomnia (17%) and irritability (11%) are the health problems most frequently associated with this group. Moreover, the proportion of persons affected by these problems in this group of workers, in respect of a two-year period, doubles the average (18% were affected). Changes in sleep patterns have led 1.2% of shift workers to seek medical advice, which is triple the percentage of those not on shift work.

3.6.2 New forms of contractual relationships

The form of adapting to the variability of demand, which is most frequently used by part of all companies in Spain, is the temporary contract. Some 33% of employees hold a temporary contract. This percentage has not increased over the last few years, and has in fact decreased slightly as a result of public policies that have been agreed with the trades unions and business organisations. However, the prevalence of short-term contracts among the younger employees (under 25 years old) reaches 70%. The use of the temporarily employed group as a more functionally flexible labour force backs up the fact that 20% of them alternate their activity in more than one job (as against 16% of the group holding permanent employment contracts). They also serve to fill "chain work" jobs to a greater extent (10.5% as against 7.5% of those with a permanent contract). The awareness of this group in respect of their exposure to safety risks is also higher (78% as against 73%).

Demands of a physical nature are higher among this group than among those with a permanent contract. For at least part of the working day, the task forces them to:

Table 19. Physical demands by contract type. In %

	PERMANENT	TEMPORARY
REMAIN IN PAINFUL OR TIRING POSITIONS	37.7	46
LIFT OR MOVE HEAVY WEIGHTS	29.4	42.7
CARRY OUT STRENUOUS ACTIVITY	25.7	35.1
USE HIGHLY REPETITIVE HAND OR ARM MOVEMENTS	59.9	66.3

Basis: Total of employees.
Source: Employees questionnaire. ENCT 99.

Among the mental demands made, the only differences noted are those in respect of performance of repetitive tasks (72.8% of temporary workers as against 67.6% of those with a permanent contract).
The level of autonomy in tasks performed by temporary employees is far below that of their permanently employed colleagues, as can be seen in the following table.

Table 20. Employees who cannot modify, en %, by employment type

	TASK ORDER	WORK METHOD	WORK PACE	DISTRIBUTION AND/OR DURATION OF BREAKS
CONTRACT TYPE				
PERMANENT	18.4	28.7	26.6	26.5
TEMPORARY	31.4	38.3		38.9

Basis: Total of employees
Source: Employees questionnaire. ENCT 99.

Both groups are also clearly differentiated in respect of the degree of participation in aspects related to their work (organisation and planning, teams, quality review, etc.). At all events, participation levels are on average 10 percentage points lower among temporary employees.

Access to training also separates the two groups. Some 45% of employees with permanent contracts had been given some kind of training in the twelve months prior to the survey date, as against 33% of those with temporary contracts. The same occurs in relation to occupational hazard prevention. Only 42% of temporary employees had benefited from a medical examination last year, as compared with 62% of those with permanent contracts.

Perception of their state of health and health problems is greatly conditioned by the fact that this group is much younger, and so their complaints are not very much higher than those found among the permanently employed group.

Accidents, which are the most extreme indicator of poor working conditions, demonstrate a frequency rate which is much higher among temporary workers, in fact two to nearly three times higher, and is just the same whether they are total or serious and fatal accidents (in the latter, the rate rises to almost double among temporary workers).

Table 21. Evolution of accidents in the working day causing labour layoff according to contract type

YEAR	PERMANENT CONTRACT			CONTRACT WITH SPECIFIC DURATION			RATE RATIO
	EMPLOYEES	ACCIDENTS	INCIDENCE RATE	EMPLOYEES	ACCIDENTS	INCIDENCE RATE	
1990	6,463.5	296.3	45.8	2,809.9	351.9	125.2	2.73
1991	6,338.6	289.9	45.7	3,027.4	357.9	118.2	2.58
1992	6,036.8	272.2	45.1	3,039.5	320.6	105.5	2.34
1993	5,876.6	248.9	42.4	2,806.8	256.9	91.5	2.16
1994	5,711.7	242.9	42.5	2,914.5	271.7	93.2	2.19
1995	5,825.6	258.8	44.4	3,177.1	311.9	98.2	2.21
1996	6,141.6	267.4	43.5	3,136.5	329.1	104.9	2.41
1997	6,442.0	269.1	41.8	3,254.4	383.7	117.9	2.82
1998	6,790.9	295.4	43.5	3,352.4	432.1	128.9	2.96

Source: Social and Industrial Statistics Yearbook; Ministry of Labour and Social Affairs.
Population basis: Employees according to active population survey
Figures in thousands.
*Incidence Rates = (No. accidents/Employee population) * 1,000*
Rate Ratio = (Specific Duration Contract Incidence Rate / Permanent Contract Incidence Rate)

3.6.3 New patterns of working times

3.6.3.1 Shift and night work

Classical systems of work organisation by rotating shifts is found in 11% of employees (15% in industry, 25% in the chemical sector, 20% in the metal sector and 16% in the social services sector). In terms of type of occupation, this is more frequent among machine operators and teams (23%) and unskilled workers (14%). Night shifts, whether on a continuous basis or part of work shift rotation, affects 5.8% of employees (6.9% in the industrial sector, and amongst these 8% of workers employed in manufacturing industries).

Table 22. Evolution of working hours type. INDUSTRY, in %

		1997	1999
SPLIT WORKING HOURS (MORNING AND AFTERNOON- EVENING)		58	64.5
UNINTERRUPTED WORKING DAY	MORNINGS ONLY	18.7	14.2
	AFTERNOONS-EVENINGS ONLY	3.2	3.2
	NIGHTS ONLY	1.7	1.8
WORKING HOURS IN ROTATING TEAMS	MORNING/AFTERNOON-EVENING	7.2	5
	MORNING/AFTERNOON-EVENING/ NIGHT	9.5	10
OTHER TYPES		1.6	1

Basis: Total of employees, industry sector.
Source: ENCT 97 and ENCT 99 company questionnaire

Table 23. Evolution of working hours type. SERVICES, in %

		1997	1999
SPLIT WORKING HOURS (MORNING AND AFTERNOON- EVENING)		47.8	49.1
UNINTERRUPTED WORKING DAY	MORNINGS ONLY	24.8	28.7
	AFTERNOONS-EVENINGS ONLY	5.7	5.5
	NIGHTS ONLY	1.7	1.4
WORKING HOURS IN ROTATING TEAMS	MORNING/AFTERNOON-EVENING	7.2	4.6
	MORNING/AFTERNOON-EVENING/ NIGHT	8.3	5.4
OTHER TYPES		4.6	4.3

Basis: Total of employees, Services sector
Source: ENCT 97 and ENCT 99 company questionnaire.

As can be seen, the only type of working day that has grown appreciably during the last few years is that involving split working hours, and perhaps this should be analysed in relation to the increasing normality of employee presence in the workplace outside the usual hours. Doing overtime on a habitual basis is a relatively new aspect in its dimensions. The demands made for greater employee involvement in the company probably account for the fact that 26% of workers habitually extend their working day without any economic return. Technical and professional personnel do this in over 40% of cases, and this is more usual in the services sector in particular.

According to ENCT 99, the systems organising rotating shift work affect 11% of employees (15% in industry, 25% in the chemical sector, 20% in the metal sector, and 16% in the social services sector). Company size also has a significant influence on the possibility and advantageousness of establishing shift work systems, and in the smaller companies their incidence is little more than 4% of employees, while in work centres employing between 250 and 499 people, this rises to 19.7%. In relation to the type of

occupation, the highest frequency is found among machine and equipment operators (23%) and unskilled workers (14%) . A proportionally higher presence of part-time employees is found in shift work (12% of this group) as compared with 9.6% of full-time employees.

Night work, either on a continuous basis or as part of rotating shift work, affects 5.8% of employees (6.9% in the industrial sector, and among these, 8% of those employed in the manufacturing industries).
Some 13% of shift workers alternate tasks within a work group and a further 14% rotate between tasks. Moreover, 22% of shift workers do this "in chain" (27% of employees doing shift work which includes nocturnal hours).

Shift workers and night workers are more exposed to physical demands such as having to remain in painful or tiring positions (11% as against the average of 8%) and, particularly, having to use highly repetitive hand and arm movements for most of their working hours (44.5% as against the average of 34.3%).

Table 24. Mental demands are also higher, as can be seen in the following table:

	SHIFT WORKERS AND NIGHT WORKERS %	TOTAL EMPLOYEES %
	63.4	58.3
	44.7	35.3
	45	32.3

Basis: Total of employees.
Source: Employees questionnaire. ENCT99.
Monotonous work also affects this group to a greater degree (45.6% as against the average of 36%).

Table 25. Their level of autonomy is noticeably lower:

LEVEL OF AUTONOMY (THEY CAN NEVER MODIFY THE FOLLOWING ASPECTS)	SHIFT WORKERS AND NIGHT WORKERS %	TOTAL EMPLOYEES %
ORDER OF THE TASKS	43.2	20.9
WORK METHOD	55.5	30.5
WORK PACE	51.6	27.3
DISTRIBUTION AND/OR DURATION OF REST BREAKS	48.2	28.8

Basis: Total of employees.
Source: Employees questionnaire. ENCT99.

In view of this information, it is only logical that the more arduous conditions of shift (and night) work should be rewarded in terms of salary to a greater degree than that found in all other forms of working day. Around 30% of shift workers are paid a variable salary either for reasons of piece rate or for the number of hours worked.

3.6.3.2 Work done on Sundays and public holidays
Some 12% of employees do this habitually: one out of every four people employed in business and the catering sector. A further 16% of the total occasionally work on Sundays and public holidays. 42% of those who habitually work on Sundays and public holidays do so at night or in shifts. In short, 45.5% of this latter group habitually work on Sundays or public holidays, and 25% do so occasionally.

3.6.3.3 Part-time work

This is one of the flexible formulae for work time, together with shift work or overtime. Its incidence is much lower than those analysed above and barely goes over 7.3 of the sample, although part-time contracts are growing rapidly (during the last year they increased by two percentage points). In principle, the part-time contract does not have to be more flexible than the full-time contract, unless it is used in unusual working day schedules, which seems to be the case in the European Union for one third of these employees (OCDE. 1998:384). In the case of Spain, data provided by the ENCT 99 distributes part-time workers into the following hourly categories:

Table 26. Part-time work by working hours type

SPLIT WORKING HOURS (MORNING AND AFTERNOON-EVENING)	FIXED MORNINGS	FIXED AFTERNOONS-EVENINGS	ROTATING SHIFTS (MORNING AND AFTERNOON-EVENING	ROTATING SHIFTS (MORNING/ AFTERNOON-EVENING/NIGHT)
30.5	32.7	18.6	7.1	4.8

Basis: Total of employees.
Source: Employees questionnaire. ENCT99.

Proportionally speaking, these employees have more frequent work in the afternoons-evenings or in teams rotating between morning and afternoon-evening work. In addition, they habitually work on Sundays or public holidays to a greater extent than their full-time colleagues (15.6% as against 10.6%).

These employees benefit to a lesser extent from measures taken to protect their health and safety. Only 32% had undergone a medical examination in the previous year, as against 60% of full-time employees. They also have less access to training activities. In the previous year, only 22% had attended a training course, as against 44% of full-time employees.

No information is available about the OSH implications of these new developments.

3.6.4 Conclusions

Some major trends in the Spanish OHS-situation can be deducted from a major survey (1999) and the comparison of these results with earlier studies. It is clear that the Spanish companies respond in numerous ways to the new production demands and increased international competition. They are eager to improve the quality in products or services. Big and medium enterprises have developed new quality policies to react to international competition. These policies have not yet lead to a greater participation of workers in decision making. Job rotation between different posts, functions and the traditional "chain-work" are still more frequent than new forms of work such as "team work". Such new forms of work are no guarantee for better working conditions.

Employees in teamwork or enjoying higher rates of rotation between jobs or functions, are subjected to a higher work pressure and intensity than average. They also have less autonomy in their task performance. Furthermore, the workers with more functional flexibility (teamwork and job rotation) report higher psychosomatic troubles.

Spain shows a high rate of temporary workers. These workers are subjected to more painful work conditions such as repetitive movements, uncomfortable positions, repetitive and monotonous tasks. These workers have to work under lower levels of autonomy than non-temporary workers. Furthermore, they have a limited access to training and occupational health risk surveillance against the risks to which they are exposed. The consequences are seen most clearly in the higher accident rates: temporary workers show an accident risk probability, which is three times higher than non-temporary workers. Also, the

subcontracting of activities among enterprises is increasing and often it is quoted as a factor for higher accident risk.
A new development is the greater variety in working hours. The rate of part-time work is rising quickly in Spain, although it is still less frequent than in other European countries.

Generally, the new forms of flexibility applied by Spanish companies are in conflict with the assumptions on which legal regulations, collective bargaining and preventive policies at company level are based. These older regulations are suited for a situation, which was steadier in the contractual and organisational respects.

3.7 France

3.7.1 Introduction

It should be noted that France has shifted, from a predominantly agricultural society, to an industrial society directly influenced by energy sources such as coal, oil and now nuclear power, in roughly a century. France then shifted from the industrial society to a service society. It did so whilst developing ever more advanced technologies such as computers and modern communication networks, genetic engineering, "intelligent" automation, etc. Blue-collar workers have been replaced by white-collar workers, and by a significant proportion of marginalised individuals.

Technical changes are accompanied by organisational changes: part-time work, fixed-term contracts, neo-Taylorism, teleworking, computerised system management, age related management, multiple, skills, etc. These different elements make it impossible to treat production processes, whether material or not (information), as an idyllic relationship between employer and employee. This is due to the high social and human costs involved, despite clear improvement in working conditions, operators' qualification levels, working hours and, to a lesser extent, salaries.

The search for a safer society, whether at work or not, leads to the requirement that technological developments be evaluated. This is coupled to a desire for monitoring technical and organisational change (alongside a desire for increased spending power and availability of products resulting from technological innovation, etc.). Recent media coverage supposes that those actively involved in the transformation of society consent to public debate. Such public debate will turn around those changes the world at work should undergo, in order to bridge the gap between the complex aspirations of society at large, and the likely effects of transformation of company structure. An exchange in point of view should take place between technocratic and "democratic" interest… (André, 2000)

In this context, the action of the authorities comes within a scheme of active vigilance, considering the strengthening of the requirements of safeguarding health at work as well as the evolution of the latest statistics of occupational accidents. The current development of systems of health surveillance as well as of compensation of occupational diseases aims to better anticipate and take into account the pathological consequences of exposure to risks, the effects of which are either diffuse or delayed; it translates an increasingly strong concern for health in general, and more especially in its complex reaction with work, the forms and conditions of which are in full change. Consequently, transparency requirements for decisions, for the independence of expertise and scientific surveillance, for the improvement of knowledge of the reality of risks or for the reactivity of all actors in the prevention have vigorously been reaffirmed in 1999 (Ministère, 1999).

3.7.2 Changes in the French OSH system

3.7.2.1 Health and scientific surveillance
The scientific surveillance procedures started in the last few years, in particular thanks to the successive collective expert research programmes INSERM was requested to conduct (asbestos, asbestos substitutes, lead, ethers of glycol), were continued and strengthened in a spirit of synergy between health at work, public health and environmental protection.
In 2000 INRS set up similar procedures in the form of "expert opinions".
The creation of the National Institute for Public Surveillance (NIPHS - n VS) by the French law of July 1, 1998 makes it possible to improve the alarm system of the authorities on subjects which require development of risk management that the authorities ensure through laws, preventive action, training and methodological tools. It supplements the action of the prevention network of the occupational hazards within the framework of a true policy of surveillance. The works carried out by the NIPHS will be combined with the various studies and investigations, in particular thanks to occupational medicine (SUMMER, ESTEV, STED, etc.). Both State and actors of prevention will have enhanced information, thus enabling better determination of the levels of risk. This will also make it possible to better anticipate and articulate the actions to be undertaken (carcinogenic risk for example) (Ministère, 1999).

3.7.2.2 The organisation of the occupational risk prevention system

3.7.2.2.1 Dialogue with the social partners
In April 1999, the social partners have engaged in a dialogue likely to be made concrete by a global inter-professional negotiation on the French prevention system, seeking and proposing developments or adaptations required by the system. This technical stage of bi and multilateral exchanges, must enable the partners to lead to a real negotiation stage (Ministère, 1999). Theoretically, this must, before the end of the year, form the subject of a draft-agreement between the social partners. Any development, as regards the organisation of prevention, will be based on these dialogues, and will quickly intervene, so that initiatives required as regards prevention are not slackened.

3.7.2.2.2 Reforming the occupational medicine
The French system of occupational medicine must develop in order to take into account new working conditions, and to meet any modified social expectations. The recognition of its social utility and consolidation of assets requires significant adaptations, in terms of services rendered to the workers, the companies and the Nation as a community (Ministère, 1999). Negotiations on this topic are currently in progress.

3.7.2.2.3 The French Agency for Environmental Health Safety (AFSSE)
The French government has set up 2 agencies, one devoted to health products, the other one to the health safety of food. A new agency in charge of both environment and working environment has to be created. It will thus be in a position to confirm information for society, as well as for those engaged in work, and to play the role of consultant with the government. The combination of the plans already set up, or being currently set up, will increase the preventive activity in France.

3.7.3 Changes in the work context

France, like the majority of Western countries, is undergoing rapid developments, generally expressed by the replacement of blue-collar by white-collar workers. We are shifting from the industrial revolution, in which production is a goal, to the service society, for which production is a means. The change from industry to service society results in the search for a better use of the resources in order to obtain an ever-larger performance, thanks to, in theory, ever-smaller effort. Within this framework, innovation is favoured, even if it corresponds to a complex process, which shows characteristics of uncertainty and incompleteness.

Figure 2. Changes in Work Conditions

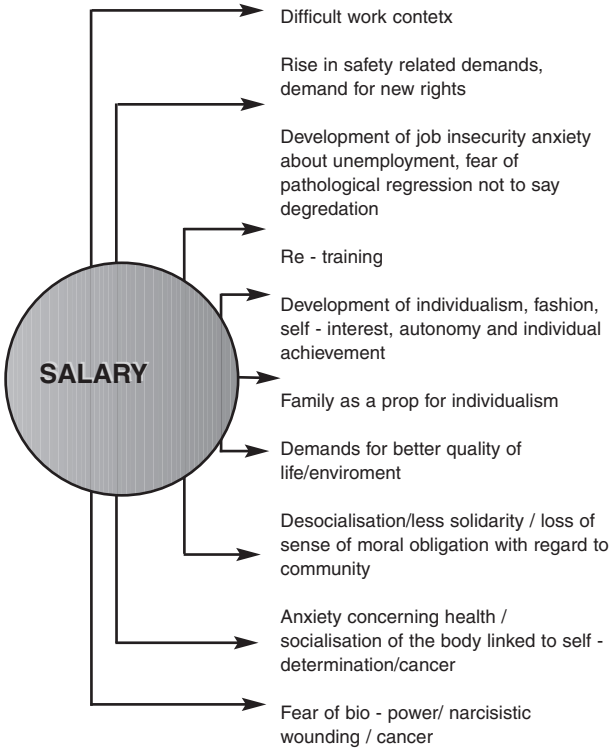
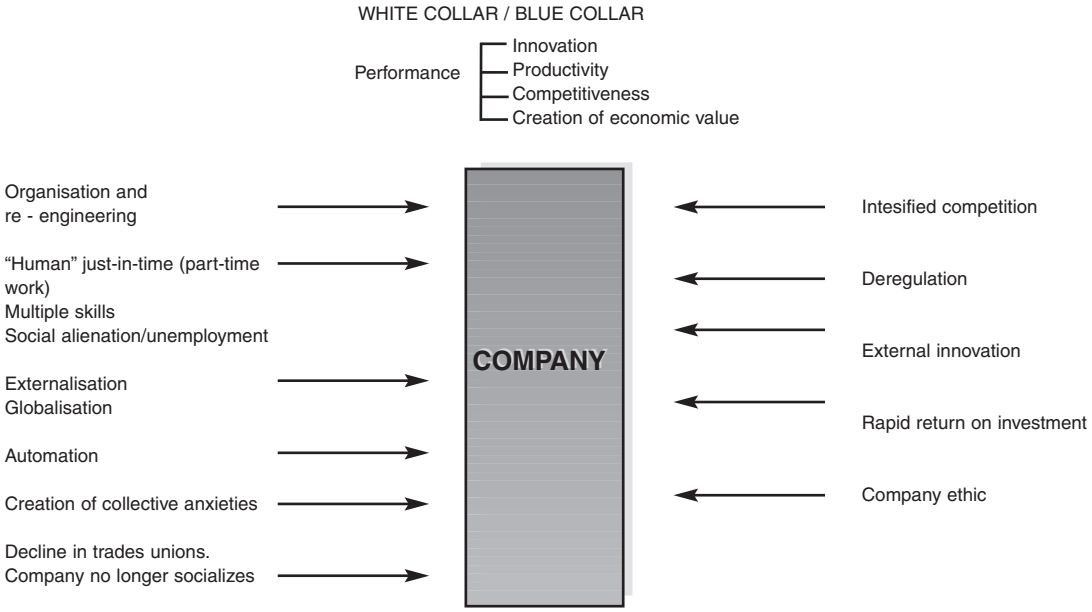


Figure 3. Changes in health outcomes



The developments of both the world of work and world of health can be represented by two figures 2 and 3, which present some strong elements induced by the new economic paradigm in which the European countries act.
At the same time, two supplementary laws were introduced in France. Known as the "Aubry" laws, they aim at reducing working time, so that the maximum legal duration is 35 hours a week. In this context, even if the minimum age of retirement is maintained at 60 years, the number of years of contributions for the same pension has increased from 37.5 years to 40. Problems of ageing workers in France need to be considered. Without being able today to quantify developments in the world of work, we find here to a greater or lesser degree the same general tendencies as in other European countries. They are presented in figures 4 and 5.

Figure 4. New patterns of work organisation

NEW FORMS OF WORK ORGANISATION	
Subsidiaries	New Developments
Sub - contracting / Technological Craftman	Just - In - Time
Globalisation	Reduction of hierarchical levels

Figure 5. New forms of work organisation

NEW FORMS OF WORK ORGANISATION	
Part Time Work	Flexibility
Temporary Work	35 Hours Week
Fixed Term Contract	Tele - work and NTIC
Early Retirement	Time Sharing at Work

3.7.4 The organisational constraints (time and pace of work)

About half of the employees encounter in their work some of the following constraints of time: shift work, night work in all or in part, supply teamwork for the weekend, irregular or unforeseeable schedules imposed by the employer, daily work exceeding eight hours. Of course, everyone does not undergo all of these constraints of time.

Taken as a whole, the employees concerned can be grouped around three patterns.
In the first pattern, employees, workers for the most part, who work shifts or work nights in all or in part. 1 worker out of 5 is involved in shift work and 1 worker out of 12 is involved in by night-work. These two constraints of times can be observed mainly in the industrial plants of more than 5 employees. Regularity and rigidity seem to characterise the schedules of these employees, since they are unable to adjust their times or to have irregular times.

In the second pattern, employees accumulate irregular working hours, working days exceeding 8 hours and night-work in all or in part. These employees are for example people working in the hotel and catering industry, in the transport and trade industries as well as in the service industry; in firms, as private individuals or in communities, this whatever their socio-professional category.
Lastly, a third pattern groups employees with irregular working hours and working days of more than

eight hours. 35% of workers, 54% of intermediate professions and 76% of senior executives are in this situation. For senior executives the constraints of times are often associated with the possibility of modulating the times of work.

Table 27. Constraints of schedule

CONSTRAINTS OF SCHEDULE (1994)	SHIFT WORK	NIGHT WORK	SUPPLY TEAM FOR THE WEEKEND	IRREGULAR WORKING HOURS	DAILY DURATION EXCEEDING 8 HOURS
ECONOMY ACTIVITY					
INDUSTRY	23.8	4.4	3.6	13.0	34.5
CONSTRUCTION	2.1	0.8	1.7	13.1	37.6
TERTIARY SECTOR	7.3	6.3	6.3	18.5	41.1
AGRICULTURE	2.4	2.7	6.1	23.8	33.9
SOCIO - PROFESSIONAL CATEGORY					
EXECUTIVES AND INTELLECTUAL PRO-FESSIONS	1.0	2.4	2.8	23.1	74.3
INTERMEDIATE PRO FESSIONS	8.4	4.8	4.7	19.8	49.2
EMPLOYEES	7.6	5.3	7.3	14.8	29.9
WORKERS	18.0	6.0	4.5	15.0	29.1
TOTAL	11.0	5.1	5.2	16.9	38.7

Table 28. Constraints of pace/rhythm

CONSTRAINTS OF PACE / RHYTHM (1994)	LINE PRODUCTION	AUTOMATIC DISPACEMENT OF A PRODUCT	OTHER TECHNICAL CONSTRAINTS	SUBORDINATION TO COLLEAGUES	DAILY OUTPUT NORMS
ECONOMY ACTIVITY					
INDUSTRY	10.3	17.3	23.0	33.5	50.8
CONSTRUCTION	0.3	1.4	17.3	29.4	36.9
TERTIARY SECTOR	1.7	2.3	10.4	23.2	32.5
AGRICULTURE	6.9	9.3	17.0	20.5	30.8
SOCIO - PROFESSIONAL CATEGORY					
EXECUTIVES AND INTELLECTUAL PRO-FESSIONS	0.2	0,2	9.1	22.6	25.2
INTERMEDIATE PRO FESSIONS	0.6	1.7	15.9	26.7	36.4
EMPLOYEES	1.1	1.4	7.9	21.6	25.3
WORKERS	9.5	15.1	20.8	30.7	51.5
TOTAL	4.1	6.6	14.6	26.3	37.6

As far as paces of work are concerned, two specific groups of employees can be distinguished, according to the type of constraint of pace they are subjected to. The first is composed of employees subjected to constraints of production (assembly line work, automatic movement of a product or automatic rate of a machine, technical constraints, immediate dependency with regard to the work of one or more colleagues, output norms to be respected within a short period of time). It is the case for 67% of the workers, of half of the intermediate professions and 40% of the employees or the senior executives. These constraints are observed mainly in industry and transport, where respectively 68% and 63% of the employees are concerned. Employees of large plants are most subject to this constraint of pace.

In the second group, the employees rather see their pace of work imposed by an external request, which demands immediate answers, or imposed by a plurality of tasks. It is the case for 79% of senior executives, intermediate professions or employees, but it is still the case for about 1 worker in every two. 74% of employees in the commerce sector and automobile repair industry, in the hotel and catering industry, in the finance industry, in the service industry to firms, to the private individuals and the communities. It is also the case for the health sector.

3.7.5 OSH implications

After several years of steady decrease in the number of occupational accidents: 1996 marked the lower number of occupational accidents with medical certificate ever recorded, the reversal of the tendency, noted as from the second quarter of 1997, led to a rise of +3,2% in 1998 (provisional statistics of CNAMTS) of occupational accidents. Even if the number of accidents which have occurred remains lower than those recorded between 1992 and 1995, and if it appears that the rise noted since 1996 is related to the economic revival, it is regarded as unacceptable, in so far as the fall of unemployment can be accompanied by an increase in the number of occupational accidents. The prevention of occupational accidents and diseases is a long term necessary collective priority, and requires the involvement of all, in particular of the social partners, at the national and European level. In addition to the maintenance of an active presence in all the Community authorities and networks, the authorities strove in 1999, on the one hand, to emphasise, in a significant and rapid manner, actions for which a new global and concerted process proves essential and, on the other hand, to follow the trends already initiated in 1997 and 1998 (Ministère, 1999).

3.7.6 Research and advice activities in the field

The changes in the world of work, and in particular in its organisation, form the subject of study and of advice at the same time by ANACT (National Agency for the improvement of working conditions in partnership with the regional agencies) and by INRS (National Institute of research and safety) in partnership with the "prevention services" of the CRAM (Regional workers' compensation boards).

Major programmes were launched in the following fields:

- 35 hours - repercussions on the world of work (risks, organisation...),
- Ageing and health at work,
- Stress and work,
- Risks induced by the new activities of work,
- Musculoskeletal disorders, etc.

These programmes illustrate new activities and make it possible to give a specific attention to emergent risks related to the current development of the world of work.

4. FUTURE TRENDS AND PROBLEMS

EU directives for the working environment, as well as national regulations, aim to improve working conditions across the EU Member States. The national reports on the changing world of work in the preceding chapters show that the demands on occupational health research are increasing due to new occurrences not yet studied.

4.1 Common trends and situations

It was concluded that all the EU countries participating in this report are subject to the same influences on working life condition, and therefore having to react on conditions of the same "path of change". The position on the path of change varies between countries, but similar situations seem to develop as the countries reach similar level of change.

During the last decade, enterprises have used various methods to concentrate their activities on core specialities. Organisations have been slimmed down to cover just the main area of production. This direction has created a growing need for external services of types that earlier were considered necessary to maintain within the organisations. Examples are handling of customer claims, maintenance of equipment, caretaker and switchboard personnel. An effect is that the number of enterprises in the service sector is growing. As many of the new companies are small, they struggle to stay in a market that is rapidly transforming from national to international. The competition is fierce, and the turnover of new companies is increasing.

The growing use of Information and Communication Technology (ICT) has meant that companies have possibilities to create networks where the high demand on Just In Time (JIT) deliveries, of everything from raw material to employees-on-call, can be met. In most of the reported countries the influx of women on the labour market is increasing, except for the Nordic countries, where women have been active on the labour market at almost the same level as men since the late 70s. A common situation in all EU countries is that the population is growing older, which also means that the workforce will comprise older workers than younger in the next decades. The various age groups of the labour force will form an "inverted triangle" with the older age group heavy on the top and a decreasing number of younger workers at the bottom. This situation is predicted for at least further two decades.

Against this background, new forms of work organisation have been introduced. Teamwork is already a well-established form of work organisation. Responsibilities of planning and distribution of work tasks are delegated to the team. With new technology, work teams may today be more or less virtual. The team members live and act in different geographic areas, but stay in continuous touch with the help of the communication technology. Companies split in smaller parts and locate e.g. the administrative and customer service to areas where labour is easily found and less expensive. An example is the switchboard of larger enterprises. It may be outsourced to an external supplier that is delivering the switchboard service to more than one organisation from a location far away from the customers.

A new group of enterprises of the 80s and 90s are the ICT companies (e-business) producing not only software for the computer industry but web-pages, computerised marketing material as well as technical facilities for the transmission of communication. Those enterprises are also open to fast changes in leadership and organisation. Mergers over national borders are common. Most of the employees of such enterprises are young, well educated and open to changes in position. They live and work in an internationalised environment. Their workplaces may be located anywhere, without losing touch with the support functions. They are involved in creative work, but depend often solely on their own competence, talent and skill. At present this is a group of employees highly in demand, ready to work "around the clock" and as a result may not be interested in long-term contracts, or permanent situation.

Even in countries where the tradition of collective agreements is strong, this new group of workers in the ICT-area has very little interest in other contractual relationships than individual ones. This attitude is in line with that of employers when exploring new ways of handling fast changing demands on the production of goods and service. In some cases even governmental institutions have lately initiated a transfer to individual contracts for employees on all levels, not only on management level. The trend to move from collective agreements for the workforce to individual ones is strengthening, but this is a sector where the legal framework, employment policies and labour market situation of individual countries will have divergent influences on the development.

The number of people employed in non-permanent positions is increasing in all the countries represented in this report. The growing occurrence of new contractual relationships may have varying backgrounds in different countries. One common trend is that younger people entering the labour market are often forced to accept non-permanent position. In countries where women are now entering the labour market in greater numbers, employment in part-time, vicarious positions are common. Part-time employment among women is also very common in the Nordic countries, although women have, to almost the same degree as men, been present on the labour market for the past twenty years. The new forms of contractual relationships cover different types of non-permanent employment, like project work, fixed-time contracts and on-call work.

The joint principle for OSH systems in Europe is prevention. It is a common view that the changing world of work will lead to new demands on the effectiveness of national OSH systems to recognise adverse effects at an early stage and implement action programmes to prevent work-related diseases and accidents caused by new conditions in working life. Possible OSH-implications of Changing World of Work are:

- New burdens arise, such as ergonomic problems in information-intensive work.
- Increasing part of work in the service sector is about personal contact with people - clients, customers, patients etc. which can lead to increased stress and violence at work.
- There is a shift away from the traditional concepts of work towards new forms, such as telework, self-employment, subcontracting and outsourcing work, temporary employment, small firms etc.
- There is a general trend towards more flexible and irregular working hours, increasing work pace and workload. This has an effect on accident rate and stress at work.
- The development of new technologies resulted amongst others in increased integration and globalization of work. Therefore, national solutions become increasingly dependent on European and international conditions.
- Demographic changes mean that in 2005, more employees will be in their fifties than in their thirties and the number of women entering the labour market will be increasing.
- With the changes in the job market, employees' work possibilities and expectations are also changing. There is an increasing interest in autonomous work, self-realization, staying healthy etc.

4.2 Divergent trends and conditions

Even if the EU countries represented in this report have common trends in the development of working life conditions, there are still important areas where the basic conditions, and hence the trends, are divergent.

The framework of the OSH systems varies from country to country. Also the support in creating an OSH system capable of dealing with the new issues in working life differs. There are countries actively implementing a new curriculum for OSH. There are countries, which during the 90s reformed their OSH systems to meet EU directives, and there are countries where the OSH system has been forced to find new ways and forms to stay effective, even if general support has decreased.
An area where the situation is divergent among the EU countries is the position of trade unions. The

difference in trade union membership among workers (blue- and white-collar workers) in individual EU countries goes from 80% to about 10%. However, even if trade union membership rate is only 10%, the impact of trade union views may be much stronger. In the area of OSH, partnership involving the social partners (trade unions and employers) is considered highly important for the impact of EU directives and national regulations.

It was required that OSH research in Europe should support a salutogenic approach to the work environment "To promote a healthy work organisation! ".

4.3 From research to practice

The united view on the requirement of OSH research was that traditional research would not be effective in giving descriptions of adverse developments in future working life. With an ever more flexible labour market, network organisations, virtual companies, individual agreements between employer and employees, globalisation of companies and an effort to adapt production to individual demands of the customers, the time to carry out traditional research on well defined, stable conditions will be hard to find. It is already the experience of researchers that enterprise management is less interested in accepting traditional investigating research to be carried out in the work organisation than some decades ago. The opinion is that OSH research in future should concentrate on action research, intervention studies and development of learning networks. The crucial area is the transfer of research into practice, and sharing of research findings with those who are involved in planning changes in work organisation. Reflective practice should be stimulated at all levels of working life.

4.4 New strategy in the control of OSH

Exploring the changing world of work in more detail, some areas of special concern appear. Effective methods for integration of occupational health and safety in production planning are not easily detected. Studies show that even in countries with legal demands for the existence of an appraisable OSH system, occupational health aspects are very often regarded separately in a process of change (Frick, 1994). From these studies we can conclude that OSH needs to be integrated in the planning of changes, and the introduction of new technology in the companies. Furthermore, by mainstreaming OSH in company policies, the maintenance of good work environment would be supported, even when changes mean transfer of production to other countries, or outsourcing the companies' service functions. The development of reliable financial tools, which can illustrate the social consequences of changes in the organisation of work, would be an important asset in integrating OSH in the functional planning of production. Action research focussing on the process of integration of such tools in companies could give leads to where the obstacles for successful integration are most apparent.

4.5 International standardisation

International standardisation in quality management, such as ISO9000, has had an impact on production planning in a broad sense. Similar development in relation to OSH could support mainstreaming work environment matters in the planning of changes in production and work organisation. As many large multinational enterprises of today tend to move towards becoming transnational, internationally set standards in the area of OSH would secure a common level of quality of work environment in all parts of a multi-national or transnational company. Multinational or transnational enterprises are mostly very large and have great impact on the labour market in the individual countries. The staff of such enterprises often move from country to country as part their work tasks. With a common set of standards for the quality of the work environment, people would be equally protected against work-related hazards regardless of the geographic position of the workplace. Initiatives to produce standards on a company level in this area

already exist in some large multi-/transnational enterprises. Good practice research to identify and evaluate such initiatives would be welcome.

4.6 Availability of OSH knowledge

In line with more international standards to facilitate the integration of OSH in any phase of company change, the availability of already present OSH research results and knowledge is a constant matter of discussion. In this matter we do not just talk about availability for decision-makers or enterprise management, but for people on the shop floor. In the changing world of work, there is also increasing speed in producing new OSH research. The traditional work environment research information cannot be deleted. We face however completely new conditions of working life, the research of which needs to be exposed to the prime users of the result, the workers and middle management of companies. The collection of information on research and good practice can be done at a European level, as already shown in the Topic Centre on Research, led by the European Agency on Safety and Health at Work. The exploitation of the material needs to be handled on national level, with the aim of presenting interesting material in the language of the individual country. Also in this area there are already interesting initiatives, e.g. in Finland, to be followed closely.

4.7 Sustaining working power

Younger workers facing the implementation of new technology or changed work organisation, can cope with demands on additional qualification/education. Their basic training includes the use of new technologies. Their demands on personal responsibility in the work situation are based on the attitudes of today's life expectancy with a large part of self-determination. In Europe, however, there are large groups of very skilled older workers, trained in a more conservative culture, who have the ambition to stay in phase with the new technology. Their private situation does not give them the choice to leave their employment to enter an additional education, even for a shorter period like six months. Methods of integrating these workers in on-going knowledge update in new technologies and responsibilities need to be found. Action research and/or intervention studies are needed to identify methods and programmes to sustain working power in the older age groups. The programmes need to focus on up-dating competence, which is based on confirmation of the value of the existing skills. This would probably result in possibilities to utilise for the benefit of both individuals and enterprises, the working power of the older age-group on the labour market.

4.8 E-business and OSH

With the breakthrough of Internet in the 90s a new type of industry developed, the e-business or the ICT companies. The products of the e-business are construction of websites, production of marketing material on the web, support functions for the transmission of these products and similar activities. The expansion of this industrial sector is so rapid that present long-term prognoses of size, turnover and core activities of the e-business are uncertain. We know already that there is also a rapid turnover of these companies. They are very much in focus of the stock market, but are considered high-risk investments.

A very evident trend is that traditional enterprises seek opportunities to use the service of the e-companies to support their marketing efforts, and to find sub-suppliers of services needed. One example is the search for new employees with special skills. With the use of Internet as a tool for finding suitable service, even the nationally based, traditionally managed enterprises form part of the globalised e-business.

The question is: what type of OSH system can follow, assess and intervene when needed in e-business?

Most of the people presently working in e-business are in the younger age-groups with fairly high levels of education. They are used to move on an international scene and do not fear changes in their working life. The companies may partly be virtual with the employees working both from home and other geographic locations, even in other countries. They have a high level of independence and integrity in relation to their employer. In fact many of them are self-employed and act on a consultancy basis. There is no typical e-business form as yet. We find very large multinational and transnational enterprises as well as a large number of nationally based SMEs with the whole world as market.

Under the title of e-business other type of companies with less favourable overtones can be ranged. There are for example call centres, which supply service based on contact via telephone and e-mail. Call centres are established in most European countries offering a wide variety of services. Call centres may, for instance, act as reservation desks for travel agencies and transport companies and in other cases handle customer complaints, market consultant services and products or give switchboard service. This wide range of work tasks means that the demand on competence and skills also differs from call centre to call centre. Call centres may be located in any geographic area as long as the staff can handle the languages required. This type of business employs many women and is often located in areas where there are few opportunities for change of occupation. The work seems not to lead to competence development. People are permanently employed, very often part-time and with varying working hours (Hook, 1998). The advantage is that the conditions of the job can be adapted to the requests of the employees. In this case, OSH research might explain the impact of such advantage, in comparison with the other elements of this type of job.

This newly developed and fast expanding industrial area certainly gives opportunities to action research and intervention studies. Continuous research activities are needed to identify possible new health and safety risks connected with the implementation of new technologies. There is also a lack of consensus definitions of various activities in this sector, such as teleworking and virtual companies. What factors constitute the definition of teleworking? Where are the borders between teleworking and home working? With prevention as the key aim of the OSH systems there are, as the discussions of the TC/WH workshop shows, many calls for research to supply new knowledge in the changing world of work. As in the past, the ultimate objective of present and future OSH research is to prevent new hazards from developing uncontrolled in the working population worldwide.

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ANNEX 1. PROJECT ORGANISATION

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ANNEX 2. EXPERT WORKSHOP ON CHANGING WORLD OF WORK

27 September 2000, TNO Arbeid, Amsterdam

Participants

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At a workshop, the European situation was discussed by the active partners with special emphasis on the following questions:
- What is known about the changing world of work in Europe?
- What are common and divergent trends in the different European countries?
- What are the consequences of these trends for work in general and for occupational safety and health at work in particular?
- What is required to find what is going on?
- What are the gaps in the research knowledge and what research is needed to fill in these gaps?

The chapter 4 in this report is based on the discussion about these questions.

European Agency for Safety and Health at Work

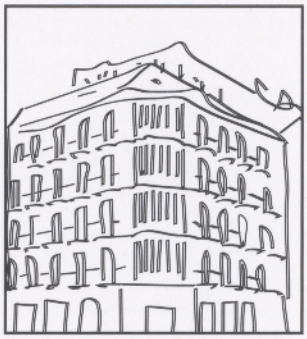
Research on changing world of work

Luxembourg: Office for Official Publications of the European Communities

2002 — II, 90 pp. — 21 x 29.7 cm

ISBN 92-95007-65-4

Price (excluding VAT) in Luxembourg: EUR 14.50



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

European Agency for Safety and Health at Work

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TE-43-02-907-EN-S

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Price (excluding VAT) in Luxembourg: EUR 14.50

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L-2985 Luxembourg

ISBN 92-95007-65-4

9 789295 007659 >