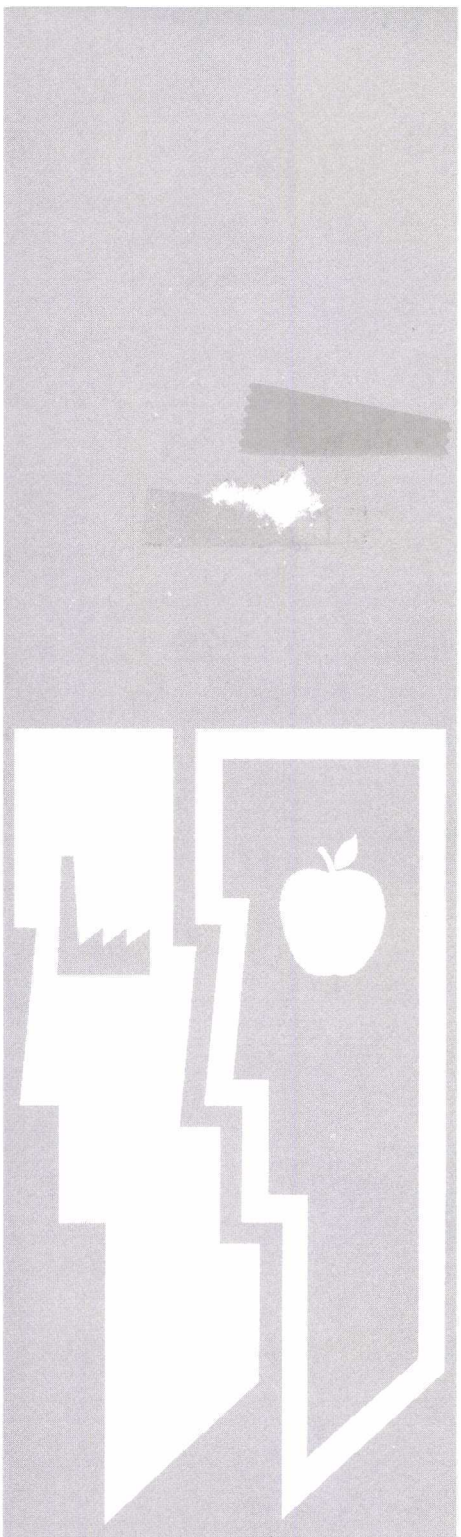
European Foundation
for the Improvement of
Living and Working Conditions

WORKING CONDITIONS IN THE EUROPEAN MEAT PROCESSING INDUSTRY



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Preface

Monitoring working conditions - that is to say offering a better picture of working conditions - has been recognized as a very important issue in Europe and in particular in the European Union in the recent years.

A better understanding of what is actually taking place in the work place, of the problems encountered, of the risks faced, of the populations facing these problems and these risks, of the changes taking place and their extent, is necessary for policy makers to set up priorities and action programmes, to identify gaps to legislation, and to measure progress made.

The increasing weight of the European dimension in the social field had to be matched with the development of monitoring instruments at the Community level, a development which had, until recently, been lagging behind.

The European Foundation has been actively contributing to it since 1987 as the monitoring of working conditions became an important part of its work programme. Three levels of action were developed.

At macro level, the First European Survey on working conditions was realized in 1991, the first of its kind, with the aim to give every 5 years an overview of the work environment situation.

At the other end of the spectrum, a description of best practices and policies for the assessment of working conditions at company level was finalized in 1995. The 1989 European Framework Directive on occupational health and safety has given this issue a particular momentum by requiring a systematic evaluation of risk situations in all companies.

At sectorial level, two studies were realized: the present one on the Meat Processing Industry, and another one on the Hospital Sector, with a view of setting up a methodology to describe the working conditions at branch level. Both sectors were chosen after consultation with both sides of industry and with the Commission. A network of researchers from national occupational health and safety organizations in ten EC Member States was set up.

The European sectorial level is an increasingly relevant level for the prevention of occupational risks and the improvement of working conditions. Problems are often quite similar, although health prevention policies and priorities can be somewhat different from one country to the other. Action programmes and research are also carried out simultaneously in various countries and a lot is to be gained by knowing what is done and how things are done elsewhere. Synergies could be developed and possible duplications avoided.

One also has to keep in mind that European branch negotiation will probably increase in the near future, which could be usefully supported by such research as the present one.

Clive Purkiss
Director

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Deputy Director

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Summary

Introduction

This summary reflects the main results of one part of the study 'Monitoring the Work Environment at Sectorial level'. This part regards the Meat Processing Industry in Europe. In this study, which was a project of the European Foundation for Living and Working Conditions, ten Member States of the European Community (EC) were involved. The study report describes some social economic characteristics of the Meat Sector, but it mainly presents a cross-national overview of the occupational health and safety situation in this sector. Since the report is particularly meant for policy makers, it also contains policy options for further improvements, both at company level, as well as at sectorial level and national level. This summary points out the headlines in these topics.

Context and aim of the study

The study was started by the Foundation in September 1993 to meet two current developments regarding working conditions in Europe. Firstly, the monitoring of working conditions is increasingly judged to be a main issue in policy making in the European Union, which requires development of monitoring instruments. Secondly, the European sectorial level is more and more being recognized as a right level for preventive actions in order to improve working conditions. In addition, several other developments at European level colour the background of this study, such as the progressing European legislation on health and safety at work.

To meet these trends, this study was set out to develop and test a standardized method of data gathering and reporting, which should result in a description of the occupational health and safety situation of a sector across Europe, useful for monitoring purposes and for policy making. Hence, the main objectives of the study were:

1. To identify risks, risk factors, and groups at risk within the sector.
2. To identify possible measures for further improvement of the working environment in the sector.

Two sectors were chosen for the experimenting with this new European sectorial approach: the Meat Processing Industry and the Hospital Sector. Both sectors are well represented in all EC Member States and have a considerable economic weight. For the experiment, it was also valuable that these branches are an industrial and a service sector, and that sufficient data were expected to be available. The study has resulted in two seperate reports, on one sector each.

Methodology of the study

To carry out the study, a network of researchers from national occupational health and safety organizations in ten EC Member States was set up. This network included Belgium, Denmark, France, Germany, Greece, Ireland, the Netherlands, Portugal, Spain and the United Kingdom.

This group firstly developed a so-called sector profile, which provided the uniform structure for the gathering and reporting of national data on the sector. After a brief pilot study, the researchers used this profile to make the description of the sector in their country.

The national data concerned social economic characteristics of the sector, health and safety output, the work environment, as well as actions, instruments and policies in this area. The data mostly already existed, and were collected from sources such as statistics, registers, surveys, literature and regulations. Furthermore, they included both quantitative and qualitative data. Most data stemmed from 1989-1993, but occasionally they were older, or more recent. In addition, the researchers interviewed key informants from employers' organizations, unions, governmental bodies, and other organizations relevant to the sector. This was first of all done to obtain the parties' views and opinions on the health and safety situation in the sector. Other reasons were to get supplementary information, and to have the draft national report checked.

The next step in the study was the consolidation of the information from all ten national reports into one overall report. This consolidated report was composed by the Netherlands Institute for the Working Environment, NIA. To ensure the correct presentation and interpretation of the data in this consolidated report, a draft version was discussed in a meeting with all participants, before finalizing it.

Despite the obstacles encountered, both during the national reporting and during the consolidation, the method of this study has proved to be successful. Not only has it resulted in a synthetical picture of the occupational health and safety situation in the Meat Processing Industry, and an overview of policy options for further improvements. It has also pointed out the necessary adjustments in the sector profile and the procedure for data gathering, which will make future application of this method in other sectors a significant and efficient undertaking.

Social economic characteristics of the Meat Processing Industry

Across the ten European countries involved in the study, the Meat Sector is generally a small branch of industry. Its proportion of the national number of companies varies between 0.1% and 1.2% in the various countries. The work forces in the sector represent 0.3% to 1.0% of the national working populations. The sector's contribution to the Gross National Product is usually less than 2%, and circa 3% at the most.

The total number of meat companies varies between 105 in Ireland, and almost 29,000 in Germany. It concerns slaughter houses and companies involved with the processing and preserving of meat and meat products, such as beef, pork, sheep and poultry meat. Most companies are privately owned and small, 60% or more of them employing less than 50 employees. The majority of the companies has in fact even less than ten workers. Companies with more than 500 workers are rather rare.

However, the majority of the sectorial work forces find employment in the larger enterprises. Most of the employees are male (41-94% in nine countries), between 25 and 44 years old, low or intermediately educated, native, and full time employed. Seasonal work exists on a small scale in four countries, but on quite a large scale in Ireland. In seven countries payment on productivity basis occurs to some extent, but in Denmark a rather high number of meat workers is piece paid. Specific vocational training for the work in the sector is not common in all countries. The sector's position on the labour market is generally somewhat problematic, with a high turnover of personnel and low attraction to potential workers.

The economic situation of the sector is rather stable in a majority of the countries, in five even showing increases in turnover. A criticial situation however exists in France and Ireland. Nonetheless, the overall economic picture is that the sector has small profit margins and a limited capacity

for necessary investments. The sector is under pressure due to increasing international competition on prices, to strict European standards on hygiene, and to changes in market demands from supermarket chains and from individual consumers. Particularly small, family-owned companies and public slaughter houses face difficulties in surviving.

The work in the Meat Sector is mostly Tayloristic production line work. To varying extents the work is automated or mechanized, but still quite some labour intensive hand work exists. The production process is involved with processing a great variety of materials, such as cattle, food additives, packing materials, and cleaning and disinfecting agents. In the processing, a big number of machines, hand tools, equipment and personal protective devices is being used. The processing results in a large variety of products for whole sale, retail and catering. The predominant type of work organization is a line structure with central, hierarchical authorities. Experimental experiences on alternative forms of work organization however exist in Belgium, Denmark, Germany, France and the Netherlands.

In all countries the sector is organized by employers' organizations and unions, which numbers varies between 1-11 per country, and 2-8 respectively. In most countries other organizations are active in various fields within the sector as well. These organizations, varying between 1-11 per country, include governmental organizations, social security organizations, and two or three party organizations. In Denmark and the Netherlands they also include sectorial organizations, specifically targetted at health and safety matters.

Six main trends are now current in the Meat Sector, affecting the ten countries to various extent. One trend regards the scaling-up and concentration of companies, including an ongoing rationalization process in abattoirs, due to European regulations on hygiene and sanitary conditions. Another trend, already mentioned earlier on, concerns the increasing international competition on prices and changes in market demands. This trend puts pressure on the sector's economic position and its competitiveness. A third trend is the growing awareness that the 'human factor' is a key factor in the sector's continuity, for example for ensuring product quality. The fourth main development regards the ongoing automation and mechanization of the production process, induced by the ever increasing demand for higher productivity. The fifth trend may be considered a linking pin between all the other trends. It regards the introduction of new management concepts, such as Total Quality Management, ISO-9000, HACCP, and Integral Chain Control. The sixth main trend concerns the implementation of European directives on occupational health and safety issues, of which eight in particular are relevant to the Meat Sector.

Throughout the ten countries, meat companies are definitely influenced by the European integration. Particularly by its open market, by the regulations on sanitary conditions in slaughter houses, and by specific regulations on occupational health and safety issues. Interviewed key informants from employers' organizations, unions, governmental bodies, and other organizations relevant to the sector, mostly consider the European integration to have either positive or negative effects on the Meat Sector. These opinions concern both social, economic and technological aspects, as well as the working conditions in the sector. A few informants however, have no high expectations of its effects on the work environment.

Occupational health and safety in the Meat Processing Industry

With respect to the occupational health and safety situation in the Meat Sector, the study has resulted in two main conclusions. First of all, it has become clear that the sector already has been quite active in improving working conditions. In all ten European countries involved in the study,

various improvement activities have been undertaken, both in individual companies, as well as at sectorial level and at national level. The second conclusion is that, despite the improvement efforts, the Meat Sector still faces several problem areas in occupational health and safety. To these problem areas, a fairly broad agreement exists among the ten countries.
The positive points in these conclusions are, that there are opportunities for exchange of information on solutions, and for joint, cross-national co-operation in future improvement activities.
The main results on risk factors, related health problems, risk groups, and actions and policies undertaken to improve the work conditions, are presented hereafter.

Main risk factors and related health problems
Literature information on risk factors in the Meat Sector has resulted in the risk profile presented in Figure 1. It shows the number of countries in which the various risk factors were identified by the researchers, to present a main problem.

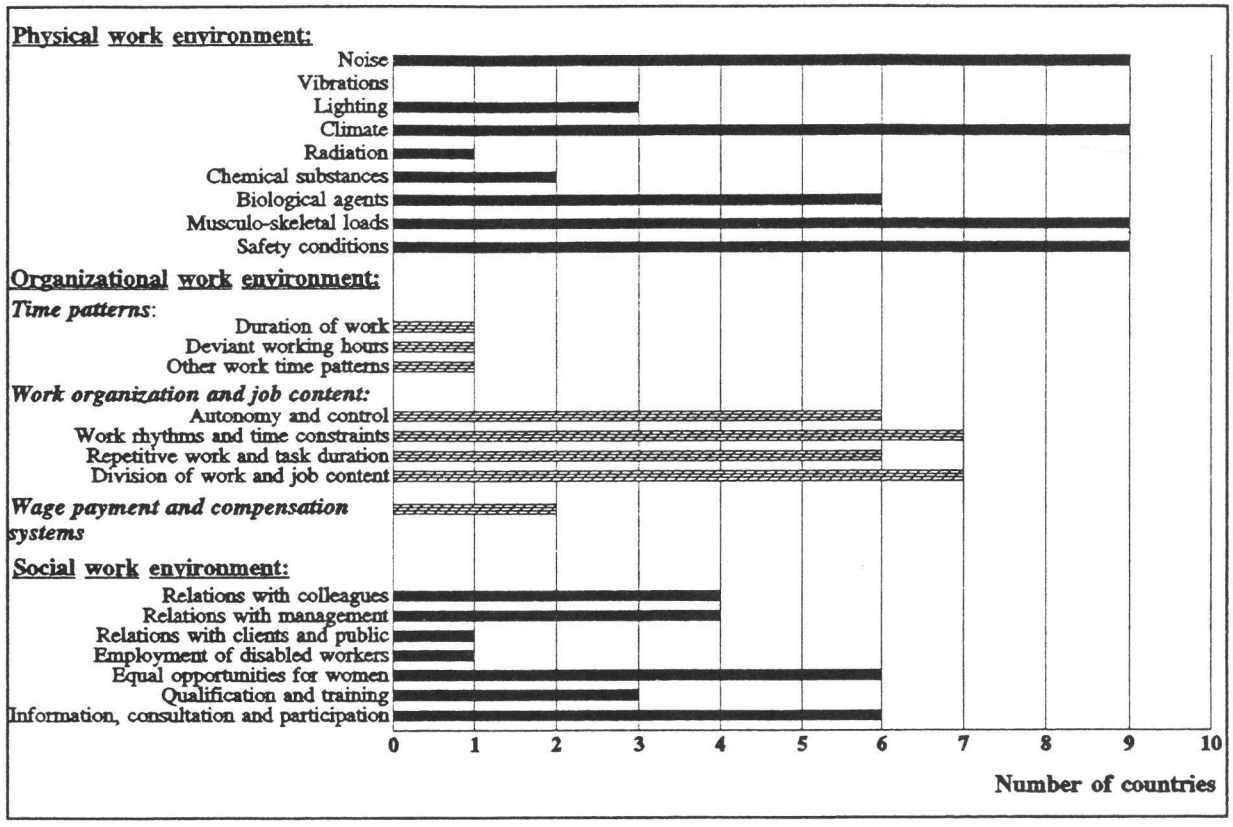

Figure 1: *Risk factors in the work environment of the Meat Processing Industry in ten European countries, identified as main problems by researchers on literature information*

In addition, key informants gave their opinions on the main health and safety issues in the sector, which resulted in a 'top 5' of issues. The combination of the literature information and the views of key informants has led to the conclusion that the Meat Sector faces nine main risk factors. Five of them regard the physical work environment, one (compound) factor represents organizational constraints, and three main risk factors concern the social work environment. An overview of these main risk factors and the related health problems is presented in Table 1.

Table 1: *Main risk factors and related health problems in the Meat Processing Industry, according to researchers in a majority of the ten countries, and according to opinions from key informants*

Main risk factors	Main related health problems
Noise: - continuous loud noise and - noise peaks from: - machines - work equipment - animals	Hearing impairment Communication problems Psychic complaints (stress/tiredness/amnesia/ concentration loss)
Climate factors: - coldness - high humidity - temperature fluctuations - draught	Respiratory disorders Infectious diseases
Musculo-skeletal loads: - repetitive speedy work - strenuous manual handling - strenuous working postures	Musculo-skeletal disorders (limbs/neck/shoulders/back) Repetitive strain injuries Occupational accidents
Safety conditions: - sharp hand tools - machines - slippery floors	Cut and stab wounds Sprains and strains Fractures, bruises, concussions (Esp. fingers, hands, wrists, arms, feet, ankles)
Biological agents: - micro-organisms (bacteria, viruses, parasites, funghi)	Infectious diseases Skin diseases (Enhanced by small wounds, low temperatures and high humudity)
Work organization and job content: - lack of autonomy and control - work rhythm and time constraints - repetitive work - high division of work and low job content	Repetitive strain injuries Musculo-skeletal disorders Occupational accidents Psychic complaints (stress/tiredness/sleeping problems/ dissatisfaction/burnout)
Lack of information, consultation, participation: - lack of feedback - lack of structural participation	No data, but likely: Psychic complaints (stress/dissatisfaction)
Unequal opportunities for women: - unequal job distribution - lesser qualification - lesser payment	No data, but likely: Psychic complaints (stress/dissatisfaction)
Lack of training and qualification of workers and management: - general professional qualification - health and safety issues	No data, but likely: Enhanced risks of all health problems mentioned above

Furthermore, occupational accidents and six types of disorders are concluded to be the overall main health consequences of working in the Meat Sector. These disorders are: skin diseases, musculo-skeletal disorders, infectious diseases, hearing impairment, respiratory diseases and psychic complaints. Compared to other sectors, the Meat Sector is considered to be a high risk industry.

Looking towards the future, both positive and negative effects on working conditions are expected from the six main trends in the Meat Sector described earlier on. The negative effects are summarized as 'an increase in stress and de-skilling' bringing problems such as repetitive strain, injuries and psychic complaints.

The expected positive effects mainly regard five topics: reduction of manual handling and heavy work; improvement of work equipment, which will reduce the exposure to noise, climate factors and safety hazards; workers' qualification will get more attention, often in relation to product quality; more workers and companies will be covered with Prevention Services; and various aspects of companies' health and safety policies are expected to get improved, for example by the undertaking of work place assessments. The real consequences will of course depend however, on the extent to which the health and safety issue is taken into account in developments and change processes.

Main risk groups
Although all workers in the Meat Sector are to a greater or lesser extent exposed to various risk factors in the work environment, some groups are more at risk. Researchers in a majority of the ten countries indentified three main risk groups from the literature information. These groups, the risk factors to which they, more than others, are exposed, and the main health problems they face, are presented in Table 2.

Actions and policies
Data on preventive and control measures, although limited, indicate that meat companies across Europe have implemented solutions on all main risk factors, except for unequal opportunities for women. It seems though, that primary prevention is not predominant and less widespread than control measures, such as the provision of personal protective devices. Furthermore, in a majority of the ten countries, companies' health and safety policies include work place assessments, Prevention Services, Works Councils and/or Health and Safety Committees, but usually not to the extent one would expect, considering the legal requirements. Particularly smaller firms often lack compliance. However, the implementation of the EC frame work directive (89/391/EEC) and some national initiatives are likely to enhance companies' policy making capacities, amongst others by the spreading of work place assessments and Prevention Services.

At sectorial level, various improvement activities have been undertaken on all main risk factors. So far though, more effort has been put in the physical work environment, than in the organizational or social work environment. The Meat Sector in a majority of the ten European countries is familiar with action programmes and projects on health and safety issues, with researches, training and education material, and sectorial magazines carrying articles on these issues. Various other sectorial policy instruments on occupational health and safety are however less widespread. These include for example: sectorial regulations; agreements in collective bargaining; funds, subsidies, grants and prizes; educational organizations and programmes; and solution databases. In half of the countries developments are taking place in the sector's policy on working conditions, varying from increases or shifts in interest, to the development of new technology and other specific improvement aimed activities.

Table 2: *Main risk groups in the Meat Processing Industry, the main hazards to which they are exposed, and the main health problems involved*

Main risk groups	Main risk factors	Main health problems
Slaughter house workers: - slaughterers - butchers - cutters	Biological agents Musculo-skeletal loads Noise Climate factors Unsafe conditions Lack of autonomy/control High work pace Time constraints Repetitive work Low job content	Accidents and injuires Skin diseases Infectious diseases Hearing impairment Musculo-skeletal disorders
Production line workers	Biological agents Musculo-skeletal loads Noise Climate factors Unsafe conditions	No data, but likely: Accidents and injuries Skin diseases Infectious diseases Musculo-skeletal disorders Hearing impairment Respiratory diseases
Boners	Biological agents Musculo-skeletal loads Noise Climate factors Unsafe conditions Repetitive work Time constraints Payment on production basis	Serious accidents Cut and stab injuries Repetitive strain injuries

At national level, several health and safety policy instruments exist as well, which affect the Meat Sector. Common instruments in the ten countries are: specific legislation; governmental inspection and enforcement organizations; ill-health and disability insurances and compensation arrangements; educational organizations and programmes; and statistical databases on occupational accidents. In a minority of the countries are also in existence: nation-wide action programmes; a sectorial approach in inspection and enforcement; and databases with statistical, technical, bibliographical or juridical health and safety information. A main conclusion is further, that the statistical data on the Meat Sector's health and safety output show serious deficits in most countries. These deficits, concerning the availability, quality and international harmonization of the data, mostly call for improvement activities at national level.

Policy options for further improvements

Although, as a key informant from a French union strikingly put it, 'the work in the Meat Sector will always be hard, because it consists of transforming a living creature into a consumable product', there are definitely options to further improve the working conditions in the sector. These options concern both individual meat companies, as well as social partners and other organizations at sectorial level, and also governments at national level. Some options have cross-national aspects, and thus affect the European level.

Policy options for meat companies

Meat companies should give priority to improvement activities in four main areas.

1. *The physical work environment*, and particularly the prevention and control of noise, climate factors, musculo-skeletal loads, safety hazards, and biological agents. For all these risk factors, a whole range of measures at various levels of prevention are described in the study report, which meat companies could consult to get ideas and take decisions on. The most preventive measures are, from an occupational health point of view, being recommended.
2. *The work organization and job content*, in order to reduce de-skilled, repetitive, high speed, monotonous work, and to turn jobs into meaningful professions again. Meat companies could reconsider their organizational and job design, realize more flexibility and implement solutions such as more team work, job enrichment, job enlargement, job rotation, possibly with joint technological adaptions like automation or mechanization.
3. *The social work environment*, particularly on three topics. Meat companies could improve workers' information, consultation and participation, for example by establishing active Works Councils and/or Health and Safety Committees, more team work, better management feedback, and workers' participation in change projects. Companies could fight unequal opportunities for women, amongst others by employment of more women, by equal payment and qualification for equal jobs, and by provisions such as crèches and parental and care leaves. Workers' and management's training and qualification could be improved by regularly providing courses, information and instructions to new workers and seated personnel. These educational activities should regard the job in general, as well as its health and safety aspects.
4. *The health and safety policy*. Recommendations in the study report vary from putting health and safety on the agenda in meetings with personnel, to the application of modern management concepts, such as Total Quality Management and ISO-9000 work methods, in order to develop a preventive health and safety policy. Compliance to legislation in force should obviously be a point of attention, particularly concerning work place assessments, Works Councils, Health and Safety Committees, and Prevention Services.

Furthermore, meat companies could stimulate social partners and other sectorial organizations to undertake supportive activities, by raising questions and requests for support to them.

Policy options for sectorial organizations

Social partners and other sectorial organizations are recommended to support and stimulate the improvement activities at company level. Considering the opinions from key informants, four prioritized areas are most likely to get support from these organizations.

1. *The physical work environment.* Sectorial organizations could initiate a cross-national evaluation and subsequent development of practical information material for meat companies on already existing solutions. Interesting information sources are known to exist in France, the Netherlands, Denmark, and the United Kingdom. The practical brochures, guidance notes or alike should be disseminated to meat companies in the national languages. If necessary, sector organizations could take further initiatives, such as the development of machinery, equipment and devices, preferably in a joint effort from sector representatives, manufacturers, future users, and health and safety experts.
2. *The work organization and job content.* Sectorial initiatives in this area could consist of a cross-national inventory and evaluation of the various experiments on alternative forms of work organization in the Meat Sector, including the joint efforts to improve both quality of working life and quality of products. Such experiences are available in Belgium, Denmark, the Netherlands, Germany and France. Practical guidelines should then be transferred to meat companies in each country, for example by seminars, workshops, publicity, information material and demonstration projects. Sector organizations could also initiate national surveys to assess the actual state of the organizational work environment in meat companies.

3. *Workers' and management's training and qualification.* Sectorial organizations could stimulate the development and usage of national qualification standards for these target groups. The standards should regard the professional job demands, as well as its health and safety aspects. As a preparation, a cross-national inventory and comparison of sector specific educational programmes, activities, materials and developments could be held. Useful input can be found in Spain, Ireland, Denmark, France, the Netherlands, Germany, and the United Kingdom. The results should then be disseminated in the ten countries, particularly at sectorial level, in order to stimulate further activities.
4. *Companies' health and safety policy.* Development and dissemination of tools for policy making for several target groups involved could be a primary initiative. Examples of such tools are available in the Netherlands and the United Kingdom. Particularly smaller companies should be encouraged and supported in policy making and ensuring compliance with leglisation. An example of good practice in this area exists in France. A very effective initiative could also be the creation of national networks of functionaries from meat companies, supported by experts, to exchange information, and share both problems and solutions. Such a network is operative in the Netherlands.

Besides taking initiatives directly aimed at improvements in meat companies, sector organizations could contribute in more indirect ways as well. For example by reconsidering, establishing or intensifying the usage of *sectorial policy instruments*, such as agreements in collective bargaining, funds, and sectorial health and safety organizations. But also by watching over possible negative effects on working conditions from trends in the sector, and by stimulating and supporting an *integrated and flexible approach* to conduct of business in meat companies. Another relevant initiative could be to organize regular *cross-national information exchange* between social partners, other sector organizations, governmental bodies, and health and safety experts. The exchange should firstly concern new initiatives on health and safety in the sector across Europe, for example via a paper or electronic news letter. Secondly, knowledge and experiences could be transferred via seminars and work shops, thus sharing good practices, experiments and successful solutions.

Policy options for national governments

National governments are recommended to undertake activities in three prioritized areas.

1. *Statistical data on occupational health and safety.* To ensure a useful monitoring system within the Meat Sector, national governments could take intitiatives to improve the availability, the quality and the international harmonization of statistical data. Such activities obviously call for co-operation with national institutes for statistics, Occupational Associations, and other registering organizations. Furthermore, these activities should be attuned to the now running harmonization projects at European level regarding occupational accidents and diseases.
2. *National legislation and enforcement.* Governmental bodies should ensure a uniform and stronger enforcement within meat companies of the national and European legislation in force. The enforcement should regard both specific risk factors, as well as companies' policies, and sanitary conditions. Furthermore, European legislation, relevant to the Meat Sector, should be implemented so that cross-national harmonization of standards is realized as much as possible, without lowering current national standards however. In some countries the establishment of a national authoritive body to support and activate the sector could be considered.
3. *European legislation and enforcement.* National governments could stimulate further legislation at European level, for example on European Works Councils or collective bargaining, or hall-marks such as CEN-regulations. They could also watch over possible negative effects from new European meat policies, and encourage the establishment of an

effective European organization enforcing national compliances with European regulations. Such activities will not only be beneficial to the Meat Sector, other sectors will profit by these as well.

1 Introduction

1.1 Context of the study

In the European Community (EC), it is increasingly recognized that the sectorial level could provide the right level for preventive action with regard to working conditions. The European Foundation for the Improvement of Living and Working Conditions (the Foundation) has undertaken research on the Construction Industry in its Four Year Programme 1989-1992. Moreover, the recent First European Survey on the Work Environment 1991-1992 has provided useful indications on sectors and issues which could be selected for action, and on profiles of the groups at risk in these sectors. Furthermore, the third action programme of the European Commission in the field of health protection at work identified some sectors as being 'high risk sectors' (Construction, Fishing Industries and Agriculture). Besides these activities at European level, a number of branch based action programmes and research programmes for the improvement of the work environment has already been developed in most EC-countries over the past years.

This situation has led the European Commission's Advisory Committee for Safety, Hygiene and Health Protection at Work early 1993 to recommend that 'high risk' sectors should be a specific area for action. It also recommended "improving the gathering and dissemination of reliable, authorative and comparable data", through in particular "standardized surveys about working conditions".

In addition to its Four Year Programme 1993-1996, the Foundation implemented the Committee's recommendation in September 1993 by starting the project 'Monitoring the Work Environment at Sectorial Level'. In this project, a method has been developed and applied to gather and analyse data, which results in a description of the occupational health and safety situation in a sector, across Europe. This first study with such an evident European sectorial approach, may proof to be a starting point at European level for a new way of working in the field of working conditions. This approach may effectively supplement the other, so far mainly used orientations on for example specific risk factors, risk groups and policy instruments in Europe.

At the start of the study, it was decided to firstly 'experiment' with this sectorial approach in two sectors, namely the Meat Processing Industry and the Hospital Sector. The choice of these sectors was based on being both well represented in all EC Member States, having an considerable economic weight, and on the expectation of sufficient information being available. Furthermore, these sectors represent an industrial and a service sector, which was also considered valuable from the viewpoint of experimenting.

This report contains the description of the working conditions in only one sector, the Meat Processing Industry. The results on the Hospital Sector are presented in a seperate report. The Foundation will disseminate both reports, and will use both of them for the evaluation of the experimental sectorial approach.

1.2 Aim of the study and the report

The study has been carried out to get a overview of the working conditions in the Meat Processing Industry across Europe. The main objectives of the study were:

1. To identify risks, risk factors and groups at risk within the sector.
2. To identify possible preventive measures which could be undertaken for further improvement of the working conditions in the sector.

Furthermore, as already mentioned in section 1.1, the study was meant to be an experiment on a sectorial approach to the improvement of working conditions, at European level.

The aim of this consolidated report is not so much to present a detailed comparison between countries. Instead, the report aims to be a synthesis which describes the most prevalent characteristics of the Meat Processing Industry across Europe, and particularly its situation with regard to the work environment.

Thus, the report is first of all meant as a tool for policy makers, both from social partners in the Meat Processing Industry, and from governments. It may enable them to discuss the national and international health and safety situation in the sector. From there they can move on to formulating and implementing internationally attuned improvement policies.
Secondly, the report may be of interest to anyone else who is interested in either the working conditions in the Meat Processing Industry across Europe, or the methodology of a European sectorial approach to working conditions, which has been the frame of this study.

1.3 Methodology

The study was set up to be carried out by national research institutes from each of the twelve EC Member States. Since institutes from Luxembourg and Italy appeared unable to participate, the study has taken place in the following ten countries (country codes used in the text hereafter are put between parentheses):

Belgium (B)	Ireland (IRL)
Denmark (DK)	The Netherlands (NL)
France (F)	Portugal (P)
Germany (GER)	Spain (SP)
Greece (GR)	United Kingdom (UK)

In Annex 1 an overview is taken up of the participating institutes and authors.
For the purpose of the study, a so-called sector profile was drafted by a small steering group of participating researchers from four countries, and two representatives from the Foundation. The profile provided a uniform structure for each participating country to gather and report the national information on the sector. The structure consisted of the following sections:

- Description of the context.
- Health and safety output.
- Description of the work environment.
- Strategies and policies, instruments and structures aimed at improving health and safety in the sector.
- Interviews with key informants.
- Conclusions.

The draft profile and guidelines were presented, explained and discussed within the Advisory Committee, consisting of representatives from all participating institutes, and from unions, employers' organizations and government at EC-level (see Annex 2). A final version, with only

limited adjustments, was provided after a brief pilot study in which the profile was tested in two countries. The national data gathering and reporting took place from January till October 1994.

The data on the sector have been gathered from information sources such as statistics, registers, surveys, literature, and regulations. This means that the study is mostly based on already existing information, being both quantitative and qualitative, and being both 'hard' and 'soft' data. The statistical information mostly covers the period 1989-1993, or parts of that period. The other information is as recent as possible, and therefore often stems from more or less the same period, and sometimes even from 1994.
Three countries (GR, IRL, P) have taken a somewhat alternative path, because not many written information sources were available to provide the data. In Greece most information has been gathered by putting out a questionnaire, based on the sector profile, to a sample of 26 companies (circa 5% of the total number in the sector). All the data from Ireland are almost entirely based on one source, being a masters thesis from 1994. The Portugese data, especially regarding the working conditions, stem from one source as well, a sectorial organization. For that section in the sector profile, Denmark and Spain as well used a limited number of information sources, which were comprehensive however. In Denmark this information mostly stems from a working environment survey in 1990, whereas in Spain much of these data were derived from a 'Risk Map' study, held in 1988 among 265 meat companies (circa 9% of the total number in the sector). The other five countries consulted a larger number of information sources, both with respect to working conditions, as well as other issues in the profile.
Besides utilizing existing information sources, key informants from employers' organizations, unions, governmental bodies and other relevant organizations were interviewed as well. Such interviews were held in all ten countries, except Ireland. The objective of this interviewing was to obtain the parties' view on the health and safety situation in the Meat Sector in their country, which formed a specific part in the profile, as well as this consolidated report (see chapter 4). In addition, consultation of key informants took place in some countries by which they got access to information sources, had the data in the draft national report checked, or found supplementary information which was then processed in the appropriate parts of the national report.

Besides providing support to the national reporting, the uniformity of the profile was chosen in order to facilitate the global comparison between the countries, and thus facilitate the consolidation of the national reports into this overall report. Despite the efforts of all ten countries to use the profile as it was designed, it has appeared that all of them have encountered some problems, which also affect the consolidation.
In the first place, data were not available on all issues in each country, either due to non-existence, or to the restricted time period of the study. Secondly, differences exist between countries in definitions and classifications used in national reporting and registration systems. Differences also regard the circumscription of the sector, e.g. the subsectors being in- or excluded in the national studies. Moreover, the heterogenity of the working conditions within the sector and its subsectors was not much accounted for in the profile.
These factors occasionally impeded the comparison and interpretation of data in the preparation of this consolidated report. To ensure that data were correctly presented and interpreted, the draft version of the consolidated report was sent to all participants for comment, and discussed in a meeting of the Advisory Committee. The amendments have resulted in this final report. Hence, despite the impedements, the obtained information was judged to be both quantitatively and qualitiatively sufficient, to compose this synthetical picture on the occupational health and safety situation in the Meat Processing Industry across ten EC Member States.

1.4 Structure of the report and remarks to the reader

Firstly, chapter 2 summarizes briefly the ten country reports on the Meat Processing Industry. Thus, an overview is given of the social economic context of the sector. Here one can find figures and more qualitative information on the labour market, the economic situation, and organizations playing a role in the sector. Moreover, a general description is given of the production process and the work activities that take place in the Meat Processing Industry. Furthermore, the main trends in the sector are being summarized. Finally, a brief characterization of the sector in each country is presented, both with regard to general developments as well as to the working conditions.

Chapter 3 provides the main information on the occupational health and safety situation in the Meat Processing Industry in the ten countries. Firstly, information on consequences of working conditions is given, by presenting data on occupational accidents, diseases, sickness absenteeism, disablement and mortality in the sector. Secondly, main risk factors are being identified, both in the physical, the organizational and the social work environment. Ill-health and other consequences of these factors are also described, as well as interesting examples of preventive and control measures. Risk groups will be dealt with in the third section of this chapter. The section thereafter presents an overview of the policies and instruments aimed at improving the working conditions. Here, data on the organization of prevention are given, and the stage of policy development is being characterized, both on company and on sectorial level. Furthermore, undertaken improvement activities such as action programmes, education, information and research are being presented. The chapter finishes with a discussion and preliminary conclusions on the identified risk factors, problems, and groups at risk, in relation to the undertaken actions and policies.

Chapter 4 deals with the view of social partners, government and other organizations relevant to the sector, on the health and safety situation in the Meat Processing Industry. An overview is given of their opinions on the major health and safety issues in the sector, the policies and solutions they propose accordingly, the trends in the sector they foresee, and their expectations from the European integration. These opinions will be confronted with each other, in order to find both agreements and disagreements between unions, employers' organizations, government and other sector related organizations. The opinions will also be discussed in relation to the findings in chapter 3, which will result in some preliminary conclusions.

Final conclusions on risk factors, related problems and groups at risk are drawn in chapter 5. In addition, policy options are being sketched here for further improvement of the occupational health and safety situation in the Meat Processing Industry throughout Europe.

For a proper understanding of the material presented hereafter, it must be stressed to the reader that if issues are not described in this report for a given country, this does not necessarily mean that they are not present in that country. It only means that the national report and authors did not provide the required information on that subject. Moreover, it should be noted that the remark 'no data available' in this report, means that data were either not obtainable within the given time period of the project, or were not existing.

A last remark concerns readers who can not find enough time to read the entire report. It is being suggested to them to restrict themselves to the Summary and chapter 5, containing the final conclusions and policy options for further improvements at company level, sector level, and national level. There, they will find all the headline information this report contains.

2 *Social economic background and country characteristics of the Meat Processing Industry*

This chapter will give an overall impression of the Meat Processing Industry, both at European level, as well as at national level. Hence, the first section provides information on the social economic context of the sector across ten European countries. The second section is entirely focused on the national level, describing briefly the characteristics of the sector in each country.
For the sake of clarity, it should be noted that the information hereafter is entirely based on data from the national reports and authors. More information on the social economic context of the Meat Sector across Europe may be obtained from the 'Panorama of EC Industry', which is published every year by the Commission of the European Community in Luxembourg.
Moreover, it is mentioned that the Meat Processing Industry is defined as NACE-sector 15.1 with three subsectors:
15.1 Production, processing and preserving of meat and meat products;
15.11 Production and preserving of meat;
15.12 Production and preserving of poultry meat;
15.13 Production of meat and poultry meat products.
In daily spoken language, the Poultry Meat Industry is in some countries refered to as the 'White Meat Sector'. The rest of the Meat Industry, involved with bovines, pigs, sheeps etcetera, is accordingly called the 'Red Meat Sector'.

2.1 Social economic context of the European Meat Processing Industry

The social economic context of the Meat Processing Industry in ten European countries will be described on five issues. Firstly, information on the labour market is given. Thereafter, some information on the economic situation is presented, which is followed by information on organizations playing a role in the sector. Then a general description is given of the production process and the work activities that take place in the sector. The section ends with an overview of the main trends in the Meat Processing Industry.

Labour market
Table 1 provides some information on the labour market in the Meat Processing Industry by giving quantitative data on the companies and the people employed. It must be noted that the reliability and comparability of these figures are limited. First of all, because they concern various years over a rather long period (1988-1993). Secondly, because the kind of companies concerned are not the same in each country. For example, data on companies with less than 10 employees (F) or on public companies (P) are not available. And some countries include related sectors, such as the wholesale trade (F), or firms involved with gut-cleaning or offal-processing (B, DK, SP). Nevertheless, a global picture can be obtained from these data.

The information in Table 1 regarding companies shows that the total number in the sector varies between 105 (IRL) and 28,670 (GER). The varience is much smaller when comparing the proportions of meat companies to the total number of companies in the countries. Since in six countries this proportion is between 0.1% (NL) and 1.2% (GER), it is clear that the Meat Industry is not a large sector. The data in the Table further show that in almost all countries the vast majority of companies in the sector is small. The proportion of companies with less than 50 employees varies between 58% (NL) and 97% (GER). The majority of them has in fact even less than ten workers. Companies with more than 500 employees are relatively rare.

Other data regarding companies (not shown in the Table) indicate that in most countries (B, DK, GR, IRL, NL, SP, UK) meat industries are mostly or all private enterprises. In Greece these are predominantly small family-owned companies (61% of the companies). Only in France public slaughter houses are still in majority, but the distinction between public and private is becoming somewhat unclear, since public slaughter houses increasingly rent their premises to private companies. This development is also reported by Belgium.
Several countries further report an ongoing decrease in the number of companies. These concern public slaughter houses (F, GER), small companies (SP), small family-owned and public companies (GR). Increases are reported as well, regarding the sector as a whole and the Poultry Sector (NL), private slaughter houses (F, P), and private companies (GR). These trends are related to tendencies of scaling-up by merging, take-overs, concentration, closings and changes from public to private, which have taken place or are taking place now in almost all countries (only Belgium does not report such developments). In four countries (F, GR, P, UK) this particularly concerns abattoirs which are now subject to a process of rationalization, due to EC-standards on hygiene and sanitary conditions. In Spain this process took place over the last years.

With respect to the labour force in the sector, Table 1 shows a range in the number of people employed of 6500 (GR) to 290,860 (GER). As was the case with companies, this varience disappears when comparing the sector's proportion to the national working population. Data from seven countries show a range of 0.3% (NL) to 1.0% (DK, GER). So, also from the point of employment, the Meat Sector is not a large branch of industry. The Table further reveals that in eight countries the percentage of male workers is much higher than the percentage of female workers. Male workers constitute 64% (F) to 94% (GER) of the sector's work force. Only in Portugal female workers predominate slightly over male workers. Two countries (F, NL) further report that the percentage of women in the Poultry Sector is higher than in the sector as a whole.

Other data concerning the sector's work force (not shown in the Table) indicate, that even though small companies predominate in most countries, they usually employ only a minority of the work force. Moreover, the majority of the workers find employment in private companies (B, DK, GR, IRL, NL, SP, UK). Both in France and Denmark, the majority of people work in slaughter houses, whereas in the United Kingdom this is the case in meat processing and bacon curing.

Most workers, both male and female, seem to be between 25 and 44 years of age. In five countries (B, GER, GR, IRL, P, SP) this category constitutes 46% (GER, P) to 65% (SP) of the work force. In some countries (GER, GR, SP) the 'old' workers (45 to 65 years and over) predominate over the young workers (younger than 25 years). In other countries (B, F, P) it is just the opposite.

Generally speaking, workers in the sector have a lower or intermediate educational level. Five countries (B, DK, IRL, SP, UK) report a considerable amount of low educated, unskilled workers up to 95% (IRL), whereas three countries (F, GER, P) mention a majority of workers (54-77%) with an intermediate vocational education. In Spain and France, female workers have lesser qualification than their male colleagues. Ireland further reports that qualification is in fact 'on-the-job', which is also the case in Belgian slaughter houses due to the lack of specific vocational education. In France, Ireland and the United Kingdom initiatives are now taken to give workers better qualification. In France this is especially targetted at young workers, whereas in the United Kingdom it concerns the development of National Vocational Qualifications for all parts of the Meat Sector.

With respect to labour contracts, permanent full-time contracts clearly predominate in the sector, as data from seven countries (B, F, GER, GR, NL, SP, UK) show. As Belgium puts it, this may

Table 1: Labour market of the Meat Processing Industry (1988-1994)

	B	DK	F	GER	GR	IRL	NL	P[2]	SP	UK
COMPANIES[1]										
Total number in the sector	649	327	3,000	28,670	568	105	766	330	2820	1,481[3]
% of total of companies in country	0.3%	<1%	0.9%	1.2%	0.4%	-	0.1%	-	0.3%	-
Company size:										
▸ 1-9 employees	57%	48%	-	77%	83%	-	38%	31%	64%	50%
▸ 10-49 employees	34%	22%	70%	20%	11%	-	20%	44%	30%	27%
▸ 50-99 employees	6%	10%	15%	1%	3%	-	4%	14%	3%	8%
▸ 100-499 employees	3%	[4]	13%	1%	2%	-	[4]	11%	3%	12%
▸ > 499 employees	<0.1%	20%[4]	2%	<0.1%	1%	-	8%[4]	1%	<0.2%	3%
PEOPLE EMPLOYED[1]										
Total number in the sector	13,233	24,936	95,291	290,860	6500	10,000[5]	21,626	15,709	49,434	87,300
% of national working population	0.4%	1.0%	0.4%	1.0%	0.9%[6]	-	0.3%	-	0.6%	-
Gender:										
▸ Male	71%	-	64%	94%	67%	>90%	84/70%[7]	41%	83%	68%[8]
▸ Female	29%	-	36%	6%	33%	>10%	16/30%[7]	46%	17%	32%[8]

1) Most recent data is taken up, stemming from years between 1988 and 1994. - = no data available.
2) Portugal: data only concern private companies; no data available on the public sector.
3) United Kingdom: figure concerns local production units; the number of companies could be smaller.
4) Denmark and The Netherlands: figures concern both categories 100-499 and >499 employees.
5) Ireland: figure concerns the total number of people employed during peak seasons, which is the last quarter of the year.
6) Greece: figure concerns the percentage of the labour force in manufacturing only.
7) The Netherlands: the first figure regards the Red Meat Sector, the second figure regards the Poultry Sector.
8) United Kingdom: the figures concern the Food Industry as a whole.

Table 2: Economic information on the Meat Processing Industry (1987-1993)

	B	DK	F	GER	GR[2]	IRL	NL	P	SP	UK
ECONOMIC INFORMATION[1]										
Annual turnover (in millions of ECU's)	2,100-2,300	-	38,730	22,200-26,100	322-348	-	5,900	-	4,866-7,212	3,349
Annual turnover (as % of Gross National Product)	-	-	0.00002%	1.7-1.8%	0.5-0.6%	-	1.0%	-	2.8-3.3%	0.5%

1) Data from Belgium cover the period 1989-1993. In the other countries they refer to one year (F, NL, UK), two years (GR), or three years (GER) during that period. Data from Spain however cover 1987-1990. Data over periods of two years of more are presented as a range with the lowest and highest value during that period.
- = no data available.

2) Greece: data concern a sample of 84 companies (= 15% of total number in sector) with 5815 employees (= 90% of total number in sector).

Table 3: Organizations playing a role in the Meat Processing Industry

	B	DK	F	GER	GR	IRL	NL	P	SP	UK
SECTOR ORGANIZATIONS[1]										
▸ Number of employers' organizations	3 (2)	2 (1)	5 (5)	2 (2)	3 (2)	1 (0)	5 (5)	2 (2)	11 (6)	4 (4)
▸ Number of unions	7 (0)	3 (0)	8 (4)	2 (2)	3 (0)	>1 (0)	3 (0)	2 (0)	2 (0)	3 (-)
▸ Number of other organizations	-	2 (1)	11 (2)	2 (1)	3 (2)	3 (2)	12 (7)	3 (2)	-	1 (0)

1) The first figure refers to the total number of organizations; the number of Meat Sector specific organizations among these organizations is given between parentheses.
- = no data available.

be due to the fact that most workers are male. Seasonal work occurs in some countries on a small scale (F, GR, SP, UK), but on quite a large scale in Ireland with circa 50% of the labour contracts being on non-permanent basis. Contracting-out is reported to occur at some scale in France and Belgium. This particularly concerns slaughterers and boners, who work for private firms within the premises of, often public, slaugther houses. In Belgium contracting-out to cleaning firms occasionally occurs as well.

The work force in the sector mostly consists of native workers, as data from seven countries (B, F, GER, GR, IRL, NL, SP) indicate. Reported percentages of immigrant workers vary between 0% (IRL) for the entire sector, and an estimated 40% for slaughter houses only (B). In the Dutch Poultry Sector the proportion (19%) is higher than the national average (7%), whereas in the French Meat Sector as a whole it is lower than the industrial average (7%). The concerned immigrant workers are often from Mediterranean countries, but also from central and south America (SP), central Asia (GR), and from over the Northern French border (B: particularly boners).

Comparable information on the size of the work force per professional category and their income is obtained only to a limited extent. Three countries (F, GR, SP) mention that line/production workers and maintenance workers constitute 70-82% of the total work force in the sector. Their monthly income varies from 450 Ecu's (GR) to 2000 Ecu's (F: team leader). On the whole, two income ranges can be distinguished for line/production workers. One of circa 450-800 Ecu's a month (GR, SP), and one of circa 1150-3000 Ecu's a month (B, F, GER, IRL, NL, UK), which shows a more or less a north-south division. A striking result is that female workers in the United Kingdom earn generally 500-1200 Ecu's per month less than their male colleagues. This will however be a reflection of the amount of part-time working within the female work force. Striking is further that a big number of Danish meat workers is piece paid, although rather highly. Payment on productivity basis also occurs in seven other countries, but to various extent (B, F, GER, GR, IRL, SP, UK). Moreover, the wage payment system in six countries (B, F, GER, IRL, NL, SP) contains bonuses for several types of inconveniences, including night-work.

The sector's position on the labour market is generally somewhat problematic. Six countries (B, F, GER, IRL, NL, UK) report a high turnover of personnel (up to 26%) and a low attraction to potential workers. Yet, at the moment, recruitment seems to be a problem only in France, although some demands for personnel, in some cases especially more skilled personnel, exist in Belgium, Greece, Ireland and the Netherlands as well. Over the last few years, sector organizations in the Netherlands have taken several actions, targetted at female workers, long term unemployed and immigrant workers, to ensure sufficient and qualified personnel in the future.

Economic situation

Information on the economic situation of the sector is taken up in Table 2. In seven countries (B, F, GER, GR, NL, SP, UK) the annual turnover varies from circa 330 (GR) to 38,700 millions of Ecu's (F). These big differences between countries disappear however, when comparing the contribution to the Gross National Product (GNP). In five countries which provided quantitative data on this issue, the Meat Sector constitutes less than 2% of the GNP. Only in Spain it is around 3% of the GNP. Furthermore, Denmark remarks that the sector constitutes an important part of the GNP, but quantitative data are not available.

Five countries (B, GER, GR, NL, SP) report an increase in turnover, and four (B, DK, NL, UK) a rather stable economic situation for the sector. Only France and Ireland report a critical situation, occurring in 1993, and they characterize the sector as financially weak. Nonetheless, the overall picture is that the sector has small profit margins, has limited capacity for necessary investments, and is under pressure due to increasing international competition on prices, to strict

European directives on hygiene, and to changes in market demands (from supermarket chains and individual consumers). Especially small, often family-owned firms and public slaughter houses seem to have difficulties in staying competitive.

Organizations in the sector

Table 3 provides information on the organizations playing a role in the sector. In all ten countries both employers' organizations and unions are active in the sector, but data on membership rates are generally not available.

The number of employers' organizations varies between 1 (IRL) and 11 (SP). Most of these organizations are sector-specific, meaning that they are only involved in the Meat Industry, or specific parts thereof. The minority of the employers' organizations are 'general', thus having a broader scope than just the Meat Industry, but often being involved in sectors related to the Meat Sector.

The number of unions varies between 2 (GER, P, SP) and 8 (F). In contrast with the employers' organizations, these unions are mostly not sector-specific, but 'general', for example involved in the Food Industry, or the entire Industry as a whole.

All countries, except Belgium and Spain, report other organizations which are especially relevant to the sector. These are for example governmental organizations, two or three party organizations, social insurance organizations, and sectorial organizations on health and safety matters (DK, NL). The number of these other organizations varies between 1 (UK) and 11 (F). In Greece, Ireland, the Netherlands and Portugal the majority is sector-specific, the others are 'general' organizations.

Production process and work activities

Most characteristic of the work in the Meat Processing Industry is that it is Tayloristic production line work. Main characteristics of the production process are therefore:

- it is mainly a continuous process with some batchwise parts in it;
- to a varying extent, the work is automated or mechanized; the degree varies depending on the various subsectors, and on the various parts of the production process;
- however, still quite some labour-intensive hand work exists;
- most of the production systems are open.

Not surprisingly, considering the type of work, the predominant type of work organization is according to a line structure with central, hierarchical authorities. However, in three countries (B, F, NL) alternative forms of work organization, such as production groups, exist as well, or experiments are taking place.

In more detail, the production process is involved with processing 'materials' such as cattle (bovines, pigs, sheep, goats, horses, poultry); carcasses, meat parts, organs and offals; food additives (preservatives, colourings, spices and flavourings, flours, fats and other fillers and binding agents). Other materials which are being used are packaging materials (cans, plastic trays and foils, cardboard boxes) and cleaning and disinfecting agents.

The means of production include several machines (for skinning, plucking, de-hairing, evisceration, carving, chopping, cutting, de-rinding, grinding, mincing, sausage/pie/tart making, crate washing, packing, sealing); hand and power operated tools (stunners, knives, saws, hooks); transport systems (conveyor chains and belts, fork lift trucks, crate stackers, pallets); storage systems (freezing chambers, coolers, chillers). Moreover, there is a large variety of personal protective devices involved (gloves, wrist protectors, aprons, footwear, thermal isolated clothing, helmets, goggles).

Work activities that take place consist of killing and slaughtering, splitting carcasses into halves, evisceration, de-hairing/plucking/stripping, de-boning, carving and cutting into smaller pieces, grinding/mixing, curing/cooking/smoking/salting/drying/freezing meat pieces and products, quality control, packing, storage, forwarding, cleaning, maintenance/repair, management/administration.

The work activitities finally result in products such as meat pieces for whole sale and retail, sausauges, bacon, fresh/cured/cooked/smoked/salted/dried/canned/frozen meat products, pates, pies, and prepared portions for the Catering Industry and individual consumers.

With respect to trends in technology, countries report mostly about automation, reducing hard and manual work. In four countries (B, F, GR, SP) such changes have been taking place quite recently, whereas other countries (DK, F, GER, NL, UK) report that further automation will take place and some regard it as a continuous development. In the Netherlands, opportunities for further automation are mostly seen in the Poultry Sector, at the beginning of the production line, and new machinery is being developed now. With respect to the Red Meat Sector, Belgium feels that a fully automated slaughtering process will never be feasible. Yet, the United Kingdom reports the now ongoing development of automated de-boning equipment for lamb shoulders and pork loins. And in France some automated techniques for carving are being tested in laboratories.
Information on trends in work organization is less comprehensive. In Germany no great innovations in this field are expected, but felt needed. In Denmark changes are expected due to efficiency improvements and initiatives from the social partners to reduce repetitive work. Greece reports that management modernization is mostly confined to larger enterprises.
In the Netherlands, Germany, France and Denmark, joint innovation of both technology and work organization, also in relation to productivity and product quality, is clearly an issue considering existing action programmes. Some experiments have already taken place in the Netherlands with respect to slaughtering, and now de-boning is in the picture.
An overall sound being heard regards the ever increasing demand for increases in product throughput, which is leading to ever faster working rate and has serious implications for work practices, work equipment and work organization.

Main trends in the sector
On the whole, six main trends can be identified, which characterize current, mostly connected, developments in the Meat Sector across Europe. The first trend regards scaling-up and concentration of companies, which is reported by all countries except Belgium. This development is on one hand due to common business trends, such as merging, take-overs and closings. On the other hand it is induced by a particular rationalization process taking place in the sector as a result of EC-regulations on hygiene and sanitary conditions in slaughter houses (64/433/EEC and 77/99/EEC), which also leads to changes of public abattoirs into private ones. This rationalization process now particularly affects five countries (F, GR, P, SP, UK), but similar developments have taken place in other countries earlier on.

The second trend regards the pressure on the economic position and competitiveness of the sector. The small profit margins and limited capacity for investments, a.o. necessary to comply with the EC-regulations on hygiene, raises difficulties in staying competitive, especially among small, family-owned companies and public slaughter houses. Besides the EC-regulations, other factors causing this pressure are the EC open market, which puts pressure on prices, and changes in market demands, especially from large super market chains and from indivual consumers.

The third trend, regarding the sector's work force, is less apparant than the others, but yet identifiable. For some time already, the sector's position on the labour market is problematic with a high turnover of personnel and low attraction to potential workers. In several countries there is however a growing awareness regarding the 'the human factor', being a key factor in the continuity of the sector, for example for ensuring product quality. In some countries initiatives have already been taken with respect to vocational training and qualification of (future) workers (F, IRL, NL, UK), as well as experiments with alternative forms of work organization resulting in more attractive work (B, F, NL).

The fourth development regards the ongoing automation and mechanization, mostly due to the ever increasing demand for higher product throughput, and often enhancing the Tayloristic character of the production line work. In some countries (B, F, GR, SP), these technological changes at large scale have only recently taken place, but it is mostly seen as an ongoing development (DK, F, GER, NL, UK).

The fifth trend can be considered a linking pin between all the ones previously mentioned, and although it seems not widespread yet, it is definitely developing. It regards the introduction of new management concepts, aimed at integrating and improving various aspects of the conduct of business. Specific reported examples concern the implementation of Total Quality Management, such as ISO-9000 and HACCP (B, GR, IRL, NL), Integral Chain Control (NL), and experimental joint efforts to improve both quality of working life and quality of products, including both technological, work organizational, product quality, human and economic aspects (DK, F, GER, NL).

Before going into the sixth trend, a few remarks should be made on the consequences of the other five on the working conditions in the sector. From the overall picture, the following main negative effects emerge: increases in work speed, time constraints and repetitive work, and decreases in autonomy, job control and job content. Main positive effects could be reduction of manual handling and heavy work, better work equipment, and more attention to qualification. The real consequences will however depend of course, at least in part, on the extent to which the health and safety issue is taken into account during the change processes.

A positive contribution to this should come from the sixth trend, the implementation of the various EC-directives on occupational health and safety. Directives of specific relevance to the Meat Sector are: the frame work directive (89/391/EEC), a.o. obligating the undertaking of workplace assessments and the provision of some form of Prevention Service to workers; and the directives on biological agents (90/679/EEC); manual handling (90/269/EEC); noise (86/188/EEC); work places, construction and use of equipment and personal protective devices (89/654,655,656,-686/EEC). In several countries implementation has taken place or is taking place now, but an overview of its effectuation in the ten countries can not be presented from the data obtained.

2.2 Characteristics of the Meat Processing Industry in each country

This section contains summaries from the ten countries studied. It thus presents a brief characterization of the Meat Processing Industry in each country, including the social economic situation, general developments, and issues related to working conditions. Here again, it must be noted that characteristics mentioned for one country might be present in another as well, for which they are however not explicitly mentioned, because in the national report they were not identified as such.

Belgium
The Meat Processing Industry is a rather small sector in this country. In 650 mostly small, private companies approximately 13,000 people are employed (0.4% of the national working population). The workers are mostly male, low educated and, particularly in slaughter houses, they are often guest workers from Mediterranean countries or French companies. Jobs are usually full-time, with payment on hour-basis and bonuses for inconveniences. There is a big turnover of personnel within the sector, and a demand for qualified boners/cutters.
The economical situation of the sector is rather stable with a total annual turnover of circa 2,100 million Ecu's since 1989. Investments are decreasing however, which impedes the necessary compliance to European standards and regulations. With 3 employers' organizations and 7 unions

active in the sector, it is rather well organized. The production process is increasingly automated, but it is still labour-intensive.
The incidence rate and severity of accidents in the sector are higher than the national average. Accidents in slaughter houses are mainly caused by working with knives, by slippery floors and handling of carcasses. In meat processing, machines are more often the cause of accidents. Skin diseases, infectious diseases (zoonoses) hearing impairment and disorders due to vibrations or chemical agents prevail in the sector as notified occupational diseases.
With respect to the physical working environment, the main risk factors are noise, biological agents, lighting, climate and safety conditions. Main risk factors in the organizational working environment are working at high speed, lack of autonomy and control, and low job content with monotonous work. Future automation may increase these hazards. Since many companies are small, family-owned and employ many immigrant workers, main risk factors in the social working environment concern relations with management, workers' participation, and relations with colleagues.
At sectorial level, the interest in health and safety policy measures is increasing, and already some small-scale initiatives have been taken. Despite the (general) legislation and its obligations with respect to the health and safety management system, the situation at company level can still be improved, especially in the area of prevention. Here again, the size and family-character of the companies form an impediment. Hence, the national authors characterized the stage of policy development as 'beginning', both at company level, as well as at sectorial level.

Denmark
The Danish Meat Processing Industry employs about 25,000 persons (1.0% of the national working population). The number of companies in the sector amounts circa 325. The vast majority of them belong to the private sector, and 70% have less than 50 workers. Nevertheless, a substantial part (20%) employs 100 workers or more, and there seem to be relatively more large enterprises than in other sectors. During the past decade, merging of companies was widespread which, together with a considerable development in the technology, has contributed to a reduction of work places. The majority of the employees work in slaughter houses. A considerable part of the workers is unskilled, and relatively well paid. Payment is on production basis however.
Despite the relatively small work force, meat production is one of the main industries in Denmark, and thus constitutes an important part of the Gross National Product. Changes in the demands of domestic and foreign markets call for continuous improvement of products. Automation and increase of shiftwork is expected. Line production work and hierarchical work organization are dominant in the sector.
Besides employers' organizations and unions, two other organizations are active in the sector, particularly on occupational health and safety issues. Workers in the sector have a higher mortality index, as well as a higher risk for occupational accidents and diseases, than workers in other sectors. The majority of accidents is caused by hand tools and other sharp objects. The main notified occupational diseases are musculo-skeletal disorders, skin diseases, hearing impairment, and infectious diseases. As main hazards in the physical working environment have been identified: noise, climate, chemical substances, biological agents, musculo-skeletal loads, and safety conditions. The organizational working environment contains lack of autonomy and control, high speed work, repetitive work, low job content with monotonous work and piece-work payment as risk factors. Risk factors in the social environment regard relations with colleagues (work in isolation) and relations with the management (lack of support and encouragement).
The national authors characterize health and safety policies as 'well-developed', both at sectorial and at company level. Quite some regulations, organizations, programmes, projects and information, aimed at improvement of working conditions, have been targetted at the sector. Moreover, two nation-wide action programmes, 'A Clean Working Environment by the Year 2005' and 'Reduction of Monotonous, Repetitive Work', will affect the sector in the near future as well.

France

The French Meat Processing Industry consists of 3,000 companies, employing circa 95,000 people (0.4% of national working population). In spite of a tendency of concentration, the majority of companies is small. Many of these companies have difficulties to survive and to invest in modernization, necessary to comply with the European sanitary standards. This particularly affects public slaughter houses, which still form a majority, although their number is decreasing. Over the past years, production tools have been modernized to increase the quantity of slaughtered cattle and meat products, mostly by mechanization and automation. With respect to slaughtering, no great technological revolutions are expected in the next 10 years.

The work force in the sector is predominantly young, rapidly moving and working full-time. The majority of the workers is male, though in the Poultry Sector they are almost equaled by female workers. Workers usually have an intermediate educational level, but professional training is lacking. Increase of employment was common in the sector until 1991. Nowadays, recruitment of new personnel is a major problem, due to the sector's poor image on the labour market.

Since 1993, the sector, but in particular the bovines and ovines subsectors, shows a critical situation due to changes in consumers' habits, consume decrease, lower prices, difficulties in supply, strict regulations, and 'Just In Time' delivery demands. The sector's annual economical turnover amounts circa 39,000 millions of Ecu's (0.00002% of Gross National Product).

The sector is supported by 5 employers' organizations, 8 unions, and 11 other organizations.

The accident rate in the sector, particularly in slaughter houses, is higher than in other industries. Main causes are hand tools, handling, falling and slipping. Main notified occupational diseases in the sector are musculo-skeletal disorders, infectious diseases, skin diseases, hearing impairment, and respiratory disorders.

Noise, climate, biological agents, musculo-skeletal loads and safety conditions have been identified as the main risk factors in the physical working environment. Main hazards in the organizational working environment regard long working hours, shift work, and Tayloristic, repetitive work with lack of autonomy, time constraints and low job content. Main obstacles in the social environment concern work in isolation, relations with clients, lack of participation, and lack of equal opportunities for women.

According to the national authors, policies on health and safety matters are to be characterized as 'beginning', both for company and sectorial level. Nonetheless, steps have been taken to prevent accidents and diseases, vocational training programmes have been developed, and studies have been carried out with respect to joint effects of modernization and risk factors, to work organization and job content. Still, it is felt that a lot needs to be done yet.

Germany

In this country, about 290,000 people work in circa 29,000 meat processing companies. The Meat Sector employs 1.0% of the national working population. The majority of the workers is male, works full-time, has an intermediate educational level and the German nationality. Turnover in personnel is high and the branch has a low attraction on the labour market.

The sector is quite heterogenous with a high degree of specialization, depending on regional and market factors, but also on the degree of industrialization. Furthermore, the sector is heavily influenced by local and historical factors, such as east-west, but also north-south differences in the nature and scale of agriculture and farming. The vast majority of the companies is small.

Nowadays, the sector is characterized by mechanical and organizational changes, by tendencies of concentration, by market and prize pressure and by cost reducing policies. To meet the market's demands for higher quality, all stages of production, from slaughtering up to selling and marketing, require improvement and innovation. The product quality issue promotes changes in company structures, and has already led to a devided market, one with cheap mass products, and one with quality products. In 1993, the sector's total turnover was 26 milliards of Ecu's (1.7% of the Gross National Product). Besides two employers' organizations and two unions, the sector has

two other sectorial organizations, one of which, the 'Fleischerei Berufsgenossenschaft', plays a dominant role in health and safety matters. Moreover, there are regional butchers guilds and state guild associations.
Annually, a rather large proportion of the workers (average 17%) is subject to accidents, of which the majority is caused by knives and machines. Skin diseases, musculo-skeletal disorders, hearing impairment, respiratory disorders, digestive disorders and infectious diseases represent the most important notified occupational diseases in the sector.
Due to the heterogenity in the sector, the working environment at similar workplaces in various companies can be very different. Despite these differences, main risk factors in the physical environment are musculo-skeletal loads, safety conditions, noise, lighting, and climate. In the organizational working environment, lack of autonomy and control, time constraints, repetitive work and low job content represent the main hazards. Overall data on the social working environment are lacking, but unequal opportunities for women represent a problematic area.
The national authors characterize company policies on health and safety as 'well-developed', and policy at sectorial level as 'partly developed'. Actions at branch level are felt necessary to stabilize production structures and to improve technology. Furthermore, models of good practice are required, as is improvement of training and information.

Greece
The Greece Meat Sector consists of 570 companies, which employs 6,500 workers (0.9% of the national working population in manufacturing). The majority of these companies is small, family-owned and has old technology and equipment, and a rather poor work organization. The number of such companies is continuously decreasing. Larger enterprises have improved their work organization, production methods and equipment over the last years, thus improving their position in the market. Some of them try to apply Total Quality Management.
Employees in the sector are mostly male, and usually have permanent full-time employment contracts. The majority works in private companies. An increasing demand for higher educated employees is expected.
The annual economical turnover in the sector is around 330 millions of Ecu's (0.5% of Gross National Product). In general, large private companies are profitable, small and co-operative companies have losses, whereas the Poultry Sector is the most dynamically developing subsector.
Sectorial organization is mostly confined to the larger enterprises, both amongst employers, as amongst employees.
Workers in the Meat Sector have a slightly higher risk to accidents, than the work force in general. The majority of these accidents are caused by sharp objects, machines, and slippery floors. Bad lighting plays a role as well. Most important work related diseases are musculo-skeletal disorders (including muscle siffness), skin disorders (e.g. dermatitis) and respiratory diseases (e.g. chronic bronchitis and extrinsic allergic alveolitis).
Prevalent risk factors in the physical working environment are noise, lighting, climate, radiation, biological agents, musculo-skeletal loads, and safety conditions. Regarding the organizational environment, lack of autonomy and control, high speed work, repetitive work, high job division and low job content are main hazards. Main risk factors in the social working environment are in the field of information, consultation and workers' participation.
According to the national authors, the developing stage of health and safety policies, both at company and sectorial level, can best be characterized as 'beginning'. Improvement is expected, due to the implementation of an EC-directive, resulting in Prevention Services for all employees.

Ireland
The Irish Meat Industry consists of 105 premises for the slaughtering, cutting and/or processing of cattle, sheep and pigs. During peak seasons, in the last quarter of the year, the sector employs up to 10,000 people. With 50% of the people having non-permanent contracts, there are significant

fluctuations in numbers employed, and a high personnel turnover. No immigrant workers are employed, and the vast majority of the work force is male, between 18 and 35 years old, and unskilled. However, a more skilled work force is now required and companies have invested money in workers' qualification.
The companies are all private, employ 10 to 100 workers, and are subject to three general trends. One is towards fewer, larger plants, another towards ownership by dairy processors, and the third concerns the implementation of systems for quality management and for product safety.
The annual economical turnover is unknown, but particularly the Beef Industry is suffering financial strain since 1993, due to a decline of the slaughterings, mirrored by a huge increase in exports of live cattle. Moreover, since 1993 the emphasis on volume sales has shifted towards commercial markets with higher quality demands. Changes like these are leading to changes in work patterns and technoloy, adding to the ever increasing productivity demand.
One employers' organization with a membership rate of almost 100%, several general unions, and three other organizations are active in the sector.
Although statistical data are lacking, cuts, amputations, injuries due to falls and animals, sprains and strains, and burn-out seem to be the main health problems related to the sector. Accordingly, the identified main risk factors in the physical working environment are safety conditions and musculo-skeletal loads. The number one hazard however, regards the seasonal peaks in the work with the time constraints and lack of training involved, hence increasing the risk of accidents. Hazards in the social working environment mostly concern relations with management, workers' information, participation and qualification, and unequal opportunities for women.
The national authors characterize companies' policies on health and safety as 'partly developed', whereas the sector policy is considered to be 'beginning'. On both levels little beyond basic requirements is likely to be developed. Yet, companies' management seem to be more aware of the value of protecting workers from sickness and injuries. Efforts are felt needed most in minimizing the seasonal peaks.

The Netherlands
Almost 800 private companies constitute the Dutch Meat Processing Industry, which employs approximately 22,000 workers (0.3% of the national working population). The majority of the companies is small, but there is a tendency to scaling-up. Poultry industries, whose number is increasing, usually do both slaughtering and processing, in a rather uniform way. 'Red meat' slaughter houses are often seperate companies, also having quite uniform production processes. 'Red meat' product companies however, some of which have slaughtering lines too, show much more variety in their way of production. Joint innovation in technoloy and work organization, also in relation to productivity and product quality, is clearly an issue in the sector. Moreover, Integral Chain Control has been introduced in the sector.
The work force mostly consists of men, the highest percentage of women being around 30% in the Poultry Sector. This subsector has also a rather high proportion of immigrant workers. Turnover of personnel is twice as high as the national average and the sector has a somewhat negative image on the labour market.
The sector's economical situation is rather sound (annual turnover circa 5,900 millions of Ecu's; 1% of Gross National Product), although under pressure due to national and international factors.
The sector is well-organized with 5 employers' organizations, 3 unions and 12 other organizations, which are mostly two or three party organizations. Particularly one of them, the Product Board for Livestock and Meat, plays an important initiating role in improving conditions in the sector, including working conditions.
Figures on occupational accidents, sickness absenteeism and disablement show the sector's disadvantaged position compared to others. Reported accidents are mainly caused by tools and falling objects, whereas musculo-skeletal disorders, skin disorders, stress, repiratory disorders, cardio-vascular diseases and hearing impairment are the most prevalent disorders. Main risk

factors in the physical working environment are noise, climate, safety conditions, musculo-skeletal loads, and biological and chemical agents. Lack of autonomy and control, work rhythms and time constraints, repetitive work, low job content and payment systems are the main hazards in the organizational work environment. The social environment bears obstacles regarding relations with colleagues and management, including consultation and participation, and to a lesser extent with respect to training and equal opportunities for women.
The national authors characterize the policies on health and safety at company level as 'partly developed'. The sectorial policy is considered well-developed, because the sector is weil-researched and in fact a front runner. Future emphasis will be on transfer and application of available knowledge on improvements, and on stimulating companies' self-activity.

Portugal
The Portugese Meat Sector consists of 330 companies in the private sector (no data are available on the public sector). Induced by EC-regulations on hygiene and sanitary conditions, there has been a development since 1990 to privatize all public slaughter houses, which will be finished by the end of 1995. All the privatized slaughter houses are linked to a national private structure.
The private meat industries are mostly small and only a few are family-owned. These industries employ almost 16,000 employees, of which a small majority is female and has an intermediate educational level.
Besides two sector-specific employer's organizations, two general unions, and the above mentioned national structure, there are two other organizations active in the sector. One of them guides the public slaughter houses in their change into private companies, and will therefore seize to exist by the end of 1995.
Infectious diseases, such as brucellosis and tuberculosis, are known to occur in the sector and are now subject to a greater awareness. Main risk factors in the physical working environment regard noise, climate, biological agents, and musculo-skeletal loads. With regard to hazards in the organizational and social environment data are lacking.
Although the national authors did not give an explicit characterization, both companies' and sectorial policies on occupational health and safety seem to be only beginning. However, due to the current process of change in slaughter houses, which includes closure of old units, building of new ones, and improvement of sanitary conditions, improvement of working conditions can be expected.

Spain
The Meat Industry in this country has about 2,800 companies and provides employment to circa 49,500 workers (0.6% of the national working population). The number of companies has been decreasing since the late seventies. The majority of them is small, private, and often occupied with only one aspect of meat production, such as slaughtering, sausage manufacturing or ham salting. Predominantly they are located in small cities and villages. Over the last years, general changes have been taking place due to the incorporation of EC-regulations and its strict hygiene standards. This has led to modernization and improvement of equipment, and to the introduction of new machinery which resulted in the automation of manual tasks. These changes have affected the working conditions as well.
The majority of the workers is male, between 25 and 44 years old, and low educated. The proportion of immigrant workers is rather small. Most people have a permanent labour contract and work in a company with less than 100 workers.
The annual economical turnover of the sector was 7,200 millions of Ecu's in 1990 (3.1% of the Gross National Product). The sector is covered by 11 employers' organizations and 2 unions.
Accidents occurring in the sector, affecting circa 20% of the workers per year, are mainly caused by tools, strenuous movements, meat products, slips, trips and falls. The resulting injuries mainly consist of wounds, cuts, lacerations, strains and sprains in the upper limbs. The main notified

occupational diseases regard mechanical vibration disease, infectious diseases, skin diseases, musculo-skeletal diseases and respiratory disorders.
With respect to the physical working environment the main hazards are noise, climate, safety conditions and musculo-skeletal loads. Regarding the organizational working environment data are lacking to identify main riks factors, but to some extent shift work and repetitive work occur in the sector. The social working environment bears obstacles concerning equal opportunities for women.
By the national authors, health and safety policy at company level and at sectorial level are both being characterized as 'beginning'. It is felt necessary to implement a prevention programme, starting with a descriptive study of the health consequences of the sector's working conditions. Furthermore, the knowledge and subsequent observance of health and safety regulations should be encouraged, for which specific training programmes are being recommended.

United Kingdom
The Meat Processing Industry consists of almost 1500 local production units, employing approximately 87,000 workers. The majority of the production units is small, but these employ a minority of the sector's work force. Most companies are private. In the Red Meat Processing Industry abattoirs are often indepent, separate companies, except for the processing of pork where an abottoir is often attached to the meat products factory. The Poultry Industry is dominated by a few large, vertically integrated companies who undertake all the processing on the site. Particularly abattoirs now face a process of rationalization, as a result of EC-regulations on hygiene and sanitary conditions.
The workers in the sector are generally low educated. Most of them, particularly the men, work full-time. The proportions of men and women are likely to reflect those of the Food Industry in general (circa 2:1). Nowadays, the sector has little difficulty in recruiting personnel. Nonetheless, this branch of industry is generally regarded as less attractive and in many regions the labour turnover is high.
The market for meat and meat products has been stable for several years, although the pattern of trade has moved from meat for home preparation to catering portions and pre-pepared products. The annual economical turnover amounts almost 3,400 millions of Ecu's.
Besides 4 employers' organizations and 3 unions, the Meat and Livestock Commision plays an important role in the sector. Its interests in improving the efficiency of the industry and its involvement in training, research and development clearly affect working conditions too.
The accident rate in the sector is one of the highest in the Manufacturing Industry and even higher than for example in coal extraction. Main accident causes are handling, objects such as hand tools, slips, trips and falls. Comprehensive data on work related diseases in the sector are not available, but anecdotal evidence shows problems associated with wet and cold working conditions, infectious diseases, and musculo-skeletal injuries, including repetitive strain injuries and back pain.
Main riks factors in the physical working environment are noise, climate, musculo-skeletal loads, and particularly safety conditions. Hazards in the organizational environment are repetitive work, low job content and piece work payment. The social working environment has risk factors concerning training, consultation, unequal opportunities for women and disabled persons.
According to the national authors, companies' policies regarding health and safety should be characterized as 'partly developed', whereas the sectorial policy is considered to be 'well developed'. However, despite the existence of a Meat Trades Joint Working Party, and its work in producing guidances on health and safety matters, the establishment of a strong authoritive body is felt necessary to provide a strong incentive to the industry bodies to become more pro-active. A recent initiative from the governmental Food National Interest Group may establish results in the future as well.

3 *Overview of the occupational health and safety situation in the Meat Processing Industry across Europe*

This chapter presents the main information on the occupational health and safety situation in the Meat Processing Industry in ten European countries. Firstly, information on consequences of working conditions is given, by presenting data on occupational accidents, diseases, sickness absenteeism, disablement and mortality in the sector. Secondly, main risk factors are being identified, both in the physical, the organizational and the social work environment. Ill-health and other consequences of these factors are also described, as well as interesting examples of preventive and control measures. In the third section of this chapter, risk groups will be dealt with. The fourth section presents an overview of the policies and instruments aimed at improving the working conditions. Here, data on the organization of prevention is given. The stage of policy development is also being characterized, both on company and on sectorial level. Furthermore, undertaken improvement activities such as action programmes, education, information and research are described. The chapter finishes with a discussion and preliminary conclusions on the identified risk factors, problems, groups at risk, and the undertaken actions and policies.

3.1 Health and safety output

This section presents information on health problems related to the working conditions in the Meat Processing Industry. It is apparant that ***statistical data on occupational accidents are best available.*** To ***some*** extent ***figures*** also exist with regard to ***occupational diseases and sickness absenteeism. Data on morbidity, disablement and mortality in the sector are rather poor however.*** In Ireland no statistics were available on any of the issues.
It must be emphasized that comparison between countries of the statistical data obtained can be very misleading. This is due to the differences in reporting and registration systems or practice, and to lack of explanatory information thereon. Furthermore, the provided figures on some countries (F, NL in any case) not always exclusively concern the Meat Processing Industry, but also related sectors like the whole sale trade and retail. Exact information on the population to which the figures refer is in many cases however lacking as well.

Occupational accidents
Quantitative data on occupational accidents in the sector are obtained from all countries, except Ireland. These are taken up in Table 4, in which a distinction is made between all accidents, accidents with work interruption, fatal accidents and accidents resulting in permanent incapacity. Most countries (B, DK, GER, NL, SP, UK) provided information over 2-5 years during 1988-1993, which is mostly presented as a range with the lowest and highest annual value during the period. Data from three countries (F, GR, P) refer to just one year in the same period. As far as is known, there are roughly two types of registration systems within the countries regarding accidents with work interruption. One is based on accidents with 1 day of sickness absence or more (B, DK, F, NL, SP), the other with 3 days or more (GER, UK). This may of course result in big differences between the data of countries. Furthermore, serious under-registration of occupational accidents is reported by four countries (DK, IRL, NL, UK), whereas Belgium could only provide data on companies with 20 workers or more. Hence, the presented ***data must generally be considered as quite unreliable and hardly comparable.***

Table 4 shows that data on all accidents are too poor to analyse. Most data are available on accidents with work interruption and on fatal accidents. The annual number of occupational ***accidents with work interruption*** varies from 15 (P) to 55,686 (GER). ***The percentage of workers***

involved per year is by five countries reported to be below 5% (DK, GR, NL, P, UK). Belgium, Germany and Spain however, report it to be around 19% which seems remarkably high, even when taking into account all the previous critical remarks. Two countries (DK, GER) further report a decrease of accidents in the sector, but Belgium mentions that the average number of lost days has increased from 15 to 31 per accident. Furthermore, in five countries (B, DK, F, GR, UK) the accident rate in the sector or particular parts thereof, appears to be higher as compared to the entire Food Industry, to all Manufacturing Industries, or to the national rate. The reported differences vary between 30% (GR) and a factor 4 (F).

As Table 4 also shows, ***the annual number of fatal accidents*** in all eight reporting countries, is very similar and ***low***, varying between 0 (B, DK, NL, P) and 11 (GER). The percentage of workers involved are consequently low as well, mostly less than 0.04%. Data on accidents resulting in permanent incapacities are quite similar too, with an annual number varying between 15 and 90 (B, GER, SP). France is the only exception with 1,261 cases in 1991, which may be due to differences in the registration system used (e.g. France counting the number of accidents resulting in both total and partial permanent incapacity, whereas other countries possibly only count the cases of total permanent incapacity).

Data on professional categories with highest incidence of accidents is obtained from six countries (B, DK, F, GER, GR, SP), but only three (B, GR, SP) use more or less the same categories. Furthermore, most countries cannot provide accident rates, but, per professional category, only percentages of the total number of accidents. This impedes an overall identification of risk groups. A clear result however is, that in three countries the category with the highest accident incidence counts for circa 90% of all accidents in the sector. These categories are however rather broad ones, such as 'line/production workers' (GR, SP) and 'foodstuff and stimulant workers' (DK). In the other countries the main categories are 'workers not qualified', 'butchers' (F, GER: both 48% of all accidents), and 'line/production workers', specifically workers handling knives and machines (B). A notable result regards the number two category in two countries: 'workers qualified' (F) and 'sales personnel' (GER), both counting for circa 20% of all accidents, which seems remarkably high.

Identification of main causes of accidents is also impeded to some extent, because of the different classification systems used. Nevertheless, the ***number one cause*** appears to be ***hand tools*** (knives) ***and other sharp objects.*** In seven countries (B, DK, F, GER, GR, NL, SP) this is explicitly mentioned as the number one or two of the 'top 5' of accident causes, responsible for 31% (F) to 84% (NL) of all accidents in the sector. Two other countries (B, UK) mention it as a main cause as well, but are less explicit in their ranking or definition. The two ***other main causes are being struck by objects***, which mostly refers to machines, ***and slips, trips and falls at the same level,*** mostly due to slippery floors. These causes are responsible for circa 20% of all acccidents in the sector in five countries (DK, GER, GR, SP, UK), respectively 6-19% (F, GR, SP, UK). Manual handling and/or strenuous movements is regarded as a main cause to a lesser extent. Three countries (F, SP, UK) report it to be a number one or two cause, responsible for 17-39% of all accidents in the sector, in various years.
For more information on these accidents causing risk factors is being refered to section 3.2.1. Furthermore, it should be mentioned that a project is now being carried out by DG V and Eurostat in order to harmonize the registration of occupational accidents throughout Europe (European Statistics on Accidents at Work (ESAW)).

Notified occupational diseases
Statistical information on notified occupational diseases, obtained from five countries (B, DK, F, GER, SP), is presented in Table 5. For all five countries it was possible to rank the occurrence of

Table 4: *Occupational accidents in the Meat Processing Industry according to consequences (1988-1993)*

	B[3]	DK	F	GER	GR	IRL	NL	P	SP	UK
OCCUPATIONAL ACCIDENTS [1]										
All accidents:										
▸ Number per year	-	-	-	-	-	-	-	15	10,165-11,654	-
▸ % of workers per year	-	-	-	-	-	-	-	0.4%	21-24%	-
Accidents with work interruption[2]:										
▸ Number per year	1,292-1,647	3,228-3,866	23,276	40,004-55,686	100-110	-	1,124-1,381	15	9,180-10,781	3,867
▸ % of workers per year	18.9-21.8%	3%-4%	-	13.6%-19.1%	1.8%	-	2-3%	0.4%	19-22%	4.6%
Fatal accidents:										
▸ Number per year	0-2	0-1	5	5-11	-	-	0-?	0	2-4	3
▸ % of workers per year	0-0.034%	0-<1%	-	0.002-0.005%	-	-	-	0%	0.002-0.008%	-
Accidents resulting in permanent incapacity:										
▸ Number per year	15-22	-	1,261	49-69[4]	-	-	-	-	50-90	-
▸ % of workers per year	0.18-0.37%	-	-	0.021-0.023%	-	-	-	-	0.1-0.2%	-

1) Per country, data never cover the full period 1988-1993, but only 1 year (F, GR, P), 2 years (NL, UK), 4 years (B, DK) or 5 years (GER, SP). Data over periods of two years or more are mostly presented as a range with the lowest and highest value during that period. Data exclude commuting accidents. - = no data available.

2) In five countries (B, DK, F, NL, SP) data concern accidents resulting in 1 day of absence or more. In two countries (GER, UK) data concern accidents with 3 days of work interruption or more. Information on the registration methodology in the other countries was not obtained.

3) Belgium: the figures only concern companies with 20 workers or more.

4) Germany: the figures concern the total number of incapacities leading to circa 100% impairment of earning capacity, due to occupational accidents, commuting accidents and occupational diseases.

Table 5: Notified occupational diseases in the Meat Processing Industry (1988-1993)

	B	DK	F[2]	GER	GR	IRL	NL	P	SP	UK
OCCUPATIONAL DISEASES[1]										
▸ Skin diseases	1 (2-7)	2 (65- 78)	3 (7)	1 (421-466)	-	-	-	-	3 (0-33)	-
▸ Musculo-skeletal diseases	-	1 (317-397)	1 (286)	2 (74-106)	-	-	-	-	4 (0-2)	-
▸ Infectious diseases transmitted by animals	4 (1-1)	5 (12- 26)	2 (60)	4 (13- 47)	-	-	-	-	2 (15-73)	-
▸ Hearing damages/loss	5 (0-1)	3 (41- 52)	4 (-)	3 (29- 83)	-	-	-	-	(0)	-
▸ Respiratory disorders	-	-	5 (-)	5 (9- 21)[3]	-	-	-	-	(0-2)	-
▸ Other diseases	2 (2-6)[3] 3 (0-3)[3]	4 (28- 37)[3]	-	-	-	-	-	-	1 (13-185)[3]	-

1) The first figures represent a ranking of the incidence of notified occupational diseases. Figures between parentheses are the highest and lowest annual number of cases over 1988-1993 (SP), or 2-4 years during 1989-1993 (B, DK, GER). The figures for France concern the total number of cases over 1989-1993. - = no data available.

2) France: the figures refer to only a small part (circa 3%) of the employees in the sector ('meat processing co-operatives belonging to agricultural organization' resorting under one of the two insurance systems within the sector).

3) The figures refer to occupational diseases caused by mechanical vibration, respectively chemical substances (B); undefined diseases (DK); to obstructive respiratory tract disorders caused by allergenic substances (GER); and to mechanical vibration disease (SP).

Table 6: Sickness absenteeism in the Meat Processing Industry (1989-1993)

	B	DK	F	GER	GR	IRL	NL	P	SP	UK
SICKNESS ABSENTEEISM[1]										
Lost days (as % of calender days)	-	-	25.0%	± 9.0%	0.4-10.0%	-	9.6-10.1%	-	-	-
Frequency (rate of sick reports)	-	-	3.9	-	3.0-29.6	-	1.8-1.8	-	-	-
Average duration (days)	-	-	26-32	33	3-10	-	22-26	-	-	-

1) Data from France and Germany cover one year. The other data cover 1989-1993 (GR) and 1989-1991 (NL), with a range of the highest and lowest value over that period. Figures from Greece refer to a sample of 26 companies (circa 5% of total number of companies in the sector). - = no data avalaible.

the five main diseases. In this ranking, number 1 indicates the disease with the highest frequency, and number 5 is the least frequent disease in the 'top 5'. Despite the probable differences in notification and registration systems, on which no explanatory information was obtained, the overall picture in the Table indicates that ***skin diseases, musculo-skeletal disorders and infectious diseases are the most frequent occupational diseases, followed by hearing damages/loss, respiratory diseases,*** and other diseases.
Furthermore, the annual numbers of notifications per disease are also given in the Table. For Belgium, Denmark, Spain and Germany these figures (between parentheses) refer to the lowest and highest annual number of cases in 2, 4 or 6 years in the period 1988-1993. In the case of France the figures concern the total number of cases over 1989-1993 in only a small part of the sector's work force. Even when taking into account the different size of the sectorial labour force in each country, there are two notable differences between countries. Firstly, this regards the numbers of notifications in Belgium and Spain, which are much lower as compared to Denmark. Secondly, the number of cases of musculo-skeletal diseases in Denmark is remarkably high, especially as compared to Germany, but also to France. The background for these conspicuencies is unclear, but it is probably due to differences in notification, registration and social security systems.
Further information from Denmark shows that the incidence of occupational diseases is much higher in the Meat Sector, than in the entire working population. To conclude with, Greece reports the occurrence but no registration of four of the above mentioned diseases, despite the fact that they are included in the national list of occupational diseases. In the Netherlands there is no such formal list, and therefore the registration is lacking.
As was mentioned before regarding occupational accidents, on the issue of occupational diseases as well a project should be mentioned, which is now being carried out by DG V and Eurostat in order to harmonize its registration throughout Europe (European Statistics on Occupational Diseases (EODS)).

Morbidity
Information on morbidity in the sector was obtained from six countries, but only two provided some statistical data concerning diagnosis (GER, NL). Both in Germany and the Netherlands musculo-skeletal disorders and respiratory disorders belong to the five main types of illnesses in the sector. These affect circa 5-20% of the Dutch workers, and 36% of the German workers. The 'top 5' further consists of consequences from accidents and stress (NL), disorders of digestive organs, injuries and toxifications, and diseases of the circulation system (GER). The four main types of illnesses in the French Meat Sector are musculo-skeletal disorders and three infectious diseases (brucellosis, leptospirosis, pasteurilosis), but only a few cases per year are reported. The information from Greece and the United Kingdom points to the same types of diseases as were reported by the other countries, but dermatitis is mentioned as well (GR). Data from Denmark further indicate that persons employed in the sector have a higher risk of admission to hospital, than employees in general.

Disabilities
From only four countries (B, F, GER, NL) statistical data on disability in the sector are obtained, and they are quite different. Nevertheless, it appears that musculo-skeletal disorders are one of the main causes (F: 5% of number of disabilities, NL: circa 8% of workers). Stress and cardio-vascular diseases are also mentioned (NL: circa 4% and 2% of workers), as well as cuts, contusions, pricks and bites (F: 55-8% of disability cases), disorders due to mechanical vibrations and skin disorders (B: 32-44% of the number of disabilities as a result of recognized occupational diseases). In France, 235 cases of permanent incapacity occurred in 1991, due to diseases. Germany reports a total of 649 cases of disability in the sector in that same year, and almost 3000 cases of rehabilitation in 1993. In the Greece Meat Sector no incapacities seem to have occurred in

recent years. For specific data on cases of permanent disablement due to accidents, is being refered to the first subsection.

Sickness absenteeism

From four countries (F, GER, GR, NL) quantitative data on sickness absenteeism in the sector were obtained, which are presented in Table 6. Data from two countries (GR, NL) cover a 3 and 5 year period and are presented by a range of the lowest and highest annual value during that period. The other two countries provided data on just one year. Data from Greece however refer to only a small sample (5%) of the companies in the sector.

The data show that the lost days due to sickness absenteeism in three countries (GER, GR, NL) are around 9% (% of calender days), and estimations from Belgium and the United Kingdom (6-7%) are rather in line with this figure. Only France is quite exceptional with 25%. The sickness frequency (annual rate of sick reports per 100 workers) varies between circa 2 and 4, except for Greece, which reports a highest value of almost 30. The average duration of illness varies from 22 to 33 days, again except for Greece where it is 10 days or less. This indicates that in the Greece sample mostly short, but frequent absenteeism occurs, whereas in the other countries less often, but longer absenteeism prevails.

Five countries (DK, F, GER, GR, NL) further report, that ***absenteeism in the Meat Sector is more frequent or takes longer as compared to the national average.*** The differences in the percentage of lost days vary from 1% higher (GER) to almost 5 times higher (FR). From the Netherlands it is known that the costs of compensation for sickness absenteeism in the sector is around 45 millions of Ecu's. Furthermore, this country reports the main causes for the sectorial sickness absenteeism: musculo-skeletal disorders (33% of absenteeism); psychic complaints (18%); and skin diseases, infections, accidents and injuries (together 17%).

To conclude with, Belgium signalizes two-way effects on sickness absenteeism as a result of the structure of the compensation system (lengthening the absenteeism period), and pressure on the labour market (shortening it).

Mortality

Information on death cases due to occupational diseases are only obtained from France and Denmark. France reports that such death cases in the Meat Sector are rare and exceptional, and it mentions two recognized occupational diseases which can lead to mortalities: tetanus and leptospirosis. Furthermore, in Denmark there are some indications that both male and female workers in the sector have a lower life expectancy than workers in general.

For data on mortality due to occupational accidents is refered to the first subsection on that issue.

3.2 Work environment

In this section the main risk factors in the Meat Processing Industry in the ten countries are being described. These main risk factors will be dealt with in three seperate subsections: the physical work environment, the organizational work environment and the social work environment. In each subsection the main risk factors will be identified and described, along with the reported health and safety problems related to these factors, and interesting examples of applied or proposed preventive and control measures.

Beforehand, it is noted that working conditions are known to be different to some extent in the various subsectors, in the various companies and also in the various departments of companies. This heterogenity was however not specifically accounted for in the structure of the profile. Hence, the information hereafter mostly presents an overview of the conditions in the sector as a whole.

3.2.1 Physical work environment

An overview of the main risk factors in the physical environment is being presented in Table 7. Authors from all countries explicitly identified main risk factors (rendered by 'X' in the Table). In several cases they reported exposure to other factors as well, which were however considered to be of lesser importance (not shown in the Table).
From the data in Table 7 it is concluded that the ***'top 5' of physical risk factors is: noise, climate factors, musculo-skeletal loads, unsafe working conditions*** (main risk in 9 countries), and ***biological agents*** (main risk in 6 countries). To a much lesser extent, lighting, chemical substances, and radiation are identified as main risk factors (1-3 countries). Not one country has mentioned vibrations as a main risk factor. Hereafter will be focussed on the five main factors, which will be described in more detail.

Table 7: *Main risk factors in the physical work environment in the Meat Processing Industry*

Country / Risk factor	B	DK	F	GER	GR	IRL	NL	P	SP	UK
Noise	X	X	X	X	X		X	X	X	X
Vibrations				-						
Lighting	X			X	X					
Climate	X	X	X	X	X		X	X	X	X
Radiation				-	X					
Chemical substances		X					X			
Biological agents	X	X	X		X		X	X		
Musculo-skeletal loads		X	X	X	X	X	X	X	X	X
Safety conditions	X	X	X	X	X	X	X	-	X	X

X : identified as main risk factor in this country.
- : no data available.
blancs : information on the (non-)occurrence of exposure to this risk factor is provided; the factor is however not identified as a main risk factor.

Noise
Exposure to harmful noise is very common in the Meat Processing Industry. Available data on the size of the exposure group, with a varying reliability, vary from approximately 35% till 70% of the workers in the entire sector (DK, F, NL, SP), and even 75% of slaughterhouse workers (DK). As most important sources are being mentioned: cries from animals, slaughtering pistols, handling systems (e.g. hanging), conveyors (e.g. chains), electric circular saws, compressors, fans in cooling systems, extraction fans, and machines for dehairing, stripping, chopping, cutting, slicing, plucking (poultry), evisceration (poultry), canning, vacuum packing, and crate washing. Radios have also been mentioned by Belgium and the Netherlands as a notorious source.
These sources either continuously or fluctuatingly produce noise which, according to data from seven countries, may cause average continuous noise levels at almost all workplaces of approximately 75-95 dB(A). In Spain and France circa 25%, respectively 50% of the workers in the Meat Sector were exposed to noise levels over 85 dB(A). Furthermore, noise peak levels of circa 100-

110 dB(A) are reported by six countries (B, F, GER, NL, P, UK).
All these data imply that in fact almost all workers are exposed to at least annoying noise, and that exceeding of legal or professional Threshold Limit Values is common.

The ***main health problems***, related to this risk factor, are ***hearing loss*** and other ***irreversible hearing damage.*** Seven countries report the occurrence of these problems, in four of which (B, DK, F, GER) some quantitative data are available, due to being registered as a notified occupational disease. In Denmark and Germany hearing impairment is the third main diagnosis in notifications in the sector, and in a recent French study it was found to be the second main cause of work related diseases.
Other noise related problems have been mentioned by five countries (B, F, IRL, NL, P): communication problems, isolation of workers, cardio-vascular disorders, digestive, sleeping and comportemental problems, rise of accident proneness, consequences on product quality and performances, amnesia, stress, tiredness, and concentration loss. No data are available on how widespread these problems are, but they seem to be seen as lesser important than hearing impairment.

With regard to ***noise control, six countries*** report to have ***national legislation, specific on this issue*** (DK, B, F, GR, NL, UK), which moreover ***shows similarities***, by pointing out action levels and obligations to both employers and employees. The lowest action levels are reported by Belgium and the Netherlands: 80 dB(A) at which employers are entitled to provide personal protective devices. In the other four countries the lowest action level is at 85 dB(A), calling for various actions in the various countries. Furthermore, 90 dB(A) is yet another action level in Greece, the Netherlands and United Kingdom. In this last mentioned country it is also compulsory to undertake action on noise peaks of circa 140 dB(A).

Besides or related to these action levels, the legislation contains specific obligations for the employer to reduce noise levels (DK, GR, NL, UK), to monitor them (F, NL, UK), to provide personal protective devices (B, DK, F, NL, UK), to inform and train the employees with respect to these devices (NL, UK), and to provide medical control (F, NL). In some cases employees are explicitly obliged to use the personal protective devices (B, F, NL, UK).
However, nothing to the detriment of the already existing similarities in national legislation, it should be noted that there might have been even more consistency, considering the existence of EC-directive 86/188/EEC, which is aimed at harmonizing standards on noise between countries.

From the fact that noise is being identified as a main risk factor, it is obvious that the ***practice*** on ***noise control*** in the Meat Processing Industry is ***far from ideal***, despite the legislation. Some countries have specific information on the practical application of preventive and control measures. Belgium reports that incapsulation and other preventive measures are not widespread. So is the case in the Netherlands, where personal protective devices are said to be over-emphasized, even though a demonstration project on noise control has run in the sector, some years ago. In Spain quantitative data is available from 1988, indicating that only 35% of the workers in a study sample were under some preventive measures and under specific medical surveillance. But only 22% of the workers used adequate measures, such as time restriction and protective devices. Portugal reports that workers usually wear auricular protections.

Seven countries (B, DK, F, IRL, NL, SP, UK) give ***suggestions for preventive and control measures.*** Some regard structural prevention, such as elimination of sources, incapsulation, automation of noisy equipment, and silencing of work rooms by baffles and by housing equipment away (B, DK, F, IRL, NL). Other regard the effective use of personal protective devices (B, IRL), and training and education on that issue (NL). Suggestions with respect to periodical

medical surveillance are given by Belgium, France, Ireland and Spain. France also recommends to monitor noise levels and to exactly detect sources, in order to eliminate them as far as possible. A suggestion that might be very useful throughout Europe comes from the Netherlands, where a governmental publication on noise control in the Meat Sector is available. It contains very specific information, not only on common noise levels at the various tasks, machines and utensils in slaughter houses for beef, pork and poultry, and the Meat Product Industry, but also on the noise reduction (in dB(A)) that can be achieved by various prevention measures. The transfer and application of this available information is therefore being suggested.

Climate

The climate and thermal conditions in the Meat Processing Industry are very much related to the core business of the sector: the production of food of good quality. While processing, the meat must be maintained at low temperatures, so is being demanded not only by national, but also by European directives. Such in order to control the growth of pathogenic micro-organisms in the interest of public health. Furthermore, consumer demands for a variety of frozen foods, chilled foods and foods which require refrigeration, also contributes to the necessity of low meat temperatures. Therefore, it may not be surprisingly that ***working in cold environments*** is reported as one of the ***main risk factors*** with regard to climate and thermal conditions (eight countries). However, ***high humidity, temperature fluctuations, and draught*** are mentioned quite often as well (5-6 countries).

The reported temperatures of the working rooms, except the freezing chambers, vary from 1-15°C (B, DK, GER, IRL, NL, SP). Exposure to coldness affects circa 50-60% of the workers in the sector (F, DK, SP), which in France and Denmark is a higher rate than in other sectors. In fact in France, coldness is the second out of seventeen causes of strain or nuisance (62 % of the sector workers). In Spain, 25% of the workers experience exposure to coldness during the entire working day. Working at extreme low temperatures (below 0°C, even down to -35°C) generally affects relatively few people, and usually only for short periods. But accidently being locked in in cold stores must be regarded as an extra risk factor.
High humidity affected 87% of the sector workers in Spain, of which 13% were exposed for more than 4 hours/day. In France, 56% of the workers mentioned it as a strenuous factor. Humidity degrees of 80-92% occur (B, GER, SP), but Belgium mentions that the degree can go up to 100% at high pressure maintenance work. Belgium further signalizes that high humidity in combination with low temperatures is especially a risk factor for maintenance workers, which is some times being transfered out of the sector, by contracting specialized cleaning firms.
Draught is mentioned by 55% of the workers in the French Meat Sector to be a strenuous factor, whereas in Denmark this concerns 34% of the workers in the sector, and 40% of slaughterhouse workers. According to Belgium, draught is caused by cooling installations, ventilators, and corridors.
Exposure to fluctuating temperatures is reported to be common in the Greece Meat Sector and to affect 40% of the sector workers in Denmark. The fluctuations are related to going in and out of buildings or cold stores, being near furnaces, refrigerators, corridors, and going from unheated work environments to heated rooms, like storage departments (B, GR, P).
Besides the four previous mentioned main climate factors, some data were reported on exposure to dry air (DK), working outside (SP), and being exposed to heat or working at high temperatures (DK, GR, IRL, SP). Furthermore, Belgium explicitly mentions the handling of cold and deep-frozen meat as a risk factor.

Data on ***health problems related to climate factors***, have been obtained from eight countries, only four of which provided data on actual occurrence of health problems in the sector. They reported ***respiratory complaints and diseases***, such as coughs, shortness of breath, tightness of the chest

(NL), catching colds, inflammation of the throat (DK), and chronic bronchitis (GR) to be common in the sector, or to occur more frequently than in other sectors. ***Infectious diseases*** were reported too (DK, P), in Denmark these being the main notified diseases related to climate factors. Furthermore, Greece reported muscle stiffness to be common in the sector, and Portugal mentioned the occurrence of skin diseases.
The other four countries (B, F, IRL, UK) indicate health problems, which may occur due to climate conditions. Three mention slowing down of mental reactions and reduction of manual dexterity, while working in the cold. This may increase the potential for accidents. In addition to the actual occurring health problems mentioned above, rheuma, asthma, urticaria, swollen hands, Raynaud's syndrome, hypothermia, frost-bite and even death may occur (B, IRL, UK). Moreover, it has been indicated that musculo-skeletal disorders and infectious diseases may be stimulated or worsened by climate conditions (B, DK).

The obtained ***information on actually applied climate control measures is rather limited.*** In fact, only Spain provides some quantitative data, indicating that in 1988 circa 50% of the workers in the sector used some preventive measures for excessive humidity and low temperature. But only circa 40% were considered to use adequate ones. The applied measures were mainly time restriction and protective devices. Furthermore, in Denmark airbag cooling is reported to be a common control measure against draught.
Five countries provide data on ***measures*** of which the ***stage of practical implementation*** in the Meat Sector has remained ***unclear***. They regard for example the existence of specific safety measures, such as building standards, for cold storage rooms (F), and legal requirements on 'reasonable' temperatures during working hours (UK). Another example is the availability of an informational publication, being a result of the development of climate control programs in the sector (NL). Moreover, control measures have been mentioned (GR, DK) with respect to fluctuating temperatures (heavy jackets and good work organization), regarding coldness (time restriction, regular breaks which suit the work, personal protection equipment like thermal isolating clothing), and draught (time and area restrictions, air sluice).
Six countries explicitly propose some preventive and control measures, which partly overlap the ones previously mentioned. ***Additional recommendations*** regard procedures for safe working in cold stores and blast-freezers; provisions to acclimatize (heated rooms and hot drinks); provisions to regulate temperatures and ventilation; attention to the comfort of personal protective equipment, not hindering movements; and the transfer and application of the already available knowledge on climate control, within the companies. Other specific and seemingly very useful preventional suggestions, come from the United Kingdom. The proposals concern the enclosing or insulating of the product in small local chilled enclosures. Furthermore, pre-chilling the product; local heating for workers; insulated duck-boards to keep workers from standing on cold floors; and task rotation. These possible measures show that requirements from product safety and from occupational health may seem in conflict from time to time, but can in fact both be met sufficiently well.

Musculo-skeletal loads
The ***hazards*** to the musculo-skeletal system of workers in the Meat Processing Industry regard ***repetitive work at high speed, heavy lifting*** and other forms of ***handling, strenuous working postures, standing*** for long times, and ***combinations*** of these risk factors. Hence, both static and dynamic loads are common in the sector, and seem to be a bigger problem than in other sectors.

Repetitive, speedy work is the most common risk factor, reported by all countries. Figures on the size of the population at risk, vary from 38% (F) to 73% (DK). Repetitive work seems to be most common in slaughter houses and boning halls, at tasks like stunning, bleeding, skinning, dehairing, opening, dressing carcasses, evisceration, boning out, and cutting chickens. But it is also reported for large meat processing units (GR), sausage manufacturing and packing (SP). Only

Denmark and Spain explicitly mention that repetitive work is often done during all or more than half of the working hours, but this is problably the case in other countries as well. Cycles have been reported of one minute (NL: at slaughter lines), less than one minute (F, NL: 30 seconds in some cases of boning out, SP: less than 30 seconds), and even of seconds (F: 2 seconds for poultry, NL: 4 seconds in some cases in the Meat Product Industry).

Exposure to strenuous work due to manual handling, such as heavy lifting, pushing and pulling, prevails in eight countries (B, DK, F, GR, IRL, NL, P, SP). Amongst others, it concerns the manipulation of animals and parts of them, hanging carcasses unto conveyor belts, and the lifting of heavy loads, such as cartons of meat. In France 59% of the sector's workers complain about heavy loads, thus representing the third out of seventeen strenuous factors. Exposure to heavy loads (> 20 kg) and/or other forms of strenuous work affects 28% of sector workers in Denmark, and 15-30% of their slaughter house workers. In Spain, about 50% of circa 2400 slaughter house workers use mild or great force during work, and must make wrist movements. Furthermore, about 60% of these workers lift loads with an average of 21 kg, almost 75 times a day. The percentage of workers involved with carrying and hanging equally heavy loads is much lower (26%), as is the daily frequence (45-58 times a day).

The occurrence of strenuous working postures has been reported by seven countries (F, DK, GR, IRL, NL, P, SP). In France, these postures represent a strenuous factor for 21% of the sector workers, particularly by skinning operations, de-boning or hanging carcasses. Denmark reports that 68-80% of the workers in the sector, respectively slaughter houses, are exposed to twisting and bending. About 30% work in stooped positions, whereas in Spain this affects 75% of the slaughter house production workers. Several other forms of strenuous working postures, such as working with arms at shoulder height or overhead, neck flexion and rotation, low back twisted, bended to the side, and working at squat, are less widespread amongst the Spanish workers (17-43%) and the Danish workers (12-24%).

Standing for long periods is reported as a risk factor by four countries (B, F, GER, NL), but it is likely to occur in other countries as well. In France it is even the first strenuous factor for workers in the sector, mentioned by 88% of them. This strain has increased since 1984, due to mechanization.

All countries, except Portugal, report ***health consequences*** from these risk factors, sometimes worsened by the climate conditions, and often with higher prevalence than in other sectors. The consequences ***concern several musculo-skeletal disorders***: sprains, strains, pains in arms, wrists, shoulders, neck, low back, knees, feet, hindrence of blood circulation, varices, hernias, bruises, muscular and tendon lacerations, and the so-called repetitive strain injuries (RSI), such as carpal tunnel syndrome (CTS).

In four countries (DK, F, GER, NL) these disorders are in fact the number one disease in the sector, whereas in one country (GR) they are expected to be one of the three most common diseases. In Denmark, France and Germany musculo-skeletal diseases represent 64%, respectively 43%, and 7% of the total number of notified occupational diseases in the sector, over various periods. Furthermore, they cover 19% of the sectorial illness cases in the Netherlands and Germany. In France and the Netherlands these disorders represent circa 7% of the branche's disability cases, and 33% of the sickness absenteeism in the Dutch Meat Sector is caused by them. Five countries (F, GR, IRL, NL, SP) specifically report the occurrence of RSI and/or CTS. In a epidemiologic study in Spain, the prevalence of RSI in upper limbs was estimated to be 9%. CTS was the main disease with a prevalence of 5%, and 25% prevalence of symptoms of this disease. Ireland reports that RSI are common among boners, and in Greece RSI are more common in

modern business units, due to the high work pace.

Besides data on disorders, some information is also provided on ***complaints regarding the musculo-skeletal system***. Amongst circa 2400 Spanish slaughter house workers, 13% complain about discomforts or pains, mostly in arms and low back (circa 27% each), and to a lesser extent in neck and wrists (circa 15% each). Low back pain occurred much more among male workers, and neck pain more among female workers. Of Danish male slaughter house workers, 32-56% had experienced pain in wrist, shoulder, neck or low back at least once during the recent year.

However, the musculo-skeletal loads, and particularly the working postures and manual handling, not only cause health disorders and complaints, but ***accidents as well***. Data on accidents due to this cause, vary from 5% (DK: 1983-1987) to 30% (F) of all accidents. In three countries (F, SP, UK) these risk factors are in fact the first or second cause of occupational accidents and injuries.

As ***applied preventive and control measures*** to these risk factors have been mentioned: ergonomical corrections like adjustable work levels (B, NL), automation/mechanization (NL, UK), transport systems leveling the unloading systems in trucks, and 'delegating' the unloading of trucks to the deliverer, which means transfering the hazards (B). In the Netherlands, a demonstration project has run in the sector, and a video was developed to inform workers on health effects and to stimulate the implementation of both organizational and technical measures within companies. Here again, this means that quite some knowledge on solutions is already available and could be transferred.
In addition, ***solutions*** have been ***proposed***, such as transport and lifting devices (F, IRL); standardization of forms and packs (F); training and instruction of workers on proper lifting and manual handling (B, IRL); and reduction of working hours for RSI risk groups (IRL).

Both France and the United Kingdom have pointed at the existence of a European directive on manual handling (90/269/EEC), which has been implemented in their national legislation in 1992 and 1993. This regulation requires that employers assess and evaluate the risks, avoid manual handling where possible, provide handling devices, and in other instances take action to reduce risks. Effects from this directive may be expected in the future, possibly in other countries as well. Expectations also regard other initiatives, in Denmark and France. In Denmark, the social partners aim to reduce work places with repetitive work by 50% by the year 2000. Plans involving both changes in technology and work organization are being developed in all sectors. In France, a joint working group of ergonomists, occupational physicians and researchers, has started to analyse working situations and to identify the interacting causes of the rapidly increasing musculo-skeletal disorders.

To conclude with, generally it seems that, compared to old and small companies, ***big and modern industries have better lay-outs and more automated or mechanized facilities***. This particularly ***reduces the physical strain*** involved with manual handling of loads, but ***increases speedy repetitive work and standing*** for long periods.

Safety conditions
The working environment in the Meat Processing Industry contains ***several risk factors which cause unsafe conditions***. The most common risk factors are ***knives and other sharp hand tools*** (B, DK, F, GER, GR, IRL, NL, SP, UK). In five countries, these tools represent the number one cause of accidents in the sector. They cause circa 35% of the accidents in France and Greece, 58% in Denmark (1983-1987), 60% in Germany (together with accidents due to machines), and 50-84% in the Netherlands. In Spain, 28% of all accidents caused by material agents, concern these tools. As specific hazardous operations with knives have been pointed out: de-boning;

cutting; slicing; dicing; skinning; pulling through the meat towards the body; incorrect cutting angle at wrist grip; working with very sharp or blunt knives; cleaning of knives; picking up and passing meat with knives; working on a piece of meat by two persons at the same time; and right-handed persons being positioned left to left-handed persons.

Machines are another frequently mentioned safety risk factor (B, DK, GER, NL, UK). In Denmark, 5% of the accidents in the sector during 1983-1987, were caused by this factor. Whereas in France 33% of the sector workers feel to risk injuries on machines. According to the United Kingdom, machines which continue to give rise to accidents, are band saws, de-rinders, mincers/grinders, vacuum packing machines and pie and tart machines. Belgium also mentions cutter bowls, circular saws, pricking machines, and compressors as potential risky machines. Germany does so for sausage filling machines. As both France, the Netherlands, the United Kingdom and Germany point out, accidents with machines often happen while cleaning, repairing, maintaining or re-assembling them.

Yet another main factor giving rise to unsafe situations and accidents, is the presence of ***slippery floors*** (B, F, GER, GR, IRL, NL, SP, UK). In France, falling and slipping represents 15-19% of the accidents in slaughtering, respectively carving, and 30% of the sector workers say to be exposed to the risk of falling. In Spain, slippery floors cause 12% of all accidents in the sector. In the Netherlands two studies imply that falling and stumbling is the second main cause for injuries in the sector. In the United Kingdom slips, trips and falls on the same level are in fact the biggest single cause of major injuries in the sector. As specific hazards have been identified: inappropriate floor surface, wet floors after cleaning, food or ingredient spillage and fat or oil residues on the floor, incorrect footwear in relations to the floor surface, broken tiles or uneven floor surfaces, and obstructions in pathways.

Various countries emphasize that most of the time not just one of the above mentioned risk factors causes accidents. More often a ***combination of factors*** is involved, such as working with knives under time constraints; hazardous equipment and working in strenuous postures; slippery floors and lack of space; hazardous work under bad lighting conditions; hazardous work without sufficient training of part-time or seasonal workers.

In addition, less freqently mentioned risk factors are electrocution (B, GER, SP, UK), moving or falling objects (B, DK: 11% of accidents in 1983-1987, GR, IRL, NL: 16% of accidents, UK), and falling from heights (B, GER, SP: 4 % of accidents). Furthermore are reported: frigthened and uncontrollable animals (B, F: 8% of accidents while slaughtering, GER, IRL, UK), fires and explosions (B, SP), hot materials like steam and water (B, GER: 5% of accidents, IRL, UK), and being struck to fixed objects (UK).

Consequences from the accidents with knives and other sharp hand tools are mainly cut and stab wounds. These ususally involve the non-knive hand and fore-arm, but serious injuries to body parts such as belly, groins and thighs occur as well. Within the United Kingdom even a number of fatalaties are on record. A study on a sample of sector workers in Belgium showed that 33% of their scars were on hands, 28% were located on wrists, and 18% on arms. These workers had an average of 3 cut wounds in the last month, and 46% of them had had at least 12 cut injuries.
Injuries caused by machines concern cuts, pinches and amputations, for example of fingertops. Sprains, strains, fractures, smashings, bruises, concussions and internal traumata are reported to be the results of slips, trips and falls. Less frequent injuries are burns and scalds, and eye injuries due to bone splinters.
These data imply that a great number of body parts are at danger while working in the Meat Processing Industry, but fingers, hands, wrists, arms, feet and ankles seem to be most at risk.

With respect to the ***practical implementation of preventive and control measures*** some data are obtained. Denmark mentions that metal net gloves are a very common protective measure against knife injuries. Belgium reports that 67% of workers in a sample wore an apron as a protective device in relation to working with knives. Employees in this country are being obliged to wear personal protective devices, but in practice they not always do so. Improper or no use of personal protective equipment and safeguards on machines, and lack of application of other safety regulations are explicitly mentioned by Germany, as factors involved in occurring accidents. And in Spain circa 95% of 265 meat processing industries lack facilities in fire prevention. Almost all industries are classified as low risk for fires, however. To a much lesser extent, their electrical equipment is inappropriate.

Much more data on prevention and control of safety hazards were provided though, but these are mere ***suggestions for measures***. They concern the training of workers, for example on the correct use of knives, machines and protective devices, and on the hazards of misuse (B, GER, GR, IRL, SP, UK). Furthermore, the presence of protective equipment on machines, such as stopping devices, emergency stops, and guards to prevent access to dangerous parts is suggested (B, GR, SP, UK). Measures regarding a better lay-out and work organization are proposed as well (B, GR, IRL, SP, UK). For example sufficient working room between machines, free path ways and sufficient lighting. In addition, various countries suggest several other measures, such as development of automated de-boning machines, proper supervision, good housekeeping and maintenance, cleaning procedures, proper wound care, accessible emergency wards. France emphasizes the necessity of improving the design of knives, saws, handling devices, personal protective equipment, and floor coverings. In fact, studies on these matters are now carried out by French prevention organizations. France further stresses to combine efforts in the field of technical equipment with those in individual protection, and to involve users during the design process. In this respect it is also relevant to mention the existence of three EC-directives, which aim to harmonize standards between countries on work equipment, the construction, and use of personal protective equipment (89/655/EEC, 89/686/EEC, 89/656/EEC).

Especially Belgium and the United Kingdom provide information on ***existing possibilities for measures***, which are however not applied everywhere yet. Nonetheless, it shows that quite some knowledge on elimination or reduction of safety hazards in the sector is already available. Both countries go into existing examples of safeguarding of machines, such as horizontally running bandsaws provided with fully interlocked enclosure guarding; the provision of sliding tables, pusher plates and portioning jigs on conventional bandsaws; the provision of restricter plates on mincing machines; the provision of interlocking and trip devices on pie and tart machines; and restricting the gap between the toothed roller and the fixed blade of de-rinding machines to not more than 3 mm. The information from the United Kingdom further concerns adequate combinations of foot wear and floor surfaces (e.g. epoxy resins, polymers, ribbed ceramic tiles), providing sufficient slip resistance in dry and wet situations. Other information regards the availability of a number of suitable aprons for de-boning work, protective gloves for three or five finger protection for either left or right hand, forearm protectors either attached to or independent from the glove, and knives designed such that they prevent hands slipping down the handle onto the blade. In the Netherlands quite some practical and ready-to-use information on protective devices for the Meat Sector, such as aprons, gauntlets, gloves and footwear, is available as well, due to research.

Biological agents

The exposure to ***biological agents*** in the Meat Processing Industry concerns a ***wide variety of bacteria, viruses, parasites and funghi***. These are being transmitted from (infected) animals, or their hairs, feathers, blood, bowels or excrements, to workers by hand/skin contact, inhalation of aerosols, by ingestion of dust, or by splashes in eyes. The exposure to these zoonoses has been

reported by eight countries, but very little quantitative data are available. In France and Belgium circa 60-65% of the employees in the sector are exposed to these risks of infection. In Spain however, the risk group is set on 7%, being workers in contact with offals, skin, woll, sick animals, dressed carcasses, blood or serum. Besides the production workers in the abattoirs, food inspectors are pointed out to be risk group as well (NL).

The ***main health problems***, reported in relation to these micro-organisms, are ***skin diseases and infectious diseases***. According to the Netherlands, these are mainly due to wound-infections on the hands, which incidence is likely to rise due to the prevailing low temperatures, high humidity, and high number of small wounds caused by stabbing and cutting injuries.
More specifically, the skin diseases which have been reported, are mycosis (F, GR), dermatitis (DK: 22% of slaughterhouse workers, GR), erysipelas (DK, GR, NL), eczeme (B, DK), intestinal scabies and nail diseases (DK). In Denmark figures indicate that biological agents (especially in food agents and waste water) are one of the main causes of the skin diseases in the sector: in 150 out of 277 cases of notified skin diseases over the period 1989-1992, biological agents were mentioned as exposure. Furthermore, warts are being mentioned by Belgium, affecting at least 6% of the sector workers, who actually infect each other.

As for the infectious diseases, the occurrence of the following ones have been reported: brucellosis (B, F, GER, P, SP), anthrax (F, GR, SP), tuberculosis (F, GR, P, SP), ornithosis (in the Poultry Industry; DK, GR, UK), leptospirosis (B, F, SP, UK), tetanus (F, SP), Q-fever (B, UK), rabies, hepatitis A and B (F), extrinsic allergic alveolitis (GR), severe and possibly fatal meninghitis, ring worm, orf (UK). Here again, quantitative data are very limited. In 1987, the incidence rate of brucellosis in the Meat Industry in Spain was 39/100,000 production workers, which was three times higher as for the general population, and which made brucellosis the main infectious disease in the sector. In France, the infectious diseases are said to be rare, except for brucellosis in slaughter houses. Data from Denmark on ornithosis point out that, although the number of notified diseases is low (4 cases in 4 years time), 60% of the employees in poultry slaughter houses appeared to be sero positive in a survey. Furthermore, pregnant women are being mentioned to represent a specific risk group for this disease. In the United Kingdom, this disease has the highest incidence rate (532 cases in total in 1988), compared to the other ones mentioned above (2-185 annual cases). For some diseases though, under-reporting occurs. In Belgium only about 10 cases of serious, possibly fatal, infections occur annually. The prevalence of the a-typical, mild variants is reported to be higher. Despite the mildness of these cases, the infections can be quite persistent and cause long periods of absenteeism from work. In addition, Belgium points out that it is difficult to diagnose diseases caused by zoonoses, especially for general practioners.

The best ***prevention of this risk factor***, as is being stated by the United Kingdom, is of course the elimination of the diseases from the animals concerned. The UK has been quite succesful in this, with respect to antrax, brucellosis and bovine tuberculosis. Control measures which have been mentioned by the various countries are the identification and special treatment of infected animals; vaccination of workers; periodical medical surveillance; education of workers; and good standards of ventilation and hygiene practices, such as the wearing of protective clothing, cleaning regimes, proper washing and eating facilities. But Belgium simply states, that the perfect protection against zoonoses can be obtained by wearing mail gloves over rubber gloves.
To what extent all these measures practically have been implemented, remains unclear from the provided data. Only a Belgium study indicates that circa 50% of workers never or seldom wear gloves, and that no one ever wears eye or mouth protection. But also that 94% can wash their hands near to the production line, and that 90% say never to eat or smoke at the workplace. Anyway, the EC-regulation on biological agents (90/679/EEC), that had to be implemented by the

EC Member States from 1993 on, may contribute to the fighting of this risk factor in the Meat Processing Industry in the future.

3.2.2 Organizational work environment

Table 8 presents an overview of the main risk factors in the organizational working environment. Authors from eight countries (B, DK, F, GER, GR, IRL, NL, UK) explicitly identified main risk factors (rendered by 'X' in the Table). In several cases they reported exposure to other factors as well, but these were considered to be of lesser importance (not shown in the Table however). From Portugal no data were obtained on this issue, and Spain concluded that the available data were too poor to draw conclusions regarding main risk factors.

Table 8: *Main risk factors in the organizational work environment in the Meat Processing Industry*

Country / Risk factor	B	DK	F	GER	GR	IRL	NL	P	SP	UK
TIME PATTERNS										
Duration of work			X		-			-	-	
Deviant working hours			X					-		
Other work time patterns		-				X	-	-		
WORK ORGANIZATION AND JOB CONTENT										
Autonomy and control	X	X	X	X	X		X	-	-	
Work rhythms and time constraints	X	X	X	X	X	X	X	-	-	
Repetitive work and task duration		X	X	X	X		X	-		X
Division of work and job content	X	X	X	X	X		X	-	-	X
WAGE PAYMENT AND COMPENSATION SYSTEMS							X	-		X

X : identified as main risk factor in this country.
\- : no data available.
blancs : information on the (non-)occurrence of exposure to this risk factor is provided; the factor is however not identified as a main risk factor.

From the data in Table 8 it is concluded that the overall main risk factors in the organizational working environment all regard topics with respect to work organization and job content. This may not be too surpisingly, considering the fact that the work was characterized as Tayloristic production line work (see section 2.1). ***The 'top 4' risk factors are: lack of autonomy and control, work rhythms and time constraints, repetitive work and task duration, division of work and job content*** (6-7 countries).
Wage payment and compensation systems are identified as a main hazard to a much lesser extent (2 countries). Yet, piece payment and/or bonuses for several types of inconveniences exists in nine countries (see section 2.1), and five of them consider piece payment to be a main cause of the strenuous work rhythms (see below at 'Work rhythms and time constraints)'. Time patterns are

seen as a major risk factor in two countries, but per risk factor it concerns only one.
This section will further focus on the four main risk factors only, by subsequently going into details of each factor, followed by the health and safety problems related to them, and finishing with information on prevention and control measures. The factors that have been identified as a main risk factor by the largest number of countries (7) will be dealt with first.

Work rhythms and time constraints
This hazard has been identified as a main risk factor by seven countries. Yet, eight countries (B, DK, F, GER, GR, IRL, NL, UK) have reported that workers in the Meat Sector experience ***time constraints and strenuous work rhythms***. More in detail, the reports ***mostly concern high speed work, and tight and fixed deadlines***. With regard to high speed work, Denmark mentions that circa 40% of the sector's workers are exposed, whereas 63% of slaughter house workers felt that work speed was too high and 70% indicated that it has risen over the years. In Greece, high speed work is said to occur only in large units, and particularly not in slaughter houses. In the United Kingdom however, it is a feature of some work especially in abattoirs and boning plants where a 'job and finish' system is being practiced. Belgium points out that high speed work occurs both at slaughtering and boning-out, as well as in meat processing. Information from the Netherlands indicates that it is definitely a phenomenon in the Poultry Sector too. Belgium further mentions that work speed at slaughter lines for pigs are usually higher than at lines for bovines. Moreover, a high degree of automation generally results in a higher work speed as well. France reports an unbalance in work rhythms during the week, since the beginning and the end are very busy, while the mid-week is rather slack. A major unbalance during the year exists in Ireland, particularly in the Beef Industry, with tremendous seasonal peaks in the last quarter.

Causes for the strenuous work rhythms and time constraints are partly identical to those causing lack of autonomy and control (see below): technology dependency, pressure from colleagues, demands from clients and the nature of the 'material'. However, a few other causes have been mentioned as well. They concern productivity based renumeration (B, DK, F, IRL, UK), lack of qualified personnel and thus few possibilities for replacement (F), inefficient planning, delay in supplies, product variety (B, F), and seasonality of the work due to climate factors (IRL). Causes are also a domination in boning plants of young male workers, who can keep up with the high speed work (IRL, UK), and friction between quantity and quality standards (NL).

The productivity based renumeration in Belgium and Ireland particularly concerns boners, who are being paid per quarter piece or per processed kilogram. In Belgium it concerns French boners, who work over the border. In France both piece payment and quantity bonuses occur. The Danish Meat Sector is in fact being dominated by piece work payment. Denmark clearly points out why this type of payment is harmful: in combination with a low job content, it makes working speed the only factor which workers can control, resulting in a competition with themselves. Although only these four countries and the United Kingdom report this feature as being a risk factor, it is known from data taken up in section 2.1, that payment on productivity basis occurs in other countries as well (GER, GR, SP). Apparently it is not considered to be a major problem there.

Division of work and job content
A ***high job division*** and ***low job content are common risk factors*** too in the Meat Sector, since seven countries identified them to be a main hazard, whereas eight countries (B, DK, F, GER, GR, IRL, NL, UK) provided data. All of them report the occurrence of ***monotonous work***, or work which hardly calls for creativity or intiative. In Denmark, 30% of the sector's workers are exposed to this hazard, which is thrice the national average. This country further points out that workers have little possibilities to 'intellectually automatize' their tasks, because these tasks demand full attention.

This ***necessity for high concentration*** is also mentioned by all eight countries, except Germany and Ireland. This hazard is mainly due to the high risk for accidents and injuries, particularly in combination with the high speed at which the work needs to be done. In Denmark, 63% of the sector's workers find more than a quarter of their working day the tasks so demanding that it requires their full attention.

A hazard which has been reported to some lesser extent, regard ***lack of multi-skilled jobs*** (DK, F, GER, GR, NL, UK). More specifically, this refers to jobs which almost entirely consist of a single or just a few executing tasks, and include no tasks such as maintenance, quality control, planning and organizing up-stream or down-stream. Often these tasks are taken up in seperate jobs. In fact, both France and the United Kingdom signalize an ongoing tendency towards de-skilling in slaughter houses, due to automation and to difficulties in recruitment of personnel.

Other explicitly reported hazards concern ***lack of team work*** (F, DK, GER, GR), and a ***too high or too low job complexity***, which includes lack of educational demand (DK, GER, NL, SP).

No data are obtained on the causes of this high job division and low job content. It may be assumed however, that the predominance within the sector of traditional philosophies on production and productivity form the background of this prevailing type of work organization, and in fact of the type of technology as well.

Autonomy and control

Six countries identify it as a main risk factor, but eight countries (B, DK, F, GER, GR, IRL, NL, UK) report that workers lack autonomy and control in their work. More specifically, it mostly concerns ***lack of control over one's own working pace and work organization***, hence not being able to determine priorities and task order. Denmark reports that this affects circa 60% of the sector's workforce, and about 70% of slaughter house workers. This is much higher than in other sectors (circa 20-40%) Moreover, six countries (B, F, GR, IRL, NL, UK) report that ***workers lack flexible time and possibilities to take breaks***, stop the production line or leave their work station, because colleagues have to stop working then as well. The Netherlands further reports that workers lack control over their work method, and Greece workers lack control over their work rhythm.

As ***causes*** for these lacks of autonomy are being mentioned: the high speed automated production lines, but also the pressure from colleagues to keep the production cycle going, and the fixed throughput of the factory. This throughput is in turn determined by the need to process the daily supplies at the same day (no stock), fixed delivery times, and late orders. Moreover, it is pointed out by France that, although there may be 'legal' breaks, they are difficult to put into practice, because they are often too short (7 minutes) to take off the protection equipment, to go to the often far away rest room, and to come back again.

Repetitive work and task duration

As was already mentioned in the previous subsection 3.2.1 under 'Musculo-skeletal loads', ***repetitive, speedy work is a very common risk factor*** in the Meat Sector. It has been identified as a main hazard by six countries, but reported as a risk factor by all ten. In fact, all obtained information on this risk factor has already been described in 3.2.1, hence here can only be refered to that section. It must be emphasized however, that repetitive work is a two-fold risk factor. It is not only a physical hazard causing physical strain, but also an organizational constraint, causing psychic strain as well, as will be described hereafter under 'Health and safety problems'. Moreover, with respect to ***causes*** of repetitive, short cycled work can be put forward, that they not solely lie in automation and technology, but also in the way the work is organized (e.g. the

job division within the work force).

Health and safety problems
The ***main problems***, related to the previously described risk factors in the work organization and job content, are: ***repetitive strain injuries*** and ***other musculo-skeletal disorders***, higher risks of ***accidents and injuries, psychic complaints and stress related disorders***. The obtained data on the musculo-skeletal disorders and on accidents have already been described in section 3.2.1, hence only additional information will be presented here.

However, obtained ***data with respect to psychic complaints and stress related disorders are not very comprehensive***. Furthermore, it must be noted that these disorders may not exclusively be the result from exposition to risk factors within the work organization and job content. They may also be a consequence of working time patterns, or hazards within the social working environment (see section 3.2.3), or a combination of these factors.

The psychic complaints and stress related disorders reported by France concern fatigue, sleeping problems, lack of self-control and burn-out. Burn-out is also being mentioned by Ireland, where only few employees in the sector are over 35 years of age. A Danish survey amongst slaughter house workers showed that 40-50% of the workers often felt stress symptoms, such as anxiety spells, sleeping problems and feeling nervous and emotionally unstable. In general, more female than male workers suffered these symptoms. Denmark further reports that certain groups of slaughter house workers have an excess risk for gastric ulcers and ischemic heart diseases. To conclude with, a recent questionnaire study in the Dutch Red Meat Sector indicated that dissatisfaction and psychic complaints occurred, which amongst others appeared to be related to lack of job control and work pressure. Moreover, it is repeated here that 18% of the sickness absenteeism in the Dutch Meat Industry is due to psychic complaints, whereas stress is the number two cause for disability.

Besides health and safety problems, three countries (F, GER, IRL) report ***other consequences*** from the insufficient work organization as well. These concern the high turnover of personnel and the low attraction of the branch on the labour market. From data in section 2.1 it is known that these phenomena occur in other countries as well, where they also may be a consequence of the organizational working environment, at least in part.

Prevention and control measures
From the fact that in all countries the production process is mainly Tayloristic, and that the work organization is mainly a hierarchical line structure (see section 2.1), it may be concluded that ***prevention and control measures*** with respect to the previous described risk factors ***are rather rare*** up till now. In fact, only four countries (B, DK, F, NL) provide information on measures which have been implemented.

An example from one company in Denmark regards the limitation of the quantity of processed meat per hour, which ensured that production lasted the whole working day. This work speed reducing standard was agreed between workers and foremen. Measures on a much larger scale are also to be expected in Denmark, due to the earlier mentioned agreement between social partners to reduce 50% of all injuries causing repetitive work, by the year 2000 (see sections 2.1 and 3.2.1) . So far, this has resulted in information material from the Sector Safety Council on measures such as job rotation, job enlargement, job enrichment and the formation of production teams. Companies are to form a plan of action, based on a risk assessment, which they must send to the Council.

As examples of implemented preventive measures, the other three countries (B, F, NL) report that production teams already exist in some companies, or that experiments are taking place. Furthermore, task rotation is being applied in these countries: in France in some experiments, in the Dutch Poultry Sector it is becoming more common, and in some Belgian slaughter houses workers can for example change from the slaughterline for bovines to the line for pigs, and in other cases workers are skilled enough to change between production units. Belgium further remarks that the quality of the work organization varies between companies, and that much depends on the design of the work places, the organization and the mentality. It also suggests regular breaks and positioning of dangerous machines in quiet work rooms, so that workers can stay concentrated. France gives some suggestions for measures as well, concerning the regulation of supply, more flexibility in delivery and orders, and more flexible technology (between 'line' and 'file').

Additional data from the Netherlands indicate that the quality of work organization and job content is considered a relatively unknown subject in the sector, so far. Yet, it is reported that 21 companies have, mostly experimental, experience with autonomic task groups or quality circles, due to their participation in the 'Quality and Hygiene Plan' which has run in the sector some years ago. Alternative forms of work organization of special interest are a slaughtering roundabout, a parallel-intermittened slaughter line, some other alternative slaughter lines and alternative boning departments. A systematic overview of these, again mostly experimental, initiatives is lacking however. Furthermore, a study has been carried out recently on the feasibility of job improvement in slaughtering, de-boning and meat products. As a follow-up, another study has started at the end of 1994, named 'Boning 2000', which will go deeper into possibilities for job improvement. Moreover, the function of food inspector is now being researched. Companies put pressure on this function, because it is seen as causing time loss, and so alternative forms of organization are being looked for. Considering the already available knowledge and experience on alternative forms of work organization, the Netherlands suggests to transfer these throughout the sector, thus working towards re-design of the work organization, possibly in combination with technological adaptions.

Three other countries only give suggestions for actions which could be undertaken. These concern worker's participation and modern management (GR), start of research on this aspect of working conditions (SP), provision of automated boning-out equipment, job rotation and careful job design to avoid and reduce repetitive, monotonous work (UK).

Striking is that ***some countries mention impediments*** for the improvement of the work organization, which ***other countries*** actually ***consider as opportunities***. For example Germany sees difficulties in the quality demands and changing market requirements. But in the Netherlands 'threats' like these form in fact the arguments and starting points behind the efforts on joint innovation of technology and work organization.
Piece payment has been mentioned as another impediment by Denmark, because changes in work organizations often lead to changes in payment systems and lower wages. This being unacceptable to workers, makes workers often refuse to participate in changing the organization. In contrast to this, Belgium mentions that a new system of job classification and payment is now being introduced in the sector, which is considered to be a possible starting point for job re-design. Ireland feels that the impediments for change in the sector's major problem, being the seasonal nature of the work and the continuing large scale export of live cattle, can only be overcome by imposed policy changes, probably at EC-level.

3.2.3 Social work environment

An overview of the main risk factors in the social working environment is presented in Table 9. Authors from seven countries (B, DK, F, GER, GR, NL, UK) explicitly identified main risk factors (rendered by 'X' in the Table). In several cases they reported exposure to other factors as well, but they considered them of lesser importance (not shown in the Table). Authors from two other countries (IRL, SP) provided data on the occurrence of risk factors, but they did not identify the main hazards among them. Hence, the consolidators made that judgement upon the provided data (rendered by 'x' in the Table). From Portugal no data were obtained on this subject.

Table 9: Main risk factors in the social work environment in the Meat Processing Industry

Country / Risk factor	B	DK	F	GER	GR	IRL	NL	P	SP	UK
Relations with colleagues	X	X	X	-			X	-	-	
Relations with management	X	X		-		x	X	-	-	
Relations with clients and the public	-		X	-			-	-	-	
Employment of disabled workers	-	-		-			-	-	-	X
Equal opportunities for women	-		X	X		x	X	-	-	X
Qualification and training		-		-		x	X	-	-	X
Information, consultation and participation	X		X	-	X	x	X	-	-	X

X : identified as main risk factor in this country.
x : identified as most important risk factor in this country (by the consolidators, based on the provided national data).
- : no data available.
blancs : information on the (non-)occurence of exposure to this risk factor is provided; the factor is however not identified as a main risk factor.

From the Table it is obvious that information on this third type of working environment is the least comprehensive, when comparing it with the physical and organizational working environment. Nevertheless, a ***'top 4' of main risk factors*** can be identified, although these are characterized as such for only 4-6 countries. This 'top 4' consists of: ***lack of equal opportunities for women; lack of information, consultation and participation; obstacles in relations with colleagues; and obstacles in relations with management***. The three last mentioned factors are in fact very much related to the work organization, i.e. the organizational work environment. The three other issues in the Table, namely relations with clients and public, employment of disabled workers, and qualification and training, are for only one or three countries identified as major hazards.

As was done in the previous sections, hereafter will be focused on the main risk factors only. They will be described in more detail, together with the reported health and safety problems and the applied or suggested measures. Again, the description starts with the risk factors, considered

to be a main problem in the largest number of countries.

Information, consultation and participation
Problems in the field of information and workers' consultation and participation are considered to form a major risk factor by five countries (B, F, GR, NL, UK), but obstacles are also reported by Denmark and Ireland. ***Three main issues*** are being put forward: ***lack of information and feedback from the management, lack of structural possibilities for workers' consultation and participation, and a troublesome position of trade unions***.

Lack of information and feedback from the management is reported to be common by four countries (DK, F, GR, NL). It concerns information both on company level, as well as individual worker's level, on issues such as the work itself, production results (quality and quantity), personal functioning, the companies' policy, and the origine or destination of the product. Denmark reports that a quarter of the workers in the sector are affected by the lack of information, and even 55% claim never or almost never to get positive feedback on their job performance. France as well mentions that supervisors and managers intervene at problems, but rarely to make compliments.

As for structural possibilities for workers' participation, nine countries (B, DK, F, GER, GR, IRL, NL, SP, UK) report the existence of legal arrangements, obligating companies to establish Works Councils and/or Health and Safety Committees or alike (see also section 3.4.1). The sort of structure to be established often depends on the size of the company. An exact overview of the extent of compliance is lacking however, since most countries have only limited data on this subject. These indicate however, that such structures are often lacking in smaller companies (NL, UK), and that the ones present in larger companies have a variable effectiveness (UK). Moreover, the Dutch Meat Sector, or particularly slaughter houses seem to be less in compliance with the regulations than the Food Industry in general. This is not the case in Denmark, where a majority of the meat companies has established some structure.

Besides the legal regulations, workers' participation and consultation may take place in projects, or in quality circles. France and Greece mention that such forms generally are lacking, and France points out that the quality circles which do exist are not always well applied, and are sometimes even detrimental to working conditions. However, France also reports that some cases are known where workers participated in a modernization or reorganization process. A somewhat famous case is known in the Netherlands as well, where a Works Council, supported by unions and experts, heavily influenced the design of a new factory and the decision making process regarding the new production technology. In Ireland, systems for information exchange are not formalized and often they do not exist.

The obtained information with respect to the position of trade unions, provided by four countries (B, GR, NL, UK), is rather diverse. In the Dutch Poultry Sector agreements have been made in collective bargaining, that employers shall communicate with unions in case of merges, shutdowns, expansions and reorganizations. The United Kingdom indicates that relations between unions and management of companies are generally good, but recognition of unions and a high degree of unionization is mostly confined to the larger companies. Belgium too points at a lesser position of unions in small, family-owned companies, due to a patriarchal management style. Greece reports that unions have not used all their rights yet, and that they do not make advantage of bodies like Works Councils or Health and Safety Committees within companies.

Data on health or safety consequences of this risk factor have not explicitly been provided, but they are likely to be stress, psychic complaints, dissatisfaction and alike. And regarding preventive

and control measures only some global suggestions are given. They concern the improvement of consultation arrangement amongst smaller companies (UK), the introduction of more teamwork and, again, the transfer of already available knowledge and experience with alternative forms of work organsiation (NL). Greece points out that the improvement of workers' participation would not only mean a decrease of a hazard in the social work environment, but would in fact be an effective mean in the improvement of working conditions in general. Ireland even feels that the reduction of the division between workers and management, and the improvement of the information flow should be of long-term benefit to all in the Meat Industry.

Equal opportunities for women

The lack of equal opportunities for female workers is considered a main risk factor by four countries (F, GER, NL, UK), but indications are reported by three others as well (GR, IRL, SP). The data on this risk factor highlight ***three main problems: unequal job distribution between male and female workers, lesser qualification of women, and lesser payment of women.***

An unequal distribution within the sector's work force, with a domination of male workers, is present in eight countries (B, F, GER, GR, IRL, NL, SP, UK) (see also Table 1). But besides being a minority, female workers are further mostly to be found in traditional positions, doing the lighter and less complex work, such as poultry processing, packing, some other production line jobs, and office work (F, GR, IRL, NL, UK). The heavier work in abattoirs and boning-out, as well as management functions are dominated by male workers.

Lesser qualification of female workers is reported by three countries (F, GER, SP), wheras two countries (F, UK) mention that women earn generally less. According to the United Kingdom, lesser payment is probably often a reflection of the amount of part-time working within the female work force. Furthermore, although not explicitly mentioned, it is likely that the three described aspects of unequal opportunities are related: lighter and less complex work demands less qualification and is paid less. The crucial question is just that women appear to do this type of work relatively more often, which would not have to be a necessity.

A few other shortcomings have been reported as well. In Greece there is a lack of nursery schools, whereas a study in the Netherlands pointed out that the way of recruitment, conditions of employment, job content and working relations form bottle necks for an equal position of women.

No data at all are provided on health or safety problems related to this risk factor. The information on preventive and control measures is not comprehensive either, but more countries are likely to have (legal) provisions, than just the reporting ones (DK, F, IRL, NL). Denmark mentions that salary differences for identical jobs and qualification are legally not allowed. Furthermore, both France, Ireland and the Netherlands report the existence of regulations on provisions for pregnant workers. The Dutch sector's collective bargainings further contain agreements on several other subjects as well, such as action programmes, crèche provisions, parental and care leaves, and fighting of sexual harassment. Moreover, a 'Workbook Positive Action for Women in the Meat Sector' has been developed. This was part of a stimulation programme for companies, in order to increase the inflow and stay of female workers.

Relations with colleagues

Relations with colleagues are regarded a main problematic area by four countries (B, DK, F, NL), but three countries (GR, IRL, UK) report some problems as well. The ***main hazards*** appear to be ***working in isolation, limitations in verbal and visual communication, limitations in social contacts, and in support from each other.*** Denmark reports that work in isolation is in fact a hazard for 16% of the sector's work force. France sees an increase in these shortcomings since

the large-scale introduction of production line work, which is still going on. As main causes for the shortcomings have been mentioned the working on the production line with its high speed of work and demands of concentration; the lack of personnel due to savings or sickness absenteeism; work pressure in general; the lack of breaks or nearby rest rooms; and the noise in the work rooms.

Other reported obstacles in relations with colleagues concern for example ethnic differences within the work force, which may result in language problems and occasionally in violence at work (B). Sexual harassment is also reported to occur, but only a small degree and affecting a small precentage of the sector's work force (DK: 3%). Furthermore, 'bad work relations' in the Red Meat Sector have been reported in a study in the Netherlands. France mentions the occurrence of 'psychological violence', caused by feeling threatened to lose one's job.

Provided data on related health and safety problems concern stress and psychic complaints, which occurrence is in fact only mentioned (DK, F, NL). With respect to preventive and control measures two countries give some suggestions. France sees some possibilities for improvement in changing lay-outs and particularly by introducing 'boxes' from the main production line, which should be designed together with its users. The Netherlands suggests the transfer of available knowledge and experience with alternative forms of work organization, which provide better possibilities for teamwork, social contacts and collaboration (see also section 3.2.2).

Relations with management

Shortcomings in the relations between workers and management are considered to form a main risk factor in three countries (B, DK, NL), but three other countries (F, GR, IRL) provided data as well. One of the ***major shortcomings*** regards the ***provision of information to the workers by the management.*** This issue has already separately been dealt with in the previous subsection, however (see under 'Information, consultation and particiaption'.

Another problem highlighted concerns ***lack of control over one's own work,*** because supervisors, quality controlers and managers control and intervene at problems (F, GR, NL). ***Lack of support from the management*** is also being mentioned (DK, F). Denmark even reports that 45% of the sector's workers feel that they never or almost never get support or encouragement from their management, whereas 5% find that they never or almost never get advise or help when they need it. France points out that foremen and line leaders can help workers, but that they lack knowledge on the machinery. Ireland reports a definite 'them and us' attitude between workers and the management, but it is considered an equal risk as in any other large Manufacturing Industry.

Other obtained data give a more global judgement of the management. The Netherlands for example reports the occurrence of a 'bad management style' throughout both the Red and White Meat Sector. In a study amongst slaughter house workers these workers reported not to know what management expects, and what their responsibilities are exactly. Belgium mentions problems in the great number of small family-owned companies. Here, executives do not always have enough management capacities and they can be rather patriarchal, leaving too little room for workers' participation. On the other hand, the possibilities for informal and personal contacts between workers and the employer are generally good in such companies.

As consequences of these shortcomings have been mentioned: ***stress*** (DK, F, NL); ***sickness absenteeism; lack of future perspective and dissatisfaction*** (F, NL); ***turnover*** (F); ***psychic complaints*** (NL); ***and lack of feeling engaged towards the work*** (DK). The Netherlands reports that in most firms the management style is in fact considered to be one of the main causes for sickness absenteeism. Denmark further points out that the lack of appraisal from the management (and the work in isolation) enhances the strain from the organizational risk factors, e.g. the low

job content and low job control.

As for preventive and control measures, both France and the Netherlands feel that workers' participation and consultation could bring solutions to the shortcomings in the management.

3.3 Risk groups

Most of the data in the previous sections have not been very explicit on the groups of workers that are particularly affected by risk factors or their health consequences. This section will focus on that subject: the main risk groups. Despite some impediments, due to incomparability of data, ***four main risk groups*** can be identified: ***slaughter house workers, all operatives, boners, and women.***

Slaughter house workers, such as slaughterers, butchers and cutters, are refered to by all ten countries as being a risk group. With respect to the physical work environment they are reported to be, more than others, exposed to risks of infection related to zoonoses; musculo-skeletal loads (strenuous working postures, high speed repetitive work); noise; climate factors (coldness, temperature fluctuations, draught, high humidity); and unsafe conditions (knives, slippery floors, animals, carcasses). Excessive hazards in the organizational work enivronment are predominantly lack of autonomy and control; high work pace; time constraints; repetitive work; and low job content with in some countries a trend to further deskilling. Accordingly, these mostly male workers are excessively affected by accidents and injuries; skin diseases; infectious diseases; hearing damage; and musculo-skeletal disorders. Moreover, they have a higher hospitalization index and an excess risk for gastric ulcers, throat cancer, and mortality due to ischeamic heart diseases (DK).

Eight countries (B, F, GR, GER, IRL, NL, SP, UK) report that in fact all groups in production are to various extents exposed to various risk factors. Therefore, all production line workers should be regarded as a main risk group, especially with respect to risk factors in the physical work environment, which are similar to those mentioned above. In addition, they are seen as a risk group because they lack formal training (UK), because of their poor working environment in general (GER, IRL), or because of their work time patterns (GER: shiftwork, overtime, irregular patterns).

Boners are identified as a specific riks group in six countries (B, DK, F, IRL, NL, UK). Here again, the physical work environment is the predominant hazard, resulting in excessive risks for serious accidents, cut and stab injuries, and Repetitive Strain Injuries. More often than others they are paid on production basis and exposed to time constraints. According to the Netherlands, they also have less complex work, lack skilling opportunities, and are more often subject to bad working relations and bad management style.

Five countries (DK, F, IRL, NL, UK) identify women as a specific risk group in relation to various risk factors, several of which are known to exist in four other countries (B, GER, GR, SP) as well. The risk factors regard unequal job distribution, lack of equal opportunities, lesser payment, and lesser qualification. Moreover, pregnant women in the Poultry Sector form a specific risk group with regard to ornithosis, since this can lead to abortion and malformation.

Other risk groups, mentioned by only a minority of the countries, include workers in maintenance and repair (F, GER, NL, UK); workers in the Meat Product Sector (B, DK, NL); insufficiently trained workers (F, GR, IRL: seasonal, part time and young workers); workers in transport and

storage (DK, GER, GR); employees of old, small companies (B, GER, GR); cleaners (B, DK); and employees in modern, automated enterprises (B, GR). Of the risk groups, mentioned by one country only, middle management (NL), team workers (UK), and senior workers (NL) are most interesting to mention, since they can be regarded as 'often forgotten' or 'unexpected' risk groups. This is true as well for truck drivers of suppliers; workers from cleaning firms (B); food inspectors (NL); chicken catchers; female workers in service and meat trade (DK); and operatives in meat wholesale trade (F). These workers are in fact not employed in the Meat Sector itself, but since they are exposed to some specific hazards, in part due to the work organization in the Meat Sector, they can be regarded as risk groups of the Meat Sector as well.

3.4 Policies and instruments

This section presents an overview of the policies and instruments aimed at improving the working conditions in the Meat Processing Industry. Firstly, data on the organization of prevention at company level are given, the stage of policy development is being characterized, and the trends in companies' policies will be described. The second subsection deals with the policies and instruments at sectorial level. On this level as well data are presented on the organization of prevention, but also on the undertaken improvement activities such as action programmes, education, information and research. Like the first subsection, this second one also ends with a characterization of the stage of policy development, and a description of the trends in sectorial policies.
It must be emphasized here that the presented data are to some extent difficult to compare, not only because not all countries provided comparable information on each issue, but particularly because data should best be interpreted against the background of the national context of occupational health and safety policies and instruments. Information on this context would however elaborate both the national reports, as well as this consolidated report too much, and is therefore only occasionally presented here. Hence, conclusions on the policies and instruments in the various countries must be drawn very cautiously.

3.4.1 Policies and instruments at company level

This subsection starts with a description of the organization of prevention at company level. Hence, data are presented on self-audits on occupational health and safety, on Prevention Services, and on Health and Safety Committees and Works Councils. Table 10 shows whether these prevention instruments are being applied within the Meat Sector in the various countries. The subsection finishes with an overall characterization of the stage of development of companies' policies and the trends in various countries.

Self-audits on health and safety
Data on the practice of health and safety self-audits within companies of the Meat Processing Industry are not very comprehensive (see Table 10). Four countries (GER, GR, P, SP) provide no data at all. The data from the other *six countries* (B, DK, F, IRL, NL, UK) imply that ***self-auditing*** is indeed an instrument ***being applied by meat companies***, but the ***scale of application***, let alone its ***quality, is not exactly known***.
Belgium for instance reports that each company with at least one employee is legally obliged to have an 'occupational health and safety department', which has to make a risk assessment, an annual action plan and annual report. So, in theory every meat company should have the disposal of a self-audit, but the extent to which this is actually put into practice is questionable, since a recent study showed that not every company has established such a department.

Table 10: Organization of prevention at company level in the Meat Processing Industry

Country / Instruments for prevention	B	DK	F	GER	GR	IRL	NL	P	SP	UK
Self-audits on health and safety[1]	X	X	X	-	-	X	X	-	-	X
Prevention Services[1]	X	X	X	X	X	-	X	-	X	X
Health and Safety Committees/Works Councils	X	X	X	X	X	X	X	-	X	X

X: instrument is being applied within meat companies to some extent.
0: instrument is not being applied within meat companies.
-: no data available.
1) Due to the implementation of the framework directive 89/391/EEC, it is to be expected that these instruments will be applied in the near future in all EC-countries.

The situation in the Netherlands is somewhat similar. Due to the national implementation of the the EC-directive 89/391/EEC, it is legally compulsory for all companies since the 1st of January 1994 to have a written risk assessment and risk evaluation as a start for their health and safety policy. Based on contacts in the field, it is reported that already before that date a number of companies used self-audit instruments and had a health and safety management system or policy in some form. The exact actual situation is yet unknown. Indicative is however, that a self-audit and policy making instrument has been developed especially for the Red Meat Sector, which is called 'Workbook Health and Safety Management in the Meat Sector'. At least 40 companies (5% of the total number in the Meat Sector) are known to use this workbook, since the health and safety coordinators of these companies form a sectorial study group.
Denmark as well points out that the implementation of the EC-directive has resulted in the requirement to all meat processing companies to prepare a written work place assessment. To stimulate this, information material on this subject has recently been disseminated and a minor campaign has been launched. Furthermore, it is reported that fire audits are required in bigger companies, or if specific fire risks are present.
The United Kingdom reports that the use of auditing systems in industry in general has been growing and that there are now several systems available. Furthermore, it is known that some of the larger companies in the industry have been undertaking self-audits, but the percentage of firms using these techniques at present is thought to be low. Figures on the sector are not available however.
In Ireland, all companies claim to have the required statutory safety statements prepared, but the stage of practical implementation is unknown.
To conclude with France, here some form of Health and Safety Committees is established within companies (see also further down), which activities consists a.o. of the analysis of risks in the working environment. But here again, no data have been provided on the proportion of companies in which these self-audits are actually undertaken.
It must be noted here however, that, due to the above mentioned framework directive 89/391/-EEC, it is to be ***expected that in the near future work place assessments will be a common form of self-auditing*** in all companies within all EC-countries, hence also in the Meat Sector.

Prevention Services
Table 10 shows that in eight of the ten countries Prevention Services are active within the Meat Processing Industry. Only from Ireland and Portugal data were not obtained on this subject. In

contrast to what the Table suggests, the situation in the other eight countries is rather diverse. Due to the lack of exact figures in most countries, only a global picture can be drawn, which indicates a ***100% coverage with Prevention Services in three countries*** (B, DK, F), and a ***much lesser coverage*** in the other ***five countries*** (GER, GR, NL, SP, UK). National authors from ***two of them*** however ***foresee a 100% coverage for the future as well*** (GR, NL).

Both for Belgium and Denmark it may be presumed that all meat processing companies and all their workers have access to Prevention Services, since the establishment of such services is required within the sector. In Belgium, companies with a Health and Safety Committee and 50 workers or more may establish their own Prevention Service inside the company; the other companies must affiliate to joined external Services.
France reports as well that in fact all companies and all workers are subject to receive prevention services, because medical surveillance is obligatory. This is being provided by the Occupational Associations which also deal with the social insurances in the sector. Moreover, general data from an inquiry imply that mostly larger companies will have an (internal) Prevention Service or, more likely, a person in charge of safety issues.

A much lesser coverage with Prevention Services seems to exist in Greece, Spain, Germany, the Netherlands and the United Kingdom, as global data indicate. With respect to the proportion of meat companies these figures are: 0.2% in Germany, 1.8% in Greece (only enterprises with more than 150 workers), 5% in Spain (companies providing periodical medical surveillance), and 20% in the Netherlands (applies to the Meat Products Sector only, which is in fact obliged to have Prevention Services due to an agreement in collective bargaining). This corresponds to the following percentages of the sector's workers: 6.8% in Germany, 45% in Greece, 60% in Spain (of the workers whose employers provide the medical surveillance), and 80% in the Netherlands (Meat Products Sector only). These figures imply that the Prevention Service rate in the Spanish Meat Sector is lower than the national rate, whereas in Greece and in the Dutch Meat Products Sector the rate is higher than the national average. In Germany and the Netherlands the Services are mostly or all outside the companies, whereas in Greece internal Services predominate.
The United Kingdom reports that many companies in the industry do not have access to Prevention Services, and only the larger companies, or those which are part of large groups, have a safety professional on either full-time or part-time basis. Data on safety professionals are also obtained from Spain and Germany. In Germany 2% of the companies in the sector have to appoint safety specialists who cover 38% of the sector's workers, whereas in Spain safety technicians have been appointed in 19 meat companies (8% of all meat companies), without being mandatory, all on part-time basis.

With respect to the future, both Greece and the Netherlands report that a 100% cover of companies and workers in the Meat Sector with Prevention Services will be achieved, due to the implementation of the EC-directive 89/391/EEC. Greece feels that the establishment of external Services would be the best and most feasible solution for many small and medium sized companies. In the Netherlands the 100% cover in the Meat Sector should be reached at the end of 1995. By then all companies should purchase at least a minimum package of services regarding risk assessment and evaluation, sickness absenteeism, periodical occupational health examinations, and consulting hours. Furthermore, the Services will have to be certified and cover the full range of working conditions, e.g. health, safety and well-being.
Although it was not explicitly reported by the other countries, it is to be expected however that the implementation of the EC-directive 89/391/EEC will in some way affect the Meat Sector in all of them as well.

Health and Safety Committees and Works Councils

All countries, except Portugal, report the existence of ***Works Councils and/or Health and Safety Committees*** within the Meat Sector (see Table 10). Portugal did not provide data on this issue. In all nine countries these health and safety organization structures have a legal basis. The sort of structure to be established often depends on the company size.

In five countries (B, F, GER, GR, NL) Works Councils have to be established in companies which minimum sizes vary between 5 (GER) and 100 workers (B). Exact data on the actual compliance within the Meat Sector are not available however. The only figures obtained concern Dutch slaughter houses of which 36% were in compliance with the regulations regarding the establishment of a Works Council (50% for the entire Food Industry). Moreover, it is reported by the Netherlands that the percentage of compliance is generally higher among the larger companies (more than 100 workers), than among small companies. Germany further reports that Councils' responsibilities towards occupational health and safety concern the duty to monitor, to organize, and to assist authorities, and that they have the right of co-determination, information and participation.

The existence of Health and Safety Committees or alike is reported by eight countries (B, DK, F, GR, IRL, NL, SP, UK). In four of them (B, DK, F, SP) the establishment of these Committees is legally related to a minimum company size, which varies between 10 for Safety Groups and 20 for Safety Committees in Denmark, to a minimum of 100 workers in Spain. In the Netherlands, Works Councils in companies with 100 workers or more may establish a Health and Safety Committee to support them in their tasks on occupational health and safety in the company, without the employers' permission; in companies with less than 100 workers such a permit is however necessary.
Another ground for establishment concerns the hazards within companies. In Spain, all companies considered dangerous by the Ministry of Labour must have a Committee, whereas in the United Kingdom employers are required to establish a Safety Committee if at least two safety representatives, appointed by a recognised Trade Union, request to do so.
Again, exact figures on the proportion of companies in the Meat Sector indeed having established a Health and Safety Committee, are lacking. However, the available data indicate that Committees are present in the majority of the Danish and Irish meat companies, in the larger unionized plants in the United Kingdom, in circa 80% of checked Spanish companies which were entitled to have one, and in 8 Greek companies.
Position, activities, and responsibilities of the Committees vary between countries, which is, amongst others, reflected by its participants: from an almost exclusive employees' affair (F, NL), or a mix of employees (i.e. members of Safety Groups) and representatives of top-management (DK), to a three-party constellation with representatives from employees, management and experts (B). Spain and the United Kingdom indicate that the effectiveness of the Committees is variable, whereas a French inquiry amongst employees showed that the Committee is one of the most efficient institutions for the improvement of working conditions.

In addition, other organizational structures which are also ***engaged with health and safety matters*** exist in ***four countries*** (DK, F, NL, SP). In the Netherlands these are two or three-party committees. In France it concerns personnel representatives which operate as mediators between the three parties. In Spain they regard 'company committees', and in Denmark it concerns two-party 'collaboration committees', which may discuss subjects related to the work organization and the social work environment, which should be coordinated with the Safety Committee.

Characterization of the development stage of companies' policies

An indication of the ***stage of development of health and safety policies in meat processing***

companies within the various countries is obtained from national authors of all countries, except Portugal. These indications result in a ***rather miscellaneous picture*** in which four countries (B, F, GR, SP) characterize meat companies' policies as 'beginning', three countries (IRL, NL, UK) characterize them to be 'partly developed', and two countries (DK, GER) use the category 'well-developed'.
It must however strongly be emphasized that the characterization is purely indicative. First of all, because no standards were provided for the categorization. This means that one country would call a developing stage for example 'partly developed', whereas another country would consider that stage to be 'well-developed'. Furthermore, this characterization is only a global judgement, not accounting for the heterogenity that is likely to exist between companies. In the third place, as has properly been pointed out by the United Kingdom, '... companies may legally be obliged to have a published safety policy, but their quality can be variable, and even when the policy on paper is good, it may lack the commitment of the management to fully implement it'.
Nevertheless, from this characterization may be concluded that the ***situation in some countries is ahead of the situation in others, which provides learning possibilities amongst them.***

Trends in companies' policies
Provided data on trends in the health and safety policies in meat processing companies further indicate that the ***policies*** can not just be statically categorized, but ***are in fact developing***. Considering the data obtained, this is anyway the case in ***seven countries*** (DK, F, GER, GR, NL, P, UK).
Only Ireland reports that little beyond the legal requirements is likely to be developed. Yet, it reports as well, that companies' managements seem to be more aware of the value of protecting workers from sickness and injury.
The current process of change in Portugese slaughter houses, due to sanitary standards, is reported to result in closure of old units, building of new ones, and hence improvement of working conditions.
Greece expects developments due to the implementation of the EC-directive 89/391/EEC, which will result in companies receiving support from health and safety specialists, and in the improvement of working conditions and training.
Reported developments in the Netherlands are also partly due to the recent changes in legislation to which the implementation of the EC-directive has led. Meat processing companies are now occupied with getting into compliance with the new legislation by affiliating to a Prevention Service, undertaking risk assessments and evaluations, developing policies on sickness absence, and providing periodical occupational health surveillance to employees. Another development is not legally induced. It concerns the appointment of health and safety coordinators within companies which is now spreading particularly throughout the Red Meat Sector. These functionaries, although without legal status, are more and more becoming the pivot in the development of companies' policies. Actions at sectorial level are clearly a stimulating factor in this (see 3.4.2).
For France similar developments are reported. Implementation of new acts on for example machinery and substances will affect companies' policies. Moreover, sectorial activitities will be stimulating as well. For example the 'Objective and Prevention Agreements' and its belonging fund stimulates particularly small and medium sized enterprises for several years already to develop their health and safety plan (see also section 3.4.2).
In Denmark developments in health and safety policies in meat processing companies are expected due to two nation-wide action programmes, called 'A Clean Working Environment by the Year 2005' and 'Reduction of Monotonous, Repetitive Work'. The first was induced in 1994 by the government, the second by social partners and government together. These programmes will result in meat processing companies having to pay more attention to and taking action on heavy lifting, repetitive work, the work organization, prevention of fatal accidents and of injuries of young people.

Developments in the United Kingdom are expected as well, due to somewhat similar actions which concern the Food Industry as a whole. A booklet, developed within the frame of a governmental campaign, sets out an action plan for management and indicates the areas of priority to which managers should be giving attention. It may take some time though to see actual developments within meat processing companies, since the campaign was only launched in March 1994.
The authors from Germany consider the implementation of new technologies to be a main trend in future investments at company level, which will concern for example heavy physical work, safety conditions, noise exposure, and climate factors.
From these obtained data it may be concluded that the ***main trends in companies' policies*** on health and safety are ***quite often induced by company external factors, and even factors from outside the sector***. In other words, working conditions itself or companies' own ambitions seem not always to be the prime impulses to induce policy development.

3.4.2 Policies and instruments at sectorial level

Like the previous one, this subsection starts with a description of the organization of prevention, but this time at sectorial level. An overview of the presence of several sectorial prevention instruments within the various countries is presented in Table 11. Attention is paid to specific directives and regulations on occupational health and safety; health and safety issues in collective bargaining; health and safety inspection and enforcement; insurances and/or compensation arrangements; sectorial health and safety committees; and health and safety funds, subsidies, grants and prizes. Thereafter, an overview of the undertaken improvement activities at sectorial level is presented in Table 12. This Table and description goes into action programmes and projects, training and education, research, and information with respect to health and safety issues. The subsection finishes with a characterization of the development stage of the sector policy, and a description of the trends therein in the ten countries.

Specific directives and regulations on health and safety
As Table 11 shows, the vast majority of the ten countries have reported to have specific regulations or directives on occupational health and safety. In ***five countries*** (B, DK, F, P, UK) these are ***exclusively general regulations***, whereas ***four countries*** (GER, GR, NL, SP) have ***sector specific regulations as well***. The general regulations in six countries (B, DK, GER, GR, NL, UK) consist a.o. of a national Working Environment Act, which is a framework Act, and decrees or orders on specific issues which mostly resort under that Act. The issues concern for example technical equipment, substances and materials, safety aspects, or a working environment fund. The lacking of such a framework Act is particularly striking in Spain and Portugal, who only mention regulations on specific health and safety issues.
The reported sector specific health and safety regulations concern national legislation (GR, NL, SP), agreements in collective bargaining (NL, SP), and implemented EC-directives (NL, SP). Implementation of EC-directives on health and safety have in fact been reported by other countries as well (F, DK, UK). Moreover, two countries (B, F) mention the existence of European regulations which are not targetted at occupational health and safety, but which do affect that area. They concern for example hygiene, sanitary and veterinary control, and environmental issues. Information presented earlier indicates however, that such regulations exist in other countries as well.

Health and safety issues in collective bargaining
Collective bargaining which affects the Meat Sector takes place in eight countries, mostly at more than one level. In four countries (B, DK, F, IRL) the bargaining is at national level, in six countries (B, DK, F, GR, NL, SP) it is at sectorial level, and in four countries (DK, NL, SP, UK) it takes place at company level. In cases of sectorial collective bargaining, it often results in

Table 11: Organization of prevention at sectorial level in the Meat Processing Industry

Country / Instruments for prevention	B	DK	F	GER	GR	IRL	NL	P	SP	UK
Specific health and safety directives/regulations	X[1]	X[1]	X[1]	X	X	0	X	X[1]	X	X[1]
Health and safety agreements in collective bargaining	0	X	X	-	X	0	X	-	X	0
Health and safety inspecting and enforcing organizations	X[1]	X[1]	X[1]	X	X[1]	X[1]	X[1]	X[1]	X[1]	X[1]
Insurance/compensation arrangements	X[1]	X[1]	X[1]	X[1]	X[1]	X[1]	X	X[1]	X[1]	X[1]
Sectorial health and safety organizations	-	X	X	X	-	0	X	-	0	X
Health and safety funds/ subsidies/grants/prizes	-	X[1]	X[1]	-	0	0	X	-	X[1]	0

X: instrument is being applied within the Meat Sector; it concerns a sector specific application; instrument with general application may be present as well.
X[1]: instrument is being applied within the Meat Sector; it does not concern a sector specific instrument, but a general one which is however relevant to the sector.
0: instrument is not being applied within the Meat Sector.
-: no data available.

agreements per subsector, such as poultry, red meat products, and red meat slaughtering (F, NL, SP).
Despite the widespreadedness of ***collective bargaining***, in only ***five countries*** (DK, F, GR, NL, SP) it is, to various extent, ***being used as an instrument in occupational health and safety*** (see Table 11). These five countries report a number of agreements on specific health and safety issues, such as working hours, qualification and training (DK, F, NL); personal protective equipment (GR, SP); compensation for and/or policy on sickness absenteeism, and equal opportunities for women (DK, NL); work organization and piecework payment (DK); safety, medical surveys and Health and Safety Committees (SP); Prevention Services, sector specific health and safety organizations, noise, job rotation, and heavy lifting (NL).

Inspection and enforcement on health and safety
In ***all countries***, one or more ***inspecting and enforcing bodies exist with respect to occupational health and safety*** (see Table 11). In ***most countries*** (B, DK, F, IRL, NL, P, SP, UK) these are ***governmental Labour Inspectorates*** or alike, which resort under the Ministry of Labour or alike. In addition, in France two Occupational Associations (CNAMTS and CCMSA) undertake inspecting and enforcement as well. Germany is the only country in which inspection and enforcement is carried out by a sector specific two-party organization (the Fleischerei Berufsgenossenschaft), which is also an Occupational Association. Moreover, six countries (B, F, DK, IRL, NL, P) mention other inspecting and enforcing organizations, which are mostly governmental too, but are targetted at other working areas, such as the environment, veterinary and sanitary standards, or product quality.
The number of inspected meat companies, reported by three countries (GER, GR, NL), varies

from 35 (NL) to 2,069 (GER) in 1992 or 1993. This corresponds to 5% (NL) to 12% (GR) of the total number of meat companies. The proportions of inspected companies which received warnings or reminders were circa 30% (GER), 80% (NL) and circa 95% (GR), and in Germany there were two shut-downs. In Germany and Greece, the assessed inadequacies mainly concerned safety conditions, whereas in the Netherlands they mainly (30-70% of the inspected meat companies) regarded noise levels, policy making, and cleaning agents.
In the Netherlands, Denmark and the United Kingdom inspections take place within the frame of nation-wide sectorial inspection programmes and campaigns, in addition to the individual approach of companies. In the Netherlands this sectorial approach is the Labour Inspectorate's new work method since 1987. An individual approach is the regular inspecting method in five countries (B, F, GER, GR, UK). The inspections are mainly targetted at the physical working environment (B, GR, NL), or on the social and organizational environment as well (F). Both in the Netherlands and the United Kingdom there is a tendency to focus more on the organization and management of health and safety, and a development to give public access to inspection results (UK), or to aggregratedly publish them (NL).

Insurances and compensation arrangements
In ***all ten countries insurance or compensation arrangements*** exist for workers affected by ***occupational accidents, occupational diseases, illness, or disability***. The arrangements are, both in number as in nature, difficult to compare between countries. Evident is however (see Table 11), that only the Netherlands report the existence of sector specific arrangements. These are supplementary to the national arrangements, and a result of collective bargaining, which were induced by recent changes in the social security system, aimed at benefit payment reduction.
Another distinction to be made regards general, respectively specific work related arrangements. Arrangements on ill health or disability in general exist in seven countries (B, F, GR, NL, P, SP, UK) as a part of the national social security system, whereas specific arrangements on occupational diseases, accidents, illness or disability exist in six countries (B, DK, IRL, P, SP, UK).
Furthermore, in six countries (B, DK, IRL, NL, P, UK) private insurance companies are involved in some of the arrangements, whereas in the others (F, GR, SP) it is exclusive business for social security organizations, such as Occupational Associations. The United Kingdom further reports that many large employers in industry offer enhanced payments for sickness and disability in addition to the statutory schemes, as a part of the employment benefits package. In Denmark some unions have introduced group insurances which may release supplementary compensation, and cases may also be plead in civil court.
Obtained data on the conditions of payment are limited and difficult to compare, but workers' wages and the extent of disability, either to perform one's job or to do any work at all, seem overall to be important benefit determining factors.

Sectorial health and safety organizations
As is shown in Table 11, in ***four countries*** (DK, F, NL, UK) ***specific sectorial health and safety organizations*** exist, but organizations active in this field at sectorial level, are in fact present in five countries (DK, F, GER, NL, UK).
The sector specific health and safety organization in Denmark concerns the Occupational Health Service for the Meat Processing Industry, providing prevention services. Less sector specific, but relevant to the Meat Sector, is the two-party Sector Safety Council for the Food, Drinks and Tobacco Industry, producing information material and arranging training programmes.
In France, a working group on 'how to improve working conditions in the sector' is in existence. Both unions and employer's organizations participate in it, and it is being co-ordinated by the expert institute ANACT.
In the Netherlands there are two Foundations Quality of Work in the Meat Sector, founded by collective bargaining. One concerns the Meat Products Sector, the other concerns export slaughter

houses. Moreover, a Committee Quality of Work in Poultry Trade and Industry exists, as well as a Platform for Social Affairs in the Meat Sector, and a union's Working Group Working Conditions. All of them discuss health and safety matters and initiate several actions such as research, information, education. The Platform was recently established to attune all the activities. Except for the union's working group, the organizations compromise representatives of both employer's organizations and unions.
In the United Kingdom the HSE/Meat Trades Joint Working Party exists in which both social partners and the government participate. The Working Party has a broad remit to discuss health and safety problems, and produces Guidance Notes for the sector. The Poultry Sector is however not included.
In some countries (F, GER, NL, UK) there are other organizations however, which were not particularly established to improve occupational health and safety in the Meat Sector, but that do take important and even leading initiatives in that respect. In France these are the Occupational Associations CNAMTS and CCMSA. In Germany it is the Fleischerei Berufsgenossenschaft. The Netherlands has the Product Board for Livestock and Meat, and the executing organization of the sector's Occupational Association, GUO. And the United Kingdom has the Meat and Livestock Commission, the Meat Training Council, and the HSE/Food National Interest Group. Activities concern for example inspection and enforcement (F, GER), training (GER, UK), development of deboning technology (UK), development of sector policy, action programmes (F, NL), and do-it-yourself instruments for companies (NL, UK).

Funds, subsidies, grants and prizes on health and safety issues
Four countries (DK, F, NL, SP) report the ***existence of funds, subsidies, grants or prizes,*** beneficial to the Meat Sector's working environment (see Table 11). All of these provisions are general, except for the ones in Netherlands, which are sector specific. However, these concern two once-only prize contests, one among employees, the other among communication teams, within the framework of a campaign. However, two Education and Training Funds exist as well, one for the Poultry Sector, the other for the Red Meat Sector, but these are not specific health and safety funds.
In Denmark it regards the Working Environment Fund for researchers, and health and safety professionals in order to finance research, training and information. Recently the Monotonous Repetitive Work Fund has been established to support the execution of the action programme with the same title, from which companies, researchers and other involved parties can benefit.
In France, the funds concern the CNAMTS fund on prevention of accidents and diseases, as a part of the Objectives and Prevention Agreements, and subsidies from the other Occupational Association CCMSA, meant for companies. From 1988 till 1992 a governmental fund FACT existed as well, which focused on the physical conditions of work, such as noise and handling.
In Spain some mutualities and professional organizations award prizes and grants on works in occupational safety and health.

Action programmes and projects
In a ***small majority of the ten countries*** (B, DK, F, GER, NL, UK) ***action programmes and/or projects aimed at practical improvements in the working environment of the Meat Sector*** have been carried out, or are now being carried out (see Table 12). The number of reported activities per country vary from 1 (B, UK) to 8 (NL), but due to the great variety and hence incomparability of the activities, these numbers are only indicative. Moreover, in all countries except Belgium, the activities include action programmes which often consist of more than one activity. These programmes are often campaigns with stimulating titles such as 'A Recipe For Safety' (UK), 'Together on the way towards better work' (NL), 'Work and Technology - Humanization of Working Life' (GER), or 'A Clean Working Environment by the Year 2005' (DK). In two countries (F, UK) the activities are mostly or all initiated by the government, in three others (B,

GER, NL) social partners or sector organizations ruled by them are the initiators in most or all cases, whereas in Denmark the bigger activities and campaigns are usually launched by the government in collaboration with the social partners, whom may also propose areas for campaigns.
With respect to the topics of the programmes and projects a global distinction can be made between activities aimed at improving companies' health and safety management (F, NL, UK), and activities directly aimed at improving aspects of the working conditions (B, DK, F, GER, NL). More specifically, the management aimed activities concern the provision of a booklet which sets out an action plan for management by indicating the areas of priority (UK); the promotion of prevention as one element in company management and the elaboration of information tools and training (F); and the stimulation of companies' self-activity a.o. by the provision of a Workbook on health and safety management, and a Workbook on Positive Action for Women (NL). The activities directly aimed at the working environment concern the use of personal protective means to improve safety (B, NL); improvement of work organization (DK, F); ergonomical measures to reduce musculo-skeletal loads and heavy lifting, accident prevention (DK, NL); elimination of monotonous repetitive work (DK); noise reduction, and climate control (NL); working hours, qualification, safety conditions of saws (F); and working conditions in general in slaughterhouses and the Meat Products Sector (GER).
Moreover, it is interesting to mention that four countries (DK, F, GER, NL) report joint action programmes in the Meat Sector aimed at both the quality of working life, and the quality of production.

Table 12: Sectorial improvement activities on health and safety in the Meat Processing Industry

Country / Activity	B	DK	F	GER	GR	IRL	NL	P	SP	UK
Action programmes and projects	X	X[1]	X	X	0	0	X	-	-	X[1]
Training and education:										
▸ Structures and organizations	X[1]	X	X[1]	X	X[1]	0	X	X[1]	-	X
▸ Programmes and projects	X	X	X[1]	X	X[1]	0	X	X[1]	-	X
▸ Materials	X	X	X	X	0	X[1]	X	X	X	X
Research programmes and projects	X	X	X	X	0	X	X	-	X	X
Information structures:										
▸ Databases	-	X[1]	X[1]	X[1]	0	0	X[2]	-	X[1]	X[1]
▸ Sector magazines/periodicals	X	X	X	X	0	X[1]	X	-	0	X

X: activity has been undertaken, specifically for the Meat Sector.
X[1]: activity has been undertaken, not specifically for the Meat Sector, but it is of relevance to health and safety in the sector.
0: activity has not been undertaken in Meat Sector.
-: no data available.
2: these concern paper publications which are not meant to be a database; they contain however a lot of practical and accessible information on applicable solutions for health and safety hazards.

Training and education activities
As Table 12 shows, ***all countries except Ireland and Spain*** report the existence of ***organizations or structures***, that are ***occupied with training and education in health and safety in the Meat***

Sector. In four countries (DK, GER, NL, UK) these concern sector specific organizations: the Slaughter School (DK); the Fleisherei Berufsgenossenschaft (GER); the Meat and Livestock Commission and the Meat Training Council (UK); the Foundation Education for the Meat Sector SOV, and several study and guidance structures initiated by a few other sector organizations (NL).
The target groups for this training and education are various. Employees get specific information and instruction on health and safety in their vocational training in the Netherlands, the United Kingdom and Denmark. Foreman, supervisors and managers get task related health and safety training in their vocational education or courses in Germany, the United Kingdom and the Netherlands. In the Netherlands for some time companies could also get supportive guidance on policy making. Moreover, in Germany courses for health and safety experts are continuously provided, whereas in the Netherlands health and safety coordinators can participate in a study group with two-monthly meetings, and vocational trainers can meet at half-yearly study days.
Five countries (B, DK, F, GR, P) report other relevant organizations which also provide or finance health and safety courses and education, but not specifically for the sector. These organizations are for example unions (DK, F); employer's associations and funds (DK, GR); Occupational Associations (F); and professional schools (P). Target groups are for example health and safety experts (B, F, P); members of Safety Groups or Safety Committees (DK, F); pupils (F, GR); trainers, inspectors (F). Although it has not been reported, it is likely that such organizations exist in other countries as well.

All ***eight countries*** marked in Table 12 for having educational organizations, accordingly have ***educational programmes which include health and safety issues. In addition*** to the structural provisions mentioned above, three countries (B, GER, NL) report ***project activities*** in the sector: a campaign with leaflets on personal protective means (B); a training project for qualified engineers with regard to technical accident prevention (GER); and three training projects with short courses and information meetings on legislation, policy making and management, and sector specific health and safety topics, meant for health and safety coordinators, management, members of Works Councils and Health and Safety Committees, or staff functionaries (NL).

Training and education material on health and safety in the Meat Sector is available in ***all ten countries, except Greece*** (see Table 12). The reported number of materials vary from 1 (IRL, SP) to 60 (UK), but due to their variety this is only indicative. Leaflets or brochures, which are often guidance notes, are the predominant kind of materials, available in six countries (B, DK, F, NL, P, UK). Sector specific audio-visual materials like films and videos can be found in four countries (DK, GER, NL, SP). More comprehensive materials are reported to exist in Ireland and the Netherlands. These concern a training package (IRL), lessons or modules on health and safety issues for vocational training (NL), and several workbooks and handbooks (NL).
The materials are predominantly and more or less evenly targetted at employees and employers. Occasionally staff functionaries, middle management, or others with specific health and safety tasks form the target group. Although all 60 publications in the United Kingdom are primarily aimed at employers, they are relevant to employees as well.
With respect to the subjects of the materials, the physical working environment predominates with topics such as safety, hygiene, climate, noise and musculo-skeletal loads. Only Denmark and the Netherlands explicitly report materials on issues like job content; work organization; communication; equal opportunities for women; workers' participation; qualification; and also on policy making and management with respect to working conditions and sickness absenteeism.

Research activities
As is shown in Table 12, ***researches on health and safety aspects in the Meat Sector*** have taken place in ***eight countries*** (B, DK, F, GER, IRL, NL, SP, UK). In all countries, except the Netherlands and Belgium, the number of reported research activities is three or less. The Netherlands

report 30 studies, the majority of which is rather large-scale and at sectorial level. The studies in Belgium, of which the number is unknown, are all small-scale researches. From the data obtained, it is evident that the government is not the predominant initiator in this field, since this is only mentioned by Denmark, the Netherlands and France. Other involved organizations regard sector organizations (F, NL, UK), universities (IRL, NL, UK), other research centres (F, NL, SP), and occupational health services (B, NL).
In four countries (DK, F, GER, NL) the researches are part of national or sectorial action programmes, aimed at both the quality of working life and of production (see before). In the Netherlands there is however also a specific sectorial action programme on health and safety issues (see before), which includes a number of resarches.
Topics in the studies are for example the working environment in general (DK, GER, IRL, NL, SP); automation of deboning (UK); brucellosis (SP); musculo-skeletal/cumulative trauma disorders and work organization (F). Studies in the Netherlands also concern specific aspects of the working environment, such as job content and work organization, biological and chemical agents, climate, noise, accidents or ergonomical issues, position of women, but also management issues like sickness absence policy and Prevention Services.

Information structures
Table 12 indicates that ***databases on health and safety issues exist in six countries*** (DK, F, GER, NL, SP, UK). The reported databases are almost all non-specific for the sector, but relevant to it. They concern computerized databases on chemicals, occupational accidents and diseases (DK); legislation, guidelines and alike (DK, UK); technical data on health and safety issues (F); and on publications on health and safety at work (UK). Moreover, paper databases on occupational accidents and diseases are reported to exist in Germany, Spain, France and the Netherlands. Considering the previous presented statistical data (particularly in section 3.1), it is likely however that similar non-sector-specific databases exist in other countries as well (B, GR, P, UK).
Only the Netherlands mention the presence of some sector specific databases, which are not computerized however, but publications containing practical information on applicable solutions for noise, climate and ergonomical problems, and on personal protective means.

Meat Sector magazines or periodicals which pay attention to ***health and safety issues*** are available in six countries, as Table 12 shows (B, DK, F, GER, NL, UK). In Ireland such magazines are available for the entire Food Sector only, whereas in France, Denmark, the Netherlands, and Belgium these exist next to the specific periodicals for the Meat Sector. All reported magazines carry articles on various health and safety topics as and when the occasion arises. None of them deals exclusively with these subjects. Only some magazines have a very specific target group: workers, or employers (DK), and health and safety experts (GER). The others are aimed at all people involved in the sector.

Characterization of the development stage of sector policies
An indication of the ***development stage of the health and safety policies at sectorial level*** is obtained from national authors of all countries, except Portugal. As on company level (see section 3.4.1), the ***picture is rather miscellaneous*** with authors from five countries (B, F, GR, IRL, SP) considering the Meat Sector's health and safety policy to be 'beginning', authors from one country (GER) judging it to be 'partly developed', and authors from three countries (DK, NL, UK) characterizing it as 'well-developed'.
As has been mentioned before with respect to companies' policies (see 3.4.1), for the same reasons it must strongly be emphasized that the characterization should only be taken as indicative. Nevertheless, it is interesting to mention that authors from five countries consider the development stage to be the same at companies' level as at sectorial level ('beginning' for B, F, GR, SP; 'well-developed' for DK), whereas authors from two countries (GER, IRL) feel that the sector's policy

development stage is behind to the stage at company level, and that the authors from the other two countries (NL, UK), consider the sector's policy stage to be ahead of that in companies.
Furthermore, it may be concluded that also regarding sectorial policy the ***situation in some countries is ahead of the situation in others, again providing learning possibilites among them.***

Trends in sector policies
Trends in the Meat Sector's policy on health and safety issues have been reported by authors from ***five countries*** (B, DK, F, NL, UK), which partly overlap the countries that described trends in companies' policies. This may not be too surprisingly, since the previous mentioned developments at company level are often related to developments at sectorial level. Hence, there will be some overlap with the information presented at the end of section 3.4.1.
As on company level, Ireland expects little sectorial developments beyond legal requirements.
Belgium notes an increasing interest for sectorial initiatives in the Meat Sector among unions, employers' organizations and Prevention Services. It sees an obstacle for such initiatives however, in the fact that the Meat Sector consists of many small, family-owned companies which often lack expertise from within and support from outside to develop an effective preventive policy.
Denmark expects several improvement activities to be undertaken in the future by the social partners and the Food Sector Safety Council, such as publication of information materials, arrangement of training programmes, and the previous mentioned campaigns 'A Clean Working Environment by the Year 2005' and 'Reduction of Monotonous, Repetitive Work'.
France reports that the Meat Sector has had priority for almost ten years now within the government and an Occupational Association. Steps have been taken during that period to reduce the number of accidents and diseases. Vocational training programmes have been developed as well. Moreover, studies are being carried out now by social partners and prevention organizations to assess the associate effects of risk factors and modernization on job content and work organization, and to look for solutions such as organizing the activities of the sector.
Observed trends in the Dutch Meat Sector's policy concern a shift in attention and improvement efforts from the physical working environment towards the organizational and social working environment. There is also a shift from research towards stimulation of self-activity of companies, and towards transfer of available knowledge on improvements to the companies. Moreover, the researches that are still being carried out are more often demonstration projects aimed at 'learning by doing'. The fifth trend regards the stronger co-ordination of health and safety improvement activities by the several sector organizations.
In the United Kingdom, so far the trade associations in the Poultry Sector have had little involvement in health and safety matters. For the rest of the Meat Industry the HSE/Meat Trade Joint Working Party, the Meat and Livestock Commission and the HSE/Food National interest Group have been the most active parties by clearly defining policy objectives for the sector, producing Guidance Notes, campaigns against musculo-skeletal loads ('Lighten the Load'), technology development, and by stimulating the management of industries to integrate occupational health and safety in their daily conduct of business. The last two kind of activities are in fact subject in the two most recent sectorial actions, i.e. the development of automated deboning equipment, and the dissemination of the booklet 'A Recipe for Safety', supported by a series of special visits to companies by HSE-inspectors.

3.5 Discussion and conclusions

In this section, preliminary conclusions on main risk factors, health problems and risk groups are discussed in relation to the undertaken and proposed actions and policies. It is emphasized that the conclusions in this section are exclusively based on the data as presented in the previous sections of this chapter.

Main risk factors and related health problems

The data obtained from the ten European countries with respect to occupational accidents, occupational diseases and risk factors in the work environment lead to the conclusion that ***eight health and safety hazards prevail in the European Meat Sector***. These main hazards are identified as such by the ***majority of the ten countries*** involved in this study (i.e. more than five countries). These main risk factors and their related health problems are presented in Table 13. It shows five factors which belong to the physical work environment, one (compound) factor of the organizational work environment, and two factors of the social work environment.

Table 13: Main risk factors and related health problems in the Meat Processing Industry

Main risk factors	Main related health problems
Noise: - continuous loud noise - noise peaks	Hearing impairment Communication problems Psychic complaints (stress/tiredness/amnesia/concentration loss)
Climate factors: - coldness - high humidity - temperature fluctuations - draught	Respiratory disorders Infectious diseases
Musculo-skeletal loads: - repetitive speedy work - strenuous manual handling - strenuous working postures	Musculo-skeletal disorders (limbs/neck/shoulders/back) Repetitive strain injuries Occupational accidents
Safety conditions: - sharp hand tools - machines - slippery floors	Cut and stab wounds Sprains and strains Fractures, bruises, concussions
Biological agents: - micro-organisms	Infectious diseases Skin diseases (enhanced by small wounds)
Work organization and job content: - lack of autonomy and control - work rhythm and time constraints - repetitive work - high division of work and low job content	Repetitive strain injuries Musculo-skeletal disorders Occupational accidents Psychic complaints (stress/tiredness/sleeping problems/ dissatisfaction/burnout)
Lack of information, consultation, participation: - lack of feedback - lack of structural participation	No data, but likely: Psychic complaints (stress/dissatisfaction)
Unequal opportunities for women: - unequal job distribution - lesser qualification - lesser payment	No data, but likely: Psychic complaints (stress/dissatisfaction)

From the data obtained (both quantitative and qualitative), it may further be concluded that ***occupational accidents and six types of disorders are the main health consequences in the Meat Processing Industry***. These disorders regard musculo-skeletal disorders, skin diseases, infectious diseases, hearing impairment, respiratory disorders and psychic complaints. Compared to other sectors, the ***Meat Sector*** can be considered to be a ***high risk industry***, both with respect to ***accidents***, as well as ***disorders***.

Main risk groups

From the data obtained, it is concluded that all workers will to a greater or lesser extent be exposed to various risk factors in the physical, organizational and social work environment. Yet, particular groups have excess risks and those mentioned by a majority of the ten countries, are concluded to be main risk groups. These regard ***slaughter house workers, production line workers and boners***. These groups, the risk factors to which, more than others, they are exposed, and the main health consequences thereof are presented in Table 14.

Table 14: Main risk groups in the Meat Processing Industry, the main hazards to which they are exposed, and the main health consequences thereof

Main risk groups	Main risk factors	Main health problems
Slaughter house workers: - slaughterers - butchers - cutters	Biological agents Musculo-skeletal loads Noise Climate factors Unsafe conditions Lack of autonomy/control High work pace Time constraints Repetitive work Low job content	Accidents and injuries Skin diseases Infectious diseases Hearing impairment Musculo-skeletal disorders
Production line workers	Biological agents Musculo-skeletal loads Noise Climate factors Unsafe conditions	No data
Boners	Biological agents Musculo-skeletal loads Noise Climate factors Unsafe conditions Repetitive work Time constraints Payment on production basis	Serious accidents Cut and stab injuries Repetitive strain injuries

Actions and policies

In the following presentation of conclusions on the undertaken and proposed actions and policies, a distinction is made between activities at company level, activities at sectorial level, and activities at national level.

Activities at company level

The data with respect to undertaken and proposed activities aimed at the identified eight main risk

factors in the working environment of the Meat Sector lead to the following conclusions.

- In general, ***limited data*** is available on the extent of ***application of preventive and control measures***. It seems however, that ***primary prevention is less widespread*** than ***secundary*** or ***lower levels of prevention***.
- With respect to ***noise***, activities have been undertaken at various levels of prevention: incapsulation, time restriction, provision of personal protective devices, and medical surveillance. Additionally proposed activities also cover various stages of prevention: detection and subsequent elimination of sources; noise-reducing technological adaptions like automation; housing noisy equipment away; silencing work rooms; informing and training of personnel on personal protective devices; monitoring of noise levels; application of national legislation; application of written information on solutions.
- Measures that have been taken on ***climatological hazards*** regard airbag cooling, time restriction and personal protective devices like clothing. Activities that have probably been undertaken as well, are: application of building standards, legal requirements, and written information on several solutions; adaptions in the work organization; air sluices; time and area restrictions. Additionally proposed activities regard: usage of various heating media and systems, including local heating; local chilled enclosures for product handling; product prechilling; insulated duckboards; provisions for regulating temperature and ventilation; task rotation; cold rooms safety procedures; acclimatizing facilities; attention to comfort of personal protection devices.
- Regarding ***musculo-skeletal*** loads various ergonomical measures have been taken: automation/mechanization; transport systems leveling unloading systems in trucks; adjustable work levels. Additionally proposed activities regard: standardization of packages; provision of transport, lifting and handling devices to avoid manual handling; instruction of workers on handling and on the use of devices; job re-design, job rotation and time restriction to reduce RSI problems; application of EC-legislation and of written or audio-visual information on solutions.
- Measures undertaken with respect to ***safety conditions*** include: safe guarding of equipment like band saws, and mincing, pie, tart, and de-rinding machines; safety regulations; facilities for fire prevention and fighting; provision of knives with a special design; adequate combination of foot wear and floor surfaces; personal protective devices like mail gloves, forearm protectors and aprons; application of written information on various solutions. Additionally proposed activities regard: automation/mechanization; reduction of work speed; better layouts; joint and better design of technical equipment and personal protective devices, also involving future users; sufficient lighting; attention to work organization; training of workers on correct use and hazards of misuse of equipment and devices; procedures and facilities for supervision, good housekeeping, (preventive) maintenance, cleaning, first aid; application of EC-legislation.
- Prevention and control of ***biological agents*** is assured by: elimination of diseases among animals; identification and special treatment of infected animals; basic hygiene standards, procedures, facilities, and personal protective devices like gloves; training and vaccination of workers. Additionally proposed actions regard: full application of the EC-standards on sanitary conditions in slaughter houses; application of written information on hand wound infections; wearing of mail gloves over rubber gloves.
- Undertaken measures with respect to ***work organization and job content*** are rather rare up till now and mostly experimental. They include: alternative forms of work organization like job rotation job enlargement, job enrichment, production teams, quality circles; in some cases with joint technological innovations or adaptions; limitation to work speed. Additionally proposed actions regard: introduction of modern management; job and organizational redesign reducing repetitive work, piece paid work, and seasonal work; automation/mechanization; more flexibility in technology and work planning; positioning of dangerous

machines in quiet work rooms; application of knowledge on the various experimental solutions.

- Undertaken activities with respect to ***workers' information, consultation and participation*** regard the establishment of Works Councils, Health and Safety Committees, and workers participation in change projects on technological innovation and reorganization. Additionally proposed activities concern: application of existing knowledge on alternative forms of work organization, including more team work; improvement of consultation arrangements, especially in smaller firms, and enhancing the role of existing Committees.
- Undertaken measures at company level with respect to ***unequal opportunities for women*** have not been reported. Proposed activities however regard: employment of more women; application of legal regulations and agreements in collective bargaining, concerning equal salaries, provisions for pregnant workers, parental and care leave, chrèche provisions, and fighting of sexual harassment; application of written information on available solutions.

The previous conclusions show that already ***quite some information and experience on prevention and control of risks*** is available within companies across the ten European countries, that ***could be exchanged***. Furthermore, it is concluded that ***several developments*** in the sector are taking place which, to varying extent in the various countries, ***will probably improve the working environment*** in companies. These regard: the implementation of EC-legislation on health and safety; the rationalization process in abattoirs in five countries; the growing awareness of 'the human factor being a key factor in production'; the investment in ongoing automation, mechanization and other technological innovation; the spreading of new management concepts; and some nation-wide action programmes on working conditions.

With respect to health and safety policy in meat companies it is concluded that the following applies to a ***majority*** of the ten European countries:

- work place assessments and/or health and safety self audits are being applied to some extent;
- Prevention Services are active in meat companies, covering 7% to 100% of the workers in the sector;
- Health and Safety Committees and/or Works Councils are found in meat companies, although not in all companies which are legally entitled to have one;
- developments are taking place due to EC-legislation, which will strongly enhance the spreading of work place assessments and Prevention Services among meat companies.

Furthermore, in four countries other developments are taking place which stimulate management's awareness and policy making capacities, thus improving companies' health and safety policies.

Activities at sectorial level

The data with respect to the sector's health and safety policy lead to the conclusion that the following policy instruments exist in a ***majority*** of the ten countries:

- sectorial action programmes or projects, which are either aimed at improving companies' health and safety management, or at improving aspects of the working environment itself;
- training and education material on occupational health and safety;
- research activities on health and safety issues in the sector, either as separate projects, or as parts of action programmes;
- sectorial magazines which carry articles on various health and safety issues as and when the occasion arises.

In a ***minority*** of the ten countries the following policy instruments are in existence:

- sector specific health and safety regulations;
- agreements on health and safety issues in collective bargaining;
- a sectorial approach in inspection and enforcement;

- sector specific insurance and compensation arrangements regarding ill-health or disability;
- sectorial organizations taking leading initiatives with respect to health and safety;
- sectorial funds, subsidies and grants on health and safety issues;
- sector specific educational organizations and programmes which include health and safety issues;
- sector specific databases containing practical information on solutions to health and safety matters.

Conclusions on the aims of the undertaken sectorial activities across the ten countries, in terms of the risk factors addressed in order to improve the working environment in meat companies, are the following.

- In general, ***more attention*** has been paid ***to the physical work environment than to the social and organizational work environment.***
- The greatest variety of activities has been aimed at three main risk factors: noise, musculo-skeletal loads, and safety conditions. These activities include researches, agreements in collective bargaining, education and information material including a paper database on solutions, and action programmes and projects which implement practical improvements.
- The same activities, except for one, have been undertaken with respect to three other main risk factors, although to a lesser extent: climate (no agreements in collective bargaining), work organization and job content, and unequal opportunities for women (no paper databases on solutions).
- Regarding the two other main risk factors a smaller variety of activities has been undertaken: biological agents (researches, education and information material), and workers' information, consultation and participation (education and information material).
- Training and education activities, articles in magazines, and action programmes and projects have been undertaken with respect to various risk factors, which likely include the previously mentioned main factors as well.
- To a lesser extent activities have been undertaken regarding other issues: working hours, qualification and training (agreements in collective bargaining, action programmes and projects), joint approach to quality of working life and quality of production (researches, action programmes and projects), and chemical agents (researches).
- A great variety of activities has also been aimed at the stimulation of companies' policies and self-activity. These activities are researches, agreements in collective bargaining, training and education activities, education and information material, action programmes and projects, and probably articles in magazines as well.

The above conclusions show that ***at sectorial level quite some knowledge and experience on improving working conditions*** already exist in various countries, which ***could be exchanged.*** Furthermore, it is concluded that ***developments in the health and safety policy at sectorial level*** are taking place in ***five countries.*** These regard an increase in interest at sectorial level; new informational, educational, research and enforcement activities; development of new technology; a stronger co-ordination of sectorial activities; a shift in interest towards the social and organizational aspects of the working environment; more emphasis on the stimulation of companies' self-activity, on the transfer of available knowledge and on demonstration projects.

Activities at national level

In a ***majority*** of the ten European countries the following instruments exist at national level, which affect the Meat Sector:

- specific regulations or directives on health and safety issues, mostly embedded in a national framework act;
- governmental inspection and enforcement organizations;

- insurance and compensation arrangements on ill-health or disability in general, as a part of the social security system, and/or specific arrangements on occupational diseases, accidents, illness or disability;
- educational organizations and programmes including health and safety issues;
- databases, either computerized or paper databases, with statistical information on occupational accidents which however show various deficiencies.

In a ***minority*** of the ten countries studied, activities and provisions at national level which affect the Meat Processing Industry include:

- nation-wide action programmes aimed at the improvement of physical and organizational working conditions;
- computerized databases with technical, bibliographical or juridical information on occupational health and safety;
- databases, either on paper or computerized, containing statistical information on notified occupational diseases, morbidity, disablement, sickness absenteeism, or mortality, which however show various deficits.

In connection to some of the previous conclusions, it is further concluded that the ***availability, the quality and the international harmonization of sectorial data on health and safety output could be improved***, which likely calls for activities, mostly at national level.

4 View of social partners, government and others

This chapter elaborates the view of social partners, government and other organizations relevant to the sector, on the health and safety situation in the Meat Processing Industry. This information was obtained by interviews with representatives from these parties. In the first subsection an overview is given of their opinions on the major health and safety issues in the sector, the policies and solutions they propose accordingly, the trends in the sector they foresee, and their expectations from the European integration. These opinions will be confronted with each other, in order to find both agreements and disagreements between unions, employers' organizations, government and other sector related organizations. In the second subsection, the opinions will also be discussed in relation to the findings in chapter 3, which will result in preliminary conclusions.

4.1 Overview and comparison of opinions of parties

Interviews with key informants from employers' organizations, unions, government and/or other organizations, relevant to the sector, have taken place in all ten countries, except Ireland. Interviews with representatives from all four organization categories took place in four countries (B, F, NL, UK). In Germany interviews were held with representatives from all kinds of organizations, except the government, whereas in Greece and Portugal this was the case for 'other organizations'. In Spain and Denmark representatives from only one organization were interviewed, which were respectively an employers' organization and a union. The total number of organizations interviewed in the various countries vary between 1 (DK, SP) and 13 (B). Most of them were separately interviewed, except in Belgium and the Netherlands where most, respectively all organizations participated in a group meeting. In Belgium and Germany, obtained data from most organizations were processed directly into various parts of the sector profile. Therefore, data from only a few of their interviews will be presented here. Summarizing, it means that the data hereafter is based on information from employers' organizations and unions in seven, partly different countries, and on information from governmental bodies and other organizations in five, respectively four countries.

Major health and safety issues

In seven countries (F, GER, GR, NL, P, SP, UK) key informants from employers' organizations have expressed their opinion on major health and safety issues in the Meat Processing Industry in their country. Lack of safety and accidents appear to be the main issue in the view of these organizations, since it has been put forward by six countries (all except Portugal). Three other, most frequently mentioned main issues regard training and qualification of workers and/or management, either for their job and/or related to health and safety (F, NL, P, UK); climate factors (NL, SP, UK); and shortcomings in management, either in general managing capacities, or particularly regarding health and safety (GER, NL, P). Moreover, employers' organizations from two countries mention musculo-skeletal loads (NL, UK); shortcomings in work organization and job content (F, NL); and inadequacies in technology and work equipment (F, GER). Main problems mentioned by one country only, regard noise (NL); legislation and compliance (P); and the conflict between quality of work on one hand, and hygiene and product quality on the other (F).

According to the data from unions in six countries (DK, F, GER, NL, P, UK), the 'top 5' main issues regard musculo-skeletal loads (including heavy lifting and repetitive work) (DK, GER, NL, UK); noise (DK, NL, UK); lack of safety and accidents (F, NL, UK); biological agents (P, NL, UK); and occupational diseases (skin diseases, respiratory diseases, and lack of acknowledgement

and compensation arrangements) (GER, P, NL). Unions from two countries further mention chemical agents (DK, UK); deficiencies in work organization and job content (F, NL); shortcomings in leglislation and compliance (GER, P); and inadequate technology or work place design (F, GER). Main problems put forward by one country only, include climate factors (DK); lack of training and qualification (F); insufficient management (GER); and bad working conditions in general (F).

All five interviewed governmental organizations agree on lack of safety and accidents being a main issue (F, GR, NL, P, UK). Governmental organizations from three countries (F, NL, P) further mention shortcomings in work organization and job content, whereas two countries regard musculo-skeletal loads (F, NL), and lack of workers' training and information on health and safety (GR, P) a main issue. Main problems indicated by one country only, regard noise and climate factors (NL); ; lack of management's awareness of health and safety problems (UK); the little attraction of the work in general (F); inadequate design of work places and machinery, and shortcomings in legislation and its implementation (P).

All four countries (B, F, NL, UK) in which other organizations have been interviewed report that these key informants see lack of safety and accidents as a main issue for the sector. Another main problem, mentioned by three countries, regard musculo-skeletal loads (B, F, NL). Main risk factors, pointed out by other organizations in two countries regard noise (B, NL); biological agents (B, F); shortcomings in work organization and job content (F, NL); and inadequate design of work places and machinery (F, UK), due to lack of compliance to CEN-standards, or to lack of awareness of work being the integrating factor between technological, economic and human criteria. According to other organizations in one country only, main problems are also chemical agents, climate factors, lack of health and safety management capacities among middle management (UK); friction between safety and hygiene standards (F); and insufficient workers' training and qualification (NL).

When putting all the opinions from the various parties in the various countries together, six major health and safety issues can be identified (see Table 15).

Table 15: 'Top 5' of the main health and safety issues in the Meat Processing Industry according to key informants from four types of organizations

Key informants / Main issues	Employers' organizations (7 countries)	Unions (7 countries)	Government (5 countries)	Other organizations (4 countries)	Total
Lack of safety and accidents	6	3	5	4	18
Musculo-skeletal loads	2	4	2	3	11
Work organization and job content	2	2	3	2	9
Training/qualification	4	1	2	1	8
Noise	1	3	1	2	7
Design of technology, work places, equipment	2	2	1	2	7

Among the four parties across the nine European countries in which interviews took place, ***most consensus exists about lack of safety and accidents being a major issue.*** It is mentioned as such by almost all employers', governmental and other organizations, and by unions from three countries. The ***five other major issues*** regard ***musculo-skeletal loads; work organization and job content; training and qualification; noise; and design of technology, work places and equipment.*** On musculo-skeletal loads and on work organization there is consensus in a majority of the concerned countries in two types of organizations (unions and 'other organizations', respectively government and 'other organizations'). On the other three issues consensus exists in a majority of the countries in one organization category only, which are either employers' or other organizations.

When looking for 'disagreements' between parties, the most striking result is that ***unions more often*** than the other three types of organizations, ***point at hazards in the physical work environment.*** In the unions' 'top 5' of major risk factors, four factors regard physical work conditions, whereas for the other three organization categories this concerns only two factors. Employers' organizations, governmental bodies and 'other organizations' appear to put relatively more emphasis on issues related to work organization and job content, training and qualification, management, and design of technology, work places and equipment.

Policies and solutions

In the interviews key informants were asked which policies and solutions they propose to address the major health and safety issues in the Meat Processing Industry in their country. In order to analyse and consolidate them, these proposals have been arranged according to the following six topics:

- activities at company level:
  - * improvement of aspects in the work environment;
  - * improvement of health and safety policies;
- activities at sectorial level:
  - * improvement of aspects in the work environment;
  - * improvement of health and safety policy;
- activities at national level:
  - * improvement of legislation and enforcement;
  - * regarding other aspects.

In seven countries (F, GER, GR, NL, P, SP, UK) employers' organizations have proposed policies and solutions to address the major issues in the Meat Sector. In a small majority of these countries the proposals regard improvement of aspects of the work environment, either by actions at company level (GR, NL, P, SP), or at sectorial level (F, GER, GR, NL). The proposals are quite diverse, however. Most consensus is found in activities at company level regarding the aspects in the social work environment, but this consensus concerns only three countries (GR, NL, P). More specifically, the proposals regard improvement of management style, of working relations, and of workers' qualification and training, both for their job and the risk factors therein. Consensus among two countries is found with respect to three topics: improvement of companies' policies (NL, UK), sectorial actions aimed at the work environment in general (GR, NL), and improvement of sector policy (F, NL). Proposals on the first topic concern qualification and equipment of middle management, hence inducing a change in attitude and stimulating companies' self-activity with respect to health and safety management (NL, UK). Proposals on the second topic regard the initiation of central sectorial actions to improve health and safety in the sector (GR); to initiate demonstration projects, and to stimulate development of new machinery as a joint effort of the sector and machinery manufacturers, in the meanwhile keeping an eye on consequences of these activitites with regard to competitiveness (NL). Suggestions for the sector policy regard intensifying the usage of the instrument of making sectorial agreements on improvement activitities (F), and to stop investments in research, but stimulate the transfer and application of already available knowledge in stead (NL).

Proposals from employers' organizations in one country only, concern four topics (all six, except improvement of companies' policies and of sectorial policy). At company level they regard the providing of personal protective devices for injuries from hand tools (SP); improvement of work organization and job content in relation to automation (NL); and the practical application of existing knowledge on solutions (NL). At sectorial level, suggestions concern actions to reduce occupational accidents, lumbagos, repetitive strain injuries and musculo-skeletal/cummulative trauma disorders (F); the improvement and intensifying of training by a sector organization, and the implementation of health and safety in company-related training (GER). To conclude with, proposals at national level regard the persuasion of employers to comply with legislation in force (P), and to increase the number of training courses for health and safety experts (GER).

Proposals for policies and solutions from unions have been obtained in six countries (DK, F, GER, NL, P, UK). None of these suggestions regard actions at sectorial level, and in only one country proposals regard the national level. Most consensus is found with respect to actions at company level, aimed at the improvement of aspects in the work environment, and particularly on aspects of the social work environment (DK, F, NL, P). These proposals concern the improvement of workers' professional qualification (DK, F, NL, P); more attention to career planning, and improvement of information, communication and management style in companies (NL).
Unions from three countries (DK, F, NL) agree on actions at company level with respect to the organizational work environment. Their suggestions regard re-examination of the work organization and improvement of job content, turning it into a profession again (DK, F, NL); reduction of monotonous, repetitive, high speed work (DK, NL); and hence the introduction of technical solutions, a new payment system (DK), and changes in shift systems (F).
In two countries (DK, NL) unions have proposed actions at company level regarding the physical environment, which concern climate factors, noise and musculo-skeletal loads (DK, NL), and chemical agents (DK). In particular they involve the reduction of coldness and draught by air bag cooling and fast opening gates; and the reduction of noise levels at the source, by baffles or similar devices, and by personal protective equipment. Further they concern reduction of physical strain, lifting in particular, by automation and related changes in the work organization; and reduction of exposure to chemical agents by substitution, capsulation, self-dosing systems and ventilation.
Three more proposals have been made, all by unions from one country only (F, GER, UK), which regard actions at company level and at national level. The suggestions at company level concern the improvement of working conditions in general by introducing alternative production processes, which balance the demands 'both for quantity and quality' (F); and the improvement of companies' health and safety policies by making the employer an expert in this area, and by turning work place assessments and audits into routine activitities in all companies (GER). The proposals at national level concern ensuring compliance with legislation and standards in smaller firms by more frequent inspection visits, and a more rigorous enforcement in general of the standards from the three-party sector organization by governmental inspectors (UK).

In five countries (F, GR, NL, P, UK) key informants from governmental organizations have proposed policies and solutions to address the main health and safety issues in the Meat Processing Industry in their country. Their proposals concern actions at company level with respect to the social work environment and the companies' policies (GR, NL, P), actions at sectorial level (P), and actions at national level (F, P, UK).
More specifically, the proposed actions at company level regarding the social work environment concern the improvement of workers' training, both for their job and on health and safety issues (GR, NL). They also concern training of management, so that both parties are better equiped to recognize risk factors and to develop a better attitude towards health and safety at work (NL). The proposals regarding companies' policies concern improvement of employers' knowledge on

technical solutions for health and safety problems, better organization of working environment surveillances (GR); encouraging the establishment of active health and safety committees, consisting of several parties and in power to define prevention policies (P); and ensuring that all involved parties familiarize with applying health and safety management systems (NL). Another proposal at company level regards the improvement of the work evironment in accordance with the principles of health, safety and hygiene promotion (P).
The only suggestion at sectorial level concerns the development of sectorial plans, projects and action programmes, including standards for environmental monitoring and health surveillance (P).
All proposals at national level regard in some way legislation and enforcement. One concerns finding the right balance within the governmental inspecting organization between putting constraints to companies by enforcement on one hand, and supporting them on the other hand, by assisting them to comply to legislation (F). Another regards ensuring companies to follow policies outlined in the booklet 'A Receipe for Safety', by special visits to companies from Health and Safety Inspectors (UK). The third suggestion concerns the drafting of health and safety rules and of recommendations for installations and health equipment (P).

Proposals for policies and solutions from other organizations have been obtained from four countries (B, F, NL, UK). In most countries the proposed actions are at company level, both regarding the improvement of aspects of the work environment, as well as companies' policies.
The proposals regarding companies' policies, obtained from four countries (B, NL, P, UK), concern for instance development of prevention policies; putting health and safety on the agenda in meetings with personnel; and introduction of ISO-9000 work methods, of first aid registrations and of fines for disobeying hygiene, health and safety rules (B). Other suggestions regard encouraging the establishment of active health and safety committees (UK). Furthermore, the proposals concern the undertaking of audits and workers' health surveillance (UK); and the provision of tools and information to middle management, hence inducing attitude changes and stimulating companies' self-activity with respect to health and safety management (NL).
Proposals on improvements in the social work environment, expressed by other organizations in three countries (B, F, UK), regard the development of workers' qualification standards (F); ensuring of workers' training according to such vocational standards (UK); provision of facilities for training new workers (B); and health and safety training of management (UK).
Suggestions for the physical work environment were obtained from two countries (B, NL). They concern stimulating the wearing of personal protective devices (B); the usage of non-irritating cleaning products (B); the provision of safety facilities and working methods with respect to knives, machines and floors, reduction of coldness, draft and noise levels (NL); surveillance of workers' hearing (B); reduction of physical strain (B, NL) and especially of manual handling by introducing adequate transport systems (B); and the provision of technical facilities and a good house keeping regime to ensure a proper hygiene control (B).
Improvement of the organizational work environment is proposed by other organizations in two countries (F, NL). Their suggestions regard improving the work organization and job content (job enrichment), supported by technical adaptions such as automation (F, NL); experimenting with alternative organizational designs and job classifications belonging to them (F), hence reducing repetitive, high speed monotonous work (NL), and enhancing meaningful work and team work (F).
Proposals from other organizations in one country only, mostly concern actions at sectorial level. They regard increasing the attention to humidity and draft where meat is kept at low temperatures (UK); paying more attention to (not too expensive) company-wide training and information on health and safety, and enable employers and employees in companies to improve their mutual communication (NL). Further they regard a joint effort from social partners and government in finding ways to integrate management of product quality, environment and health and safety, in order to improve companies' and the sector's economic position (NL).

Taking all the opinions from the various parties in the various countries together, it shows that the ***proposals from most countries*** regard ***improvements at company level,*** concerning the ***social work environment and companies' policies*** (see Table 16). ***Actions at sectorial level are hardly proposed, whereas suggestions for actions at national level take an intermediate position.***

Table 16: *'Top 5' of the areas of policies and solutions proposed by key informants from four types of organizations to address the main health and safety issues in the Meat Processing Industry*

Key informants / Proposed improvement policies and solutions	Employers' organizations (7 countries)	Unions (7 countries)	Government (5 countries)	Other organizations (4 countries)	Total
Company level: social work environment	3	4	2	3	12
Company level: health and safety policy	2	1	3	3	9
Company level: organizational work environment	1	3	0	2	6
Company level: physical work environment	1	2	0	2	5
National level: legislation and enforcement	1	1	3	0	5

In conclusion and in more detail, the obtained information indicates that across the nine European countries in which interviews with key informants took place, most consensus among the four parties exists on the following proposed policies and solutions.

At company level:

- ***social work environment:*** improvement of training and qualification of workers and management, both professionally and on health and safety issues;
- ***organizational environment:*** improvement of work organization, job enrichment, reduction of repetitive, high speed monotonous work;
- ***physical work environment:*** improvements with respect to safety, noise, climate, musculoskeletal loads, and biological agents;
- ***health and safety policy:*** improvement of awareness and expertise on health and safety issues among management, and of companies' self-activity, amongst others by undertaking audits and risk assessments and by establishing active Health and Safety Committees.

At national level: drafting, implementation and stronger enforcement of general health and safety legislation, rules and recommendations.

When looking for differences in opinions among parties, the most striking result is that ***none of the interviewed unions and only one governmental organization suggested sectorial actions,*** in

contrast to employers' organizations (from four countries) and other sector related organizations (from two countries).

Another striking result is that the main proposed areas of policies and solutions do not seem to correspond entirely with the main health and safety issues, as identified by the informants. Regarding the health and safety issues (see before) most emphasis was put on the phsyical and organizational working environment, whereas the main areas of policies and solutions regard the social working environment, and management's and workers' training and qualification in particular. At second hand, this may however be not so strange, since from the proposals it can be understood that key informants see training and qualification as a turn-key activitity for all kind of improvements in companies.

Trends in the sector

In seven countries (F, GER, GR, NL, P, SP, UK) key informants from employers' organizations have given their opinion on trends in the Meat Sector. On one issue these opinions show overlap. This regards a trend towards greater automation, which is signalized in three countries (NL, SP, UK). In the Netherlands this is particularly expected for the Poultry Sector (at the stunning and hanging of animals, at evisceration and at packing) and for the Meat Products Sector (packing department). In the United Kingdom this expectation concerns the increasing trend towards high-speed slaughtering lines, and automated de-boning in particular. In both countries these expectations are based on now ongoing technical developments and experiments. The informants from Spain and the Netherlands expect positive effects from automation on working conditions (advances in equipment and machine design, and decrease in physical strain and monotonous work), whereas in the United Kingdom negative effects are foreseen (further de-skilling and, linked hereto, training problems).

Other trends from which positive effects on working conditions in the sector are expected, have been mentioned by key informants from four countries (F, GER, GR, SP). In France it is expected that necessity of prevention and protection of workers will be more and more a concern of companies, due to an ongoing demand for work force in the sector, and to the expectation that physical risk factors, such as coldness and humidity, will stay in existence, because they are difficult to reduce. In Germany a positive influence on the motivation for health and safety is foreseen, due to the expected decrease in shortage of young, newly recruited employees. Improvement of working conditions are expected in Greece, because this is one of the Meat Sector's priorities, but also because of the implementation of the EC-directive 89/391/EEC which, among others, will result in health and safety services for every company. An employers' organization in Spain further expects that 'human matters' will more and more be taken into account.

Negative effects on working conditions in the Meat Sector are expected in the Netherlands, because of higher product demands and up-grading of job content in the retail trade, particularly large supermarket chains, which mean that the more strenuous handling activities have to be done in the Meat Sector itself.

In three countries (NL, P, UK) some more trends are signalized by employers' organizations, which have not been characterized as either positive or negative regarding its effects on working conditions. In the Netherlands these trends regard scaling-up, flexibilization (working hours, costs and contracts), and changes in quality control in the Poultry Sector (primary visual control by cameras, in stead of food inspectors). It was further put forward that trends regarding working conditions are very much related to economic developments, and that an integrated management approach to both quality control and working conditions should be strived for. In Portugal a substantial change of industrial structures are foreseen when companies get in compliance with EC-standards on safety of industrial sites and equipment. The compliance with EC-standards regarding hygiene is expected to lead to a reduction in the number of licensed abattoirs in the

United Kingdom. Here, a change in markets is foreseen as well, due to changes in eating habits. The catering market is likely to grow, wheras the domestic market will probably lose importance, although the market for red meat is expected to remain fairly static.

Views on future trends in the sector from key informants of unions have been obtained in six countries (DK, F, GER, NL, P, UK). Most of all, these views show differences among the countries. Furthermore, in most countries both positive and negative developments in working conditions are foreseen, sometimes as results from one single trend.
Positive trends are for instance expected in Denmark with regard to the physical work environment. Noise is expected to be reduced, due to the introduction of a new threshold limit value in 1995, and heavy lifting will in many cases be omitted by technical solutions (many packing operations will for example be automated). In France it is signalized that some companies are already undertaking actions to improve the situation by reorganizing the whole process from production to customer. Support for these companies is felt needed to keep them competitive, and furthermore to stimulate such activities at a larger scale. In Germany improvements in the working conditions are expected, although more health promotion by the health insurance is wished for. Positive effects on working conditions are expected in the Netherlands from further automation, which is foreseen in slaughter houses, Meat Product Industry and the Poultry Sector. Other positive trends mentioned by Dutch unions' informants regard increasing investments in working conditions by the larger companies; up-grading of middle management; and two now running innovative projects, aimed at improving both productivity and quality of jobs and work places ('Slaughtering line 2010' and 'Ideal de-boning work place'). In Portugal a strong raising of awareness of all workers is expected with regard to hygiene, related to concerns for public health. Unions' informants in the United Kingdom further expect some rationalization in the sector. Particular in the abattoir industry, the work is likely to get concentrated in the larger, more modern plants, where conditions are generally better. This as a result from a more strict enforcement of EC-regulations on hygiene.
Negative trends are mentioned by informants from five countries (DK, F, NL, P, UK). In Denmark it is expected that the psycho-social work environment will become more strenuous. The work speed will increase, the work process will become even more narrow and specialized, and the payment system is seen as an obstacle for job improvement and a better work organization for many years to come. Despite the positive developments in France mentioned earlier on, not a very brilliant future for the Meat Sector is expected here. The whole situation is felt to be too complex to change attitudes at short term, and near future improvements are therefore judged as improbable. In the Netherlands unions' informants foresaw possible negative effects from automation on employment; from the increasing flexibilization of working hours on workers' health; and from the growing influence of the retail trade on the working conditions in the Meat Sector. In Portugal it is signalized that health and safety conditions have become worse, since most slaughter houses became private enterpises. To conclude with the United Kingdom, the Meat Industry here has been contracting slightly over recent years. This trend may continue, because due to the previous mentioned rationalization smaller, less efficient units may be forced out of business.

Trends in the Meat Sector have also been mentioned by key informants from governmental bodies in five countries (F, GR, NL, P, UK). Here again, the signalized trends vary quite a lot between the countries, but most of them are expected to have positive effects on working conditions in the Meat Sector.
For instance in Greece, a step forward towards improvements is expected from the implementation of EC-directive 89/391/EEC, which will result in health and safety services for all enterprises. In the Netherlands further growth in awareness regarding working conditions is expected, particularly in the larger companies. Moreover, there will be general changes in health and safety inspection and enforcement, putting more emphasis on the inspection of companies' health and

safety management system and its practical functioning, in order to realize more structural improvements. In Portugal the Meat Sector is expected to get more modernized, due to investments and to the general country development now taking place. A beneficial spin off for safety matters is expected in the United Kingdom, due to the up-grading of some premises in order to meet EC-hygiene requirements.
On the contrary, such improvements in hygiene conditions when taken to extremes, are in France seen as possibly giving rise to health and safety problems such as coldness and slippery floors. Furthermore, it is perceived here that there is no tendency towards improvement of working conditions and no important technological progress is expected, because the Meat Industry is predominantly a 'work force industry'. It is felt more likely that the work speed will go up, due to restructuring of the sector, and that small slaughter houses will be closed as a result of the EC-regulations on hygiene. A similar trend of further rationalization is expected in the United Kingdom as well, because the considerable pressure to improve the hygiene standards comes at a time with tight margins and a fairly static market for meat and meat products.

Opinions on trends in the sector were further expressed by key informants from other organizations in three countries (F, NL, UK). Once again, the opinions are rather miscellaneous. Predominantly negative effects are expected in France, if organizational design and technical devices are not reconsidered. Then increases are foreseen in musculo-skeletal/cumulative trauma disorders, occupational accidents, burn out, and precarious situations. An increase in electrical safety problems may rise in the United Kingdom, due to the renewed interest in high voltage stunning in cattle slaughtering and in high tenderization processes.
Positive developments in working conditions are signalized in three countries (NL, P, UK). In the Netherlands there has been a steady improvement of working conditions over the past decades which has risen the question of continuation: will this development steadily proceed, or will there be a breakthrough, and how could this be stimulated? A specific positive development regards the more and more spreading of other types of work organizations (product groups in stead of line organization). Improvement of working conditions are further foreseen in the United Kingdom, as a result of a steady automation and mechanization of the more mundane and less rewarding tasks such as slicing, weighing and packing, and in particular now automated deboning is becoming an economic reality. Another development signalized in this country regards the introduction of large scale micro wave cooking in meat companies.
Other trends highlighted in the Netherlands, of which its effects on working conditions are yet unknown, regard scaling-up, efforts to reduce costs, higher demands from the labour market and new national legislation to fight sickness absence.

In conclusion, the ***main trends in the sector, as foreseen by key informants,*** include ***automation and mechanization, implementation of EC or national legislation, rationalization and scaling-up, and changes in the product market and the labour market.*** However, ***overlap in opinions*** among the four parties in the various countries ***is not predominant***. To some extent overlap exists on the trend to further automation and mechanization, and on the trend to get in compliance with EC-regulations, particularly with respect to hygiene and, to a lesser extent, with respect to occupational health and safety.

Expectations from the European integration
In seven countries (F, GER, GR, NL, P, SP, UK) key informants of employers' organizations have indicated what they expect from the European integration.
Expectations with respect to the Meat Sector in general have for instance been mentioned in France. These regard constraints to companies and an increase of homogenity between countries due to EC-standards, but also economical and social benefits, and a stronger need for exchange of experience and information between EC-countries. In Germany it is felt that EC meat policies lead

to insecurity among customers, because ingredients of meat products are not clearly identifiable and because the number of substances in products increases. According to employers' organizations in the Netherlands European integration will have the effect of increasing international competition, hence more attention to costs and proces control, which may in turn cause problems with the labour provision for the sector. In Portugal and Spain an increase in competition is expected too, as well as improvement of service and product quality, market enlargement (P), and modernization of industries (SP). In the United Kingdom concern was expressed at the number of abattoirs still in existence, which have not yet been brought to EC-standards of hygiene.
Expectations regarding health and safety in the sector are positive in four countries (GER, GR, P, SP). In Germany this is due to the hygiene standards which machine producers must meet, whereas in Greece and Spain it is because of the EC-legislation on working conditions, such as EC-directive 89/391/EEC. In Portugal a reduction of the number of work related accidents is expected.
In the Netherlands there are no high expectations from EC-legislation or the European integration in relation to health and safety. Reasons for this are the lacking of an effective controling and enforcing European organization; the foreseen increase of power of large companies due to the increasing competition; the opinion that provisions as legislation can not meet everything; and the already existing similarity of production machinery throughout Europe. Nonetheless, it was mentioned that a study like this may lead to new legislation in order to meet the negative effects from the increasing competition on working conditions.
In the United Kingdom concern was expressed because of possible negative effects of EU-standards. Recent EC-legislation on animal welfare restricts the voltages that may be used for stunning, which could lead to accidents due to improper stunning. The other concern regards the CEN-harmonisation of machine safeguarding standards, which could mean a lowering of standards than are currently applicable in this country.

Expectations from the European integration have also been put forward by key informants from unions in six countries (DK, F, GER, NL, P, UK).
With respect to the Meat Sector in general, unions' informants from Denmark expect a sharper competition on prices. In France it is hoped that European integration will contribute to putting an end to copying the Americans, and to reach and European standard. In Germany it is expected that the integration will bring new life into the entire common market, and hence also into the market for meat products. However, changes of ingredients in meat products make consumers insecure and may negatively influence consumption. Unions' informants from the Netherlands hope for a better co-operation and united competition at national level, for example by working according to similar regimes within companies. In the United Kingdom improvements of hygiene standards in abattoirs are expected, due to the need to comply with EC-legislation in this field.
With respect to working conditions, positive effects from the Europan integration are expected by unions in four countries (F, GER, NL, P). In France it is considered useful if integration would lead to a study which realizes an exchange of information on improvement policies and solutions that have proved to be successful in the various countries. German unions' informants expect a stimulation to health and safety in the sector, due to the EC-induced obligation for companies to undertake work place assessments. In the Netherlands, the EC-regulations on health and safety are considered to provide opportunities to unions for steering, and these regulations are expected to influence national regulations on the subject. It is also hoped for that European integration will result in companies applying similar regimes on working conditions, thus hopefully leading to a better co-operation and united competition at national level. In Portugal great improvements regarding equipment and working conditions are expected.
Some negative effects on the working conditions in the Meat Sector are foreseen as well. In Denmark a worsening of the working environment is feared, as a result from the expected sharpening of competition on prices. Germany fears a possible import of BSE and cholera,

whereas unions' informants in the United Kingdom are concerned about a possible lowering of presently achieved national machinery safeguarding standards, if CEN-standards are to be adopted.
Furthermore, informants from two countries have made some critical remarks concerning working conditions. In the Netherlands it is regretfully felt that, in the near future, no EC-regulations on workers' participation can be expected (e.g. regarding European Works Councils, or collective bargaining at European level). In the United Kingdom, the Trade Unions Technical Bureau set up by the EC, is considered to have the potential to have major influence on health and safety in the Community, but so far it has not had the effects it should have.

Views on the European integration have also been obtained from key informants of governmental organizations in five countries (F, GR, NL, P, UK).
Governmental informants from three countries (F, P, UK) have indicated their expectations for the Meat Sector in general, particularly as results from the EC-legislation on hygiene. In France it is expected that these standards will affect companies' and subsector's competitiveness, and hence the possibilities to survive. Especially small companies and the slaughtering and Pork Meat Industry may have difficulties, because the necessary investments are high, respectively these subsectors have negative financial results. In the United Kingdom improvement of hygiene standards in plants are expected, particularly in slaughter houses. In Portugal it is expected that the European integration will encourage the sector's modernization and general country development, which will affect the sector as well.
Positive effects from European integration on working conditions are foreseen or hoped for in three countries. In Greece a new step towards improvements is expected from the implementation of EC-directive 89/391/EEC, by which all enterprises will be covered with health and safety services. In Portugal is hoped for the establishment of a national normative and informative setting to encourage hygiene, safety and health in the sector. In the Netherlands the CEN-regulation on machinery safeguarding, which will soon get into force, is much welcomed. Such EC-hall-marks are in fact hoped for on other issues as well, amongst others from the viewpoint of competition.
The same EC-regulation gives rise to concern in the United Kingdom however, where governmental informants fear a lowering of standards that have customarily been accepted in this country.

In four countries (B, F, NL, UK) key informants from other organizations have expressed their opinion on the European integration.
In one case these opinions concern the Meat Sector in general. In the United Kingdom a concern was expressed over a perceived lack of uniformity in enforcement with regard to the EC-standards on hygiene in the sector. The so-called patchy levels of enforcement may lead to a competitive disadvantage in this sector, where margins are tight and competition extremely fierce.
Views on possible effects on working conditions in the sector in relation to the European integration have been obtained from all five countries mentioned above. In France is was foreseen that integration might lead to financial support and experiments on health and safety issues. In the Netherlands it was considered probable that EC-integration and regulations may affect developments in workers' participation. Moreover, it was mentioned that the EC-induced effects on competition may influence working conditions both positively, as well as negatively. In the United Kingdom it was mentioned that the EU-integration, and particularly the development of CEN-standards for machinery safeguarding, has already caused problems in machine designing. It may cause further problems, because the harmonization within CEN-committees might lead to lowering of standards that have traditionally been acceptable in this country. Belgian informants did not express expectations, but they welcomed both the present interest for the sector at European level, as well as the sectorial approach to health and safety matters in this study.

In conclusion, ***key informants expect developments from the European integration,*** both for the

Meat Sector in general, as well as ***negative and positive effects on working conditions.*** Regarding the sector in general, most consensus exists on expectations that ***competition will sharpen,*** and that ***EC-legislation on hygiene will lead to restucturing.*** With respect to ***working conditions, most effects (positive or negative)*** are ***expected from EC-legislation*** on several health and safety issues.

4.2 Discussion and conclusions

In this subsection the previous presented opinions of social partners, government and other organizations will be discussed and confronted with the findings in chapter 3, which were mostly based on data from existing information sources, such as statistics, registers, surveys and other literature. In other words, this means a confrontation between 'the objective reality' and 'the perceived reality' of decision makers in the various countries, which may show starting points for future policy at European level. Hence, this section will contain some preliminary conclusions.

Risk factors and related health problems
When comparing the 'literature' data on main risk factors and related health problems in the Meat Sector across the ten European countries, as summarized in section 3.5, with the opinions of key informants as presented in section 4.1, there is evidential overlap on four risk factors:
- lack of safety and accidents;
- musculo-skeletal loads;
- noise;
- work organization and job content.

One of the two other main issues identified by the key informants, i.e. design of technology, work places and equipment, is very much related to the first three mentioned risk factors, and to the physical working environment in general. So here exists consensus between literature and key informants as well.
Differences seem to exist regarding five risk factors. Four main risk factors according to literature, but not so explicitly according to key informants include:
- climate;
- biological agents;
- lack of workers' information, consultation and participation;
- unequal opportunities for women.

A main risk factor according to key informants, but not so explicitly according to literature is:
- training and qualification of workers and management.

These differences must not be taken too sharp however, because most of these factors can be found between the lines, both among the informants' opinions (see for instance 'Policies and solutions' in section 4.1), as well as in the literature information. The only real difference then, is unequal opportunities for women.
With respect to main health problems and main risk groups, no confrontation can be presented here, since key informants did not give opinions on these subjects.

Policies and solutions
Comparing the 'literature' data on the undertaken and proposed actions and policies as summarized in section 3.5, with the proposals from key informants as presented in section 4.1, shows consensus on a great number of items:
- prevention and control of the exposure to noise;
- improvement of the climate conditions;
- reduction of the exposure to musculo-skeletal loads;
- improvement of safety conditions;

- prevention and control of the exposure to biological agents causing infectious diseases;
- improvement of the work organization and job content;
- improvement of companies' health and safety policies;
- improvement of workers' training and qualification.

Differences seem to exist as well however. Most striking in the key informants' proposals is:

- improvement of management's training and qualification, both professionally and on health and safety issues, is strongly emphasized;
- drafting, implementation and stronger enforcement of general health and safety legislation, rules and recommendations is one of the main recommendations, despite what has been done already in this area;
- sectorial actions were not so often proposed as might be expected, considering the existing practice at this level.

Furthermore, main risk factors on which actions have been undertaken or proposed according to the literature data, which however have not been mentioned so explicitly by key informants as targets for action, regard:

- improvement of arrangements for workers' information, consultation and participation;
- improvement of equal opportunities for women;
- improvement of the availability and quality of sectorial statistical data on occupational accidents, occupational diseases and other illnesses, sickness asbenteeism, disability and mortality.

But again, these differences should not always be taken too sharp, because many of them disappear somewhat when reading between the lines in the literature information and the opinions from key informants.

5 Final conclusions

This chapter contains the final conclusions of the study, which are based on all the information presented in the previiious chapters. Hence, the information from written information sources, and the opinions of the interviewed key informants are integrated here.
In the first section some general conclusions are presented regarding the methodology of the study, as well as the main social economic characteristics of the Meat Processing Industry. The second subsection presents the conclusions on the occupational health and safety situation in the sector, summarizing the main risk factors, the related health problems, the main risk groups, and the conclusions on the undertaken actions and policies. Keeping an eye to the future, the last section presents the policy options for further improvements.

5.1 General conclusions

Methodology
With respect to the methodology of the study, it is firstly concluded that the following main obstacles have been encountered.
- Data on various issues, and particularly quantitative data, were not always available in the various countries, either due to non-existence, or to the restricted time period of the project.
- Related to this, some of the national authors used ways of data gathering and reporting, which differed to the one that was originally set out and that was followed by most authors.
- Cross-national differences exist in definitions and classifications used in reporting and registration systems on occupational accidents, diseases and other health and safety output. Furthermore, explanatory notes on these definitions and classifications were not always obtained.
- The same applies to the circumscription of the sector, e.g. the subsectors which were included, or excluded in the national descriptions of the sector.
- The provided structure for the national descriptions of the sector, the so-called sector profile, did not much account for the existing heterogenity of the working conditions within the sector, its subsectors, or individual companies.
- The circumscription of, and the distinction between aspects of the work environment in the sector profile were occasionally unclear, particularly with respect to the organizational and the social work environment;.
- The sector profile neither elaborated on the existing national context of occupational health and safety policies and instruments.

Despite these obstacles, and the impediments they presented with respect to the interpretation and cross-national comparison of the data, it is secondly concluded that the methodology of the study has proved to be successful to compose a synthetical picture of the occupational health and safety situation in the Meat Processing Industry. In other words, the aims of the study have fully been met. It also means that, after some necessary adjustments in the sector profile and the procedure for data gathering, this sectorial approach to the improvement of working conditions at European level, may in the future be applied to other sectors as well.

Social economic context
Regarding the social economic context of the Meat Processing Industry, the following conclusions are drawn.
- The Meat Sector is generally a small branch of industry, considering its proportion of the national number of companies, its proportion of the national working population, and its contribution to the Gross National Product.

- Most meat companies are small and privately owned.
- The majority of the sectorial work force finds employment in the larger (private) companies, however. Furthermore, the majority of the employees is male, native, between 25 and 44 years old, low or intermediately educated, and full time employed.
- The sector's position on the labour market is generally somewhat problematic, with a high turnover of personnel and low attraction to potential workers.
- The overall economic picture is that the sector has small profit margins and a limited capacity for necessary investments; particularly small, family-owned companies and public slaughter houses face difficulties in surviving.
- In all countries the sector is organized by employers' organizations and unions, and in most countries other organizations are active in the sector as well, in various fields.
- The work in the Meat Sector is mostly Tayloristic production line work. To varying extents the work is automated or mechanized, but still quite some labour intensive hand work exists. The production process is involved with processing a great variety of 'materials', using a great number of machines, tools, equipment and personal protective devices, and results in a large variety of products for whole sale, retail and catering. The predominant type of work organization is according to a line structure with central, hierarchical authorities.
- Six main trends are now current in the Meat Sector, affecting the ten countries to various extent. These trends are: the scaling up and concentration of companies, including an ongoing rationalization process in abattoirs, due to EC-regulations on hygiene and sanitary conditions; the increasing international competition on prices and changes in market demands, which put pressure on the economic position and competitiveness of the sector; a growing awareness of the 'human factor' being a key factor in the sector's continuity; a still ongoing automation and mechanization of the production process; the introduction of new management concepts, such as Total Quality Management, ISO-9000, HACCP and Integral Chain Control; the implementation of EC-directives on health and safety issues, of which eight in particular are relevant to the sector.
- Throughout the ten countries, companies in the Meat Sector are definitely influenced by the European integration, particularly by its open market, by the regulations on sanitary conditions in slaughter houses, and by specific regulations on occupational health and safety issues. Key informants mostly consider the European integration to have either positive or negative effects on the Meat Sector, both with respect to social, economic and technological aspects, as well as regarding the working conditions. A few of them however, have no high expectations of its effects on the work environment.

5.2 Conclusions on the health and safety situation in the Meat Processing Industry

Firstly, it is concluded that a fairly broad agreement exists among the ten European countries with respect to the main problem areas which the Meat Sector has to face, despite the improvement efforts it has undertaken already. From the data available in the ten countries on hazards in the work environment, on occupational accidents and ill-health, together with the opinions of key informants, nine main risk factors can be identified, as well as seven main health problems, and three main risk groups. These main risk factors and main risk groups are all identified as such upon literature information in the majority of the ten countries (i.e. more than five countries), and/or are listed in the 'top 5' of main health and safety issues according to the key informants.

Main risk factors and related health problems

Of the nine main risk factors in the Meat Sector's work environment, five regard hazards in the physical work environment, one (compound) factor represents organizational constraints, and three risk factors concern the social work environment. These nine factors and their related health

problems are:

Noise
Exposure to continuous loud noise and to noise peaks, exceeding legal or professional Threshold Limit Values, is common in the Meat Sector. It implies that in fact almost all workers are exposed to at least annoying noise, which is mainly produced by machines, work equipment and animals. Related health problems are mainly hearing impairment, communication problems and psychic complaints such as stress and concentration loss.

Climate factors
Strenuous or nuisant factors in the climate conditions are mainly the exposure to coldness, high humidity, temperature fluctuations and draught. The thermal conditions in the sector are very much related to the sector's core business, i.e. the production of food of good quality, which calls for appropriate sanitary and hygiene conditions that seem to conflict with healthy and comfortable working conditions. Main health problems related to the climate conditions, are respiratory disorders, such as coughs, colds and bronchitis, and infectious diseases.

Musculo-skeletal loads
The main hazards to the musculo-skeletal system of workers in the sector regard high speed repetitive work, strenuous manual handling such as heavy lifting, pushing and pulling, and strenuous working postures such as twisting, bending or working with arms at shoulder height or overhead. Health consequences are mainly disorders of the musculo-skeletal system, particularly of limb, neck, shoulders and back, repetitive strain injuries and occupational accidents.

Safety conditions
Workers of the Meat Sector are subject to safety hazards, mainly due to sharp hand tools such as knives, machines, and slippery floors causing slips, trip and falls. The main consequences hereof regard cut and stab wounds, sprains and strains, fractures, bruises and concussions. Body parts that seem to be most at risk are fingers, hands, wrists, arms, feet and ankles.

Biological agents
Exposure to biological agents in the Meat Processing Industry concerns a wide variety of micro-organisms, such as bacteria, viruses, parasites and funghi. These are being transfered from animals, parts thereof, or their excrements to workers by hand and skin contact, inhalation of aerosols, ingestion of dust, or splashes in eyes. The main health problems regard infectious diseases such as brucellosis, leptospirosis and tuberculosis, and skin diseases like dermatitis, erysipelas, and mycosis. These zoonoses, as these diseases are called, are enhanced by the prevailing small hand wounds, the low temperatures and high humidity.

Work organization and job content
The predominant Tayloristic production line work and hierarchical organization structure result in hazards, such as lack of autonomy and control over one's work, strenuous work rhythms and time constraints, short-cycled repetitive work, and highly divided work with low job content. Main health consequences are repetitive strain injuries, musculo-skeletal disorders, occupational accidents, and psychic complaints such as stress and dissatisfaction.

Information, consultation, participation
Workers in the Meat Sector often lack information or feedback from the management, and have no or insufficient structural possibilities for consultation and participation in for example regular meetings, innovation projects, or quality circles. Data on health consequences are not available, but psychic complaints, such as stress and dissatisfaction, are likely to occur.

Unequal opportunities for women
The Meat Sector has an unequal job distribution. Women are generally in minority and are mostly found in traditional positions, doing the lighter and less complex work, whereas management functions and the heavier tasks are dominated by male workers. At least partly due to this job distribution, women are generally lesser qualified and paid less. Data on health problems are not available, but they are likely to be psychic complaints as mentioned before.

Training and qualification
Lack of training and qualification concerns both workers, as well as management, and it regards both the general qualification for the job, as well as the specific qualification with respect to health and safety at work. Among workers these deficiencies are likely to contribute to higher risks of several health consequences such as accidents, infections, musculo-skeletal disorders, and psychic complaints. The lack of management's qualification is likely to affect all aspects of business conduct and working conditions, including physical hazards, work organization, work relations, and companies' health and safety policies.

In addition to the previous conclusions on distinguished risk factors, it is further concluded that several hazards in the Meat Sector influence each other and result in synergetic effects. Examples are working with knives at high speed, slippery floors and lack of space, hazardous equipment and strenuous working postures, or hazardous work without sufficient training.

Furthermore, it is concluded that the overall main health consequences of working in the Meat Processing Industry regard occupational accidents and six types of disorders: musculo-skeletal disorders, skin diseases, infectious diseases, hearing impairment, respiratory diseases and psychic complaints.

Looking towards the future, it is concluded that both positive and negative effects on working conditions are expected from the six main trends in the Meat Sector (see section 5.1), including the EC induced ones. The negative effects particularly affect the job content and may be summarized as 'an increase in stress and de-skilling'. The positive effects mainly regard five topics: the reduction of manual handling and heavy work; the improvement of work equipment, which particularly may reduce the exposure to noise, climate factors, and safety hazards; more attention to workers' qualification, often in relation to product quality; increase in the number of workers and companies covered by Prevention Services; and improvement of various aspects of companies' health and safety policies, such as the undertaking of work place assessments.
Due to additional developments and activitities at sectorial or national level, several other effects may rise as well in the various countries.

Main risk groups
It is concluded that all workers will to a greater or lesser extent be exposed to various risk factors in the physical, organizational or social work environment. However, particular groups at risk are concluded to be:

Slaughter house workers
Slaughterers, butchers and cutters are, more than others, exposed to several physical hazards (biological agents, musculo-skeletal loads, noise, climate factors and unsafe conditions) and to a number of organizational constraints (lack of autonomy and control, high work pace, time constraints, repetitive work and low job content). As a result, they are more prone to occupational accidents and injuries, skin diseases, infectious diseases, musculo-skeletal disorders and hearing impairment.

Production line workers
All workers on production lines have risks of being exposed to biological agents, musculo-skeletal loads, noise, climate factors and unsafe conditions, and are therefore identified as a main risk group. Although no specific data were obtained, it is likely that the main health problems related to these exposures, are similar to those mentioned for the slaughter house workers.

Boners
Boners are particularly at risk for being exposed to several risk factors in the physical work environment (biological agents, musculo-skeletal loads, noise, climate factors and unsafe conditions), and to some organizational constraints (repetitive work, time constraints and payment on production basis). The main health problems in this risk group regard serious accidents, cut and stab injuries, and repetitive strain injuries.

Actions and policies
With respect to actions and policies aimed at the improvement of working conditions in the Meat Sector, it is firstly concluded that in all ten European countries involved in this study, various activities have already been undertaken, both at company level, at sectorial level, and at national level. Hence, to a varying extent knowledge and experience is already available within the various countries, not only with respect to preventive and control measures on specific aspects of the work environment, but also regarding health and safety policy instruments. A general recommendation is therefore that national and cross-national transfer of this knowledge and experience should be organized and stimulated.

More specifically with respect to the nine main risk factors it is further concluded that the various activities undertaken at sectorial level include them all, although more effort has been put in the physical work environment, than in the organizational and social work environment. The situation at company level is somewhat unclear, since only limited data are available on the application of preventive and control measures towards these main risk factors. These limited data however indicate, that on all main risk factors, except unequal opportunities for women, preventive and control measures have been taken in companies in various countries. Characteristic to the reported measures is, that primary prevention is not predominant and is less widespread than lower levels of prevention, such as the provision of personal protective devices.

With respect to the three main risk groups it is concluded that specific risk group orientated improvement activities seem not to prevail among the undertaken actions. Only some of the reported initiatives at company and sectorial level are specifically targetted at a specific group of workers. Most of the activities are however hazard orientated, hence mostly affecting various groups of workers.

Regarding the meat companies' occupational health and safety policies, it is concluded that work place assessments, Prevention Services, Works Councils and Health and Safety Committees are in existence in the majority of the ten countries studied. However, these policy instruments exist to varying extents in these countries, but mostly not to the extent expected, considering the national legal requirements in force. Particularly smaller firms often lack compliance. Current developments due to the EC frame work directive (89/391/EEC) will however strongly enhance the spreading of work place assessments and Prevention Services among meat companies, and due to some national initiatives stimulation of management's awareness and policy making capacities are expected in various countries as well. These developments illustrate the conclusion that main trends in companies' health and safety policies are quite often induced by company external factors, and even by factors from outside the sector.

A conclusion on the policy instruments at sectorial level is, that concrete, improvement aimed action programmes and projects, researches, training and education material, and sectorial magazines on health and safety issues are in existence in a majority of the ten European countries in this study. Various other sector specific arrangements on health and safety are however less widespread. These include: sectorial regulations; agreements in collective bargaining; ill-health or disability insurance and compensation arrangements; funds, subsidies, grants and prizes; educational organizations and programmes; solution databases. Furthermore, it is concluded that various developments in sectorial health and safety policy are taking place in half of the ten countries. These regard: an increase in interest at sectorial level; new informational, educational, research and enforcement activities; development of new technology; a stronger co-ordination of sectorial activities; a shift in interest towards the social and organizational aspects of the working environment; more emphasis on the stimulation of companies' self-activity, on the transfer of available knowledge and on demonstration projects.

Regarding policy instruments at national level, which affect the Meat Sector, it is concluded that health and safety legislation, governmental inspection and enforcement organizations, ill-health and disability insurance and compensation arrangements, educational organizations and programmes, and statistical databases on occupational accidents are common across the ten countries. In a minority of the countries are also in existence: nation-wide action programmes to improve working conditions; a sectorial approach in inspection and enforcement; databases with statistical, technical, bibliographical or juridical health and safety information. With respect to the statistical data on the health and safety output of the Meat Sector, it is further concluded that the availability, the quality and the international harmonization show serious deficits in most countries.

5.3 Policy options for further improvements

From all previous conclusions and opinions of key informants, policy options for future improvements have been deduced. These are presented hereafter, distinguished in policy options for the management at company level, options for social partners or other organizations at sectorial level, and options for governments at national level. Some options at sectorial and national level however affect the European level as well.

Policy options at company level
Considering the identified main risk factors in the Meat Sector, and the opinions and proposals of key informants, companies should give priority to four main areas of activities:
- Improvement of the physical work environment, and in particular prevention and control of noise, climate factors, musculo-skeletal loads, unsafe conditions, and biological agents.
- Improvement of the work organization and job content.
- Improvement of the social work environment, and in particular improvement of workers' information and participation, of opportunities for women, and of workers' and management's training and qualification, both regarding their job in general, as well as regarding occupational health and safety.
- Improvement of the health and safety policy.

The kind of activities that could be undertaken are listed below.

Physiscal work environment
Improvement of the physical work environment within meat companies could consist of the following activities, of which the most preventive ones should be prioritized.
- In a sequence of decreasing level of prevention, noise reducing measures to be considered are: the detection and subsequent elimination of sources, for example by a more relaxed treatment of

animals, by usage of noise-reduced slaughtering pistols, machines, transport and handling systems, and other equipment with noise-reducing technological adaptions, and by a preventive maintenance schedule; incapsulation of noisy equipment; housing it away from work rooms; silencing work rooms by devices like baffles; time restriction to persons working at noisy places; provision of personal protective devices; informing and training of personnel with respect to the hazards and its control measures; the monitoring of noise levels; and medical surveillance of workers with respect to hearing impairment. Companies should further ensure that these activities get them in compliance with the national and EC-legislation (86/188/EEC) on noise at the work place.

- Again in a sequence of decreasing level of prevention, companies could consider the following activities concerning climate factors: application of building standards particularly concerning cold stores; usage of various heating media and systems, including local heating; temperature and ventilation regulating provisions; air sluices and fast opening gates; local chilled enclosures for product handling, air bag cooling and product prechilling; insulated duckboards; a good cold rooms safety procedure; adaptions in the work organization, such as task rotation, time and area restrictions; provision of comfortable personal protective devices like clothing; provision of acclimatizing facilities. With respect to climate factors companies should ensure as well that they meet the national legal requirements.
- To reduce musculo-skeletal loads, companies could consider the following activities: further automation or mechanization of actions; provision of transport, lifting and handling devices to avoid or reduce manual handling, including unloading systems in trucks; standardization of weight and form of packages purchased and produced; adjustable work levels; adaption of the work organization, inlcuding reduction of work speed, job re-design, job rotation and time restriction to reduce problems like repetitive strain injuires; instruction of workers on good handling practices, including proper usage of devices. Regarding manual handling, companies are to get in compliance with the concerned EC-directive (90/269/EEC) as implemented in the national legislation.
- Safety conditions could be improved by: further automation and mechanization; safeguarding of various machines and equipment; positioning of dangerous machines in quiet work rooms to reduce concentration problems; provision of specially designed knives and other tools or technical equipment; proper combination of slip resistant floor surfaces and foot wear; sufficient lighting; better lay-out of premises; adaption in the work organization, including reduction of work speed; safety procedures and facilities for supervision, good housekeeping, preventive maintenance, cleaning, and first aid; provision of adequate personal protective devices like mail gloves, forearm protectors, aprons and helmets, involving future users; instruction of workers on safety hazards, on correct use of equipment and devices, and on hazards of misuse. With respect to work equipment and personal protective devices companies should ensure to comply with national legislation induced by EC-regulations on this issue (89/655,656,686/EEC).
- Exposure to biological agents and risks of infection could be avoided or reduced by the following measures: identification and rejection or special treatment of infected animals; serious application of basic hygiene standards and facilities on for example hand washing at the work place, desinfection of footwear and tools, prohibition of eating, drinking and smoking at work places, appropriate cleaning regime, obligation of wearing personal protective devices like mail gloves over rubber gloves, and proper wound care; vaccination of workers; instruction of workers regarding the hygiene standards, the hazards of infection, and the correct use of facilities and devices. Slaughter houses should ensure compliance with the EC-standards on sanitary conditions in this respect (64/433/EEC and 77/99/EEC), whereas other meat processing companies should anyway ensure the observance of the EC-directive on biological agents (90/679/EEC), as it is implemented in the national legislation.

Work organization and job content

Activities that meat companies could undertake to improve the work organization and job content are the following (in a sequence of decreasing extent of change).

- Introduction of alternative forms of work organization and job re-design: formation of autonomous production teams, quality circles, or other forms of team work; implementation of job enrichment, job enlargement, or job rotation. Hence reducing de-skilled, repetitive, high speed, monotonous work, balancing both quality and quantity demands, and turning jobs into meaningful professions again.
- Where applicable, realization of joint technological adaptions like automation or mechanization.
- Application of modern management concepts, such as Human Resources Management and Total Quality Management.
- Realize more flexibility in technology and work planning, particularly in delivery of supplies and in daily processing quotas.
- Abolish or reduce piece payment and seasonal work.
- Change shift systems.

Social work environment

Policy options for companies to improve their social work environment are as follows.

- Workers' information, consultation and participation could be improved by: the establishment of active Works Councils and/or Health and Safety Committees, particularly in smaller firms; enhancing the role of existing Councils and Committees; increasing team work; more constructive feedback from management to workers on aspects of production and job performance; participation of workers' representatives in change projects on technological innovation, reorganization and reconstruction. With respect to Works Councils and Health and Safety Committees companies should observe the applicable national legislation.
- More equal opportunities for women could be realized by: employment of more women; placing more women in less traditional positions, such as management functions and the physically heavier jobs, which should then be lightened; equal payment and qualification for equal jobs; provisions for pregnant workers; parental and care leave; crèche provisions; fighting of sexual harassment. In various countries meat companies should comply with the agreements on this issue in the collective bargaining in force.
- Workers' and management's training and qualification should be improved, both regarding their job in general, as well as regarding occupational health and safety. Workers' professional qualification could be improved by: provision of training facilities to new workers, according to national vocational standards; periodical 'freshen-up' instructions and training for the seated work force; attention to career planning. Improvement of management's professional qualification should particularly concern: information and open communication to workers, a more modern management style among middle and top management, hence giving more room to workers' participation. With respect to health and safety, both workers and management could be trained and equiped to develop a 'responsible care attitude', to better recognize risk factors, to know more about, and better select appropriate preventive and control measures. This training could be a part of the regular professional training, or consist of separate courses.

Health and safety policy

Companies could improve their health and safety policy by the following main activities.

- Undertaking of work place assessments and self-audits as a well organized routine activity.
- Establishment and/or encouraging of active Works Councils or Health and Safety Committees, in power to contribute to preventive policies.
- Application of managements concepts, such as Total Quality Management and ISO-9000 work methods, on the health and safety issue to develop a preventive policy.
- Ensuring that all parties involved familiarize with the concepts of health and safety management

systems by provision of information, training and tools (see before).
- Putting health and safety on the agenda in meetings with personnel.
- Provision of Prevention Services and/or medical surveillance to all workers.
- Ensure compliance with legislation in force.
- Stimulate social partners and other sectorial organizations to initiate supportive activities by raising questions to them.

Policy options at sectorial level

At sectorial level, activities should be initiated to support the improvement activities at company level. Hence, priority should be given to the same four areas previously mentioned under 'Policy options at company level'. However, considering the opinions of the key informants, support from decision makers from social partners and other influential organizations is most likely to a few lesser priorities:
- Improvement of the physical work environment, and in particular prevention and control of noise, climate conditions, musculo-skeletal loads, unsafe conditions, and biological agents.
- Improvement of the work organization and job content.
- Improvement of workers' and management's training and qualification, both regarding their job in general, as well as occupational health and safety.
- Stimulation of companies' self-activity with respect to their health and safety policy.

The activities that could be undertaken to these prioritized areas are listed below.

Physical work environment

Sectorial support to the improvement of the physical work environment in meat companies could consist of the following activities.
- Cross-national evaluation and development of practical information material for companies on already existing solutions in the various countries. The evaluation should identify advantages and disadvantages of solutions, not only in terms of physical risk factors, but also in terms of organizational constraints and social risk factors. For the development of the information material, knowledge and experience should be used from:
  * newly developed automated technology: automated deboning of lamb shoulders and pork loins in the United Kingdom, automated techniques for carving in France, and automated machinery, simplyfying stunning and hanging of animals in the Poultry Sector in the Netherlands;
  * the sector specific 'paper databases' existing in the Netherlands, which contain practical solutions for noise, climate conditions, musculo-skeletal loads, safety conditions, and information on personal protective devices;
  * the campaign 'Lighten the Load' in the United Kingdom, which was aimed to reduce musculo-skeletal loads, as well as applied solutions regarding machine safeguarding, adequate combinations of floor surfaces and foot wear, specially designed knives, and personal protective devices;
  * the current action programme 'A Clean Working Environment by the Year 2005' in Denmark;
  * a working group in France, which is analyzing working situations and trying to identify the interacting causes of musculo-skeletal disorders, as well as studies regarding improved designs of knives, saws, handling devices, floor coverings, and personal protective devices.
- Dissemination of this material to meat companies in all countries in the national languages.
- If necessary, take more initiatives, nationally or cross-nationally, to develop machinery, equipment and devices as a joint effort of sector representatives, including future users, manufacturers, and health and safety experts.

Work organization and job content

Sectorial initiatives to improve the work organization and job content in meat companies could be:

- A systematical, cross-national inventory and evaluation of the various experiments in the Meat Sector on alternative forms of work organization, and of the joint efforts to improve both quality of working life and quality of products, which have taken place or are taking place now in the Meat Sector in five countries:
  * experiences in some Belgian slaughter houses, in which workers can change between various slaughter lines or production units;
  * the current action programme 'Reduction of Monotonous, Repetitive Work' in Denmark, in which companies are to develop an action plan based on a risk assessment, supported by information material containing examples of alternative work organization;
  * a study now carried out in France, which assesses the associate effects of risk factors and modernization on work content and work organization;
  * the campaign 'Work and Technology - Humanization of Working Life', which has run in Germany some time ago, amongst others in the Meat Sector, as a joint effort to improve both product quality and quality of working life;
  * various experiments in the Netherlands, within the frame of the 'Quality and Hygiene Plan' which has run in the sector some years ago, but also the more recent or now current projects 'Slaughtering line 2000', 'Slaughtering line 2010', 'Boning 2000', a feasability study on job improvement, as well as existing information material on the subject.

  The evaluation of these experiments should not only take into account the work organizational aspects, but also the pro's and con's regarding the physical and social work environment.
- Dissemination of these experiences and practical recommendations based on them, to meat companies in each country, for example by seminars, workshops, publicity, information material, and demonstration projects in companies which then should get (financial) support to keep them competitive.
- Initiate national surveys to get a systematical overview of the actual situation with respect to work organization and job content in meat companies.

Training and qualification

Sectorial initiatives to improve workers' and management's training and qualification could consist of the following activities.

- Development and stimulation of usage of national qualification standards, programmes and materials for workers and management in the Meat Sector, both regarding their professional job demands, as well as the health and safety aspects.
- As a preparation, a cross-national inventory and comparison of the educational activities and materials regarding the Meat Sector, existing in the various countries, could be held including:
  * the vocational programmes, known to exist in Denmark, the Netherlands, Germany and the United Kingdom;
  * the health and safety modules, used as material in the vocational programmes, existing in the Netherlands and perhaps in other countries as well;
  * the recent sectorial initiatives and developments, such as the investments in skilling workers in Ireland, the development of national vocational standards in the United Kingdom, the improvement of qualification of young workers in France, and the expected improvements in workers' training in Greece, as one of the results of the implementation of the EC frame work directive 89/391/EEC;
  * the existing educational and informational materials, such as several workbooks and handbooks in the Netherlands; a training package in Ireland; films and videos in Denmark, Germany, the Netherlands and Spain; and the great number of leaflets, brochures and guidance notes existing in nearly all countries.
- Dissemination of the results of this inventory, particularly at sectorial level in the ten countries, in order to stimulate further developments.

Companies' health and safety policy
Sectorial initiatives to stimulate companies' self-activity with respect to their health and safety policy could be the following.

- Development and dissemination of tools for policy making, targetted at management, representatives of Works Councils and Health and Safety Committees, and other functionaries involved. Several existing materials could be taken as example:
  * a workbook for policy making, developed in the Netherlands, amongst others containing do-it-yourself instruments for work place assessments and auditing; its introduction in the sector was accompanied by informational meetings and courses on legislation, policy making and management, and on sector specific health and safety issues, meant for health and safety coordinators, management, members of Works Councils and Health and Safety Committees, and staff functionaries;
  * the booklet 'A Recipe for Safety', developed in the United Kingdom, which helps companies' managements to identify the areas of priority, hence providing an agenda for discussions on health and safety matters in the company.
- Encourage and support particularly smaller companies in policy making and ensuring compliance with legislation. In this respect the activities in France, within the frame of the 'Objective and Prevention Agreements' and the accompanying fund and subsidies from the Occupational Associations, could be taken as example.
- Create a national network for information exchange between functionaries from companies and experts, hence sharing problems, but also solutions. An example of such a network exists as well, which concerns health and safety coordinators of meat companies in the Netherlands.

Sector policy
Besides sectorial activities, directly aimed to improve health and safety aspects in meat companies, social partners and other sectorial organizations could contribute in other, more indirect ways as well.

- While developing the sector policy, e.g. a five year programme, taking into account:
  * whether or not to establish or intensify the usage of sector specific policy instruments, such as health and safety agreements in collective bargaining, sector specific health and safety organizations, health and safety funds, insurance and compensation arrangements, etcetera.
  * whether, roughly speaking, priority should be given to research and surveys in the sector, to sector-wide action programmes, or to experimenting and learning-by-doing in demonstration projects in some companies, but to the benefit of the whole sector;
  * an integrated and flexible approach to working conditions and conduct of business e.g. finding ways, for companies and at sectorial level, to integrate the areas of occupational health and safety, employment, environmental care, product quality, and competitiveness in such a way that the changes in one area are judged upon their possible effects on the other areas;
  * a good co-ordination of all sectorial or sector affecting activities.
- Organize cross-national information exchange at a regular basis between social partners, other sectorial organizations, governmental bodies and health and safety experts, in order to:
  * report and perhaps join new initiatives in countries, for example by establishing an electronic Information Center, making use of facilities like Internet, or by publishing a European Meat Sector News Letter;
  * transfer available knowledge and experiences across the European Meat Sector, for example by organizing seminars and workshops, presenting good practices, experiments, policies and solutions which have proved to be successful in the various countries.

Policy options at national level
Policy options at national level concern actions, which could be taken mostly by governments, in

three prioritized areas: statistical data on the Meat Sector's health and safety output, national legislation and enforcement, and European legislation and enforcement. The kind of activities are described below.

Statistical data
Considering the deficits in the availability, the quality and the international harmonization of statistical data on the Meat Sector's health and safety output, governments should take initiatives to realize improvements, in co-operation with the Occupational Associations, the national institutes for statistics, and other organizations involved. It particularly regards data on occupational accidents, occupational diseases, morbidity, sickness absenteeism, disability, and mortality. Improvements could substantially contribute to a sectorial monitoring system, useful for policy making at national and Europan level. Improvement initiatives should best be linked to three now current activities at European level: the Foundation's project 'European Working Environment in Figures', and the projects by DG V and Eurostat on harmonizing the registration of occupational accidents (ESAW-project), and of occupational diseases (EODS-project).

National legislation and enforcement
In the field of national legislation and enforcement, governmental bodies could undertake the following activities with respect to the Meat Sector.
- Initiate the establishment of a national authorative body if felt necessary, for example to provide a strong incentive to the industry bodies to become more active, to draft health and safety regulations and recommendations, or to encourage health, safety and hygiene in the sector in other ways.
- Ensure a uniform and stronger enforcement within companies of national and European legislation in force, both with respect to specific risk factors, as well as health and safety policy, and sanitary conditions. Regarding these activities the following could be considered:
  * development of a sectorial inspection and enforcement programme, as has been done in the United Kingdom, Denmark and the Netherlands;
  * more frequent inspection visits to smaller firms to ensure compliance in this particular 'risk group';
  * finding a right balance between putting constraints to companies on one hand, and supporting them in complying with legislation on the other hand.
- Implementation of the EC-directives in the national legislation, in such a way that harmonization of standards within the Community is realized as much as possible, but on the other hand not lowering current national standards. For the Meat Sector, this particularly concerns the directives on noise (86/188/EEC), manual handling (90/269/EEC), biological agents (90/679/-EEC), work equipment and personal protective devices (89/655.656,686/EEC), the frame work directive (89/391/EEC), the directives on sanitary conditions in slaughter houses (64/433/EEC and 77/99/EEC), and the CEN-regulation on machine safeguarding.

European legislation and enforcement
National governments could undertake the following activities towards European legislation, however taking into account that not all issues can be met by such provisions, and that most of these actions not only affect the Meat Sector, but other sectors as well.
- Stimulate the realization of EC-directives on workers' participation, for example regarding European Works Councils, or collective bargaining at European level.
- Stimulate the development of more EC-hall-marks, such as the CEN-regulation on machine safeguarding.
- Watch over possible negative effects of EC-meat policies on working conditions.
- Encourage the establishment of an effective controling and enforcing European organization to ensure national compliance with EC-directives.

Annex 1 *Participating institutes and authors of national reports*

The national reports, or any other more indepth information on the Meat Processing Industry in each country, may be purchased from the following institutes and persons.

- Belgium (B):

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European Foundation for the Improvement of Living and Working Conditions

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WORKING CONDITIONS IN THE EUROPEAN MEAT PROCESSING INDUSTRY

Monitoring working conditions – that is to say offering a better picture of working conditions – has been recognized as a very important issue in Europe and in particular in the European Union in the recent years.

A better understanding of what is actually taking place in the work place, of the problems encountered, of the risks faced, of the populations facing these problems and these risks, of the changes taking place and their extent, is necessary for policy makers to set up priorities and action progammes, to identify gaps to legislation, and to measure progress made.

The European sectorial level is an increasingly relevant level for the prevention of occupational risks and the improvement of working conditions. Problems are often quite similar, although health prevention policies and priorities can be somewhat different from one country to the other. Action programmes and research are also carried out simultaneously in various countries and a lot is to be gained by knowing what is done and how things are done elsewhere. Synergies could be developed and possible duplications avoided.

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